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Graphic Score on Trial:

The Utility and Emergence of a Transdisciplinary Linguistic

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Integrated Composition, Improvisation, and Technology

by

Corey Marc Fogel

Dissertation Committee:
Professor Michael Dessen, Chair
Professor Amy Bauer
Professor Simon Leung

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Table of Contents

List of Figures

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Vita

Corey Marc Fogel

2001	B.Mus., Jazz Performance, Arizona State University
2002	MFA, Integrated Media, California Institute of the Arts
2017- 2022	Teaching Assistant/Associate, University of California, Irvine
2023	Ph.D. in Integrated Composition, Improvisation, and Technology, University of California, Irvine

ABSTRACT OF THE DISSERTATION

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This dissertation extends the investigation of the utility and function of abstract graphic music notation, through scholarly and creative practical research. Graphic notation is often situated in an ephemeral current of aleatoric music– a gig; a momentary and impulsive transaction between composer and performer, with a focus on spontaneous interpretation. Analysis of graphic notation generally comprises artists' statements, historicization, and intrigue for this novel and relatively obscure genre of composing. As graphic notation continues to emerge within myriad subcategories of creative music, as well as contemporary art contexts, pedagogical, and neurological research, it is important to survey its modern provisions, affordances, and socio-cultural outcomes.

In this project, I first examine existing research into graphic notation, and briefly trace its emergence in contemporary music since the mid-20th century, to demonstrate how it has and continues to address the creative and technical needs of composer-performers. I touch upon other scientific domains, specifically music education.

Examples of graphically notated works are then cited and analyzed for their musical performance and/or art exhibition. From a semiotic perspective, I measure the interpretation and meaning-making of abstracted notational symbols. As a visual language, I look closely at the space surrounding its ever-evolving vocabulary. I theorize about both qualitative and quantitative valuation of interstices in the syntax of graphic notation passages. From the dynamic positioning to the contrasts in color, texture, shape, and size between abstract characters, transformational relationships are equally important for interpretation by improvising musicians. Citing successful exhibitions in the art world, I investigate the appearance of graphic notation in galleries and museums by composers and conceptual artists alike, particularly the subsequent impact on music's ontological status and cultural reach among an expanding audience.

This scholarly framework sets the tone for the autoethnographic account of my practical research experiments during my doctoral tenure. The creative activity for this dissertation comprised multiple ways of using graphic notation in practice, ranging from semi-permanent art exhibitions, which doubled as performance environments, to a large-scale concert of ensemble scores which were spontaneously generated by manipulating commercial software and graphic design techniques as an improvisational and interactive form of composition and conducting.

Introduction

Graphic notation is alive and pervades many areas of music, as well as music education and music therapy. Since 1950, it has steadily gained momentum as a utility for composers, educators, and researchers. As a springboard for spontaneous composition amongst self-identified free improvisers, graphic notation unsettles an otherwise ephemeral, responsive artform and adds to it an element that contributes to its canonization and historicization, evidenced by conferences, articles, Pinterest pages, and art exhibits. It expands preconceived notions of music writing with its oft overlooked construction: its material status between sound and vision. As I will argue in this dissertation, because of its abstract and interpretative nature, graphic notation in score-form should be analyzed not strictly in terms of its structural elements, but through a consideration of the interstices between them, for herein lies the strongest theoretical information about what graphic and other types of open scores provide a performer, and how their interpretation shapes the ontology of the evolving musical canon.

This dissertation project investigates the utility of abstract, graphic, music notation composed for and performed by musicians of numerous backgrounds. I aim to fill in what I perceive to be gaps in the reception of graphically notated music, at times creating diametrically opposed perspectives in order to locate and define the value of existing and commonly accepted perspectives. Graphic notation is most commonly thought of as a tool for composers of contemporary music seeking to elicit creative responses from performers of their music that reach beyond the functional limitations of standardized notation systems. My interest in innovative notation lies specifically in the impact that it makes on

the process of musical improvisation. As graphic notation continues to appear in the applied practices of both composition and improvisation, new possibilities are emerging for the two practices to mutually affect one another; to complicate or lessen distinctions between them as creative activities. Through this interaction, assumptions on both sides are unsettled, resulting in a further blurring of lines and greater entanglement with rippling musical, cultural, philosophical, and industrial effects, building toward an important paradigm shift on the horizon.

In my first chapter, I present an overview of existing scholarship on graphic notation. This includes relevant scholarly writing on and by musical artists, the function of score-reading and innovations regarding alternative notation in contemporary music.[1] I draw upon artist statements by composers whose musical trajectories led them to advanced notational tools, and their reflections on various pieces and performances. Additionally, I cite the emergence of graphic notation as a pedagogical tool, outside of the context of a contemporary music scene.

In my second chapter, I describe several innovative graphic notation strategies within what I consider to be a spectrum of abstraction that includes activities which expand traditional notations, cannibalizing them into abstract materials, and working with completely abstract notations. I analyze examples of each approach, along with multiple

[1]The majority of these writings map a demographic of white-identifying American and European composers. It is beyond the scope of this dissertation to account historiographcally for the entire landscape of Black experimentalists' influence on these newly emerging ideas about open forms. As George Lewis says in his 1996 article Improvised Music After 1950: Afrological and Eurological Perspectives: "The theoretical and practical positions taken with regard to improvisation in this post-1950 Euro-American tradition exhibit broad areas of both confluence and contrast with those emerging from musical art worlds strongly influenced by African-American improvisative musics." For more, see Lewis, George E. "Improvised Music after 1950: Afrological and Eurological Perspectives." *Black Music Research Journal*, vol. 16, no. 1, 1996, pp. 91–122. JSTOR, https://doi.org/10.2307/779379.

performances of the same graphic score compositions, in order to theorize about the essence, function, and affordances of abstract notation, including the implications for listeners of accessing radically different variations on the same score, and a theoretical framework which emphasizes relational or transformational space within abstract graphic notation environments or scores.[2]

In Chapter III, I examine the growing significance and dissemination of graphic music notation in the field of contemporary art, and its resulting impact on sociocultural discourse in art and educational institutions, art publications, and contemporary art spaces. I explore the means by which graphic music notation is able to make a sonic intervention into a visual art space, particularly when aided by a performance. I theorize about the potential of this emerging practice for expanding audiences' understanding of music composition, and speculate about the potential future implications of this shift for composers and musicians.

Lastly, in Chapter IV, I detail the creative work composed and performed for this dissertation. I analyze the performances and the performers' responses to compositional and visual prompts, and evaluate the successes and failures of these musical works. I discuss the impact on my own creative practice moving forward, and the overall clarity of the applicable concepts that I set out to test in this research.

Throughout this dissertation, I distinguish graphic *notation* from more holistic, graphic *scores* that may include images, texts, and technologies that define them as a work:

[2] "What is meant by an affordance? …the affordance of anything is a specific combination of the properties of its substance and its surfaces taken with reference to an animal … the affordance may be more easily perceived by an animal than the properties in isolation, for the invariant combination of properties 'meaningful' whereas any single property is not." James J Gibson, "The theory of affordances." *Hilldale, USA* 1, no. 2 (1977): 67-82.

Scores contain notation, or more generally, instructions, of which music notation is but one variety. Scores are finished forms through which we engage notation as a tool. A score is an environment delimited by its purpose--to facilitate a recording, a performance, a catalog, or a volume.[3] In the broadest sense, the word "score" can also include other types of transmissions that do not include notation as the primary technology used by composers and read by trained musicians.[4] If I compare a score to a movie, then notation is the *mise-en-scène*, or the arrangement of elements within it. This dissertation is about opening up the box and seeing what's inside. Notation is the armature of a score.[5] Without notation; without instructions to be executed, performed, interpreted, there is no score. In this dissertation, "graphic notation" will refer to vocabularic systems defined by functional properties and by style, as determined by their composers. At several points in this paper, broader discussions, theories, and analyses will be made about abstract notation systems at large.

The particularities of analyzing graphic notation compared with graphic scores are multilayered. This distinction, between an evolving language and a fully prepared composition, notation and score, is clearer when analyzing Western music, whose language

[3] A score is commonly defined as, "The entirety of the instrumental and vocal parts of a composition in written form, placed together on a page in staves placed one below the other." See *OnMusic Dictionary*. Published June 10, 2016. https://dictionary.onmusic.org/terms/3036-score.

[4] Artist and writer Pablo Helguera says: "In the visual arts the term score is borrowed from music to refer to a predetermined series of physical, verbal, or musical actions conceived by an artist and meant to be reinterpreted. The relationship between musical composition and the visual arts has been strong since the beginning of the avant-garde, and many visual artists based their aesthetic ideas on musical concepts." *In Terms of Performance*, a website published by the Arts Research Center at University of California, Berkeley, and The Pew Center for Arts & Heritage, Philadelphia, 2016, http://intermsofperformance.site/keywords/score/pablo-helguera.

[5] Mise-en-scène is defined as, "a French term for "staging," or "putting into the scene or shot"; in film theory, it refers to the sum total of all the factors or elements placed (by the director) before the camera and within the frame of the film, in order to affect the artistic look and feel of the shot -- including their visual arrangement and composition." See *Filmsite Film Terms Glossary.* Published June, 1996. https://www.filmsite.org/filmterms13.html

system is a codified and fully integrated standard. To analyze a graphic score, on the other hand, entails interpreting one composer's novel or particular notation system from the ground up. To analyze a Western music score means to analyze notation that has been utilized (and sometimes embellished) by thousands of composers over centuries. Innovation and expansion of the classical Western music notation toolbox has its limits, and the interest of my research is to speculate on an expansion that could one day integrate fully abstracted visual elements and related performance techniques.

A steadfast tradition of Western music notation currently dominates standard practices for reading and performing music. Historically evolving from neumatic musical systems, it has become a codified, universally legible language for doing the thing we call "music" in the Western world. For this reason, forays into alternative notation forms that include graphics, text, and technology are frayed and chaotic, and everyone seems to have their own individual story to tell about their relationship to them. Musical artists who seek functional alternatives to conventional notation often come to graphic notation as a kind of "post-notational" tool to communicate concepts beyond the limitations of the five-line music staff and its auxiliary ornaments. In this way, nearly all composers of graphic notation have arrived at their systems in response to a necessity within their own practice, and therefore, on a uniquely personal timeline of artistic development. The fact that graphic notation emerges at a different pace from each of its purveyors contributes to a feeling of scattered innovation and subsequent scholarly research. If we visualize an object exploding into many different sized shards, each one touching ground at a different distance and in a different direction from the explosion, we may have a suitable illustration of the many artistic departures that individual composers have taken from codified

Western notation, a kind of "staggered abstraction," in terms of each artists timeline of expansion and development of their individual systems.

Graphic notation in the larger cultural landscape still requires some padding or scaffolding as an emerging practice– introductions, demystifications, perhaps even oblique apologies for straying from tradition. When learning about graphic notation for the first time, responses may range from fascination to bewilderment. This is to say that graphic notation is still slowly earning people's trust, and is somewhat stuck in a state of being perpetually new. Analogies that come to mind include "...have you tried Matcha?" "...but have you tried cashew milk?" "...how about a vegetable oil engine?" What would it look like for graphic notation to earn its place as a viable tool across genre and context, and become a more household term? Does graphic notation require a defense, a testimony, and a jury to determine its worth? motive? An alibi? Do we need to put graphic score on trial?

Chapter I: Overview of Graphic Notation Scholarship

From music to education to neuroscience, much testimony has been given to the strengths of graphic notation to mediate, facilitate, translate, and evoke connectivity between sound and vision.[6] Existing scholarship on graphic notation can be loosely organized around a few important and still emerging research areas, yet it resists categorization. As I understand them, the major categories of research are: autoethnographic writing, source studies on composers and artists, musicological writing, and empirical studies outside of music. While I move to define and describe these categories as clearly as possible, there is noticeable overlap between them, with regard to the purpose and the content of certain works.

I will first set the stage for the analysis and classification of existing tendencies I see in graphic notation and its scholarship. The reason for certain overlap between areas of research can be found at the core of this interdisciplinary practice. Due to the overarching novelty of this unusual artform, combined with the individuality of each composer, scholarship is either broadly zoomed out, or extremely zoomed in. In other words, composing and performing with graphic notation is still an up-and-coming practice which follows no steadfast rules that have resulted in more specific studies, something I will seek to do throughout this paper. The field is frayed, most notably and naturally by composers'

[6] Most of the research on graphic notation as a tool or a technology outside of the framework of a particular score exists in the realm of music therapy and education. The majority of scholarship comprises composer-artist statements regarding finished works. See John Cage and Alison Knowles, *Notations* (New York: Something Else Press, 1969) and its follow-up/tribute by Theresa Sauer, *Notations 21* (New York: Mark Batty, 2009).

highly idiosyncratic methods, but additionally by the artists, educators, and curators who are leading this research in many viable directions.

Innovation is a fundamental driver of the shift toward alternative music notation, consequently, original endeavors for expanding this paradigm tend to be widely varied between creative voices. However, within these individual moves toward innovation and change are inevitable aesthetic and functional similarities. A conundrum of graphic notation and resulting scholarship is that it represents a sizable creative exodus from the constraints of traditional Western notation, but not an exodus en masse; rather, it presents as a scattered map of individual composers' attempts to get more out of the language that comprises their scores. While some languages have evolved in tandem, in communities of composers and/or performers, others were surely created independently. Certain composers' notation systems do share aesthetic and functional properties; for example, horizontal lines for duration, verticality for pitch or for register, would naturally occur to many whose practice was rooted in Western music and wished to pivot away from a practical encumbrance. The unavoidable commonalities between composers' novel notation could (and should) impact the taxonomic development of graphic notation scholarship, with regard to visual technique and functionality. With these intersections of notation style, could the use of graphics ever become a codified practice, and could the commonalities and cliches between composers ever be critically accounted for?[7]

[7] This brings to mind the news article from 2019 in which a "young hipster" saw an article about cliched individuality, thought that it featured his image, wrote a letter of complaint to the publishing media outlet only to later find out that it was not him in their photograph, thus supporting the publisher's claim about cliched image. See the article by Josh Hafner, "All hipsters look alike? Man claims article's 'hipster' photo is him, only to be mistaken," *USA TODAY*, March 11, 2019. https://eu.usatoday.com/story/news/2019/03/11/hipster-effect-man-mistakes-photo-himself-article-mit-review/3129327002/.

Most scholarship tends to align regarding graphic notation's potential to bridge gaps between sound and image, and to advance a growing tool for composer-performers. We also see important innovations in technology for performer-composers that make significant use of graphic notation as an input and output. Conferences dedicated to alternative trends in music notation are more common. By 2022, an extensive literature has emerged surrounding graphic scores, but even so, most sources fall along the lines noted above, with much room in future scholarship for theorizing their nature and function. In the rest of this chapter, I will detail examples of these different types of scholarship on graphic scores, including writings by composers themselves as well as scholarly works that theorize their relationship to broader or ontological questions about music practice.

Source Studies

Scholarship concerning graphic notation in the context of creative music often takes the form of descriptive analysis of various methods or specific graphic score composers' work.[8] My definition of this category is taken from the Ithaca College LIbrary Research Guide.[9] This field of knowledge is largely underpinned by typical transactions between

[8] In 1965, the nonprofit Association For The Advancement of Creative Musicians (AACM) was founded by a group of Chicago-based, Black American musicians in order to make a dedicated space for forward–thinking artistic and professional activity, outside of the mainstream channels of jazz and popular music of the time. Between the AACM and other similar collectives such as the Black Artists Group (BAG) in St. Louis, the term "creative music" took hold to distinguish these burgeoning artforms. For more information, see George Lewis, *A Power Stronger Than Itself: The AACM and American Experimental Music* (Chicago: University of Chicago Press, 2008).
Earle Brown,"On December 1952," *American Music* 26, no. 1 (Spring 2008): 1–12.

[9] A primary source provides direct or firsthand evidence about an event, object, person, or work of art. Primary sources include historical and legal documents, eyewitness accounts, results of experiments, statistical data, pieces of creative writing, audio and video recordings, speeches, and art objects.

composer and performer, along with subtleties which may play out in a concert or a recording.

There is no clearer precedent for the chaotic framework of graphic notation than John Cage and Alison Knowles' *Notations,* compiled and published in 1969. I will evaluate this book as a timely survey of graphic notation following its first wave of emergence. Often thought of as an original, essential resource for its elaborate presentation of contemporary graphic scores, this collection actually spans the multimodal landscape of new-music scores of its time, to include an equal number of traditionally notated works. Numerous facets elevate *Notations* from a simple edition of musical manuscripts to a multilayered object with a hierarchy of dimensions and purposes. While it is indeed a "book of scores," it is also a book of artworks that, combined, form one meta art piece. For Cage's grand vision, each score has been instrumentalized within a larger domain wherein it is assembled by Alison Knowles on the page, alongside poetic commentary, which is also subject to and cannibalized within a schema of typographical treatment, which is intended to blur the line between glyphs and visual art. As Cage states in the preface:

> Not only the number of words and the author, but the typography too–letter size, intensity, and typeface– were all determined by chance operations. This process was followed in order to lessen the difference between text and illustrations.[10]

What is also lessened is the difference between graphic and traditional scores.

> The collection was determined by circumstances rather than any process of selection. Thus it shows the many directions in which music notation is now going.

Interviews, surveys, fieldwork, and Internet communications via email, blogs, listservs, and newsgroups are also primary sources.
Secondary sources describe, discuss, interpret, comment upon, analyze, evaluate, summarize, and process primary sources. Secondary source materials can be articles in newspapers or popular magazines, book or movie reviews, or articles found in scholarly journals that discuss or evaluate someone else's original research. https://library.ithaca.edu/r101/primary.php

[10] John Cage and Alison Knowles, *Notations* (New York: Something Else Press, 1969). pp. 1

> The manuscripts are not ar-ranged according to kinds of music, but alphabetically according to the composer's name. No explanatory informa-tion is given.[11]

This array of selected music demonstrates that all music notation is in fact graphic, and what become the most salient properties of these scores in Cage's project are penmanship, contour, and density, regardless of the compositional method employed. This is explained clearly when Cage writes:

> A precedent for the absence of information which characterizes this book is the contemporary aquarium (no longer a dark hallway with each species in its own illuminated tank separated from the others and named in Latin): a large glass house with all the fish in it swimming as in an ocean. p. 1

In other words, *Notations'* aquarium is the opposite of a taxonomy, and emphasizes an amalgamated starting point or a root to which current scholarly and practical research can both be traced. For within *Notations* is improvisation, chamber music, Fluxus artmaking, poetry, and more.

As this creative scoring practice grew, so too did subcategories of purpose, and methods of investigation, with increasing pertinence, permeating and defining the landscape of visual music. Its largely ephemeral end-product, inextricably sonic and visual, is not exactly appropriate for a concert review, nor does it qualify for art reviews until explicitly curated as an art exhibition. This is to say that what is actually happening between composer-performer, between composition-performance, has not been completely pinpointed or codified as a practice, and thus, not researched as a phenomenon. Rather, it still conforms to a common transaction of a piece of music being performed. What is known are the myriad methodologies of composers, the practical applications of

[11] Cage and Knowles. pp. 1

performers realizing a piece, and the sounds that happened. However, there is more to this interdisciplinary practice that remains to be investigated and written about. Emerging investigations facilitated by graphic notation in both art, tech, and music, could be compiled into a modern-day manual of possibility, similar to *Notation in New Music: A Critical Guide To Interpretation and Realisation*, by Erhard Karkoschka.[12] *Notation in New Music* was released in 1964 and was, for its time, essential to a growing genre of 20th century new music and experimentalism. This exhaustive volume helped to legitimize underrecognized contemporary practices in a respectably published edition, citing notable composers and their experiments. Karkoschka breaks down, extracts, and catalogs the notation styles of many renowned composers, totaling nearly one thousand then-new symbols for composition. As evidenced by *Notations 21* by Theresa Sauer, hundreds of new music composers have since utilized, recombined, and expanded much of this notation vocabulary.[13]

The impact of these two books by Karkoschka and Cage and Knowles continues to be felt, as graphic notation is disseminated and discussed ever more widely.
One example of this type of scholarship is the history, inspiration, and rules of notational innovation by composer Anestis Logothetis, as explained in “Towards A Decodification Of The Graphical Scores Of Anestis Logothetis (1921-1994). In "The graphical space of Odysee (1963),” Baveli Maria-Dimitra and Georgaki Anastasia write:

> Logothetis’s urge to start a new, different musical notation derived from the problems music was facing during his time. According to his words: In this way, the compass of modes of musical expression is significantly expanding. However, the notation with which one wants to describe the sonic events is not adequate for this purpose. Several problems arise out of this: not only noise-like sounds can only be

[12] Erhard Karkoschka, *Notation in New Music: A Critical Guide to Interpretation and Realisation* (New York: Praeger, 1972).
[13] Theresa Sauer, *Notations 21* (New York: Mark Batty, 2009).

> represented with great effort or in some cases not at all, but the desire for a flowing music whose genesis can be experienced again and again is impossible to realize in this way.[14]

In the book *The Graph Music of Morton Feldman,* David Cline takes an intimate look at all of the aspects that shaped Morton Feldman's notation, including the philosophical, mechanical, theoretical, and historical. Readers get a full spectrum view of Feldman's inspiration, creative needs, and evolving style of alternative box-grid-numeral notation systems. Contemporaries John Cage and David Tudor are cited throughout, in interviews, publications, concert events, and miscellaneous correspondences. Morton Feldman discusses the serendipitous origins of his graphic notation, when he says:

> I was living in the same building as John Cage…It was while waiting for the wild rice that I just sat down at his desk and picked up a piece of notepaper and started to doodle. And what I doodled was a freely drawn page of graph paper – and what emerged were high, middle, and low categories. It was just automatic …[15]

This tale of Feldman's inspired drawing moment becomes a crucial detail for how graphic notation develops along the trajectory of his career, and, at least initially, in counterpoint to Cage's. Cline goes on to analyze Feldman's graph-based pieces in detail for pitch, registration, instrumentation, and resulting tendencies by performers. His graph-based pieces are analyzed in detail for pitch, registration, instrumentation, and resulting tendencies in those categories by performers.

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[14]Baveli Maria-Dimitra and Georgaki Anastasia, "Towards a decodification of the graphical scores of Anestis Logothetis (1921-1994). The graphical space of Odysee (1963)," Paper presented at 5th Sound and Music Computing Conference, 2008, https://www.academia.edu/40308390/Towards_a_decodification_of_the_graphical_scores_of_Anestis_Logothetis_1921-1994_._The_graphical_space_of_Odysee_1963_.

[15] David Cline, *The Graph Music of Morton Feldman* (Cambridge: Cambridge University Press, 2016). pp. 9; ("An interview with Morton Feldman, Jan Williams, 22 April 1983" [1983], in Chris Villars (ed.), Morton Feldman Says: Selected Interviews and Lectures 1964–1987 (London: Hyphen Press, 2006), pp. 153

> [David]Tudor connected his liberation from notation with three works composed in the late 1950s. However, aspects of his approach to Feldman's graph music suggest that he began looking beyond notation at an earlier date. This would explain why he applied the mode of thought he had developed in connection with Boulez's *Deuxième Sonate* and Cage's *Music of Changes* when selecting pitches in *Intersections 2-3*. We know that in the early 1950s Feldman was aiming at 'no-continuity', and the suggestion made here is that Tudor saw Feldman's use of a rigid division between registers as implying a connection between sounds that was not only inconsistent with Feldman's own aesthetics but also dispensable; ….[16]

David Cline's *The Graph Music of Morton Feldman* describes Feldman's immeasurable impact on twentieth-century avant-garde music with great specificity, making it an invaluable resource for understanding the unfolding of graphic notation as a cultural offering during this period.

In her 2017 article *Electronic Scores for Music: The Possibilities of Animated Notation* Australian composer and sound artist Cat Hope presents a compelling argument for animated notation as "the most exciting new direction for music notation since the conception of the real-time score."[17] I find a great amount of resonance with Hope's effort to underscore the potential of future work that is born out of an innovative notation environment. The article seamlessly collects the motivations of composers who have played pivotal roles in the development of alternative notation, and discusses how her work looks forward in a similar spirit. The article gives us a transparent perspective on the technical details of her computer program, with practical examples taken from performance, as well as descriptive musical potentialities not yet realized.

[16] David Cline. pp. 290

[17] Cat Hope, "Electronic Scores for Music: The Possibilities of Animated Notation," *Computer Music Journal* 41, no 3 (2017): 21–35, https://doi.org/10.1162/comj_a_00427.

At a recent concert of string quartets by Wadada Leo Smith, a unique format was presented in an unusual context. An exhaustive number of Smith's string quartets were played over two nights in a contemporary art gallery in Hollywood. I went to pay my respects to Smith, who rarely visits California. In my observation, contemporary music in an art gallery setting attracts loyal and/or newly intrigued audiences from that gallery's community, in addition to musicians, particularly as this was co-hosted by the contemporary music series Monday Evening Concerts. The primary curator of this gallery, Hamza Walker, is well-known for his interest in and programming of avant-garde and improvised music. The night began with a discussion about Smith's career and anecdotal origin stories that led him to his current practice. All of the compositions on the program displayed Smith's signature indeterminacy in various ways, both traditionally and graphically notated.

His Ahkrasmation language and its many facets, including the fundamental "rhythm unit" were touched upon, but obscured by poor amplification, facemasks, mumbling. Most importantly, no background into Smith's compositional method was provided by the curator to contextualize the discussion. For all of his enthusiasm and anecdotes he prompted from Smith, (heard in multiple talks) he did not provide nor decode Smith's creative lexicon. Graphic notation was used in a majority of these pieces, but the audience did not get to learn of this modality. In a such a forgiving and curious cultural context, the art gallery, it was a missed opportunity to absorb and live with these compositions according to the multimodal style deployed. For more experienced listeners, we did not get to learn that graphic notation was used for this classic format of the string quartet. The music was lush and sonorous and could easily deceive most listeners into assuming that it

was notated traditionally. Many pages had pitch specifications on a sideline staff, but many pages were graphic, and one general mood characterized the entire body of work.

The beauty, one could say, is that all of this is irrelevant to enjoying the performance, and this music, whether direct or deceptive or didactic, transcended any particular notational approach. We heard what we heard, which was the collaboration between the composer and the performers, facilitated by his original compositional strategy, developed over forty years.

Autoethnographies

Like many topics in the musical canon, a majority of existing work on graphic notation starts as artistic, practice-based research, which is then written about and published as scholarship. Historically, many composers of graphic notation have written autoethnographies about their individual scores, or about the system they've devised, as a way to tell the story of their innovation, some poetically, others didactically. These writings may also include a specific concert for which a new notational approach was taken, or an instructive look at how to play a graphic score in a future concert.

In one example, in 1970, at the request of Capital University's Conservatory of Music, composer Earle Brown orally dictated his motivations for developing graphic notation, which were then transcribed and published in the journal *American Music* in 2008.[18] Brown gives a thorough explanation of his interest in alternative forms of notation, as well as aspects of performance that he felt were not accounted for in a traditional score.

> I had very much the impulse to do something in "our kind of music" which would have to do with this highly spontaneous performing attitude–improvisational attitude, that is–from a score which would have many possibilities of interpretation.

[18] Brown, Earle. "On December 1952," *American Music* 26, no. 1 (2008): 1–12.

> Under the influence of Calder, I considered this kind of thing to be a mobility, which is to say a score that was mobile–a score that had more than one potential of form and performance realization.[19]

This text is highly influential as a testimony to the type of experimental thinking that was stirred up between art and music movements seventy years ago. Brown's generous, detailed manuscript highlights intersections between various performance modalities, and between concepts of form and function. It illustrates the growth of a musical artist who saw the potential for a score to account for more than just pitch and rhythm. He arrived at his system through a triangulation of interests: mechanical devices augmenting acoustic instrumental performance, improvisation and indeterminacy, and pushing the limits of his own methods of composing and conducting. Through his essay *On December 1952*, we are able to learn about a formally trained composer branching out and altering the perspective, the functionality, performability, and purpose of music notation, to satisfy his artistic needs by using graphic notation.

> I was trying to compose or get the outlines and character of a string quartet piece in hardly more time than it would take to perform it or maybe even less time than it would take to perform it. But this was an attempt at correlating my own conception with an extremely rapid way of "composing," which was, I have said, almost like improvising myself, in other words, realizing a graphic drawing in my own way.[20]

To read and to learn about *December 1952* and his collection *Folio and Four Systems* from this essay can be highly instructive for composers and performers, in that Brown's new notation is in dialogue with traditional notation, with art, and with performance. It demonstrates a score's potential as a blueprint, as a translating device between inanimate

[19] Brown, pp. 3.
[20] Brown, pp. 5

and human elements, between a potential and actualized performance. The essay is an authentically raw, if somewhat incidental, artist statement marking a transition to a system that best suited his interests as an artist at the time this was written. Further detail is given about specific performances of the *1952* series, providing a comparative analysis of performers' approaches and of Brown's own flexibility, originally envisioned and expanded upon by subsequent realizations.

Anecdotally, listening to Earle Brown's recorded monologue, I sense that his explication has a certain modesty or benevolent tone, in response to the prompts by the Capitol Conservatory dean Marceau Myers. I think it is relevant to consider the value given to Brown's aleatoric and graphic compositional methods by Myers's request for this monologue. Furthermore, I theorize that there is a notable connection between this valuing of a unique musical artistry such as Brown's and Myer's leadership as Dean of University of North Texas' school of music from 1974-1987, as he created its highly reputable jazz program. Brown's indeterminate scores offer rich opportunity to improvisers, many of whom get their start in a conservatory or conservatory-style jazz institution. A prominent figure within an academic music institution known for incorporating jazz traditions with commercial music trends sought to document and tell the story of an American composer of fringe music using experimental methods that lead to ground-breaking graphic notation, which would influence many generations of avant-garde composer-performers, as well as scholars. This is significant because it paints a picture of cultural value held within the growing academic music sphere of the time, and how concurrently burgeoning experimental music practices were making an impact on higher education, perhaps in a less sequestered way than commonly thought.

Brown's self-reflections set a precedent for autoethnographic writing that has continued to be a prominent thread in the available literature on and dialogues around graphic scores to this day. A more recent example can be seen in the work of composer Lars Brondum. In his 2018 article "Graphic Notation, Indeterminacy and Improvisation: Implementing Choice Within a Compositional Framework," Bröndum says: "The developments of alternative notation and concept-based music of the 20th century has given the composer in the postmodern era many additional tools to develop further and to use to shape a personal aesthetic style or approach."[21] Bröndum's research unpacks and exemplifies all the essentials components of a graphic score, primarily through analysis and discussion of his own methodology and techniques, situated within current contemporary music practices and further defined by his musical journey over several decades. To contextualize his creative approach, he historicizes many years of graphic scoring and experimental improvisation as well.[22] Bröndum concludes with brief interviews about performers' experiences reading certain notation, which shed valuable light on graphic notation as a utility for facilitating an improvisation. Bröndum's article places most emphasis his construction of notation.[23] While limited in scope, these interviews are instructive, as I found the most value in reading about the reactions of participating performers to his scores. This is a valuable resource for composers and performers alike. His participants are trained performers who do not seem to see their engagement with

[21]Bröndum, Lars. "Graphic Notation, Indeterminacy and Improvisation: Implementing Choice Within a Compositional Framework," *Open Cultural Studies Journal* 2 (2018): 639-653.
[22]For example, Bröndum situates this work in "a brief background context around terms and ideas about improvisation and indeterminate music, pioneered by composers such as Cecil Taylor, Derek Bailey, John Cage, Karl-Heinz Stockhausen and Pauline Oliveros." Bröndum, p. 639.
[23]"It is a piece where I extensively use graphic notation. The symbols, such as triangles, vertical bars, switches for alternative routes, boxes with pitch sets to improvise." Bröndum, pp. 643

these works through the lens of improvisation. They largely believe that the activity in Brondum's pieces is something other than improvisation, which, in its true form, is neutered by his use of graphic notation and other instructional schema. This points to an alignment with the philosophies of Wadada Leo Smith and his rigorous investigation of alternative notation as a compositional tool for generative musical ideas, outside of the framework of "improvising". Smith's conceptual-made-literal approach to his system of notation resonates with my interest in ethnographic research with performers who can enter into a series of performance experiments that explore semiotic and visuocognitive approaches to graphic score interpretation.[24]

The work of trumpeter-composer Wadada Leo Smith spans nearly five decades. For forty years, Smith has been making his original "art-scores" using his original Ankhrasmation language, which have been exhibited in multiple art galleries and museums in the last decade. On his website, a few scores are shared, with idiosyncratic detail of what is required of the performer.[25] Embedded in the span and the evolution of Wadada Leo Smith's output is an evolution of graphic notation. HIs Ankhrasmation language is abstract, lush, intricate, and evocative. Recent accolades for his work from both jazz and art contexts means greater visibility for graphic notation, via one of its most important living composers.

[24] In his artist statement, Wadada Leo Smith, a well-known improviser, states: "Over the last several years, I've come to great conflict in accepting the word 'improvisation' and its common use in practice as being able to define what I and some of my colleagues are doing today. Since 'improvisation' has been adopted in the academic fields of inquiry, 'improvisation' as an idea has come to mean almost anything conceptually. The word and the understanding of 'improvisation' has lost its uniqueness." Wadada Leo Smith, "Philosophy and Language of Music," artist's website. Accessed August 2022. https://www.wadadaleosmith.com/philosophy-and-language-of-music/.

[25] Smith,Wadada Leo, "Philosophy and Language of Music," https://www.wadadaleosmith.com/philosophy-and-language-of-music/

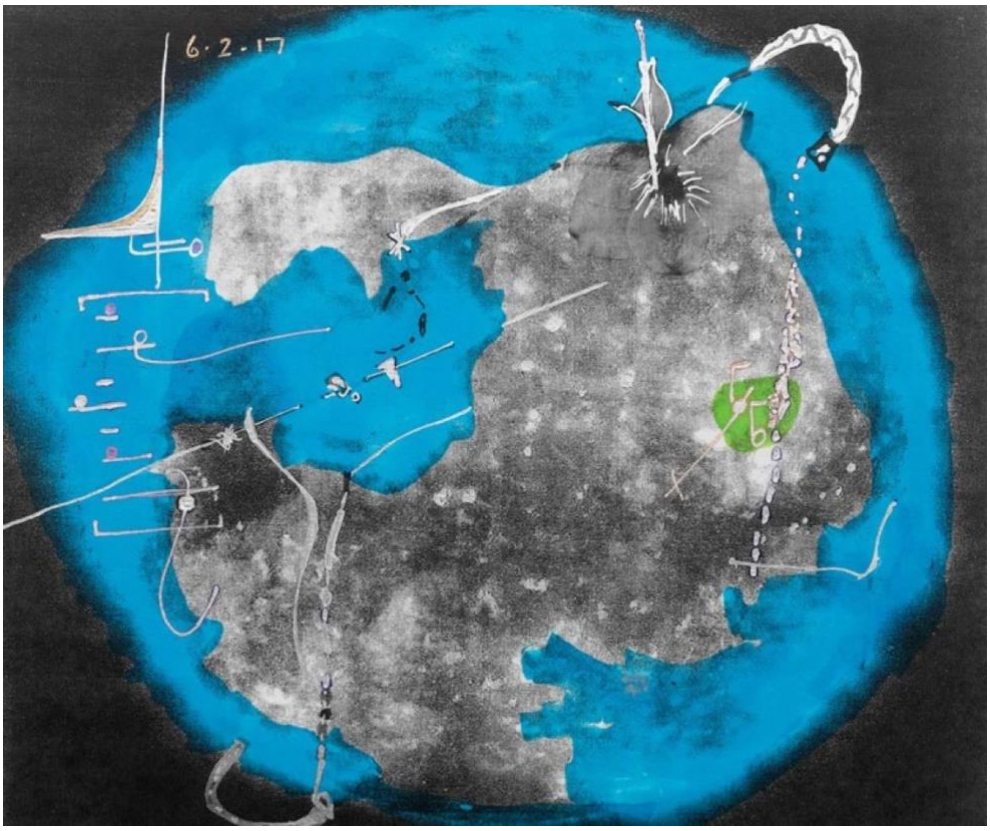


Figure 1. Wadada Leo Smith's *Symphony No. 4*

In 1973, Smith published an overview of improvisational music entitled *Notes (8 pieces).* He takes on the entire sphere of creative music making and puts it into short analytic capsules (essays), with topics of interest ranging from artistic impulse, sonic construction, industrialization and socio-cultural significance. These short, compartmentalized essays come together to form an anatomical mapping of creative, improvised music. When threaded together from the various passages, one can synthesize Leo Smith's image of creative music. He traces the cultural and indigenous origins of the seeds of Black music that grew into the stylistic forms that were most prominent in 1973. He discusses formal and technical aspects of genres that grew into and out of contemporary improvisation, including ensemble configurations, instrumentation, and orchestration. He touches upon the commercial economy of creative music. Everything

significant about creative music for Leo Smith is unpacked and explicated with great detail. Many of the issues he writes about are still present today, making *Notes (8 Pieces)* a sort of constitution for composer-performer-improvisers. A combination of inspiration, urgency, and criticism can be felt throughout. I believe this book demands a sort of accountability from readers who self-identify as creative musicians. Smith is encouraging new modes of production and fabrication in order to move creative music forward. *Notes* is driven by the underrepresentation of improvised music, and of Black music, calling for a correction to many blind spots on these subjects.

Nearly fifty years later, a common theme from lectures and interviews, one at the very top of his latest artist statement, is that Smith has "come to great conflict in accepting the word improvisation and its common use in practice as being able to define what I and some of my colleagues are doing today."[26] He has, for now, settled on the more neutral term "Create" to define the process of making art in the present moment. This conception concerns the making of art across genre and medium, something core to my own creative process. While *Notes* is an exhaustive dissection of the improviser and their role in society, musical commerce, history, and within ensemble configurations, his most recent artist statement simplifies and clarifies his outlook on art-making. Certain themes in the current artist statement are consistent with *Notes*, such as these two quotes:

> ...every improviser should be able to copyright and protect the material that they contribute to the total improvisation, and they should share too in the profit of its sale by being assured of contractual royalties.
>
> Creation should be copyrighted as a musical work owned by the composer-performer, soloist, and the collective soloists.

[26] Wadada Leo Smith, "Philosophy and Language of Music," artist's website. Accessed August 2022. https://www.wadadaleosmith.com/philosophy-and-language-of-music/.

while other passages are a bit circular and confusing, contrasting with the use of terminology in *Notes*:

> Creation serves as the opposite of composition, and therefore it refers to a work of art in the same respect as composition. It is not unlike composition in this sense, it has signs and symbols which could also be found in composition. Also, unlike composition the performers use those signs and symbols to generate a work of art… [27]

The significant points of reference for this dissertation are the following: tracing Smith's evolving philosophies of improvisation/Creation, alongside his expansive output, particularly his graphic compositions.

Musicological Writing

Musicological writings often describe the concept of graphic notation, and the broader trend of using visual symbols to compose and perform music, generally in order to introduce readers to this language for the first time. Musicological writings on notation in general, on score-reading, improvisation, synesthesia, and perception have also been compiled from conferences and symposia that addressed graphic notation as a cutting-edge practice within these broader categories, and therefore comprise a third category of scholarship.[28]

While not exclusively concerned with abstract notation, Juraj Kojs' article "Notating Action-Based Music" helps to complicate the domain of graphic notation with research that

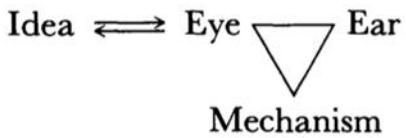
[27] Wadada Leo Smith, *Notes (8 pieces) Source a New World Music: Creative Music* (U.S.: Leo Smith, 1973).
[28] Examples include *Seeing Sound, Hearing Images*, edited by Nicholas Cook and Bianca Ţiplea-Temeş (Cluj-Napoca, Romania: MediaMusica, 2017), from the symposium *Seeing Sound, Hearing Images* at the Cluj-Napoca Music Academy in Romania, 2015; Virginia Anderson, *Sound & Score: Essays on Sound, Score and Notation* (Leuven: Leuven University Press, 2013), from a conference of the same name in 2011.

begins from the perspective of the performer, their instrument, and the techniques deployed, or what he calls "enacted cognition."[29] He illustrates the need for non-traditional notation to instruct performers to use their bodies and their motor skills in various ways. In particular, he focuses on tablature as an integral structure for notation since its inception, and its importance to the physicality of music making. His article answers the question: how have contemporary music composers accounted for imprecise, gesturally-based content in their scores? They have done so using innovative notation systems whose variably chance-based operations result in a new type of precision for executing intentional actions on an instrument.

A broad fluency in improvisation is required to interpret many of the commands specified in the example scores in Kojs' article. This is an excellent example of scholarly research that gets more specific about a symbiotic relationship between composition and performer. Kojs is essentially arguing that instrumental techniques inform the ways that notation has developed, and will do so, as techniques continue to evolve. Extended techniques in particular, as they organize much of contemporary improvisers' experimental desires through sound explorations, could strongly benefit from a more clearly and intentionally documented correlation to abstract or "extended" shapes. If tablature and pictographcs alike refer to codified actions and known instruments (such as is depicted in Karkoschka's book), then abstraction of visual symbols could be more purposely investigated, as they relate to the body and an open-ended, exploratory approach to playing both traditional and experimental instruments, naturally yielding indeterminate musical results in a composition or improvisation.

[29] Juraj Kojs, "Notating Action-Based Music," *Leonardo Music Journal* 21 (2011): 65–72.

A composer whose work I will analyze in Chapter II, Roman Haubenstock-Ramati, coined the idea of "music graphics." In just over five pages, his 1965 article "Notation-Material and Form," remarkably manages to engage, with urgency, the theoretical, musicological, interdisciplinary, and practical implications of the advent of graphic notation. As an example of the kind of publication that is simultaneously an autoethnographic account from a composer and a form of musicological writing, "Haubenstock-Ramati, like Earle Brown, provides a clear view into his motivation for notational innovations, in addition to his broader theories for seemingly any notational innovation.[30] Haubenstock-Ramati discusses conceptual differences between improvisation and composition, and how nuanced musics on a spectrum between the two warrant new developments in music notation. This dense look into the rise of early 1960s notation is a challenging and, at times, biased analysis of creative music practice, as expressed in the following quote, which follows an analytical formula for the union of visual-musical information:



Eye-Ear-Mechanism = Composition, act of writing down.

Figure 2. Roman Haubenstock-Ramati's conceptual mapping, from his essay "Notation-Material and Form."

[30] Roman Haubenstock-Ramati, "Notation-Material and Form," *Perspectives of New Music* 4, no. 1 (Autumn-Winter 1965): pp. 39-44.

> During the compositional process, a reciprocal relationship develops between the idea (thought) and the slowly evolving manner of writing it down. This relationship of continuous mutual influence lasts during the whole time of composition, and has the effect that, if the original idea of the work is musically pure and true, the resulting piece will be the best possible in terms of both music and its notation … I am affirming the existence of certain types of musical graphics. For this reason, I organized the first exhibition of this music at Donaueschingen in 1954.[31]

It is unclear what Haubenstock-Ramati's criteria for "truth" is, but his claims are very pointed, and his analyses are intricately involved.

> There are two motives which are always responsible for a change in the established method of notation: the one I should like to designate as the motive of *discovery*, the other as the motive of "*invention.*" We relate the notion of "*discovery"* to the material, the notion of "*invention*" to the form.[32]
>
> To recapitulate, improvisation is the natural and spontaneous product of an emotional condition, a product which is bound in time by the length of the improvisation; while a composition is the product of thought, a product of reflection without limit of time. (A composition exists and has meaning even though not played.)

While Haubenstock-Ramati's claims are rather rigid and absolutist about a creative practice that is highly subjective and indeterminate, his writing can be read as an affirming manifesto for any practitioner (composer, performer, scholar, pedagogue) interested in graphic notation's potential. He leaves no stone unturned about the breadth and applicability of new notation in context and in practice; in society and in culture. I will quote one final passage that communicates Haubenstock's astute convictions about graphic notation as a powerful technology:

[31] Haubenstock-Ramati, pp.41
[32] Haubenstock-Ramati, pp.41

> Musical graphics in its most varied forms, from complete graphic representations to brief graphic structures which are interjected into a conventionally notated composition, has influenced the whole of new music with respect to sonorous material, and has obviously enriched it. For that reason, one can even excuse much of the totally graphic music, if it is refined, sensitive, and attractive. [33]

While already twelve years old, one of the more forward-looking bodies of research I have found is *Sound & Score: Essays on Sound, Score and Notation*, compiling the papers presented at the "Sound and Score" conference in Leuven, Belgium in 2010. In her essay "*Exploring Musical Integrity and Experimentation*," philosopher Kathleen Coessens grapples with semiotics and syntax in music, deconstructing iconography in a score. Her discussion of scores and their ontological significance touches upon the type of cognitive processes I feel could be embodied on a broader scale amongst musicians who perform graphic notation. Coessens writes:

> Scores are closed systems; they reduce musical ideas to symbols that are agreed upon through what they show and how they show their information. As powerful tools of signification they offer orientation towards both sound production and playing technique.
>
> At the same time, a score appears both overdetermined and indeterminate, leaving a certain freedom in its "semantic" exploration. But how much subversive interpretation can it afford?[34]

Subversive interpretation could depend on the intentions of the composer and the context in which a score is given and received. In the case of graphic notation, a greater freedom of semantic exploration could become a pertinent area of study. Coessens gives a unique agency to the performer as a steward of new musical experiences. There is a sense of

[33] Haubenstock-Ramati, pp.41

[34] Kathleen Coessens, "Exploring Musical Integrity and Experimentation," Edited by: de Assis, P & Brooks,W & Coessens, K. in *Sound & Score: Essays on Sound, Score and Notation* (Leuven: Leuven University Press, 2013). pp. 63

collectivity in her writings that pertains to musicians who are at the forefront of the issues she investigates.

In the essay "*A Physical Interpretation of a Score in a Listening Attitude*," Susanne Jaresand and Maria Calissendorff provide a history of the relationship between dance and music, and illustrate how embodiment and interpretation are interconnected through notation.[35] The coauthors touch upon many, "As all notation contains or requests technique and physical, corporeal idiosyncrasies of a musical artist, abstract notation opens up the possibilities of interpretation which is 'body forward,' that is, motivated by movement rather than by sound." This is something that motivates much of my own approach to reading graphic notation, as the physicality of a drummer is an enormous range of technical movement that makes us uniquely aware of our bodies. Broadly speaking, knowing such an article exists in this realm is an affirming way to bridge the sorts of personal or private motivations behind artistic research (in this example, mine) with scholarly research, in other words, it helps intellectualize a creative practice with a theoretical and philosophical framework. Topically, I believe that further studies of movement in musical interpretation, and vice versa, can help to solidify a foundation of interpretation of graphic notation, particularly as modern technology facilitates the possibility for notation to appear in new settings for musical performances (projections, billboards, new architecture discussed in Chapter III).

Musicological analyses like those of Coessens, Jaresand and Calissendorff are useful in that they go beyond simply providing technical details to emphasize the more conceptual

[35] Susanne Jaresand and Maria Calissendorff, "A physical interpretation of a score in a listening attitude" Edited by: de Assis, P & Brooks,W & Coessens, K. in *Sound & Score: Essays on Sound, Score and Notation* (Leuven: Leuven University Press, 2013).

underpinnings of their choices to indeterminate notation. Their ideas originate at the intersection of dance and music, but also serve as a gateway for considering other interdisciplinary pairs, namely music and visual art. The potential applications of their philosophy are clearly exemplified in quotes like this one:

> Listening can be understood as a meaning-making action that includes musi-cians, dancers, choreographers, conductors and visual artists, all involved in the artistic process. This leads us away from conventional principles of cause and effect, instead turning the artistic approach towards listening to allow for further understanding and new interpretive dimensions in artistic expressions. [36] p 187

I think exploring the way these types of concepts might be interpreted in musicians' individual methodologies could be also incredibly useful pedagogically. Lastly, I find these points applicable to my interest in transformational properties between graphics elements.

A second volume in the series, entitled *Sensorial Aesthetics in Music Practices*, explores human experience and perception of phenomena that are underrecognized in scholarly research.[37] These articles focus on ways that the primary activities within a music practice both yield and influence complimentary, sensory experiences, and may then be impacted by those experiences in relay. Drawing upon nature, embodiment, memory, cognition, Coessens and a cohort of writers establish an aesthetic of lived auditory experiences, supported by theoretical and philosophical frameworks for their significance in and from western art music. Many arguments are made through examples of composers and their works, examining what compositional approaches ask of a performer, what sensitivities are activated and experiences are stored as a result of performing a piece. I believe this investigation provides the basis for a landscape of available extramusical

[36] Jaresand & Calissendorff, pp.187
[37] Orpheus Institute, *Sensorial Aesthetics in Music Practices* (Leuven: Leuven University Press, 2019).

material for use in the interpretation of indeterminate music. Coessens' writing can help to uncover an emerging feedback loop between the individual and the music they engage, and could help to develop a lexicon of strategies deployed when playing increasingly open-ended, alternatively-notated musics. As notational technologies evolve further away from western music traditions, new modes of expression are being fetched or requested by composers and their notation, and *Sensorial Aesthetics* makes explicit what was previously implicit in western music traditions.

Coessens's philosophies on auditory perception and experience usher in musical experiences from environmental noise, while abstract notation can interpret such perceptions and elevate them to usable materials in the cognitive process of performing. When I say notation interprets a human experience, I am proposing that abstract notation validates this relatively undiscussed, expansive realm of aestheticized, sensory experience that goes well beyond an instrumental framework of pitch, rhythm, and production. Graphic notation can utilize all of this experiential data in a more purposeful way–impulse and inspiration for improvisational creativity–whereas traditionally composed music utilizes primary elements of pitch, rhythm, technique, etc. *Sensorial Aesthetics* explores what has historically been thought of as secondary, if thought of at all. Coessens' writing lays important groundwork for investigating these experiences and considering them philosophically and conceptually, at which point they become suitable for reflection and recycling into any number of prompts found within text scores and graphic scores.

Empirical Research

Lastly, a lesser-known area of research describes the use of alternative notation in psychotherapy and classroom pedagogy, to document personal experiences, emotions, and informal participation in music. Interest in graphic notation to facilitate musical experiences within a pedagogical setting is rapidly expanding. Teachers, occupational therapists, and neurologists are using it to stimulate creativity, thought, and synaptic connections between senses and motor skills. This applied research is in many ways the most direct investigation and clearest evidence of graphic notation's usefulness as a *technology*. The significance of graphic notation appearing in this context is that it is uniquely differentiated from a *graphic score*. It is introduced in a more current or timeless way, with a brief historical overview.[38] While a score is typically a finished work; authored, formed, completed, industrialized in terms of a professional music career; an art object, notation as a tool in music education can exist in a simpler channel, for ephemeral and momentary activities, games, assignments. Any of these modes *may* also result in the creation of finished scores, however, it is a different set of motivations than that of the self-identified composer or performer typically preparing curated music in their métier. As a curricular tool, students and teachers can draw on graphic notation to foster ideas, lessons, sounds, compositions, collaborations in a more neutral, less aesthetic, cultural context.

[38] Sabrina Peña Young, *Musical Emotions: Fun Activity For The Music Classroom* (Buffalo: Teachers Pay Teachers, 2016), https://www.teacherspayteachers.com/Store/Pena-Young-Music-Publishing-And-More. Peña Young writes, "What is Graphic Notation? For many centuries, western culture has had handwritten notation, a gift that allows music from one century to pass to performers over a millennium. You may have heard of Appalachian shape notation or even traditional notation from the Middle Ages. In the contemporary sense, graphic notation is often used by experimental composers to convey a particular sound like a cluster chord (a chord made up of adjacent notes or a non-melodic vocalization."

Sabrina Young's lesson *Musical Emotions,* aimed at students between PreK and 12th grade, focuses on correlating emotions with sound. One of several variations in her materials proposes the following: [39]

> Exercise 3: Draw Your Composition
>
> In this exercise, you will use graphic notation to write a piece about a season.
>
> 1. Take out a piece of paper
> 2. Use writing-appropriate writing utensils. Younger students can use crayons or markers. Adults and teens may choose a notation program, pencil, or even paint
> 3. Choose a season as inspiration for your composition.
> 4. Using percussion instruments, your voice, or an instrument, improvise a short two-minute work based on the season.
> 5. Using shapes, colors, lines, and abstract imagery, try to use graphics to illustrate how to perform the work.
> 6. Once you are complete, title the work and share it with another musician and encourage them to play the piece.
>
> The point of this exercise is not to create an accurate representation of your work, but to correlate what is on the paper with what you hear. A small child, for instance, may draw a "frowny" face to represent hitting the cymbals or a series of wavy lines can represent a flourish on the piano.

In an article for Music Teaching, music technology-centered education consultant David Ashworth outlines more explicitly what graphic notation can offer a classroom environment.

> There are many advantages to exploring graphic notation in the classroom:
>
> - It's a fact that most of our young students will only have a limited experience of working with and understanding standard musical notation. This, in turn, imposes real constraints of the music they can make and

[39] Young. pp. 2

perform using stave-based notation. Introducing elements of graphic notation can provide the freedom to realise musical potential more fully.

- Graphic scores can often allow for more creative engagement and output, by providing the players more opportunities to decide what and when to play.
- As a consequence, this can make opportunities for differentiation in classrooms much easier, allowing more experienced students to be challenged, while providing stimulating but less demanding opportunities for less confident students.
- Many graphic scores are quite flexible in terms of specifying which instruments can be used. This makes them particularly suitable for different teaching contexts, especially in classrooms where we have some students playing a wide range of instruments to a high standard, and others who have little or no background in instrumental playing.
- A well-designed graphic score can provide a 'big picture' overview that students can easily understand. They can see how a piece is structured and how it develops over time.
- There are considerable opportunities for cross-curricular work. These include designing and producing graphic scores using hand-drawn or computer-based techniques; working with mathematical shapes and systems; considering cycles and patterns derived from nature – all these provide exciting opportunities for cross-disciplinary exploration.

The work of NG Hoon Hong, Performing Arts professor at Nanyang Technological University in Singapore, exemplifies graphic score scholarship that emerges from a more pedagogical engagement with the topic, and it also aligns with the questions in this dissertation regarding how synesthesia and semiotics can expand our abilities to make meaning and express musical ideas. In his 2019 published study *Project Stomp: Using Graphic Notation for Effective Multimodal Collaborative Learning*, Hong's approach to a

classroom of young students collaborating with disparate levels of musical training involved implementing simplified block rhythmic notation, graphic play-by-play transcription, and cellular improvisation. Project Stomp is "a systematic pedagogical course of study that utilized multiple representational modes to engage a diverse group of secondary students in a composition- and performance-based module of study (Hong, 2020) Through multimodal thinking and multi-sensory cognition, his experiments drew out some of the universal mechanisms we all possess for understanding and communicating through music. What is appealing about this study is the neurological meeting place between cognitive operations; the center of multimodality into which various individuals contribute their disciplinary strengths. [40] As a foundation, this is highly valuable to the type of creative activity I hope to inspire in my work and research. I found the presentation of this research to be both refreshing and relevant to the concepts that motivate my own.

> Compared to Western notation, the closeness of the graphic score's representations to the contemporary multimedia world and how it functions, in particular to the digital audio workstation's visual representation of sounds, provides an immediacy that makes musical understanding easier. In short, the graphic score is better able to synergize with the audio and other modes to achieve more effective musical learning and circumvent the limitations of Western notation. It also enables students to more easily express their musical ideas in terms of musical structures, motifs, and the relationships between them in their complexities. (Hong, 2020)[41]

Hong's work is an important departure from the almost didactic instructivity of a graphic score in the contemporary music context. In this narrow pedagogical realm, graphic notation includes a wider definition, and extends to students of variable musical

[40] Hoon Hong Ng, "Project Stomp: Using Graphic Notation for Effective Multimodal Collaborative Learning," *General Music Today* 33, no. 3 (2020): 5–13, https://doi.org/10.1177/1048371319890299.
[41] Hong, pp. 8

literacy. Graphic notation in this instance is untethered from the familiar association with an experimental musical style. It connotes a simpler form of musical activity that precedes training and artistic development. The results of his research with notation systems are purely functional, and combine alphanumeric characters inside of other shapes or array, like the following example shown in Figure 3:

Arrangement of a group's rhythms can be represented graphically (see below). Each alphabet represents a rhythm. Perform the graphic score from left to right.

Mountain (Musical concept taught: staggered entry and staggered exit)

Bar Number	1	2	3	4	5	6	7	8
Member D				**D**	**D**			
Member C			**C**	**C**	**C**	**C**		
Member B		**B**	**B**	**B**	**B**	**B**	**B**	
Member A	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

Figure 3. Ng Hoon Hong's graphic score for elementary school children.

If this were the seed of a multimodal system for encoding and decoding musical ideas, then I could easily envision an inclusive spectrum of 'functional notation', spanning from Hong's notation to abstract colored notation like mine and other's functional systems.

Hong's publication has enormous potential to impact teachers and students in music education, special education, as well as neurological, behavioral researchers, to consider new methods for multimodal learning, creating, performing, and communicating using visual material as their primary resource. What happened in his research experiment marks an important precedent for music practices amongst young people finding their voice and their preferred mode of expression.

Project Stomp illustrates how this may be done by offering pedagogical strategies

> that enable diverse students to synergize different modes to effectively compose and perform. … The multimodal aspects of learning in the project align with real-world multimodal-multimedia experiences. The project identifies the visual mode (Western notation) as a weak link in the multimodality of students' group music-making processes and reinvents it to allow for composing and performing based on a common visual understanding that is accessible to all.[42]

Carl Bergstrøm-Nielsen, is a Danish composer, musicologist and music therapist. In 1993 his work in graphic notation led him to develop a system for music therapists to document improvisations by clients with a range of both physical and mental disabilities. A study published in 2011 documents the application of his methods by music therapists Avi Gilboa, Susanna Cohen, Rivka Lader, and Yifat Milstein.[43] Here we see a unique connection between a figure in contemporary music and figures in the medical industry. The therapists' report details their various music therapy cases and how musical improvisation was a key factor in documenting progress in their clients' behaviors. Bergstrøm-Nielsen's methods of documenting this progress graphically made the findings that much more obvious, and seemed to correlate abstract visual descriptors with liminal emotional expression that lacks clear terminology. Therapists were encouraged to use their own authentic, graphical innovations to document their clients' behavioral expression through musical improvisation. Perhaps the furthest from the industrialized craft of art music, the study demonstrates another pole of graphic notation as a tool, while having direct, correlative significance to the emotional spectra of contemporary improvisation in creative music. This detailed report makes a strong case for the usefulness of graphic notation to express what words cannot, and illustrates a parallel between the fields of psychiatry and

[42] Hong, pp. 9

[43] Susanna Cohen et al., "A multiple- perspective approach to graphic notation," *Nordic Journal of Music Therapy* 21, no. 2 (November 2011): 153-175.

in music, both of which may see limitations in language used to portray ideas of style, emotion, affect. Graphic notation has been utilized in this study to convey intersticial psychic states in between commonly used verbal descriptors.

The Global Graphic Score Project is a website that promotes discovery and curiosity using a fun and non-academic approach to composing and performing with graphic notation.[44] Seemingly aimed toward adolescents, its format simplifies the act of communicating through visual art and sound with a straightforward methodology. he website's creators provide examples of seminal graphic score performances by John Cage and Cathy Berberian, as well as activity ideas and material suggestions. The rudimentary nature of the project makes for arguably the most direct way to introduce, teach, and utilize abstract notation, without the complications or the baggage of extensive musical training. Just as we have terms such as "post-tonal" (music theory; composition), so too are graphic scores typically introduced into the lexicon of a music well after Western classical training performance, and in this case, it is something of a "pre-". This is an innovative pedagogical strategy that gets at the essential nature of abstract notation as a useful device for people of any experience level who desire to make music. This level of simplicity feels appropriately proportional to graphic notation's versatility, which allows anyone to explore (music-making). A project like this celebrates and encourages creativity that is free from the traditional, pedagogical underpinnings of classical music training and performance, music theory, etc.

> Graphic scores can be very artistic and imaginative. They allow the composer to explore different ideas about art, objects and environments, and can include shapes,

[44] Dan Mayfield, "Global Graphic Score Project," School of Noise, May 27, 2020, https://www.schoolofnoise.com/global-graphic-score-project/.

> squiggles, letters and pictures. These patterns can be used to represent different musical directions such as pitch, dynamics, timbre, tempo, texture or even silence. (from *Activity 1 – Create a graphic score)*[45]

While not expressly aimed at creating "experimental" music, the Global Graphic Score Project is instead a social experiment that unites people of all backgrounds with a basic language to communicate and share ideas. The School of Noise team encourage interested young composers to fully realize pieces with optional themes and instructions, and to then upload their finished scores to a community gallery, perform them, and share audio/video documentation. The results feel inherently more immediate and more fruitful because of the ways young people are composing with their own imaginative notation, and performing notation of others from diverse backgrounds and experience levels. In other words, this research demonstrates that authentic, improvised interpretations of open notation by elementary school students can be as viable and formed as interpretations by seasoned musical virtuosos.

By creating a shared gallery of graphic scores and performances in which all are welcome, the School of Noise bridges a divide between what is commonly thought of as "advanced" and "rudimentary" levels of musical aptitude and cognition. This collection, composed by all types of participants, underscores a strength of open notation to blur the hierarchies of formal music training. Figure 4 shown below is a score composed by a student in a 3rd grade class. Figure 5 is a more advanced, digitally rendered, yet more familiar pictographic score by one of the project's founders, Daniel Mayfield. A notable part of Mayfield's performance instructions ask "what sounds can you make to perform this

[45]The School of Noise. A guide to the Global Graphic Score Project. PDF. published 2020 https://schoolofnoise.com/global-graphic-score-project/compose-a-graphic-score/

graphic score?" This is arguably the simplest, clearest formula for performing a graphic score composition, and it seems evident that this context reveals the gestalt of using graphic notation as a tool.

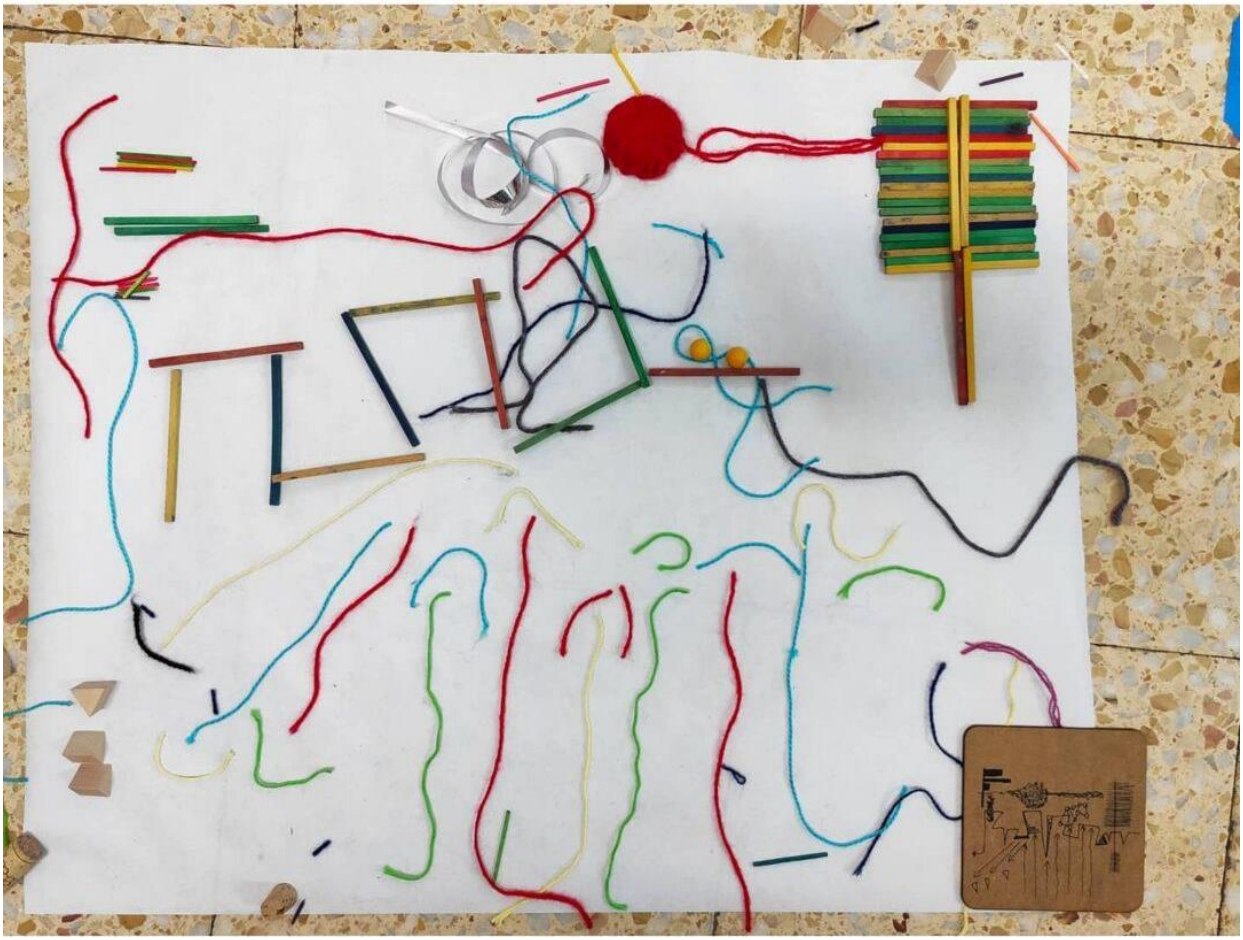


Figure 4. *Guerra Espacial* composed by 3rd Grade Students from Ceip Cervantes School, Recomposed from Adolf Murillo's Traçencurt

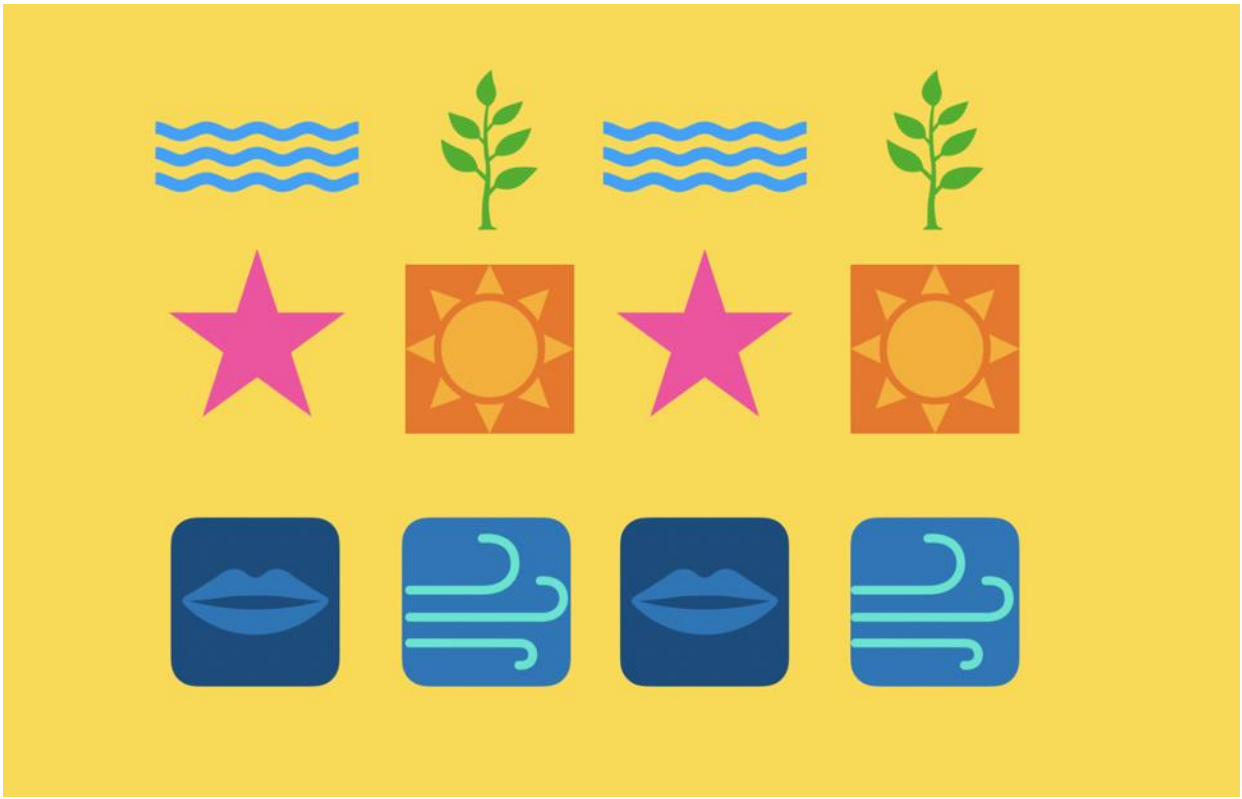


Figure 5. *Seaside*, composed by project founder Dan Mayfield

If empirical research on graphic notation seems unrelated to practicing improvisers and composers, I would argue that this area of scholarship widens graphic notations preconceived notation as an exclusive contemporary music tool, positions it on an unexpected and emerging spectrum and could therefore help distinguish the notation systems of composers in contrast to what occurs in a classroom or therapy session.

Chapter II: Workings of Graphic Notation

Emergence Of Graphics; Emergence Of Co-Authorship

Notation that has evolved either into or out of traditional western notation seems to possess an inextricably novel quality. Any shift from the traditional staff notation can be easily aestheticized. “It’s like a poem!” “It’s like a painting!” Such responses are reductive, an othering of graphic notation, a perpetual exoticization. Unless graphic notation becomes a household term, I think this type of response will remain prevalent. As evocative as any novel notation system may be for a viewer, these innovations all have functional, working parts with entire logic. I hope to underscore a certain accountability for a performance practice in which the onus shifts from composers' concrete ideas as notated to performers’ flexible ideas inserted. Whereas Western classical composers once determined all of the musical components expressed by a performer, interpreting graphic notation places compositional authorship on performers through ever-shifting prompts to improvise and supply ideas that make up a composition.

To begin by looking at a gentle shift, a recently developed system called Dodeka Notation (Figure 5), appears quite familiar, or at least related to traditional notation. The difference is that we have not learned to decode its shapes as we have for standard music notes. This notation takes on an additional life of color and dimension. It is expressed in a related but noticeably different visual language. Dodeka isn't abstract, per se, but it proposes a new graphic language that seems to displace the old. When notated in Dodeka, does Beethoven’s Für Elise become instantly more animated on the page? Does this notated

composition take on an additional media form, independent of a sonified performance? I believe the strength of Dodeka's visualization of a ubiquitous musical work like *Für Elise* is that we want to hear it with our eyes, and we want this notation to succeed in communicating what we know culturally is already there.

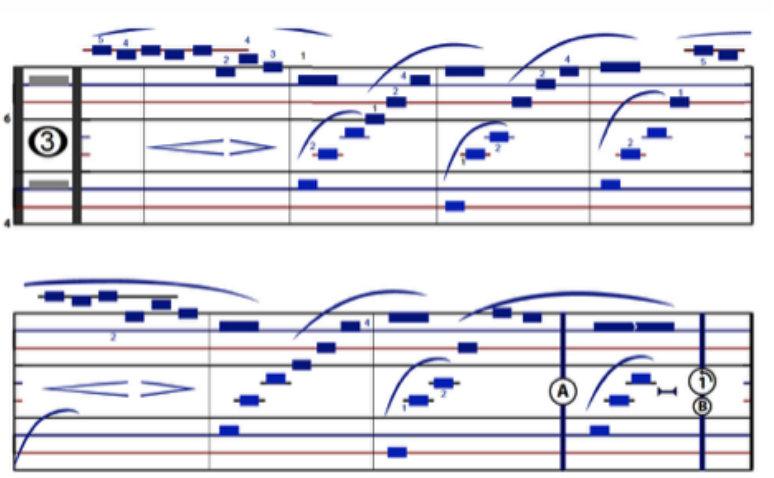


Figure 6. Excerpt of Beethoven 's *Fur Elise* written in Dodeka Notation

Dodeka's novel, yet clear visualization of musical duration and register can help us understand the potential directness in using shapes to depict musical events. Our perception of instrumental register is oriented by, again, a familiar yet different staff system. Dodeka's visual depiction of duration is literal- notes are longer. How we perceive Dodeka as a form of graphic notation lies in the simple idea that it has shifted from codified symbolic notation and employs color. What I find valuable about this system as an example is that these shapes, while they share a very similar function with traditional notation in this particular context, share much more in common aesthetically with a wider range of symbols in other collections and contexts with far more subjective meanings. If a composer extracted this notation from its staff lines, there would be virtually no discernible symbolic

meaning, which is entirely useful for aleatoric music, while extracting traditional notation from its staff widely signifies pitch and rhythm.

In her *The Imaginary Museum of Musical Works* (1992), Lydia Goehr discusses the ontological status of musical works:

> Musical works enjoy a very obscure mode of existence; they are 'ontological mutants '. Works cannot, in any straightforward sense, be physical, mental, or ideal objects. They do not exist as concrete, physical objects; they do not exist as private ideas existing in the mind of a composer, a performer, or a listener; neither do they exist in the eternally existing world of ideal, uncreated forms. They are not identical, furthermore, to any one of their performances. Performances take place in real time; their parts succeed one another. The temporal dimension of works is different; their parts exist simultaneously. Neither are works identical to their scores. There are properties of the former, say, expressive properties, that are not attributable to the latter.[46]

In this quote, Goehr distinguishes between sound and score. On a spectrum of abstraction, there are ways in which non-standard notation breaks with tradition. In terms of its practical applications, abstracted notation also breaks with functionality, as the utility of graphic scores remains undefined as a whole. Composers' approaches to graphic notation may be literal or conceptual or somewhere in between, but notation is always functional and will always retain the study of performing a written score.

To use a metaphor for abstraction vs specificity in another domain, a formula or prompt for performing a through-composed, traditionally notated piece of music, composed to elicit a specific result, might look something like:

apple, orange, orange, plum, peach, apple, apple, plum, plum

[46] Goehr, Lydia. *The Imaginary Museum of Musical Works : an Essay in the Philosophy of Music* / Lydia Goehr. Oxford [England: Clarendon Press, 1992. Print. pp. 2

...while a piece with moments of indeterminacy via graphic elements might be:

apple, [citrus], orange, plum, peach, apple, apple, [stone fruit], [stone fruit]

Now there is a written freedom to plug in any number of fruits from a given category. A composition with largely abstracted notation might look like:

[fruit], [citrus], [citrus], [stone fruit],[stone fruit], [fruit],[fruit], [stone fruit], [stone fruit]

...while an entirely abstracted graphic piece might look like:

[fruit], [fruit], [fruit], [fruit], [fruit], [fruit], [fruit], [fruit], [fruit],

Traditional notation obeys specific particular rules, and musicians train in order to perform according to those rules. In this metaphor, the rules or the "ask" of the performer becomes less and less specific, and more oriented toward executive decision-making, agency, creative authorship, all of which produces variable results over time.

Much like the second and third fruit examples above, the intermediary, partially abstracted stages, there are many contemporary new music compositions, as shown below in Fig. 7, in which the scaffolding provided by familiar notation can usher in new, more abstract visuals. Traditional and experimental notation work in tandem.

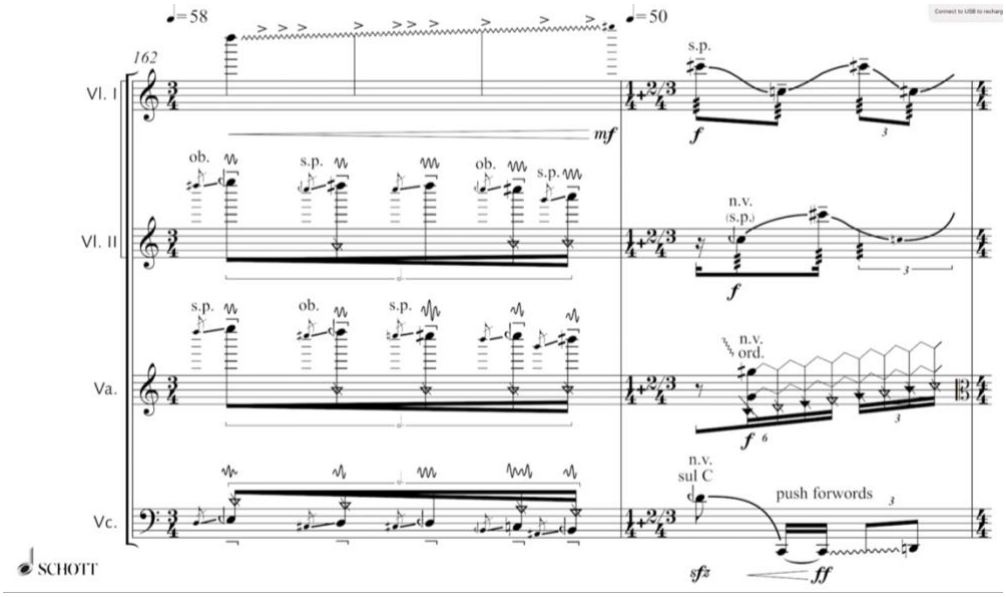


Figure 7. An excerpt from *String Quartet.*

In *String Quartet* (1995) by Chaya Czernowin, we can see an emergence of what I would call 'pre-graphic' or "post-notational" events extending compositional techniques in an otherwise traditional domain. Her innovative visual language is not intentionally illustrative in style, but has naturally illustrative qualities which are eye-catching in contrast to familiar notational elements. Their function is specifically defined and designated by the composer. Although we don't know exactly how these gestures and events will sound, the notation does give us an approximate idea. Czernowin's performance notes indicate experiments with instrumental technique which produce variable results, contingent on a form of decision-making or improvisation by performers. Works like this require contemporary classical musicians to have skills in order to account for new notational languages representing figurative forms, not simply pitch and rhythm and ornaments. In her 2017 essay *The Art of Risk Taking,* for the volume *Experimental Encounters in Music and Beyond* , where she writes:

> Is creativity at its base experimental? It does not have to be. One creates variations on existing things. One creates improvements to existing things that one likes so they will work even better. When we talk about experimental art or music we talk about art that is the result of a particular kind of creative activity.

Regarding technique deployed to realize her new notational shapes, it is no coincidence that they would refer to a more crossmodal or gestural impetus for a musical composition, as described in Czernowin's foreword:

> In my work, String Quartet (1995), the quartet becomes a single composite instrument. This instrument cannot play individual sounds but rather composite gestures, of which the initial impulse linked to the production of a sound is an integral element. In a journey to Thailand, I visited Wat Arun, the Temple of Dawn'. First from a distance, it appeared as a majestic looming tower possessing a monolithic form. It was then of extreme surprise to proceed closer only to discover that the tower was actually comprised from thousands of small shards of ceramic plates. From the closer perspective proximity, these small shards created intricate filigreed patterns. The play between the presence of the temple's totality and its fractured parts helped to provide both the material and formal conceptions for this quartet.[47]

The piece is built from three movements with two 'sonic windows' between them. In the first movement, the composite sounds are introduced and they form phrases, interjections, and a part of a song. Using these composite sounds, further abstracted notation and staff, the second movement is closer to a structured improvisation, in the way that players are directed to operate interpretatively within specific temporal and registral limitations written into the score. (Figure 8) The last movement is a speech composed of the fragments from the first two movements.

[47] Czernowin, Chaya. "*String Quartet*, 1996 / Chaya Czernowin." 1995: n. pag. Print.

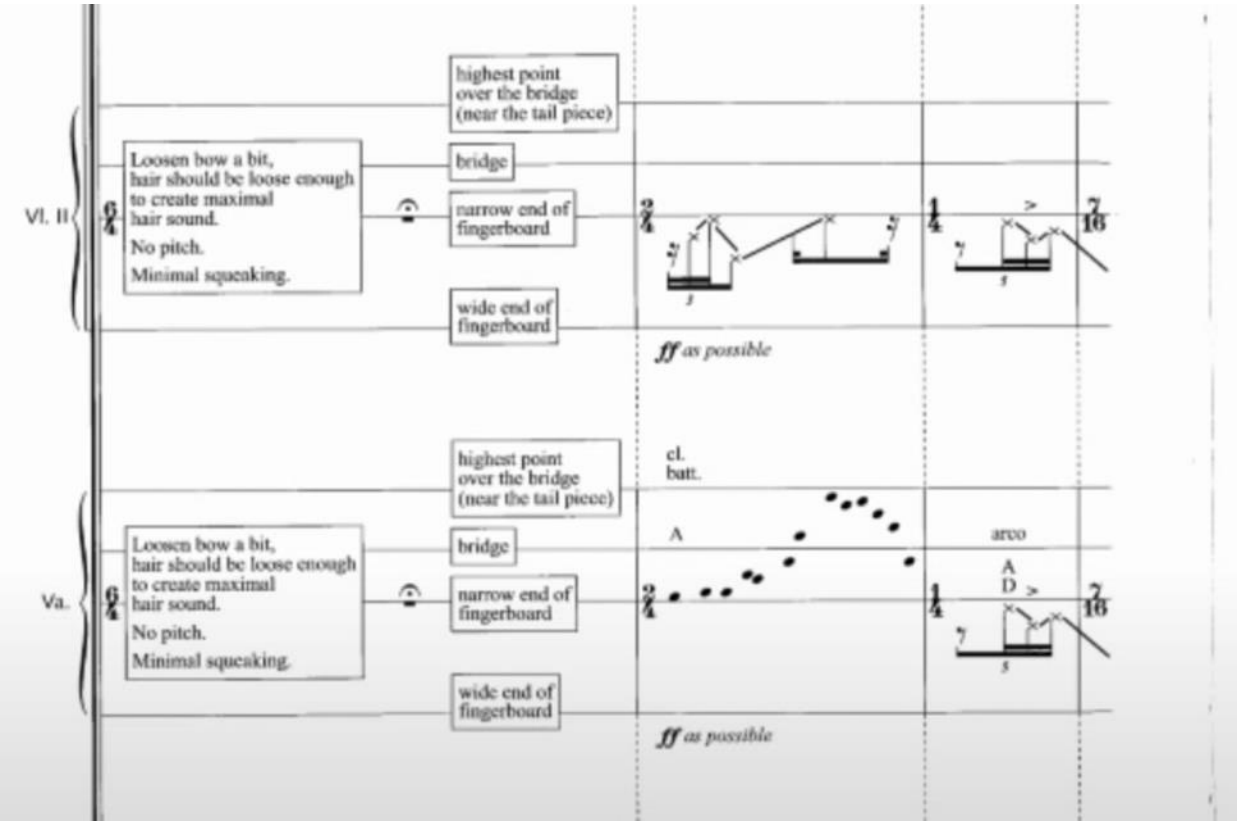


Figure 8. An excerpt from *String Quartet*

In this example, a majority of the work is determined by standard notation, while a few innovative abstractions leave some moments up to chance, sonically. This means that a majority of the work will sound reliably similar from performance to performance. The indeterminate moments differentiate between performances, and from my view, each performance enjoys a more distinct identity due to the original contributions from the performers– a more personalized stamp. The character of each rendition is inherently (if minutely or subtly) different, compared with the character of each rendition of a fully traditionally notated musical work. By "contribution," I am referring to musical details commonly specified by standard notation, but now generated or 'composed' in the moment by a performer interpreting an abstract notational element. For example, pitch content in

sections of each rendition of the *String Quartet* will be different. Therefore, in this example, we move incrementally closer to a responsibility of authorship on the performer, shared with the composer. Ontologically speaking, we commonly accept that pitch, melody, harmony, rhythm, and form are the anatomical signifiers of a musical composition. Two versions of a Bach piece may vary because of musicians' interpretative style. They may respond with different phrasing and lyricism to a melody, a rhythm, a dynamic, or a verbal ornament (e.g., "*agitato" "un poco adagio"*). These are interstitial, personal contributions which enhance the composed material. In the case of innovative notation by Chaya Czernowin, musicians are asked to interpret her indeterminate gestures which inherently yield pitch and rhythmic content, between larger determinate signposts. In the case of most classical compositions, we hear musicians playing notes that result in gestures. In *String Quartet,* we hear gestures that result in notes. As a slight shift into abstract forms on a western staff, Cznerowin's notational innovations usher indeterminacy into through-composed works.

In another example, Cornelius Cardew's *Treatise*, often the subject of graphic score scholarship, effectively hangs on to Western art music's notational tradition by the thinnest possible thread.[48] The proportion of conventional to abstract notation is incredibly steep, placing it on the far end of the spectrum of abstraction. The irony is the way traditional tools have been used, abused for the abstract result of this composition. The 193-page

[48] For more on this work, see Tony Harris, *The Legacy of Cornelius Cardew* (UK: Ashgate, 2013). Notable electronic musician and DJ Jason Forrest, aka DJ Donna Summer, published an article questioning whether *Treatise* was even intended to be music, and addresses its significance in typography, graphic design, and information design, culled from Cardew's background. Jason Forrest "Treatise: A Visual Symphony Of Information Design," *Medium*, November 24, 2019, https://medium.com/nightingale/treatise-a-visual-symphony-of-information-design-2ced33ef01a0. David Cline explores the linguistic connections between Cardew and Ludwig Wittgenstein in his article "Treatise and the Tractatus," *Journal of the Royal Musical Association* 145, no. 1 (2020): 119–66.

graphic opus is littered with stray note heads and mangled shards of a music staff, in what would seem to be a teasing, punitive farewell to an obsolete tool as Cardew, a known humorist, may have viewed traditional notation.

Most glaringly, Cardew cannibalizes the ten-line grand staff environment as a now-usable visual compositional material. He pulls the proverbial carpet (staff lines) out from under the notes, and explores it as primary content. Nearly every page can be viewed as a reference to Western music notation in some way, with occasional notes peppered about. *Treatise* establishes a kind of meta-language, repurposing the mechanics of staff lines and the functionality of pitch and rhythm. Size, density, arrangement, and orientation are all subject to Cardew's compositional whims, as well as further distortions of curvature and proportion of notational elements upon which classical musicians typically rely. It would seem as though he is shining a light on micro-experiences between aspects of a music-reading praxis- reconciling, fluctuating concentrations of material on a staff (and off), different psycho-emotional responses, and recognizable visualizations of interstices between notes; between movements; and between entire compositions.

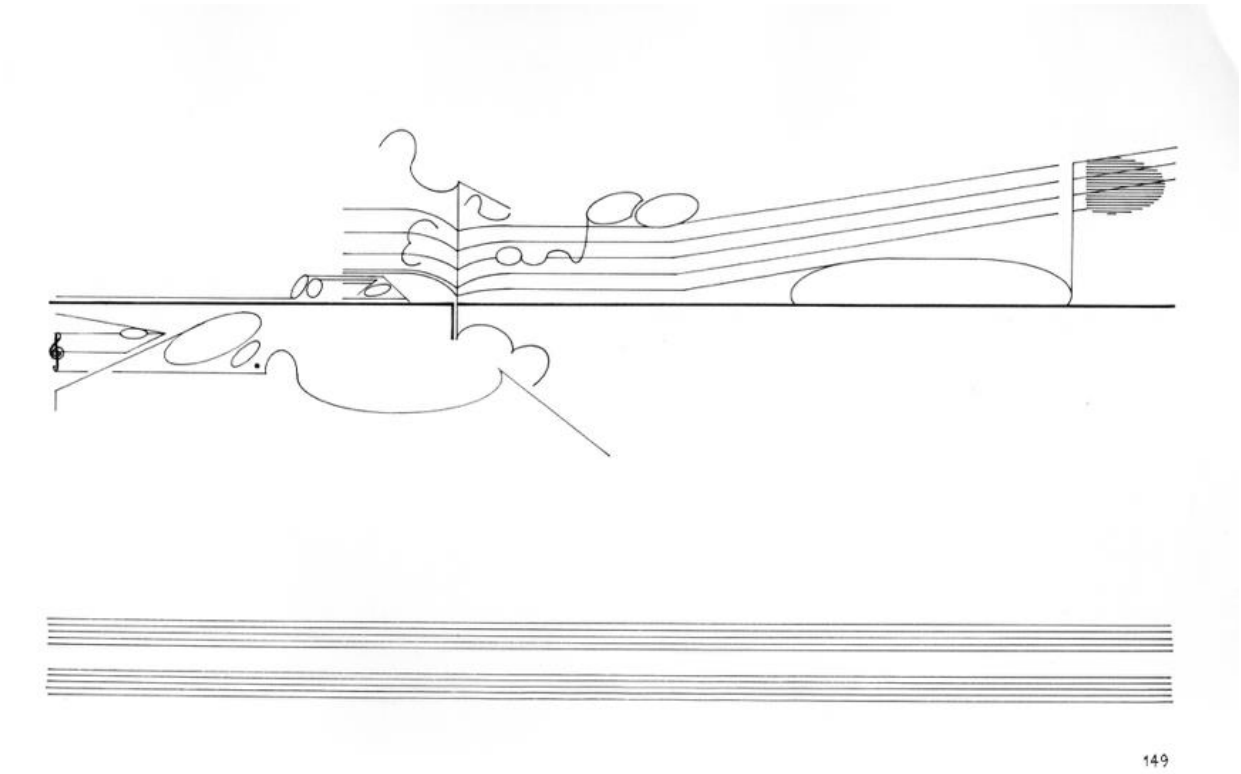


Figure 9. One page of Cornelius Cardew's *Treatise*

Each page of *Treatise* includes a double staff at the bottom. This could serve to contextualize the work relationally, as it implies a typically legible scale for notes and for a sense of how many measures can fit into one system. The dimensions of such a familiar element, divisible into measured music, may orient a performer's sense of time and muscle memory, as they read through one system or one page. While the consistent double staff at the bottom of each page might be romanticized as a familiar, temporal organizing principle, tethering all of Cardew's new visual language to a recognizable timeline, the other traditional referents throughout rarely follow any visual logic consistent with that double staff. They are big, small, inverted, detached, and more. Western notation is ultimately deconstructed by Cardew, and utterly abstracted as a usable language. In his own words from *The Treatise Handbook:*

> *Treatise* is a long continuous drawing - in form rather similar to a novel. But it is composed according to musical principles and is intended to serve as a score for musicians to play from . However, indications of sounds, noises and musical relationships do not figure in the score, which is purely graphic (rare exceptions occur when the signs used are *reminiscent* of musical notations - to the professional musician, these appear as lights in the fog, but for the fully indoctrinated reader, they pose knotty problems in musicology).[49]

Given the lack of rhyme or reason to explain the logic of Cardew's visual language, I propose that the only true way to derive meaning from the interpretation of his symbols is via their relational transformations; a sort of algebra. Without the constant staff lines at the bottom, a performer would have no visual or temporal reference for Cardew's passages, which, for example, utilize comparatively larger staff lines as notational material. Just as his horizontal staff lines give performers an orientation to which 90º rotated staff lines can then be referenced, so too does it provide a relational reference point for their enlargement. Without the horizontal, we would not know the vertical. Without smaller note heads, we would not have a reference for larger noteheads. This relationality forms the basis of much of *Treatise*, as if everything refers back to the staff and the notes that fit on it. Relationally, permutations are boundless, and therefore, the size, shape, direction, truncation, and complication of every shape defines the other. There is no inherent value in anything Cardew has notated, yet, there is clear value in the transformation from one notation to another. Cardew's staff delimits one pole or basis for exploration in the visual field of the score. This reliable measurement of transformational space between notations can help ground the interpretation of something meaningless or abstract.

[49] Cardew, Cornelius., "*Treatise Handbook*: Including *Bun No. 2* for Orchestra, & *Volo Solo*, by Cornelius Cardew." London: Edition Peters, 1971. pp. xii.

I hope that in the future, we may see more in-depth, analytical scholarship on these particularities of Cardew's graphic work. Of the many diary-entry-style notes in his *Treatise Handbook*, Cornelius Cardew writes:

> Interpreter! Remember that ·no meaning is as yet attached to the symbols. They are however to be interpreted in the context of their role in the whole. Distinguish symbols that enclose space (circle, etc.); those that have a characteristic feature. What symbols are for sounding and what for orientation. Example: The horizontal central bar is the main and most constant orientation; what happens where it ceases (or bends)? Do you go out of tune (eg)? [50]

Compared with Czernowin's employment of graphic notation, *Treatise* represents several steps toward abstraction on a spectrum. It obeys many particular 'rules' that characterize traditional Western Music notation, but those rules and the language systems they drive have been completely distorted and, while not necessarily repurposed, they have effectively and most certainly been "de-purposed" by Cardew.

Graphic Notation in Practice

Agency, background, aesthetic choices, and ability all factor into the ways in which musicians navigate a musical score. Firstly, in a general and physical sense of a score, traditional notation has been highly codified with regard to a size aesthetic, and that means in musicians' engagement is second-nature. Musicians can rely on the legal-tabloid space that traditional notation occupies on a manuscript page, and therefore can commit or in other words resign themselves to a particular visceral registration of notes on the staff. Traditional notation rarely diverges from this narrow range of size, shape, and color.

[50]Cardew, Cornelius. Treatise Handbook ®. The Musical Times 113 (1972): 593–. Print. pp. iii

Graphic notation asks that we abandon preconceptions of time and space with regard to sound. Musicians engaging with a graphic environment must subdivide, magnify, interrogate, and recalibrate their faculties of engagement. Alexander Refsum Jensenius had this to say in his 2010 article about gesture:

> Musical gestures are characterized by a multi-functional nature through which multiple meanings are generated. Consequently, the study of musical gesture requires an interdisciplinary approach, with contributions from a diverse set of disciplines, including physics of musical instruments and acoustics, biomechanics and human motor control, auditory and visual perception, musical performance and dance, music theory, music technology, robotics and human-computer-interaction, aesthetics and various social sciences, including the study of emotions. Given the nature of musical gestures, progress will be obtained by combining different scientific methodologies, most particularly, the methodologies from the natural sciences and the human sciences.[51]

This quote accounts for a vast array of conditions and circumstances under which musicians and artists alike might find themselves using graphic notation. Each one of these expansive domains mentioned contains an entire field of visual data from which to derive multi-modal creative strategies that can include notation either directly or indirectly, by way of design, choreography, setting, and more. Jensenius is illuminating a kind of circuit board of possible synapses between physical praxis and visual information.

A lifetime of reading traditional notation sees musical notes into containers of predictable events. Musicians have an extensive mental predisposition or program in place when approaching a traditional music score. A reliable range of dynamics, articulations, timbres and combinations thereof, along with subsets expressed in each of those categories

[51]Jensenius, Alexander & Wanderley, Marcelo & Godøy, Rolf & Leman, Marc. (2009). Musical Gestures: concepts and methods in research. Musical Gestures: Sound, Movement, and Meaning. http://dx.doi.org/10.4324/9780203863411

is firmly established by the trained musician. A visual registration of a piano score "holds" piano sounds- the piano attack, the piano strings hit by the hammers, the piano sustain pedal, or natural decay. A note represents a sound and a stack of notes is a stack of sounds, most of which typically sound at around a *mp-f* dynamic range. This is a reasonable set of expectations. At its most abstract, graphic notation blasts these expectations apart and requires new registral maps for a new range of sounds across drastically wider spectra of symbols.

What can be said about divergent factors between graphic scores and traditional scores in performance? In what follows, I examine two very different versions of Roman Haubenstock-Ramati's *Alone 1* - graphic score for unspecified low-pitched instruments (1965), one by a professional chamber trio of creative musicians in the Belgrade Museum National Theatre, and another by a student ensemble at National Yangming Jiaotong University in Taiwan.[52] Some of the musicians confine their interpretation to a singular, essentially traditional technique on their instrument, while others utilize space, theatricality, extended technique, and movement, revealing the range of interpretive potentials in a single graphic score.

In both sonic and gestural terms, the two performed versions describe the convergent and divergent potentialities of the interpretation of Haubenstock's idiosyncratic visual notational aesthetic. On the ground level, a flurry of evenly distributed, predominantly familiar symbols maps fairly reliably to the flurry of pointillistic sound in

[52]Vasa Vučković. 10/5/2017. Roman Haubenstock - Ramati: ALONE I, https://youtu.be/1B2M-0nb3DM, and Chaoming Tung. 5/22/2020. Alone I (1965) Roman Haubenstock-Ramati (1919-94) NCTU experimental improvisation 2020. https://youtu.be/4Eap7qWRK5o

each performance (and at least two others).[53] Zoomed in, the microscopic differences in the sounds, gestures, and other creative strategies by all performers reflect the vast visual scope of this score's design. The arrangement is clearly ternary, and would appear to be the organizing structure for each trio personnel. The swirling of characters in every direction, comprising larger compound shapes, reads as humor, absurdity, and irony in Haubenstock-Ramati's approach.

Performance #1 is presented in a museum, by the trio of Vasa Vučković (bass clarinet), Hanan Hadžajlić (alto flute), and Neda Hofman (piano). For context, these three appear to be an established ensemble with a creative and professional rapport. Audience applause can be heard when they finish. Performance #2 is rendered by a group of young students Lǐ Yíxuān (bass recorder), Lín yù yú (cello), and Huáng Tāoyún (electric guitar) in an Experimental Improvisation class (another subset of this student ensemble also performed the piece for violin, prepared electric guitar and piano). The notation is divided into what feels like three distinct areas, (Fig. 9) and every available recording of *Alone 1* is performed by a trio. The notes in the original score only specify *Unbestimmte tiefe instrumente*, "infinite depth instruments."

[53] For additional renditions, see https://youtu.be/FYbeudSaj_k by other Yangming students, and https://youtu.be/eQSD-hQioMk by Ensemble Modern Wein

Figure 10. an upscaled digital photo of Haubenstock-Ramati's *Alone 1*

From a bird's eye view, and without even hearing any music, one can glean fundamental behavioral differences between the two trios. Most noticeably, the Serbian group makes more overt eye contact with one another, in order to coordinate musical events. The clarinetist in particular appears to be closely (overly) attuned to the whims of the flute. His actions feel inextricable from hers. The two woodwinds are therefore performing as a "section," roughly 8-10 ft from the pianist, with no line of sight. I believe this is logistical, as it appears that this performance belongs to an evening-length concert of different chamber works by the group. At one point, the woodwinds trade locations with the pianist, traveling to one another's instrumental setup. The pianist plays the flutist's

music stand as a percussion instrument, and the woodwinds seemingly take acoustical advantage of the piano's resonant interior chamber.

All three relatively distinct swaths of notation are bookended by a semblance of an uppercase letter "D," either distorted, and/or filled with smaller notation granules. I find it difficult to ignore a glaring icon of a grand piano in all three instances. The most abstracted and most pianistic D in the top left corner of the score shares proximal space with a trajectory of arrows, and in fact, most adjacently, three arrows in a centripetal arrangement. I say "in fact" because all of this points toward a possible creative strategy for directionality and logistics; an initial cartography of interplay between three players, one of whom is a pianist. One could argue that they are using space and proximity in their approach to Alone 1. I find it easy to visualize their spatial placement in the notation. Like the piano on stage, the pianistic D shape in the score is more isolated from the majority of the notation, and is the extreme point on a carefully plotted curve, composed of many shapes interacting in myriad complex ways.

Their range of creative offerings extends beyond the production of sound, and it stimulates my interest in how they might have distinguished sonic from spatial strategies in the notational material. In her essay *Exploring Musical Integrity and Experimentation*, Kathleen Coessens writes:

> A Music score often displays other levels of syntax, like symbols and constructions related to the instrument and the artist's body[54]

[54] Coessens, Kathleen. Interlude I: Exploring Musical Integrity and Experimentation. In K. Coessens, P. D. Assis, & W. Brooks (editors), Score and sound: Essays on Sound, Score and Notation (blz. 61-66). (Orpheus Institute Series). Leuven University Press. (2013). http://upers.kuleuven.be/nl/book/9789058679765

In terms of each player's faculties or tools deployed in this Serbian group's performance, I see a categorical binary. Broadly speaking, they have their 'axe' plus some kind of an augmentation. They are each bringing [instrument + _____] to their performance, and each use their binary palettes approximately 80/20% in the performance. Vasa uses [clarinet + optical coordination], Hadan [flute + vocalization], and Neda [piano + music stand percussion] To relate this to the score, In each primary swath, there exists, roughly, another 1-2 secondary dominant (pun intended) anchoring shapes (Fig. 11) - the letter A, the blue baffles, and the inverted letter *T*. I can easily imagine these as organizing structures and overarching prompts to, for instance, augment their instrumental set up by [+_____] .

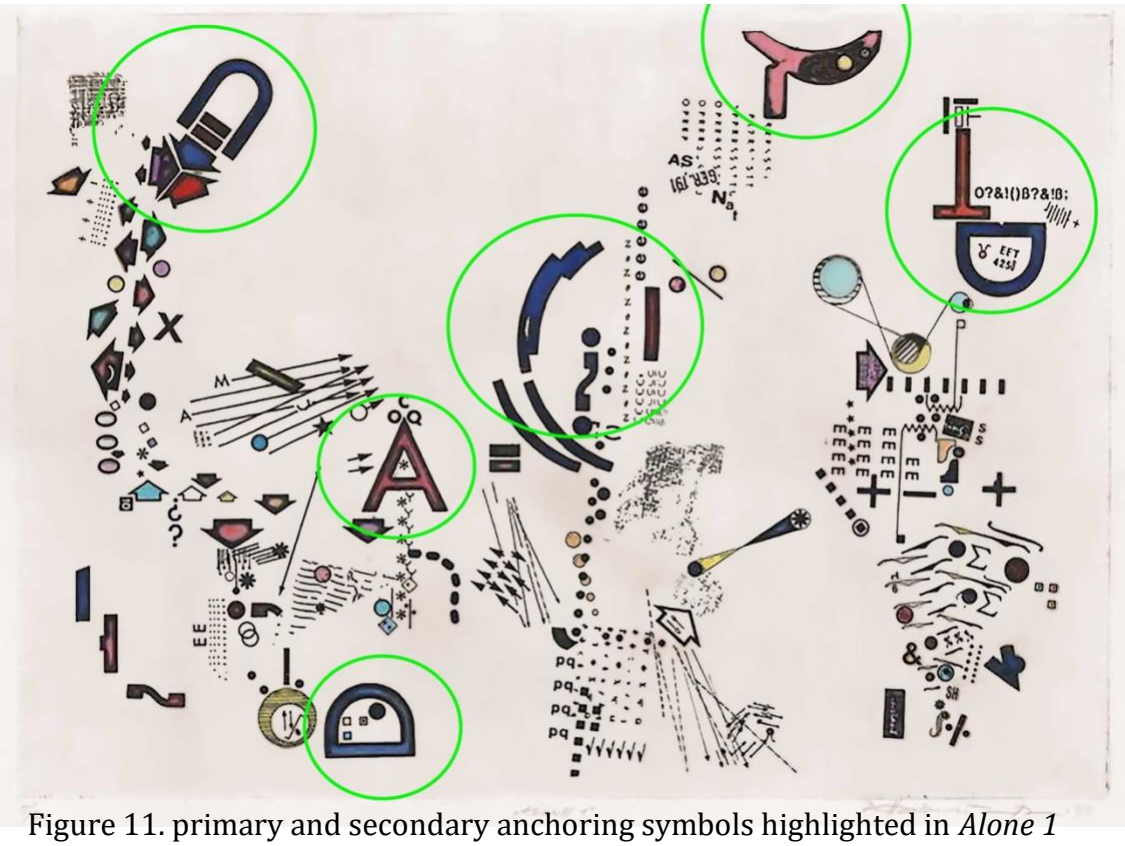


Figure 11. primary and secondary anchoring symbols highlighted in *Alone 1*

The student ensemble, in terms of their physicality and location, is, by comparison, contained, or stationary. In context, their performance is more casual, but no less energized. They are each seated, presumably in an educational classroom setting, and presumably with no audience (save for their three *Alone 1*-interpreting classmate counterparts in another YouTube video[55]). Their visual communication comes maybe once in the middle and most noticeably at the end of their performance, typical of a group negotiating the end of an improvisation. They seem engaged only in the act of listening, and also rather independently. They perform in a relatively still manner, compared with the other group who are more traditionally "performative." It almost seems as though the stillness of the students indicates their focus on experimentation and investigation, while the gestures of the more experienced group indicate familiarity with improvisation.

Sonically, these interpretations have a lot in common. Both performances seem to interpret the overall aesthetic of the score "well" or "faithfully." Density, stroke, variety, and color all play important roles in mapping a score to listening, and in my experience, in performing. *Alone 1* is no exception. The score is by no means followable in a linear sense. Many scores like it give creative agency to the performer to determine directionality and orientation. Having absorbed this notation before hearing either version, I feel that its visual aesthetic resonates throughout. Its entirety feels registered by the performers. Its particularities in style take root as a whole. I would attribute the fast-paced flurry of notes to the clear flurry of symbols, contextualizing each other's placement with chaos, anarchy, and of course pop-art sensibility. There's probably no other way to interpret this piece and I would attribute this interpretation to its density of material on a page, in a continuum of

[55]Tung, Chaoming. *Alone I* (1965) Roman Haubenstock-Ramati (1919-94) NCTU experimental improvisation class 2020 II. https://www.youtube.com/watch?v=FYbeudSaj_k

density with traditional notation filling a page. It is a "busy" piece and these are two "busy" performances– exciting in the way they offer so many variations in musical gesture and in timbral and rhythmic improvisation. The skeleton of chaos and flurry is inextricable from anything the musicians play, because that is the overall registration of *Alone 1* in the body of the listener (me). The slower repose in either version does not only feel like slowness, it feels like a selective omission of fastness, and the piece retains its overall density and chaotic nature, pulsating the silence between moments of what might usually sound relaxed, legatto, or quieter.

Judging by their instrumental fluency, both ensembles' predispositions to a traditional score must play a significant role in their embodiment and realization of *Alone 1*. This predisposition to physical registry is something like a depth perception– a density perception, knowing and embodying one's surroundings. If any musician could suppress this perception, like closing one eye, they might be able to ignore the generally busy aesthetic of the score at will. They might be able to isolate calmer portions of repose in the score (Fig. 12). This speaks to how much information we can digest within a prescribed space for a music score, e.g., a music stand, or a digital image of a musical manuscript, typically somewhere between the legal and tabloid size, and usually read from a two-four feet distance. Interpreting the energy of this whole score and having it contextualize all the sounds produced is akin to flying over a metropolis in an airplane and registering the entirety of its energy. Should you arrive by underground train, and drive through the metropolis in a car, you would progress through phases of reveal and register more of an arc, perhaps of architecture, density, congestion, nature, in a linear fashion, without the entirety of a bird's eye view. From an airplane, your eyes may survey these characteristics

in no graspable order; no organizational logic other than your own arbitrary, visual trajectory. They would influence and contextualize one another. This to me is the nature of all graphic notation on a given page, and how performers are demanded to account emotionally, psychologically, physically, intellectually, and creatively.

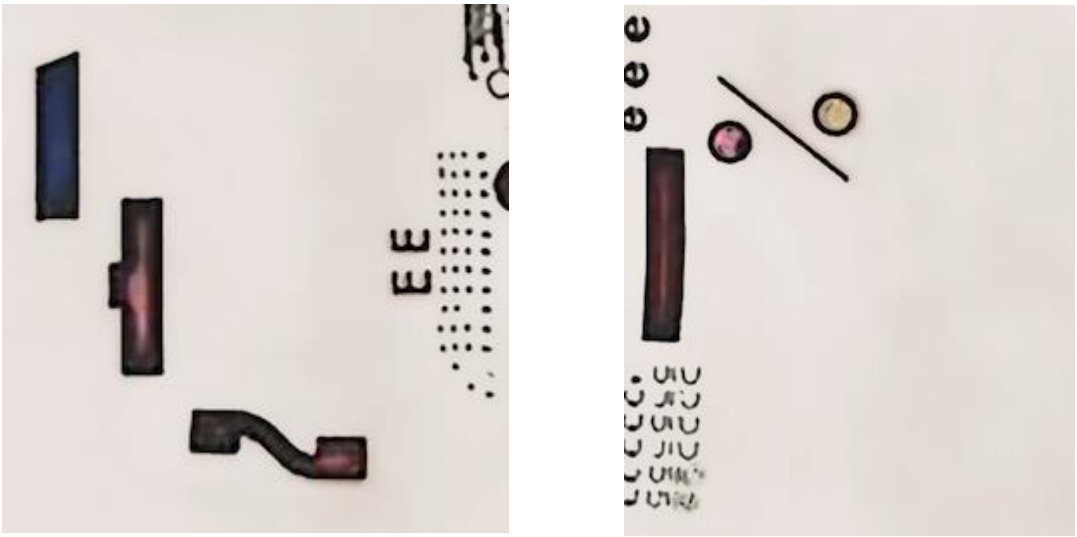


Figure 12. 'calmer' 'excerpts' of *Alone 1.*

Polymath Christian Marclay, known for his experiments that blur the lines between sound and vision, composed the piece entitled *Manga Scroll,* (2008) (Figure 13) intended for vocal performance. It is made up of onomatopoeic words, illustrated to reflect Japanese Manga-style comics. Several vocalists, mostly well-known avant-garde improvisers, have performed this piece– Shelley Hirsch, David Moss, Koichi Makigami, Phil Minton, Laurie Anderson, Joan LaBarbera, and Theo Bleckmann.

Figure 13. one page of Marclay's *Manga Scroll*

Although Manga Score is labeled as a graphic score, does it represent true graphic notation? Is it a text score? *Manga Scroll* is a fairly literal poem composed in a fixed and universally accepted language of character symbols signifying vocal utterances, couched in directional lines and rollercoaster-like orientations. It seems to be faithfully and directly replicable, save for some stylistic nuance offered by each vocalist who performs it. From a didactic on the Museu d'Art Contemporani de Barcelona [MACBA] website:

> The 'graphic score' *Manga Scroll* is composed of onomatopoeia, but in this case the words have been drawn from North American translations of Japanese graphic manga novels and collaged into an undulating, linear composition on a long paper scroll. Such scrolls date from the eleventh century onwards in Japan and might be thought of as a precursor to contemporary Japanese graphic novels or serialised comics. However, Manga Scroll is a vocal score, intended for performance. In this sense it evokes avant-garde, performed phonetic poems, such as Kurt Schwitters'

Dada work *Ursonate* (1932), but also pays tribute to Cathy Berberian's *Stripsody* (1966).[56]

As this note suggests, Berberian's score is an obvious reference point, and both that work and Marclay's bring up important questions for me about replicability and iteration in indeterminate music. To perform this piece does not exactly seem like an interpretation, but rather a reading or a recitation. Of the many versions available on YouTube, all sound reliably similar, and which begs the question: why does Marclay use improvisers? Could classical vocalists or spoken word poets realize this piece as well as improvising vocalists? Could, or is *Manga Scroll* workshopped or taught to young improvisers?

An important takeaway from *Manga Scroll* is the relationship between the notation and the physical setting of the piece. *Manga Scroll* noticeably consists of two main elements: the 'Manga' and the 'scroll', the latter of which is operated in each performance by two assistants- presumably stage hands, grips, page-turners. The unusualness of this presumably auxiliary role adds a novel, theatrical element to the piece, and compels the viewer to wonder what exactly the performer is reciting. The breadth of the notation is not unlike the breadth of Mark Appelbaum's Metaphysics of Notation, but the latter is installed in a physical setting which can accommodate its lengthy span.[57] Marclay's analog scroll is also comparable to the *scrolling* digital scores of Cat Hope and many other contemporary experimental notation composers. If it is the visual construction/design of the *Manga Scroll* that dictates its size and functional situation on the page, then one might wonder why in

[56] Christian Marclay: Compositions; May, 2019 https://www.macba.cat/en/exhibitions-activities/activities/christian-marclay-compositions

[57] Mark Appelbaum, *The Metaphysics of Notation*, 2009. Twelve 6' panels, two corresponding mobiles, and a print, 72' in length. For more information on this work see Ray Heigemeir, "Metaphysics of Notation," Stanford Libraries Blog, February 25, 2011, https://library.stanford.edu/blogs/stanford-libraries-blog/metaphysics-notation.

each performance, the score is laid flat on a table and not really visible or shared in any way with the audience. The piece *is* exhibited in museums and galleries, occasionally in tandem with a performance.[58]

The animated, visual scores of Australian composer/scholar/flutist Cat Hope engage performers in an emerging modality, an emerging narrative, and a semi-creative odyssey. Her left-to-right scrolling compositions, composed of abstract, graphic notation, are, in a very general sense, instructive for a new paradigm of composers and performers utilizing novel notation languages. The primary vehicle for her work is the Decibel Ensemble, who read the scrolling scores on IPads which are running Hope's Score Reader. This work raises important questions about the role of interpretation in such a situation where the notation is abstract, but the language and approach are highly codified within the ensemble and the composer's relatively closed system: How much creative agency do performers actually have in such a situation? Is the work becoming highly reproducible, and how does this aesthetic approach relate to the histories known as creative music?[59]

In her 2013 Ted Talk about her then-innovative scoring software for Decibel, Hope states that traditional notation doesn't do "the trick." She does not say what the trick is, but I believe in the case of Hope's music, "the trick" is to normalize sonic abstraction, and possibly to collapse extended technique into simply "technique." Many performances of Hope's music align sonically with the language of self-identified improvisers, but I question whether the fixity of their ensemble + score-reading mechanism + environment retains a somewhat Western chamber-classical underpinning. Is this work engaging performers'

[58] For more on *Manga Scroll* see, "Programme, Christian Marclay: Compositions," Museum of Contemporary Art of Barcelona, May 18 2019, https://www.macba.cat/en/exhibitions-activities/activities/christian-marclay-compositions.
[59] See footnote 12 in Chapter 1 providing context on this term.

creative freedom, or simply an illusion of freedom? If graphic notation evolved into a new norm, might the composerly autonomy that Cat Hope retains in her proprietary software + fixed ensemble be an ideal one? Cat Hope's approach indicates a conventional degree of composerly autonomy, in that performers have some interpretive freedoms, while also subject to constraints; the difference in performative freedom between her scrolling scores and conventional scores is less one of degree and more one of kind, in which different types of choices are made by the performers in each case. At its current paradigmatic stage, the scrolling scores of Cat Hope neatly usher performers along at a tempo, with a suggestion of flexibility, but seemingly only within the range of speed that a performer could ostensibly scan an image for the duration that it scrolls across the screen. While this notational system is indeed graphic, colorful, and idiosyncratic, it doesn't exactly shift the collaborative dynamic between composer and performer, but simply offers a new variation on it. This may increase visibility and literacy of alternative notation within the larger musical landscape. As commonly used lead sheets are an accepted standard for control & variable in produceable music– they specify melody, harmony, bpm– then so too could a graphic score which encodes gestural, rhythmic, dynamic, and textural variation, become a more widely recognized tool via Hope's system. In other words, Hope's system holds a great potential a new and emerging determinacy in abstractly scored music. As long as her system is *scrolling* then it is programmatic, which is the crux of the composer agency versus performer-improviser agency. Or, in other words, Hope's is a composed music.

However, In *TheTalkingBoard* mode of the Decibel score reader, Hope, in collaboration with its primary programmer Lindsey Vickery, explores a crucial aspect of interpretation and the imagination. In this mode, an entire graphic passage is visible, and,

akin to a Ouija board, a floating lens or "planchette," one for each performer, encircles a small portion of the image to play as it passes over. This advanced approach asks musicians to consider the 'big picture' when sonifying a constrained fragment. A peripheral observation of material outside of the circular lens enables musicians to synthesize what has passed, and what is to come, in consideration of their improvisational response. As I will discuss in Chapter IV, this idea of conceptualizing an incomplete idea whose beginning or end may not be known, but rather inferred and reinforced by shifting sonic and visual properties is important to my graphic score compositions, as many shapes function as cells that constrain and eclipse or obscure my notation.

I see TheTalkingBoard as more of an industrial utility than a creative tool for composer-performers. TheTalkingBoard creates and superimposes a score-reading environment onto pre-existing scores. Originally accompanied by two scores, by Vickery, and Hope, it is now also a mode in Hope's Decibel Score Creator, in which anyone can upload an image file to be navigated by planchettes. TheTalkingBoard is a contained system, with a range of determinate and indeterminate behaviors. Three primary modes comprise a TalkingBoard session: wander, follow, converge, along with growing and shrinking planchettes. These behaviors approximate and encode common tactics for collaborative improvisation, and their random alternation provides rich opportunities for discovery within the score by performers. However, because of its finite framework, Lindsay Vickery retains a certain autonomy as the creator. Performers' creative handling of encircled material is dependent on defined ranges of zoom and of speed (or tempo). Conceived partly in response to a challenge [...] to create a score that subverted the

dominant horizontal left-to-right paradigm of score-reading" (Vickery), I think the degree of subversion is ultimately for participating musicians to judge.

The Repository of Graphic Score Performance

This section's title, The Repository of Graphic Score Performance, refers to a thought experiment in which I am imagining a way that graphic scores will be organized and collected, and generally accounted for, in the future. A problem that I see in the notion of traditional archiving of indeterminate musics which rely heavily on responsive, spontaneously generated content by its performers, is that different iterations of a given composition may share nothing in common except for their title. We take for granted that most composed music, be it folk, rock, jazz, chamber, or other, can be identified, historicized, and collected based on shared melodies/ motives/themes, harmonies, tempos, instrumentation, time signatures, in many cases, notated scores or lead sheets. Some classical pieces have different publishers, and a simple glance at a score might suffice for immediate identification. Even a quick look at the body of a classical music score, regardless of its publisher, might be enough to identify it based on Western notation. Certain parts of a published score might overlap, while arrangements might not. When listening, there are context clues that can help us 'name that tune'. Even Western and non-Western musics that are based on largely oral traditions can be identified by melodies, lyrics, or chords. Indian ragas, as another example, can be identified by form and rhythmic phrases. How can a listener "name that tune" in aleatoric, indeterminate, abstractly notated

music? Does music need to be identifiable in order to be collected, stored, archived, remembered, or studied?

Unaccounted for in the librarification of indeterminacy is the actual range of musical responses to open-ended notation. No concrete space has been defined for this ever-expanding aspect of past > future iterations of an indeterminate composition. Additionally, a performance that is recorded and distributed, i.e., commercially marketable, tends to imply accuracy in execution and interpretation. It describes the musical vocation and even the talent of the participants; that they did their jobs. A much more subjective set is loosely described by recordings of indeterminacy. No such job or talent can be really described by a recording of abstract graphic notation, only the subjective enjoyment of the listener who consumes improvisational music. However, a job was done and musicians were tasked with realizing a graphically notated score. Fully improvised, scoreless music exists at an extreme end of this spectrum, as it can only be evaluated subjectively, based on qualities like synergy, compositionality, intensity, or interest. It is not subject to the intentions of a composer whose score is being interpreted and can be archived firstly by this type of authorship.

How do we catalog genres of music that are generated spontaneously and produce mostly the same result from iteration to iteration? How do we catalog original music that is entirely different from iteration to iteration? What sort of canon or repository results from abstractly notated compositions with entirely different interpretations? How can this canon motivate our activity as musicians? How can it change our thinking about what we do? What if we as improvisers and composer-performers of creative music were tasked with dismantling the very fabric of the musical canon? What if each time we made a sound,

it wasn't as ephemeral as commonly thought, but rather, contributing to an unmovable, timeless ledger of compositional activity; plugging into a continuum of sounds both heard and not heard or sights / gestures seen and not seen?

In the following thought experiment, I am imagining a way in which graphic notation could serve as a sort of organizing principle or a possible meta-data for what was played in different interpretations of a single piece. To return to the case study above, In Chaya Czernowin's *String Quartet,* audible differences have an impact on the listening experience or the consumption of composed music. I find it instructive to consider the way we might catalog a range of *String Quartet* renditions, as we become more aware of interpretative contributions from each player. In a listening test, participants would less likely name-that-tune if the needle dropped on an aleatoric, graphically-notated moment, than a traditionally notated passage. What responsibility or interest do consumer-listeners have to account for these moments of co-authorship between Czernowin and her ensemble members? To collect multiple versions of a piece like *String Quartet* for their distinct character variations? Its graphically notated moments might inspire someone to collect multiple renditions of *String Quartet* due to their improvisation variations. This is a first step in reconsidering the ontological implications of composed indeterminacy, notably through graphics. Unlike, for example, a popular melodic or rhythmic motif, the compositional results that come from an expansion of notational traditions has a direct correlation to the entity of a "version" with descriptive properties that a listener can identify.

The instability of abstract notation, having not been codified into set language, allows for modularity and recombination of visual information. A finished piece of

graphically scored music can contain any number of modular elements, which emphasize more fluid characteristics than traditionally composed music. A new type of thinking is required to connect similar visual events in multiple scores. The implications are drastically different than connections between two notes of identical pitch and rhythmic value and articulation in multiple scores. A whole note middle C at pianissimo in two compositions directs anyone who plays it to execute exactly what is written. Graphic notation is a flowing stream, like any body of water whose particles are constantly shifting, levels rising, temperature fluctuating, dimensions expanding. So too is a graphic score an invitation to tap into a passing moment of the infinite, on an elemental level. I do not consider this analogous to the ephemerality of sound in general, nor a passing moment in time, punctuated by a through-composed work of music. It is the deconstruction of working parts that makes this river of fundament uniquely impermanent.

A Brief Theory of Transformation in Graphic Notation

To conclude this chapter about the workings of graphic notation, I now turn to a theory I have been developing for the valuation of graphic notation elements, inspired by transformational theories for Western music developed by scholars David Lewin and Dmitri Tymococko. I have begun developing this spin-off theory for the valuation of symbols, based on their relationships to one another. Concerning the interpretation of components within in a graphic score, I postulate that it is essential to observe and to analyze basic relationships *between* glyphs, in order to conceive of a framework for aesthetically organizing and/or permuting any material that is improvised by a performer,

in response to visual prompts. When analyzed and internalized, the contrasting characteristics of any grouping of graphic elements can be analogously applied to improvised, musical material.

In formulating this theory, I have looked first at examples of polar or diametric opposites: light and dark, black and white, day and night, up and down, north and south. These poles have value because of the existence of their opposites, or their antipode. We cannot truly know one without the other, and our cognition of their value is aided by any number of intermediate points along their spectrum (i.e. "grey" (areas)). I have also looked at philosophical writings on semiotics by Jacques Derrida and Ferdinand de Saussure.

In a world of signs, what can we know about the value of abstract shapes in 2-dimensional space? With regard to any schema used to perform a graphically notated composition, sometimes indicated in performance notes, players may be afforded little or nothing to guide them toward an understanding of actual value. In some cases, without any schema authored by a composer, a performer is left only with bearings and orientation. This instability of meaning, while in some schools of thought celebrated as a hallmark of open notation, cannot be truly unstable when faculties and cognition are implemented to interpret a symbol. Unavoidable considerations such as: where is an element on a page? Left? Right? How *much* of the page is occupied by notation? What is between?

Compared with a language that is widely recognized, read, and interpreted, the nature of an abstract language would necessitate that meaning must be made from nothing, or very little. In a sense, abstract notation encodes its output in real-time. It is not defined until it is performed, because nothing about it has been predetermined. Traditional notation has encoded values in pitch and rhythm; in gesture and in dynamics; in duration,

and uses spoken languages to shape or decorate its musical development. While divergent in many obvious ways, abstract notation adheres to basic and sometimes advanced formal rules of a traditional score. By definition, a score, again, is:

> n. a written representation of a musical composition showing all the vocal and instrumental parts arranged one below the other. [60]

A score can function as a kind of a frame. A score frames or punctuates a musical moment(s), and invites a recitation by performers. It delineates a cellular environment which is filled with instructive, linguistic devices. We know this to be true, and scores have evolved as such. For centuries, a musical manuscript contains a message and performers are expected to receive and decode that message. In this way, a score is a letter from a composer to a performer. It encodes a set of actions inscribed by a composer. A score does not break with that tradition, whether it is graphically or traditionally notated. As an invitation to be interpreted and performed, it cannot function another way.

Therefore, as something of a surrogate for systematic or traditional notation, graphic notation' meaning remains subject to the expectations and associations a performer receiving and reading it. A performer says "I'm here to play!" while a score says "I'm here to be played!" Play, read, recite, decode, liberate, transform- musicians must render the sound notation message put before them by a composer. Without any predetermined nuance or narrative, intricate interpretations are inspired by a performer's journey through notation, from point A to B to C, or, sets of poles. If at least two elements

[60] See *OnMusic Dictionary*. Published June 10, 2016. https://dictionary.onmusic.org/terms/3036-score.

are described with graphic notation, poles can be defined. A range of sonic possibilities is more concisely denoted by a clear range of visual parameters, whereas a single parameter denotes an idea in vacuum. Improvisers may create perfectly valid interpretations of singular notational objects, based on any number of factors, emotional/visceral responses, associations with the characteristics of that graphic notation. For example, in this score:

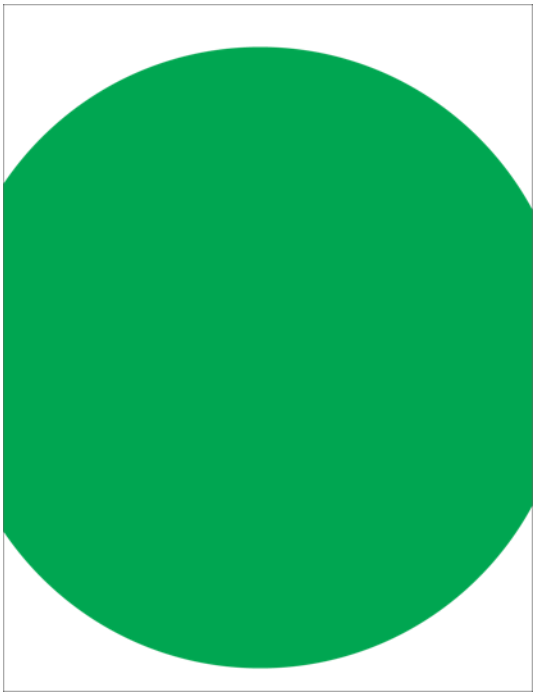


Figure 14. Example score A

What can be known about the notation in this score? What we might call [eclipsed green circle] does not have any reference point except for a reader's personal experience with its size, its shape, its contour. If we introduce a second element, the range and dimension of the score is altered drastically.

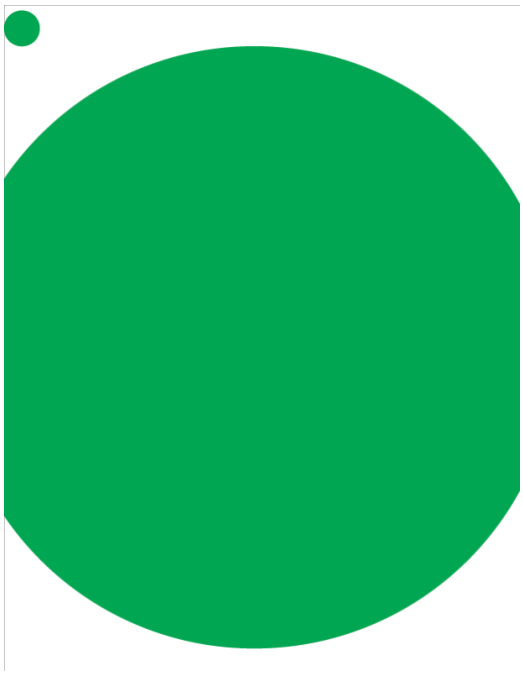
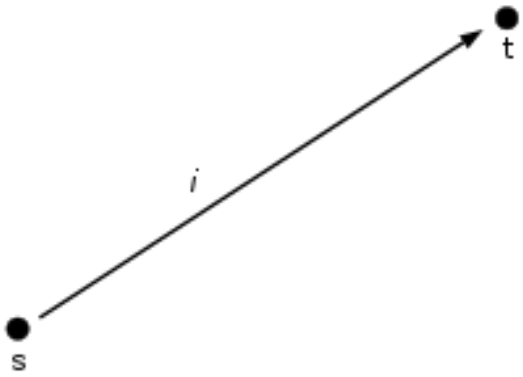


Figure 15. Example score B

In the second score, an entirely other set of parameters can be ascertained based on a relationship between the two elements. Because a comparison can be drawn between the two figures, a range of knowledge can be applied, book-ended, polarized, and explored. The process of exploration alone, from one pole to another and their corresponding, relative values can have direct implication on the temporal component of an improvised interpretation. However, exploring the range of relation between the two notational elements does not necessarily mean something linear or temporal.

Figure 16. Example score C

In Lewin's theories, this is parallel to the movement between chords, melody sequences, notes, motifs.



"[The transformational] attitude does not ask for some observed measure of extension between reified 'points'; rather it asks: 'If I am at **s** and wish to get to **t**, what characteristic gesture should I perform in order to arrive there?'" [61]

To echo Saussure, what *can* be known about this sample composition is what it is *not*; what traits are not present. This composition does not address a range of color, nor a range of shapes, nor a range of textures. It does not relate more than two items. It does not contain any visible juxtaposition.

[61] David Lewin *Generalized Musical Intervals and Transformations* (Oxford: Oxford University Press. 2007), pp. 159

In the following examples, multiple ranges of traits are addressed between two elements.

Same shape, different color:

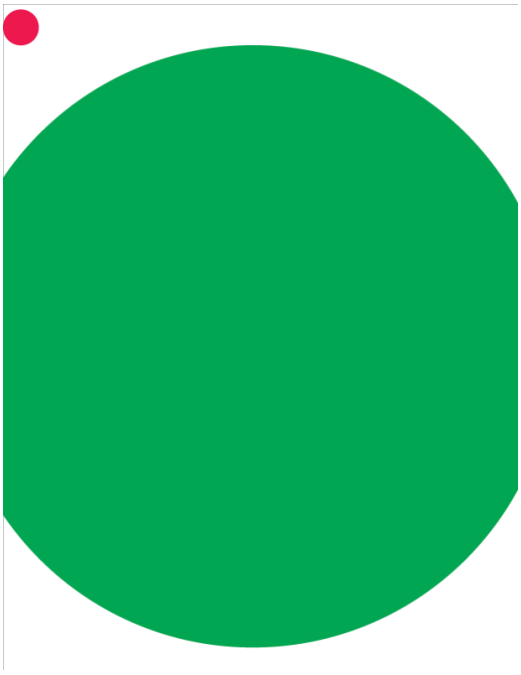


Figure 17. Example score D

Different shape, different color:

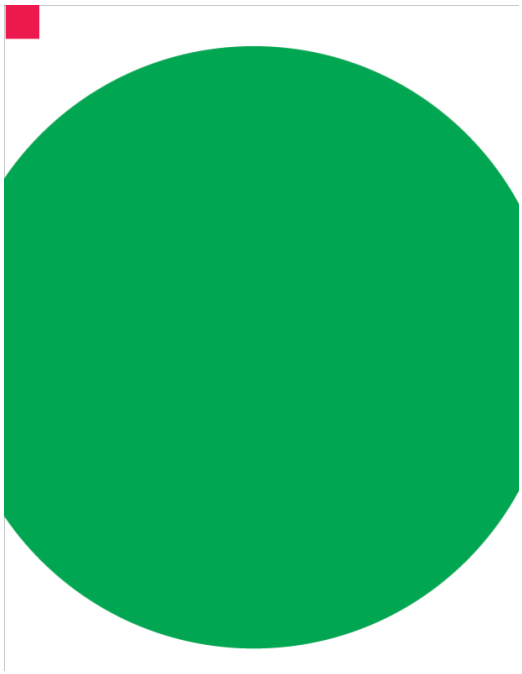


Figure 18. Example score D

A simple analogy to underpin this fundamental act of discernment in improvisational decision-making can be seen in the classic game of SET. [62] SET asks players to find groupings of three cards, with different levels of similarity and difference, which comprise a "set". The cognitive valuation of cards and measuring of various sets can be

[62] Set (stylized as SET) is a real-time card game designed by Marsha Falco in 1974. The deck consists of 81 unique cards that vary in four features across three possibilities for each feature: number of shapes (one, two, or three), shape (diamond, squiggle, oval), shading (solid, striped, or open), and color (red, green, or purple).[1] Each possible combination of features appears as a card precisely once in the deck.

applied to discerning transformational differences found in graphic notation, and applying them to a musical interpretation.

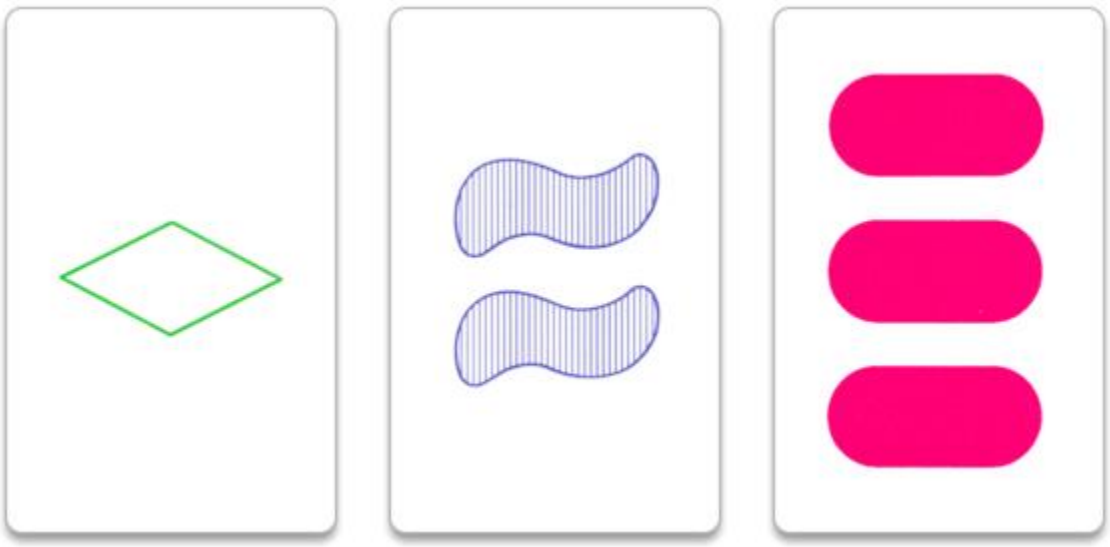


Figure 19. A maximally differentiated “set” (4 varying parameters)

Figure 20. Example of a minimally differentiated “set” (1 varying parameter)

Future explorations in the development of this theory will lead me back to occupational therapy materials for mental disabilities, something I encountered and bookmarked during my time a behavioral aid for autistic elementary school children during the years 2005-6. These tools also promote and study differentiation and meaning-making of simple colors, shapes, and textures. In her 2004 book, *Learning Re-Enabled: A Practical Guide to Helping Children with Learning Disabilities*, Susan N. Schriber Orloff describes says:

> Visual perception is the brain's ability to receive, interpret, and act upon visual stimuli. Perception is based on the following seven elements:
> 1. Visual discrimination: The ability to distinguish one shape from another.
> 2. Visual memory: [...] remember a specific form when removed from your visual field.
> 3. Visual-spatial relationships: [...] recognize forms that are the same but may be in a different spatial orientation.
> 4. Visual form constancy: [...] discern similar forms that may be different in size, color, or spatial orientation and to consistently match the similar forms.
> 5. Visual sequential memory: [...] recall two to seven items in sequence with vision occluded.
> 6. Visual figure/ground: [...] discern discrete forms when camouflaged or partially hidden.
> 7. Visual closure: [...] recognize familiar forms that are only partially completed.[63]

Each of these cognitive abilities is apparent in all types of music reading, but they are particularly relevant to discerning and utilizing transformational relationships in graphic score to make creative decisions. All of these could be amplified, or celebrated as essential components of interpreting graphic notation.

Further applications of these theories could be endlessly fruitful. Because they concern abstract, or boundless visual information without linguistic constraints, in-depth analysis of transformational properties of many graphic scores could yield infinite results. Not only performer-interpreters, but also composers could greatly benefit from these

[63] Orloff, Susan. Learning Re-enabled : a Practical Guide to Helping Children with Learning Disabilities. 2nd ed. St. Louis: Elsevier , 2004.https://lib.ugent.be/catalog/ebk01:1000000000749043

considerations, in order to shape their intent in using notational variations, and to account for a more complexly layered process of score-reading, with regard to cognition and optical physiology.

A gentle or beginning attempt at applying this theory could be exemplified through a work by Anthony Braxton. Composition 10- features abstract notation, but certainly musical ideas constrain his notation - there is clear compositional direction, and there is performer agency and choice. If a performer reads a range of notational variation which is concerned with one musical parameter, say “trill” or “cluster”, then they conceive of a corresponding sonic variation.

Chapter III: Visual Salience

Sensory Transmutation

Throughout the course of its development, graphic notation as a fluid media form has found a new home in alternative contexts, often within the world of contemporary art. If music includes notes and rhythms and symbols, then "Music" as we know it can now appear in galleries and museums, in an exhibition, a collection, an artist's talk, or a catalogue. Contemporary music specifically can now reach new audiences in this presentation, where scores can be visually engaged in new settings. What graphic notation represents to us determines what is culturally possible. As another emerging channel of research, phenomena of graphic scores can be extracted from their shift into visual art, in which visual notation floats between contexts and mediums. While a firm stake was made during the Fluxus movement, by composers and artists converging through scores and performance, the visual salience of graphic music is still emerging. In this chapter, I will draw from various trajectories in order to chart the development of graphic notation's path through visual art contexts to date, and the sociocultural implications of its various growth, and ultimately, its usefulness within this realm. I will attempt to abstract bits and pieces of linguistic philosophies and apply them to graphic notation as an emergent linguistic.

As a musician, I get a feeling that my most important roles are being reimagined; that my native tongue has jumped a fence, dissolved a boundary, bridged a gap. My labor as a composer is transposed into painter, designer, editor, compositor. As a performer, "interpreter" feels like the best way to describe my labor in an art and spectatorship

context. As another form of musical interpretation, audiences engaging *any* form of notation outside of a traditional setting means that untrained viewers or non-musicians are, in a sense, *reading music*—taking in linguistic objects. While a trained musician reads and plays written music for accuracy, the lay person puts their eyes on, for example, a graphic music score and can imagine its subjective sound. In this chapter, I am interested in investigating what takes place when viewers see music. As a response to their sighting, is their imagination interpretively valid? Is it accurate, within a framework of Cagean indeterminacy?

> It is better to make a piece of music than to perform one, better to perform one than to listen to one, better to listen to one than to misuse it as a means of distraction, entertainment, or acquisition of "culture." –John Cage [64]

Have we arrived at the next sequential iteration of this quote? Has a graphic score in a silent art gallery been misused as a means of entertainment, and acquired as 'culture'?

The following is a speculative analysis of what I believe happens when people view a piece of music in a new environment, namely, the contemporary art space. The art gallery is a natural fit for exhibition of graphic scores due to their use of color, shape, texture, and conceptualism. These works, in most cases, began as musical manuscript and were then curated as art objects, analogous to a painting or illustration. The presence of graphic scores in the art space alters the course of musical consumption through multisensory engagement, in new environments. While sound installations bridge a gap between a sit-down concert and an ambient, self-directed meander, graphic scores in an art space can bridge an additional gap between the ears and the eyes, and the entire viscera. The eyes

[64] Cage John. 1961. Silence: Lectures and Writings [First edition] ed. Middletown Conn: Wesleyan University Press.

engage visual music on a different internal timeline than the ears engage a concert. When a music score is presented visually in a gallery or museum, many components we take for granted are rendered propositional, because in that setting, they are imaginary. Sound, sound production, technique, and expertise are immaterial when viewing music notation in the art space. They are implicit, embedded memories of a past and future of a composition's life. Also embedded is a historical record of a composition's performances. This is an important distinction of a score from its notation. If a score delivers notation, a canvas, frame, or pedestal, delivers a score. A canvas is a tool, and also becomes a consumable, commercial object. Contained within it is a visual music composition.

If a classical music score or even an excerpt of music notes were seen in an art context, enough is known culturally and industrially to conjure an idea of familiar (popular, idiomatic) music. A soundless piece of music connotes the sound and labor of the musician. Musical notes evoke genres with discernible rhythm and pitch, compared with the experimental sounds often encouraged by composers using graphic notation. The average art viewer is likely not walking by a graphic score and immediately conjuring angular melodies, multiphonics, or irregular rhythmic blasts, because those do not hold as much cultural currency or familiarity.

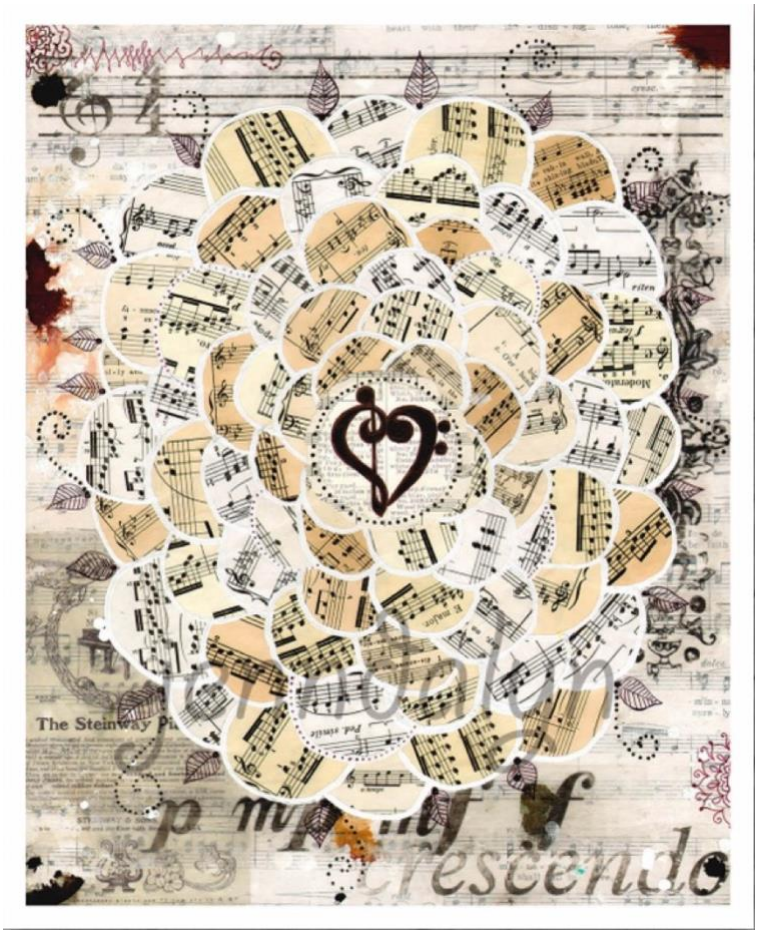


Figure 21. a work entitled *Musicbloom* by the artist Jenndalyn, found on the internet, self-characterized as "mixed media collage art." [65]

The following analysis is intended to draw a spectrum of music as art, using two polarized examples. My goal is to situate and help define graphic notation's visual transmutation, salience, and consumption. As a far-removed example, outside of a more critically engaged space, yet still a viable work for the visual art space, *Musicbloom* (Fig. 21), by the artist Jenndalyn, is composed of many visually similar cells which appear to be classical music excerpts. The artist may have imposed their creative voice through the variety of color in each circular cell, but these hues faithfully represent a range of colors of

[65] "Jenndalyn. Mixed Media Art & Photography." https://jenndalyn.tumblr.com

aging musical manuscripts. Every cell in *Musicbloom* represents a "doing"–the musical labor of a performer, a standard of music notation as a tool directing musician to play. Aesthetically, we see many notes in many cells. Framed by theories of indexicality, the cut-up passages evoke physical orientation (posture, bowing, fingering, embouchure), location (practice rooms, concert halls, orchestra seating), and other miscellaneous details of a music experience (dress codes, programs, tickets, conductors, instrument repairs), yet they have been repurposed and collaged to make an abstract flower, at the center of which are two common clefs which form a heart. Art has been forged out of an understood vocation of classical music to make *Musicbloom*. From the artist:

> Everything about music amazes me, right down to the way it is written and read. This mixed media painting was created using many pieces of vintage sheet music :)
>
> My mixed media work is inspired by nature, small miracles, and an overall appreciation for all worldly and other-worldly things.[66]

The semiotic significance of this musical iconography cannot be ignored. The experiences and the industry that the flower petals signify are acculturated, and may not apply to someone outside of classical music culture, who has never heard or experienced it before. However, if an audience member is fully acclimated to Western classical music culture and industry, then this art viewing experience is considerably instructive. It signifies something more specific or closed, compared with the signified in an abstract graphic score. Of course, varying levels of musical and cultural literacy can play a more advanced role in the perception of this collage. As music notation making an appearance as

[66]Jenndalyn. Mixed Media Art & Photography." https://jenndalyn.tumblr.com

visual art, *Musicbloom's* flower petals signify something already known, familiar, and traditional, with specific cultural currency and commercial value. To view *Musicbloom* is to accept or reject those tropes.

By comparison, does a Wadada Leo Smith visual composition ask a viewer to audition a culturally familiar sound into their consciousness upon viewing? What does *Musicbloom* leave to a viewers' imagination as compared with Leo Smith's *Kashala?* Neither artist has imposed less of their voice onto their work, however, as music-for-the-eyes, Jendalynn has "composed" a collage of universally recognized and musical experiences, while Leo Smith has composed a passage of visual representations of ephemeral, subjective sound experiments, using a visual system that is not recognized far beyond his ensemble & community. Jendalynn's use of conventional musical scores may serve as a foil for us to consider the ways in which purely graphic compositions can free the imagination of the viewer to create sounds in their heads. This difference to me underpins the attraction of exhibiting abstract graphic scores in an art space.

Figure 22. Wadada Leo Smith's *Kashala.*

Jenndalynn's materials signify finite, formed music, while Leo Smith's are infinite, sonically unformed, because his music has an evolving grammar for interpretation and realization. However, they both encode process (métier, sonification) equally. Jenndalyn's *Musicbloom* physically and conceptually minces a history and a tradition of classical music that has been previously formalized on a page. Her source material draws from many shards of compositions that have been revised, notated, read, analyzed, performed, heard, and received by audiences. Smith's *Kashala* is much closer to an abstract painting, and does not use closed or finite linguistic systems in the way that Western classical music does. Not unike Cornelius Cardew's *Treatise*, Jenndalyn also uses recognizable music notes, but hers have been previously formed into works before being plundered and collaged; whereas Cardew repurposed foundational notation elements, unformed prior to his assemblage. To compare *Musicbloom* with Cage's *Notations,* Jenndalyn assembles works at a particular stage of their life into her collage domain, as Cage and Knowles did with scores and poetry, however, they used composers' fully formed, intact scores, not granulated at all like in *Musicbloom*.

To differentiate between levels of authorship, to differentiate perspectives, and to theorize about various stages of codification and signification of graphic notation as a vocabulary and a material, I've mocked up an example of a Jenndalyn-style treatment of multiple Leo Smith graphic scores.

Figure 23. Example plunder of Wadada Leo Smith's *Kashala.*

In this mock-up, there isn't any semiotic legibility of the source material nor of any index of activity contain within (improvising, interpreting, coming out of black creative music traditions); no equiavelent index to the legibly established source material of *Musicbloom.* Is this a difference in age and evolution of the two languages? Or a cultural difference? If established as a widely utilized musical language, Smith's system could too, one day, be cannibalized, plundered, and recognizable to viewers who understand his and other graphic notations as a grammar and a symbol for music production, with all of the viable attributes contained in the classical music cells of *Musicbloom*. On one hand, Leo Smith's graphic music receives high praise in the modern-day gallery and museum space. On the other hand, Jenndalyn's *Musicbloom* is for sale through commercial channels such as

Walmart.com and bespoke printed clothing outlets. The thought experiment behind my imaginary illustration is to level and examine traditional and abstract notation languages side by side. Through a lens of viability and familiarity established by *Musicbloom's* repurposed collage arrangement, we can compare the classical manuscript with a graphic score and speculate as to where abstract notation vocabularies like Smith's are situated in our sociocultural landscape, both as a visual and a musical material.

Semiotics

Semiotic designations are used to define relationships between virtually all things signifying and signified in visual communication. Entire branches of study are devoted to that which is signified in music notation. An exhaustive number of possible starting points exist for the analysis of semiotics in musical language and its interpretation. I will try to connect some general concepts developed by a few original philosophers of semiotic thought, such as Umberto Eco, Ferdinand De Saussure, and Charles Pierce. Borrowing from studies of linguistics and of visual symbology, I have found that several ideas are applicable to graphic notation as an unformed language yet to be codified and yet to be theorized. I will propose a few ways in which graphic notation might be subject to a more in-depth analysis as it continues to evolve as a viable tool for future generations of composer-performers.

Saussure was a pivotal figure in the development of linguistic studies. The bulk of his work is directly influential on my research into interpretation of graphic notation's potential as an abstract language. Saussure "saw language as a system of signs constructed by convention. Understanding meaning to be relational, being produced by the interaction

between various signifiers and signifieds, he held that meaning cannot be understood in isolation." (Mambrol, 2016)

> As Jacques Derrida pointed out, Saussure's theory is based on binary oppositions or dyads, i.e., defining a unit in terms of what it is not, which give rise to oppositional pairs in which one is always superior to the other. The most fundamental binary opposition is related to the concept of sign, the basic unit of signification. In Saussure, the previously undivided sign gets divided into the signifier (the sound image) and the signified (the concept). Saussure stressed that the relationship between the signifier and the signified is conventional and arbitrary, and that both terms are psychological in nature. There is no one-to-one relation between the signifier and the signified. For instance the sound image "tree" may refer to different kinds of trees or it may even be a metaphor for forest. Therefore, it is inferred that meaning is arbitrary and unstable.

To view graphic notation through a Sausurrian, semiotic-linguistic lens presents several interesting possibilities for graphic notation analysis, including some contradictions. Synchronic and diachronic approaches to linguistic analysis differ in the way they look at meaning. Synchronic analysis focuses on a present moment in which a linguistic object is interpreted, and diachronic takes into account the evolution of its meaning over time. Their applications to graphic notation are interesting to me because of the fact that abstract, novel notation is inherently emerging. I do not know how to measure thresholds of linguistic systems being "emerging" or "codified" or "standardized", but graphic notation, their aesthetic, and their function are subject, as previously mentioned in Chapter II, to the motivations of the individual composer, and to the creative agency of the performer. This puts yet another chaotic spin on graphic notation, graphic scores, and graphic environments for mixed notation. As applied to indeterminate graphically notated music, both synchronic and diachronic approaches can be instructive, and aid the expansion of study of this language. I think this dichotomy of analysis, which concerns itself with "how much" meaning, and "when," can help to underpin the instability and

subjectivity of graphic notation, while also supporting the resulting aggregation of multiple composers whose abstract notation systems may or may not share certain properties and schema. The breadth of interpretation, regarding increasing number of performances, supports a diachronic analysis of meaning of graphic scores, and the notation they contain, treated separately or hierarchically. This accumulation of readings is embedded in Chapter II's concept of a Repository. Encountering the inherent properties of a novel graphic notation system promotes a more synchronic view.

If each performer contributes to an ongoing, dynamic definition of an abstract symbol, this symbol is undergoing a diachronic evolution. But what constitutes "ongoing?" ; "dynamic?" What is a minimum criteria for a linguistic evolution? What measure of time or instantiation of a graphic 1) score 2) notation must exist for either to have a history or record of its interpretation? When a graphic score is premiered, or rehearsed for the first time, no other realizations of this work and its notation exist. None can be traceable, nor contribute to any history of the interpretation of language in the composition. If this composition were to be performed one-thousand times, there would be a bounty of interpretations from which to chart and analyze meanings of linguistic symbols notated by the composer and determined in performance by players. Its referent is fundamentally unstable because it shifts each time this language is interpreted. I believe this is parallel to Leo Smith's philosophies of performing his music, (notably in a contemporary art context) when he says:

> Ideally, when people hang one of my scores, they would invite me and one of my ensembles to come and perform it for them. And the performance ought to be recorded and exhibited with the score. Periodically, they should invite us back to constantly revitalize that score. That's the ideal…I'm trying to show something: that

> a score is a living entity and that it changes just like the cosmos does. Multiple performances will show the score's versatility and its expansive nature.[67]

In consideration of the classic semiotic organizing paradigm, the symbol/ index/icon triad, traditional notation in Western music is a codified language for the trained musician to read and to execute particular tasks.[68] This language has been given and received; developed; agreed-upon. The tasks, their interpretations, and desired results have also been agreed-upon by those who "approve this message", and participate in idiomatic music (composers, performers, consumers).

An entire economy of success and failure, adequacy, and accuracy is fixed around the function of the musical language. There are cultural and professional contracts that musicians and consumers fulfill with each musical transaction. Purveyors of popular music uphold responsibilities as the designated interpreters or readers of traditional musical notation symbols that produce a desired result. Their fluency combined with notation's legibility forms the foundation of this language. It is *symbolic* in nature.

Both graphic notation and the score in which it is commonly packaged are indices, or are indexical of various practices, cognitions, and transactions. Graphic scores are indexes of an unorthodox praxis, interpreting and producing sound from image in what is most often a shift from a traditional praxis of performing music. For the young students working within the emerging pedagogies mentioned in Chapter I, graphic scores may be the only expression of music they have known or may ever know. In their case, a graphic score is simply an index of playing music. The shift from traditional notation stands out as

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[67] Corbett, John. "Wadada Leo Smith." BOMB Magazine, 15 July 2016, https://bombmagazine.org/articles/wadada-leo-smith/.

[68] American Philosopher Charles Sanders Pierce developed the acclaimed Semiotic Triangle to organize the various ways that visual signs are perceived, interpreted, and analyzed.

the most significant part of the indexicality of graphic scores. The experimentation, the augmentation, the reconsideration, the trial, the error, and the emergence of the music practitioner, are all embedded in the engagement and the index graphic score music.

An ongoing creative experiment of mine in the abstraction of traditional notation is a set of passages with all of the stems removed. (Fig. 26) Interestingly, a stem or vertical line is arguably the most abstract element in this codified system. It doesn't indicate rhythmic value, nor duration, nor articulation. It is merely a structural convention, and yet it is the most organizing one.

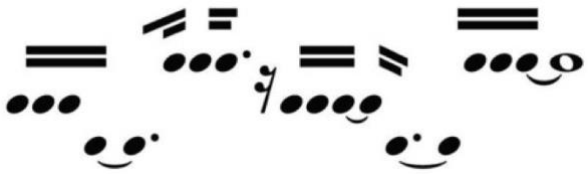


Figure 24. Experimental rendering of traditional notation

In this instance, the absence of a systemic device signifies its presence, aided by a standardized, intact proximity between the elements which it typically binds together. This is perhaps not unlike visual experiments with detection of words with v ow ls r m v d. In fct, a p p l r d v c w th h vy c l t r l and fnctnl c rr ncy is th r m v l of v w l s in ordr to rndr wrds as icons of what they once were in trdtnl language. [69]

In this experimental musical passage, an interpretation of the gaps–the space–space left is required, yet the original function of the omitted element requires no actual symbolic reading at all, as long as noteheads and their rhythmic subdivisions are properly read.

[69] See the 2010 album recording *MDNA* by musician Madonna https://www.nme.com/news/music/madonna-216-1276791

What function did a stem ever play? When asked, during initial phases of my research, how they were struck by this omission as a performer and a composer, former UCI professor Nicole Mitchell responded "They're friendlier!"

I would concur with professor Mitchell, because, on a visceral level, physical space has been ceded by this omission. You might call this clearing of space a placebo of liberty, or freedom for the reading musician, without diminishing any responsibility of their task, nor does it increase creative agency rhythmically or otherwise. A musician is now interpreting a missing element, the stem between beams and notehead, that required no interpretation or actual reading previously. My lightly experimental notation is iconic of standard notation, and retains its iconicity of rhythm and register. However, without the musical staff present, these graphics lose their iconic representation of specified pitch, arguably a basic necessity of any composer or performer working within this linguistic framework.

The placebo effect is extends to many facets of reading graphic scores, and one that I think warrants exploration in future experiments. It may in fact be the crux of my original motivation to implement *entirely open* graphic scores to facilitate an improvisation. This also refers back to the interviewees in Lars Brondum's paper about his graphic scores yielding actual improvisational music, or something entirely different. A graphic score in its most abstract form is a sort of ghost environment, a domain which claims to have all of the working parts and architecture of a music score, yet all of the rules on which a performer relies have been altered.

Graphic Scores in [Space]

As consumers of music, we are accustomed to congregating in a particular way in order to witness music in public-performed on a stage. Hearing Western music performed obeys a certain tradition. Our forward-facing orientation is not unlike the ritual of congregating in a place of religious worship, in which attention is directed to a priest, preacher, rabbi, etc. It follows a continuum in which concert halls are built with the utmost consideration of enhancing the sounding music that is performed. Planned acoustics, architecture, reverberation, and reflection attract those who wish to present their music as well as audiences who wish to hear it, reinforcing the tradition of music performed in a *music venue*. As a professional musician, I continue to participate in this model, both as a performer and spectator.

Compared particular with a concert hall or club, the physical layout of the contemporary art space is a democratic one, with freely flowing viewership circulating in and around. This environment can decentralize and reimagine sound, both audible and non-, the way it travels through space, and how it is conveyed to an audience. The gallery space reorients attention to performance, and therefore, attention to compositional practices. Several intersecting spectra contribute to these phenomena which include scoring techniques, spatialization of sound, theatricality in music performance, and location. Artists are taking stock of these potentialities and it is informing their compositional process and the conception of sound practices.

Graphic scores help us to expand the possibilities and the very definition of a "music concert." What is a concert? A concert is a presentation of music for an audience. Drawing on an extensive history of contemporary music being delivered in conjunction with visual media, I argue that graphic score music, on some level, is the pinnacle of an intermedia collaboration, but the collaboration is with itself; a new presentation of music, both with and without sound. Scriabin's *Prometheus: The Poem of Fire, Op. 60,* featuring his synesthetically concieved *Clavier à lumières,* Merce Cunningham's choreographies featuring the music of John Cage, early experimental animations by Oskar Fischinger, Harry Smith, Normal McLaren, and Walther Ruttman, Philp Glass 3D video operas– all of these early interdisciplinary marriages exhibited music in new and unusual ways. Visual mediums provide a sort of scaffolding for music with which it is paired. What is unique about new presentations of sound and vision married in a graphic score, is that the corresponding music is almost exclusively experimental in nature, and the site is often a democratized, public space. Why this is important is because venues and communities for experimental music can be insular, exclusive, sparse, and even at times alienating. However, in the gallery and museum space, as graphic scores tend to be visually arresting, often indicating a conceptual impetus for their schema, and, in a sense, historically more 'suitable' for public consumption than the avant garde music they tend to produce, they can invite audiences in, to accept a wider range of musical styles and techniques. In other words, graphic scores have expanded the context for receiving improvisation, experimentation, and all of the things commonly associated with it. The deceptively accessible genre has the power to bring new audiences to an often insular music tradition of avant garde experimentalism, free jazz, and aleatoric chamber music, to name a few. It's not only an increasingly visible

genre, it's also the process that now has an expanded audience: It's extended technique. It's the expansion of the discourse around the limitations of traditional composition as an institution. It's the politics of protest that have historically created improvisational music.

The aesthetics and the artistry of graphic scores necessitate additional exhibition modalities not commonly afforded to audiences in a concert hall.[70] To program a graphic score in a visual setting is to account for its infinite interpretations, and in most cases, a concert will accompany a visually-based curation. Presentation of these works in a space designed for the contemplation of visual art enables a social engagement not found in traditional concert settings. If museum visitors see a graphic score painting, that painting might on one day be accompanied by performer-interpreters, and another day not. This reorganizes audience's social engagement with the ephemera of music and sound production on new and evolving terms.

When was the last time a traditional musical manuscript was enlarged and displayed in front of an audience? To go hear your favorite symphony performed live means you've left your cd or record player at home and journeyed to a concert hall to hear an orchestra. To go hear your favorite graphic score means entering any number of possible environments (museum, concert hall, DIY space, gallery, architectural site, public art environment) with any number of indeterminate musical and social outcomes. It can also generate a dialogue with sociocultural narratives, history, and design of a given site.

[70] In 2013, across multiple cities and host venues throughout England, the organization Sound UK presented *Graphic Scores: Celebrating the Art of Music,* a UK tour of graphic scores featuring pianist Joanna MacGregor, vocalist Elaine Mitchener, trumpeter Tom Arthurs, cellist Oliver Coates, and electronics artist Isambard Khroustaliov. The series featured works by George Crumb, Cathy Berberian, Fred Frith, John Cage, Wadada Leo Smith, Cornelius Cardew, Tom Phillips RA, and Jennifer Walshe, performed against the visual backdrop of their projected scores. For more on this see the programme on Sound UK's website, https://www.sounduk.net/events/graphic-scores/.

Site-specificity becomes increasingly significant when presentating these new visual music forms, and creates the most immersive experience with visual music language.

For example, composer, colleague, friend, former classmate Raven Chacon has exhibited graphic score compositions in numerous settings over the last five years. Most recently, in the Whitney Biennial, his scores were displayed in one discrete gallery space and later accompanied by musical performances. His exhibition of scores in the Whitney spanned a wide range of notational techniques– traditional, graphic, numerical, geometric, set within a singular visual aesthetic. Multiple improvisers, for whom the various scores were composed, performed the works at various points during the exhibition.

Other exhibitions of Chacon's scores have include fabric and/or vinyl banners on building sides and billboards. Having actually digitally rendered three of these works for Chacon, I can speak to one unique experience that occurs when seeing them finished. I am not a visual artist for hire, and I am not a professional poster maker or fabricator of any sort. I was simply asked to render handa-drawn mockups as Adobe Illustrator notation for a production company to duplicate at large scale. Therefore, my interstitial role in these scores' producton was given greater emphasis once they were exhibited. I saw an unprecedented sort of musical and artistic labor, somewhere between copyist and designer, and also producer, not entirely different than hiring a particular instrumentalist to record their part for a composer. This type of labor and its fruits are unique to the production of a graphic score, in the fact that I was rendering hand-drafted notational ideas that are outside of, for example, a traditional notation practice that is often by hand as much as it is by print or by software.

Figure 25. Raven Chacon- *AMERICAN LEDGER* (NO. 1), 2018. University of British Columbia Music Building

As consumers of music, we are accustomed to a congregating in a particular way in order to witness music in public, performed on a stage. The tradition of hearing Western music performed obeys a certain tradition. Our forward-facing orientation is not unlike the ritual of congregating in a place of religious worship, in which attention is directed to the frontality priest, preacher, rabbi, etc. It follows a continuum in which concert halls are built with the utmost consideration of enhancing the sounding music that is performed. Considerations of acoustics, architecture, reverberation, and reflection attract those who wish to present their music as well as audiences who wish to hear it, reinforcing the tradition of music in a concert hall. As a professional musician, I continue to participate in this model as a performer and spectator.

In an example of this intersection, artist and composer Jobina Tinneman frequently sets her work within natural landscapes and architectural sites by addressing them with large panoramic scores on fabric. Her graphic notation is often a transcription of her

navigation through a specific site, then performed by musicians whose reading uses sound to reenact the composer's original survey of her subject. In Tinneman's performances, notation is the translator between sound and space. The composer and performer exchange two phases of a geographical navigation, by giving and receiving the illustrative lines in the score. To underscore the utility of graphic notation in this instance, traditional notion could only suffice to translate speed and incidental frequencies made by the composer investigating the space. A text-based score could only suffice to convey literal descriptions of her speed, interest, frame of mind. While these may have the potential to generate work in other theatrical and musical sub-genres, they would lack the simultaneous or multidisciplinary significance of a sound interpretation and visual installation.

Figure 26. Jobina Tinnemans. Panoramic Score, Fort Process Festival 2018 [71]

These growing initiatives can expand the professional landscape and visions of architects and curatorial exhibition designers alike, for they invite new inquiry into sites as canvases or gigantic music stands. The potential for site-specificity in graphic notation installation can activate any location's temporal momentum, where each viewer can have a different concert length. Sites far and wide may eventually become competitive to host a graphic score and concert. Electrical boxes, to manhole covers, to alleyway walls may become increasingly visible to musical artists and event programmers, as reimagined music stands.

I encountered the graphic scores of Felix Antoine Morin through one of the arguably most mainstream avenues in the art market: Satchi.com. (The commercial dealer sells approximately fifteen of Morin's works at a reasonable or even considerably modest price, average $2,000–a low cost for a lifetime of revisitation and reimagination!) His artist statement checks many similar boxes proposed in this dissertation, most cogently his desire to abstract materiality of sound, to unsettle the parallel relationship between notation and a corresponding sound or sound gesture[72]. With a background in electronic composition, it seems as though Morin's primary impetus to compose musicless graphic scores for an art gallery is to create or to heighten an awareness of existing sound, be it

[71] Fort Process is a one-day sound and art festival that currently resides in Newhaven Fort, East Sussex. The event is curated in a way that creates dramatic interactions between the acoustic and physical properties of that space, and the work presented in and around it. https://lost-property.org.uk/fortprocess/

[72] "Félix-Antoine Morin's graphic scores represent existing musical forms whose basic structures are drawn from his repertoire of compositions. Through a syncopated visual construction, by which he instinctively creates new connections between signs, he shifts the initial writing toward material abstraction."
Félix-Antoine Morin- Visual Art. https://felixantoinemorin.com/visual-art/

environmental or a memory stored in the body. From his Asemic Sound Mappings exhibition blurb:

> The sound environment can be real or simulated, outdoor or indoor, experienced or from memory. Sound is the medium we live in, and the effect of our acoustic and sonic environment on our lives is no less than the effect of air and water.
>
> These pictures are not a picture of a sound or a representation of notes. Each painting carries traces that will overturn all possible meanings, with every new look that comes upon it and every sound that accompanies it. -Melis Bektas[73]

Another investigation led me to the art of Mokha Laget. Laget's current exhibition "Visual Scores" (Fig. 28) seems rather derivative, and as a badge of context, makes arguably the most generic association to describe the work[74]. These two exhibitions indicate a wider recognition of graphic scores as a viable genre in the art space. Exhibitions like these are more common and establishing a greater dialogue surrounding the influence and metaphor of sound in an exhibition without sound.

Figure 27. Morin's *Partition Graphique Quarante-huit* (2021) from Asemic Sound Mappings exhibit.

[73] Bektas. pp. 2

[74] "The Visual Scores allude to a constellation of contemporary music notation initially pioneered in the 1950s by such composers as John Cage. Sometimes Laget draws a score based on actual experimental music, at other times she interprets the imaginary music in her mind" https://www.mokhalaget.com/copy-of-fresh-look

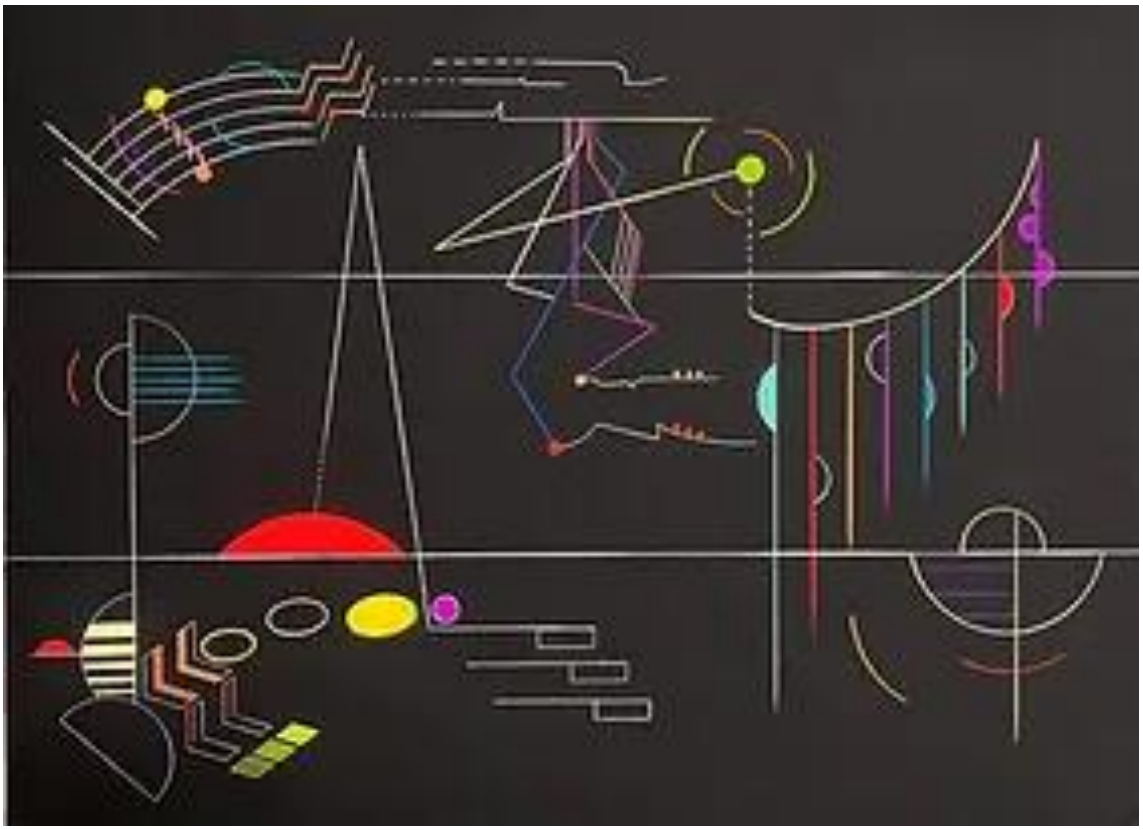


Figure 28. Visual Scores drawing by Mokha Laget.

The aforementioned *The Metaphysics of Notation* by composer Mark Applebaum is an exemplar work for connecting many topics discussed up until this point in the chapter, as well as the entire dissertation. *Metaphysics* is a piece similarly monumental and heroic in volume to Cornelius Cardew's *Treatise*. Applebaum uses representational imagery in an abstract framework, setting the piece aside from fully abstract graphic notation works and evoking a uniquely narrative quality, through its use of pictographic signs. He uses surreal combinations of familiar images and shapes, echoing the typographic collection "Wingdings." Many of the symbols carry cultural connotations, prior contexts, and give this piece a strong iconographic character. Hearts collide with human silhouettes between

wavy lines, flowers, tightly notated rhythms, blobs, stars, twists, and kaleidoscopic arrays. *Metaphysics* simultaneously conjures and further abstracts visual associations, by juxtaposing recognizable pictographs, thereby complicating the task of interpretation by performers.

As a featured performer of the piece, my experience was noticeably different from performing other graphic scores. The headspace that *Metaphysics* invites is very different. I saw the score and the venue as a site for investigating the psychological states induced, and their impacted on my improvisation. The use of icons made me think in surreal but more concrete terms– evoking lived experiences, displaced and transported to the performance. The combined linear and vertical arrangement of symbols punctuated frames of the imaginary.

Metaphysics' passages can be broken down into noticeably different chunks from page to page. Density is a striking feature of the piece, with many styles colliding in any given section. About his stylistic approach, Applebaum writes:

> The circle and the oval are far enough apart that they might appear atomic, isolated. Or, to use Cage's language, unimpeded. But, because they are connected by slender lines, we are compelled to see mutual belonging, a molecular constellation. Cage would call them interpenetrated, and their connection affects how we understand them and, presumably, how we might play them. [75]

This supports my theory of transformation from Chapter II. Transformationally speaking, the iconography gives clearer meaning to his abstract symbols, by contrast. Seeing clusters and textures liberated me from my encounters with tree branch or a snowflake. With such

[75] Applebaum, Mark, 'Reflection', in Daniel Leech-Wilkinson, and Helen M. Prior (eds), *Music and Shape, Studies in Musical Performance as Creative Practice* (New York, 2018; online edn, Oxford Academic, 21 Dec. 2017), https://doi.org/10.1093/oso/9780199351411.001.0001

contrast between icons, I could strategically move between different flavors of conceptual labors of interpretation. I used his shapes to inform my movement and my placement in ways that were only possible in this unique venue setting. Ironically, motific sound ideas were the least priority. They were a natural byproduct of the prompts I chose to engage. I had intuitive gestural responses to abstract shapes, almost as a relief from the constraining historical and cultural associations of the representational icons.

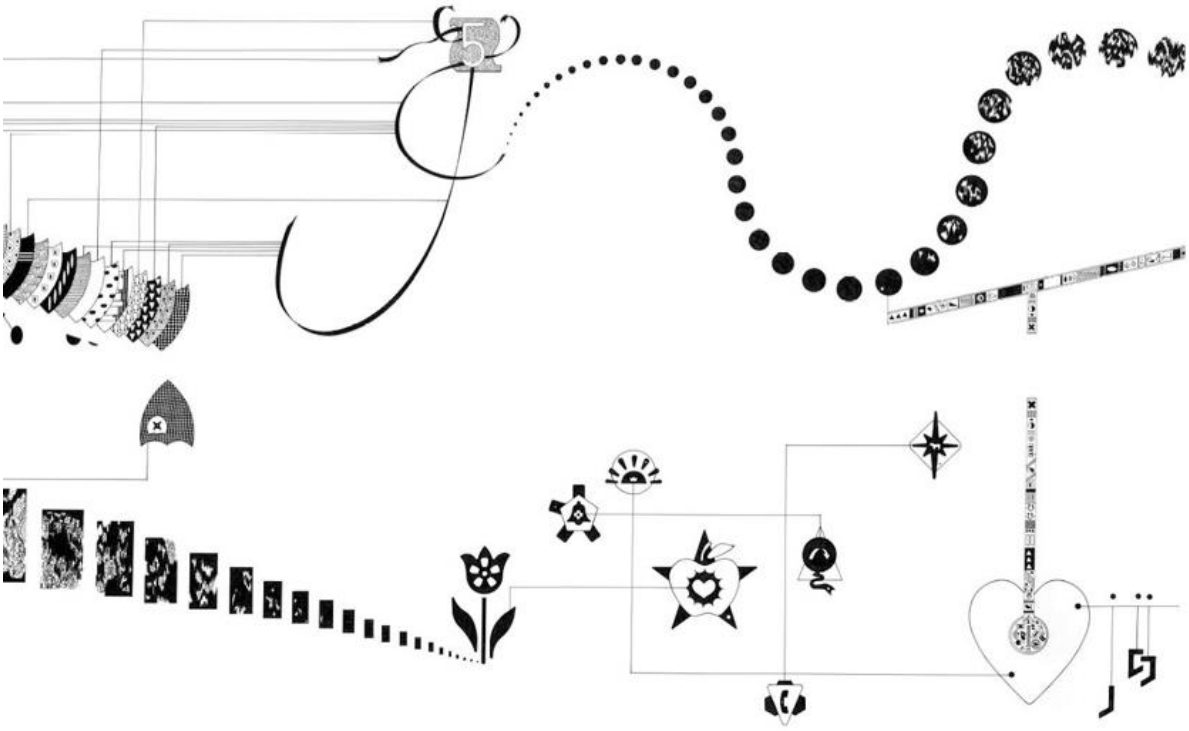


Figure 29. Excerpt of *The Metaphysics of Notation*

In *Handbook For the Metaphysics of Notation,* the composer speaks of his influence of traditional composers and his graphic notation's overlap with their traditions.

> But for both the inclined and the averse, my purpose here is simply to recognize the kinship that this kind of artistic adventure has with traditional compositional

> devices. Josquin, Bach, and Schönberg use retrograde; so do I. Counterpoint can be heard in the music of Palestrina, Brahms, and Ferneyhough; and while it may or may not be heard in *Metaphysics* (its sounds are left to each interpreter), it can be seen clearly there. My score and those of Frescobaldi, Beethoven, and Messiaen employ augmentation. Palestrina, Haydn, Wagner, and I are concerned with cadences. Sequence is common to Du Fay, Mozart, Chopin, and my score. The Metaphysics of Notation didn't invent the canon; it is found in Ockeghem, Monteverdi, and Nancarrow. [76]

His dialogue with classical composers emphasizes a fluidity between his and their notation. Notions of such fluidity could impact performers' who may strive to play *Metaphysics* "correctly " and could complicate their interpretation in many ways.

Measured at a length of 72-feet wide, the piece is divided into twelve large panels of notation + one hanging mobile, previously arranged around the mezzanine of the Stanford University Art Museum. The venue was crucial to the premiere of this work. Acoustics and architecture undoubtedly impacted the musicians' performances. Spatial parameters, marble flooring, daylight were constant during *Metaphysics* concerts. WIthout any governing rules for performance, players could naturally engage Applebaum's familiar pictographs, his abstractions, or the fixed physical setting for their event, in which their process of exploration was itself essentially on display.

Another facet of the work is the finite number of interpretations presented at a rate of one per week, for a total of forty-three weeks. Performances took place over ten months. This is an interesting encapsulation or a span of interpretation of a graphic musical composition. The results were compiled on a DVD featuring many of the performers. The variation between interpreters can further spin out the possibilities for interpretation exponentially. How does each performing musician take stock of their place in a collective

[76] Applebaum, pp. 300

of something so potentially infinite? Ten months' worth of performers brings up questions about hermeneutics of Applebaum's visual language, and of the synchrony/diachrony dichotomy. Does meaning change over the course of this exhibition?

Chapter IV: Creative Project

For this dissertation, I created a number of works that address the function and interpretation of graphic notation in multiple contexts and modes of production. They fall into two main categories: large-scale, immersive installations with several performance interpretations, and computer-generated scores which were improvised responsively in a single concert event. In January of 2021, I created three scores as large-scale paintings in the Human Resources Los Angeles art gallery: *Graphic Score for 2(x) in 6 Parts, Graphic Score Facsimile for 3(x) in 2 Parts,* and *Three, Full Deterred Silences*. *Graphic Score for 2(x) in 6 Parts* was performed by a duet of voice and bassoon, and featured in a livestream concert series entitled *Music For Your Inbox,* and subsequently recorded by two other voice+wind duets for comparative analysis. In January of 2022, I designed and installed *Obelis Kantus* for the UC Irvine Claire Trevor School of the Arts' outdoor Amphitheater, which was performed twice by student ensembles: an undergraduate quartet on March 8th, as well as a graduate octet on March 10th. In May of 2022 in Los Angeles, I hosted a concert based entirely on spontaneous notation, generated digitally in real-time by me, in response to an ensemble of nine players. The concert was divided into two 30-minute improvisations, both of which yielded approximately 115 iterations or pages of a graphic score.

Background and Motivations

A controversial aspect of my relationship with graphic scores is an original feeling that, "we shouldn't need these," specifically in free improvised music. I began using graphic notation as a self-identifying improviser with a problem to solve: a perpetually dissatisfied feeling with many group improvisations, particularly in academic / workshop / school scenarios. I felt a significant void of conceived structures, arcs, syntax, and general architecture in the musical conversations I was having. I wanted more, and I wanted clarity; compositionality. As a student of this work, I wanted to understand what would unleash a sound and feeling that my heroes inspired in me. I became increasingly intrigued with synesthetic connections and visually apparent metaphors for sound, namely spontaneously composed, abstract music. I continued to explore the depths of these connections and ways of organizing sound on paper using visual language.

As a tool, I have also found graphic scores to be useful for cultural reasons. At many points in the last twenty years in Los Angeles, I have felt like an orphan, in search of more centralized and meaningful contexts for the folkier aspects of my offerings that stem from traditions of free improvisation. This pushed me to make meaning out of unlikely scenarios (art galleries, art fairs, museums, mixed-genre DIY shows, rock clubs), and to almost insistently bring improvised music into alternative spheres and communities. As the ensemble leader of these projects, I was gradually losing the cultural expectation for a democratically presented trio or quartet of improvisers with a dedicated audience or venue (though such contexts would come and go). To organize these performances and my ensembles, my natural instinct was to make a simple plan using a visual road map. While I was not self-identifying as a composer, these scattered opportunities to make improvised

music in unlikely contexts were the beginnings of a developing practice, in which I was asked to present work as a leader, and a graphic score became an important centerpiece, inspired by the location, acoustics, occasion, and the collaborators involved.

When composing/designing my graphic scores, I begin by putting something onto the page and then shaping it into what that I feel other musicians can engage with. The type of performer engagement I am composing for uses improvisatory logic through a range in physical behaviors, aesthetic directions, and psychic motivations to permute a musical idea. By this, I mean that I am graphically encoding those possible relations that musicians commonly make with aleatoric scores. My graphic compositional process is itself a slow improvisation, as it is when I compose more traditionally. Rather than transcribing the melodies, harmonic structures, and rhythms that I imagine musicians producing, I am mostly transcribing, or *de*-scribing the actions or impulses by improvisers in my imaginary upcoming concert. Inherent in my exploration for new modes of interpreting notation is a lifetime of classical training, improvising, and ensemble practices, and I look for this shared experience in my collaborators. My notation points to a process, and that process is then refined by my visual design aesthetic.

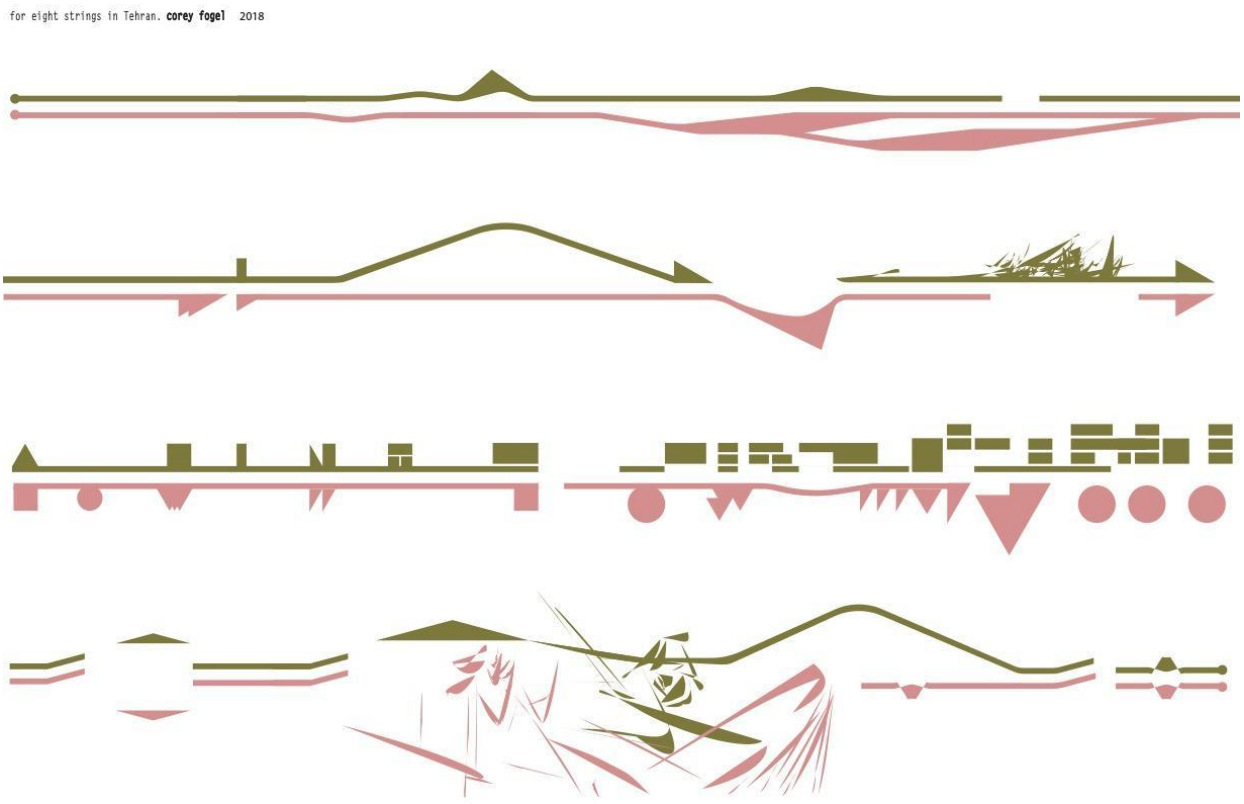


Figure 30. For 8 Strings in Tehran (2018)

In this example from an earlier work, *For 8 Strings in Tehran*, composed in 2018 for kamencheh and upright bass, two musicians are asked to read one color each. The two colored parts are composed of large and small visual permutations that form a syntactical narrative. When a shape is iterated, I am imagining every way that an improviser might iterate in their interpretation. Each way that these visual elements progress is an invitation for a performer to progress musically (sonically, gesturally). Every adjustment I've made can be associated with musical actions such as: trying different chord tones, inversions, substitutions, rhythmic subdivisions, syncopations, harmonics, timbres, bowing, and more. The connection between my technical illustrative actions in composition and the musical development in performance is foundational to my continued interest in graphic notation. Nearly every technical method used to develop this piece translates to the possibility of

discrete musical development between events. My access to and fluency with Adobe Illustrator forms the basis of my belief in the transformational properties of graphic notation. The craft is embodied, as I use a combination of keystrokes and mouse commands to shift a new instance of a shape however far from its original. If I shift another copy or shape even farther, I am considering the transformational value each shift could afford an improviser, whether technically or conceptually. In the example passage below, each cluster of shapes aligns differently than the previous cluster (right, left, center, random), and creating it comes with a physical imagination-from creating at fingertips to the visceral center of the body of a performer– simulating different possible interpretations of this syntax by different possible instruments.

Figure 31. For 8 Strings in Tehran excerpt

In the next example, a passage of clearly contrasting shapes between the two colored parts, used a technical strategy to duplicate and permute an object, and I was imagining what opportunity this holds for a musical dialogue between performers.

Figure 32. For 8 Strings in Tehran excerpt

These and countless other actions I have developed and deployed to create graphic scores made up my system of conducting the ensemble in my dissertation concert. Unlike the

improvisations I was imagining in my pre-composed, static scores, now I was using these tools to permutate notation in response to actual sounds made by the performing ensemble. The actions felt as though they had graduated or mobilized from a long and meditative process of practice, research and development, during the creation of static scores. However, while one small set of adjustments was previously deployed for a major development or monumental leap and a static score, now each action was responsible for micro iterations, as well as occasional dramatic leaps. For example:
progressions from page 9 to page 10 of the resultant score from ½ of my concert.

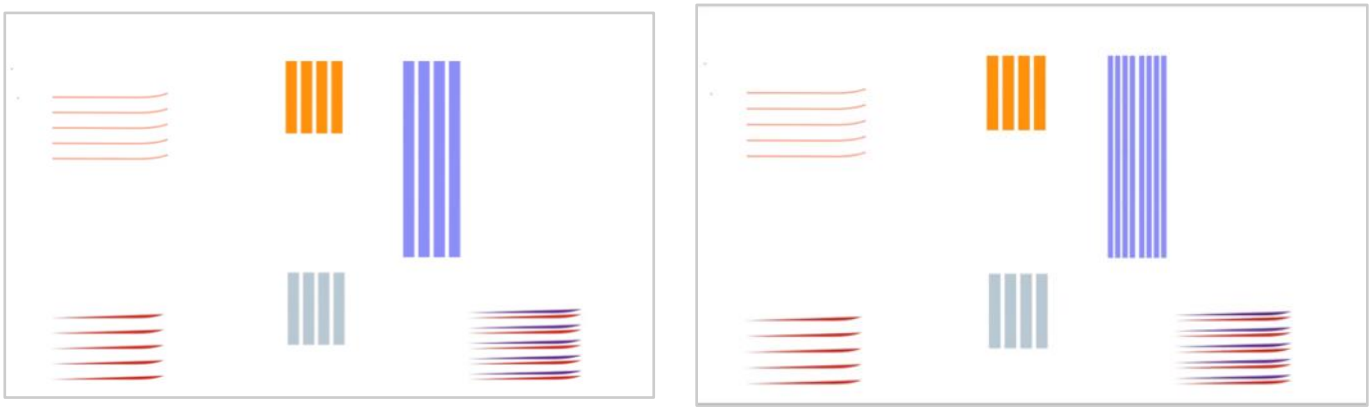


Figure 33. Dissertation concert score excerpts

Graphic Score Murals

The opportunity to test these aforementioned theories in practice began eighteen months ago, when I proposed to install a few original scores in a large art gallery in Los Angeles. I did not know at the time how valuable my proposed experiment would be, nor how clearly and directly the project would address my research interests.

For a call for proposals, I submitted an experiment I had wanted to try for many years- to blow up my graphic scores to "life-size," and situate myself in their presence, to ping them for possible meaning and purpose beyond the typical transaction of a score document printed and delivered from composer to performer. My proposal was accepted and I generated a digital score envisioned for the architecture of the venue, Human Resources gallery in Los Angeles, a place and a community that had nurtured the development of 15-20 wildly different works ranging from solo improvisation to ensemble to performance art over the last twelve years. This was a safe space that I understood both communally and architecturally, and would be most receptive to such an experiment. Using consumer house paint, I installed my single preconceived score, intending to create a vaguely studio environment for a personal dialogue with and reflection of my work at this scale. Being a musician as artist-in-residence in the gallery, I knew that I wanted to create scores at an immersive scale, in which to immerse or "live with" for an extended period of time, like a traditional visual art exhibition. This immersion addressed new and old questions about time and engagement with intersecting media forms.

What quickly felt less like a studio experiment and more like a fully realized work on the gallery wall inspired me to generate two more pieces for the remaining walls. At the same time, a long-time collaborator approached me about their new online performance series, which was also accepted into the same call for proposals at Human Resources. Their newly hatched Music For Your Inbox initiative wanted to fully produce a streaming performance of this new work. This was an honor and a rather serendipitous opportunity, compounded with this two-week residency in the gallery. While ideal circumstances might have welcomed multiple performances by variable ensembles, the pandemic dictated a

limited number of participants, as well as musicians who could safely perform together in one space for a video shoot, e.g., a partnered couple. This left very few options, but we were able to commission bassoonist Archie Carey and vocalist Odeya Nini for this streaming concert. This concert was a success and comprised one even more unusual component: *Music For Your Inbox* commissions a visual artist to create a piece of ephemera that all subscribers receive by post leading up to any streaming events. Inspired by conversations about rhythm and gesture, I asked a painter friend named Devora Levin in Toronto, Canada if she wanted to create a visual response to my score. I provided her with almost identical information that I provide to a musician and asked her to incorporate all the ideas we had discussed extensively about making work with the body.

At the mercy of the pandemic and within the constraints of the two-week Human Resources residency, I opted to commission two other interpretations of my score in a more traditional fashion, i.e., providing a digital copy of the score directly to additional musicians for recorded renditions. For the sake of uniformity and as an organizing principle, I wanted to use roughly the same instrumentation as the streaming concert. I wanted each rendition to be a vocalist and a woodwind for a control variable. The second duo was composed of vocalist Shelley Hirsch and saxophonist Sam Weinberg. This was done in a recording studio in Brooklyn, New York directly after we had recorded as a trio, which may have impacted their reading of my score. The third and final duo was composed of vocalist Luisa Muhr and saxophonist Daniel Carter.

Figure 34. *Graphic Score for 2(x) in 6 Parts.* 2021

Graphic Score for 2(x) in 6 Parts. (2021) is read in a mostly traditional way, which is left to right, and top to bottom. The piece is composed of six short movements. Individual or pairs of musicians are assigned to one triangular cell to follow throughout, either top left (crimson) or bottom right (periwnkle). Situated diagonally, this stacking of parts explores both a non-hierarchical and non-symmetrical relationship, and from left to right, progresses in terms of dominance and subordinance. Only at the midpoint of each movement are the parts equally hierarchical and equally symmetrical, something that no traditional score can ever do. While this arrangement was originally intuitive and aesthetically derived, it led me to consider, and ask performers to also consider questions of meaning, such as: What is the difference and subsequent impact on your reading of

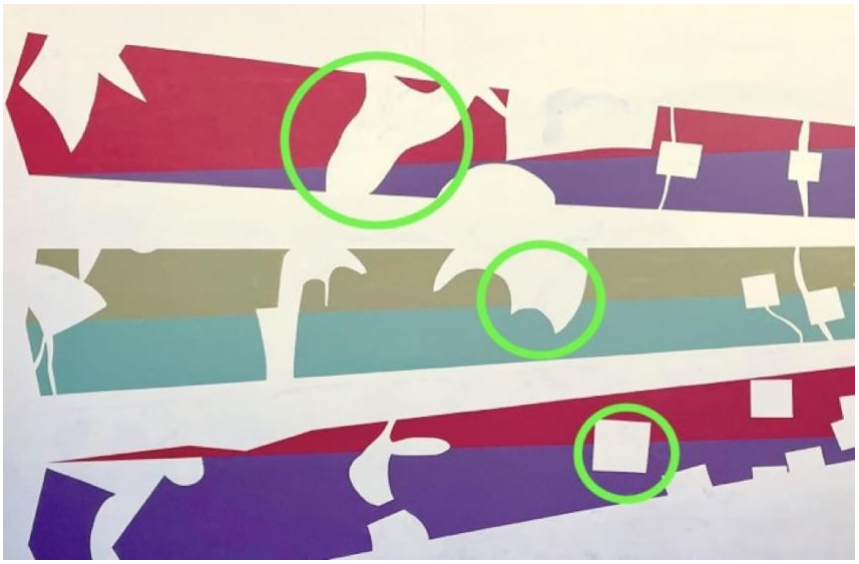
orange notation on a periwinkle background, compared with black notation on a white or beige background? The answer could ostensibly give more weight to the aesthetic value of traditional notation, which is largely codified and unquestioned by performers. How differently can a performer interpret the piece if its parts are stacked on top of one another, or side-by-side? Does a diagonal orientation reduce or reinforce feelings of dominance, hierarchy, or ordering a musical score?

To continue investigating this new setting for graphic scores, I proposed a new mural piece, entitled *Obelus Kantus,* for the blank white backdrop to our CTSA outdoor amphitheater on UCI campus. I wanted specifically to expand the length of exhibition, and to expand and test a new context / audience. I wanted to enliven the campus with public art, and to give the student body and faculty an opportunity to engage with an inviting yet unfamiliar system of composition, and perhaps learn something new. Multiple faculty thanked me for bringing the music school together as a community in a unique way, and one undergraduate described how they would hang out near the mural frequently, and when it was gone, that "everyone is bummed."

Figure 35. *Obelis Kantus,* 2022

The function of this piece has three primary features. I noticeably divided the composition into three consecutive parts or movements, and each part is divided into two colors. The composition is meant to be read from left to right, and from top to bottom. Musicians are asked to interpret the white symbols as notation, which inhabits each color region. Each color is assigned to Individual musician or groups of musicians. Color assignments are meant to be discreet. If two or more musicians are assigned to one color, then they will likely be of a similar instrument family, and their task is to interpret their colored region as a team, approximating some sort of "unison" in their realization. If white

notation overlaps multiple, colored regions, then musicians are asked to consider how their interpretation can be collaborative, and how it can reflect the proportions of white on multiple colors (Fig. 37, circled in green). If connectivity between multiple white notations can be gleaned vertically, then musicians are asked to consider this relationship between movements and how this might impact parameters of memory, theme, and variation in their interpretation. (Fig. 36 circle in purple)



Figures 36; 37. *Obelis Kantus* closeups.

Compared with *Graphic Score for 2(x)*, *Obelis Kantus* does use a vertical hierarchy or stacking arrangement of musicians' parts or regions. However, the tilted angle of cellular containers 1 and 3, combined with the 180 degree horizontal division between colored regions, asks musicians to consider a shifting progression of dominance between parts, in which they may pass the torch from one to another, using the shared / overlapping notation to their collaborative advantage. For example, at the beginning of the piece, at the top left, the red region is predominant, with only a sliver of purple, and by the end of the first movement, this relationship is reversed. The shape of the tilted cells eclipses portions of the colored regions in order to give interest to their presence. Musicians may observe and interpret whether these regions feel complete, omitted, dynamic

In performance, I got two very different results. I deliberately separated undergraduate students from graduate students, in order to highlight a contrast in experience level and aesthetic interests, at least superficially, as dictated by the scope of our respective academic programs at UCI, as well my familiarity and engagement with each participant's work in our community. I deliberately created one quartet performance and one octet performance to test the parameters of my score. I was appreciative of the fact that my undergraduate students were less bound by genre, evident by the fact that they explored more jazz and rhythmic ideas. In contrast, this to me highlights the way freely improvised music is often stylized or even stigmatized. The graduate students, including myself, while we spoke of our developed timbral language of and exploratory techniques, and brought a wealth more experience composing and performing aleatoric music, there performance was, in a way, a more expected result. I am unsure whether I favor one or the other.

Computer Generated Scores

The final portion of my creative research developed very gradually, but came together very quickly after a long marination. Since 2018, my goal was to create a real-time experience of directing an ensemble with dynamic notation. Using entirely abstract notation, or mixed notation in a graphic framework, I wanted to maintain a refined visual aesthetic that typifies my work in video, performance, and design. I began to draft an app which I titled "Conduict" (conduct + conduit) which combined traditional music software and graphic design tools[77]. I would design and oversee the functionality, and with outside programming help, an authentic and personalized tool would evolve. When pre-existing software tools were suggested to me, I thought they would be lacking in multiple areas. I did not think any existing software tools could generate spontaneous notation as I envisioned in this mode of experimental conducting. I thought pre-existing tools would limit my materials to pre-composed and curated slides of graphic notation, or a set of smaller finite excerpts to manipulate. I wanted the granularity and the genesis of notation to underscore the need for a conductor/operator/participant, more than a distributor of precomposed, incremental graphic notation images (a chunked-out, subdivided, slow-drip (if modular) score) I did not think that conducting in such a way would produce new knowledge. In other words, I did not think this method of research could be particularly rich nor generative.

For a telematic class performance in December 2020, I did prepare and curate chunks of a typical score as finely as possible. While Michael Dessen's course was open to different creative approaches to telematic music, I took it to learn the current technologies

[77] See Appendix E for mockup

for real-time sound collaboration (during a pandemic), and score-reading felt like an extra layer outside of my scope. However, I precomposed seven additive iterations of a score for a Google Slides presentation, to intermittently reveal them in response to an improvising quartet. I used Zoom to share this slideshow, and Sonobus software for audio conferencing. Shown here, iterations #1, 4, and 7:

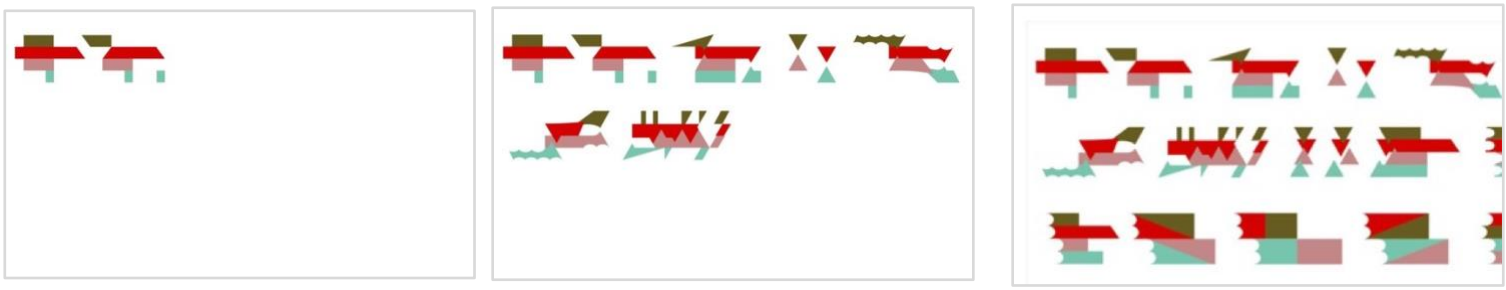


Figure 38. Triptych of untitled telematic Google slide score.

This method allowed for limited spontaneity. I had seven 'moves,' or responses at my disposal; an arbitrary predetermination for exploring this process with the quartet in a twenty-minute class performance. The performers did not know that number, but knew an approximate duration, and the overall gist of the additive score on a single page.

In retrospect, I could have divided this progression more finely, not only to include singular shapes, but even smaller portions of shapes. This performance was a slowly scrolling progression, reading left to right, top to bottom. These iterative chunks did not reflect the usual breadth and temporal space imagined in my static scores. However, the segmented toolkit quality was something I've wanted to explore with dynamic conducting.

At the time I did not think this iterative method would have a critical impact on my creative process for finished scores. I grappled with notions of impermanence or ephemerality compared with tailoring and revising visual compositions to be beautiful or

at least complete. At the time there was a unique, new feeling of disconnectedness from the notation, as it was made serve a function in the moment of the performance. After rendering and curating smaller utilitarian bits of notation, I realized that in contrast, the craft of refining and completing my visual scores, reflects an uber romanticization of refined and complete (compositional, transcendent) free improvisations. I investigated this new awareness and expanded my practice as I worked toward a more advanced method of real-time notating for my final concert.

I tried to develop a Max/MSP patch that would send different parts to different players, but I felt that would omit the visual interactivity that is generally evident *between* parts on a single visual plane in my scores. Building upon the previous telematic experiment, it occurred to me to stream a single image file that I was constantly manipulating in Adobe Illustrator. After many attempts, I streamlined a method of updating performers' scores, without pre-composing any notation materials, and without them seeing the guts of my saving and shuffling new iterations/files. I realized that in Apple's proprietary Preview image viewer, I could open an Adobe file, and each file Save in Adobe Illustrator, would update and display anew. This hacking of basic tools felt the most authentic to my fluency and skills for making scores. I could use all of the tools that have informed my aesthetic decisions in my notation. While I did not favor the larger iterative subdivisions for conducting, my scores have iterative qualities which are naturally derived from the tools in the toolkit.

As an ephemeral form, this new method lacked a foundational element of my static scores, which is the refined visual symbolism used to convey a romantic ideal for improvised music. In other words, this notation improvisation left no room for the usual

revisions in creating a score, and as I analyze the resulting ephemeral scores, they continue to impact my sense of producing a work which wawa always inherent in my scores. In my concert performance, the usual revisions to a score became the actual responsive iterations, necessary scoring materials for performers to interpret very differently compared to static scores. Revisions became integral to the overall process, had a greater sense of purpose, as they were happening responsively to the group, not in my own creative vacuum. My scoring process has evolved for more than a decade, and I have thus internalized the available modulations capable with Adobe's tools as metaphors for syntactical musical development. Each edit with Adobe Illustrator became a momentary experiment with the tools and with the sound that the ensemble gave back. If I tried something on screen and I did not like the musical result, I could undo, or forge ahead with another iteration. If liked something sonic or visual, I could pause and let it sit for a moment, or take that opportunity to participate more as a drummer, but, ultimately, I could not be precious about any given iteration or any graphic form. At the same time, as a basic principle of authorship, I felt a responsibility to each iteration in the way that musical improvisers are often taught that 'there are no mistakes', and to honor and cultivate all of the material we generate; to treat it as usable.

Schematically, the two halves of the concert functioned differently. In the first half, the nine performers were assigned one of nine colors of notation to follow and interpret on a white field. In the second half, the canvas was divided into four colored quadrants, and notation appeared only in white. Between two and three musicians were assigned one quadrant, to share notation, like Obelis Kantus. AlsolLike Obelis Kantus, notation could overlap regions and have implications for musicians to share it proportionally. If a notation

is 90% contained in one quadrant, and 10% spilling into another, then those proportions can be directly applied to collaborative listening between players assigned to those quadrants.

Figure 39. Excerpts of dissertation concert score #2

In piece#1, interaction between symbols felt more deliberate or apparent. They would entangle and overlap one another. At times I would adjust colors of notation to reassign it to another player. However, the majority of the interactivity seemed audibly represented by different colored symbols' *proximity* and *proportion* to one another.

On My Relationship To The Score

Perhaps the strongest takeaways from my dissertation concert pertain to the way that I produce a graphic score, which, as I have distinguished, has always felt to me like the envelope or the vessel; the finished piece. Contained in this vessel are all of the parts of the journey from beginning to end of a performance. The score to me has always felt like a window into the dimension of sound and creativity that is made manifest by musicians who play it. A specifically graphic score feels even more like a portal to me, because the tradition and context of performance is mostly different from fully notated music. We can rely on the fact that we will hear something new each time a graphic score is performed.

This particular journey was new for me, controlling the score impulsively and responsively. I had not previously conducted an ensemble playing my graphic scores. Conducting, for me, has early roots in the musics of Butch Morris, John Zorn, and Lukas Foss, to name a few. I had the opportunity to hear Butch Morris speak about his conduction system in my undergraduate jazz program, but somewhat serendipitously as he was part of an unrelated concert series and his ensemble at the time was entirely traditional Korean instrumentalists. In the final stretches of my research, I find myself comparing my language to Butch's and wondering exactly how he got his desired, boisterous results. In talking to

early participant Shelley Hirsch, he did not rehearse his improvised conductions. I can recall a sort of demanding or stringent tone to his lecture in the late 1990s, and have heard similar echoes in his later lectures I have found on YouTube. I have to wonder if a certain rigor of sense or constraint is missing from my conducted, generative notation practice? His improvisers all seem to use what he gives in an audible way that I still feel is missing from my work. A fundamental difference between Morris' conduction is that he is using his body in performance, based, at least loosely, on the roles of a traditional conductor. He used a baton. He executed familiar "downbeats" and gradual transitions, among many other gestures. The basis of his system is the body, and his visual information is gestural. I have tried to embed viscerally relatable information into my notation, but, by comparison, how the body (of participating performers) enters my visual domain and engages my notation is seemingly not as direct as a conductor whose physical actions are in the most general sense, a mirror of their ensemble. What I deliver offers its own set of unique experiences and prompts, but the music made in many of Butch Morris's performances give me reason to compare and contrast how we get our desired results.

I was fortunate enough to witness John Zorn conduct his *Cobra* performmances with an ensemble of influential heroes on two separate occasions, in 1996 and in 1998. I also learned and performed it under the tutelage of Willie Winant, one of the only colleagues rumored to be "allowed" to share and/or conduct the game piece under Zorn's expressed approval. I understand and have synthesized the organizational methods and performer/composer agency behind *Cobra*. The ways that *Cobra* is divisible into frames / cells / file card cues like many of Zorn's compositions are, on one hand, influential on my graphic scores, and, on the other hand, not divisible enough to have a direct impact on the

number of iterations I produced. In *Cobra*, I have been particularly sensitive to the difference between participants spontaneously composing and simply perceiving a green light to make [sound]. However, what has always resonated more strongly and what feels central to my spontaneous notation process is John Zorn's *Theatre of Musical Optics.* In this body of work, Zorn typically hosted late night, solo performances, seated on the floor of his own apartment. He worked with an obsessive collection of tiny objects which were positioned inside the cells of a large grid on a tray, and assembled them into various combinations or sets on a narrowly lit black stage. Each piece had a certain order and sequence according to how objects fit together to create a set. Each set remained on the miniature stage only for the preparation time of the next assemblage. While the mode of production, the materials, and timing are entirely different from my own, the real-time preparation, execution and delivery resonates directly with my modality of preparing sequential slides, largely dependant on either geometric or spatial logic of shapes interacting on my screen. Additionally, Zorn's concepts of *metaphorical music* inform my impetus for modeling collective improvisations with visual symbols for performers to interpret. In Zorn's own words:

> I began working with the concept manipulating physical objects that I found, or that found me, as if they were musical notes. […] if you can make art with sound, can't you make music with objects, or something visual?[78]

This and countless other ideas that form the foundation of Zorn's practice have left an indelible impact on my conception of sound, objecthood, and eventhood.[79]

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[78] Sanders, Jay, curator, Whitney Museum. Rituals of Rented Island: John Zorn. Whitney Museum interview for *Rituals of Rented Island: Object Theater, Loft Performance, and the New Psychodrama—Manhattan, 1970–1980 Oct 31, 2013–Feb 2, 2014.* https://whitney.org/media/240

[79] I do not focus on his work in Chapter II because his original notation forms can be generally characterized as cellular instructions, using a functional mix of traditional and graphic music symbols and

> I realized that an object in itself could be seen as a solid sound. So I began to think of sound as something physical, as particles moving in the air. And if you took a microscope, and could actually see these particles, you would be able to see music. So it's as if I was enlarging each particle [...] so that it has color, and shape and form, just like something musical has. That's what Kagel led me to, and that's why he's so important for me.
>
> In playing the saxophone, I'm involved in composing music for improvising musicians, which is something similar to my optic pieces, it's setting up situations and relationships, dealing with the very basis of improvising: what is it, to improvise, what kind of relationships are created when you're playing with three people, four people or five people? And taking advantage of every possibility [...] of every single combination, structurally.[80]

One other clear referent from my thesis concert operation is the composition *Zoom Zoom* (2007) by Christian Marclay. In this slide show piece, a vocalist onstage interprets photographic images projected on a digital screen, which feature a word or an onomatopoetic string of letters. The performer may recite, embellish, and improvise on each image. Marclay chooses sequential images responsively, and at an irregular time interval. The interactivity between composer-conductor and performer aligns with my interactive improvisation with the ensemble in my dissertation concert.

text, connnected with various sequential approaches, either conducted or illustrated on the page. For more information, see Windleburn, Maurice. *Formulating a 'cinematic listener' for John Zorn's File Card Compositions.* SoundEffects vol. 8, no. 1. 2019 https://www.soundeffects.dk/article/view/115032/163425

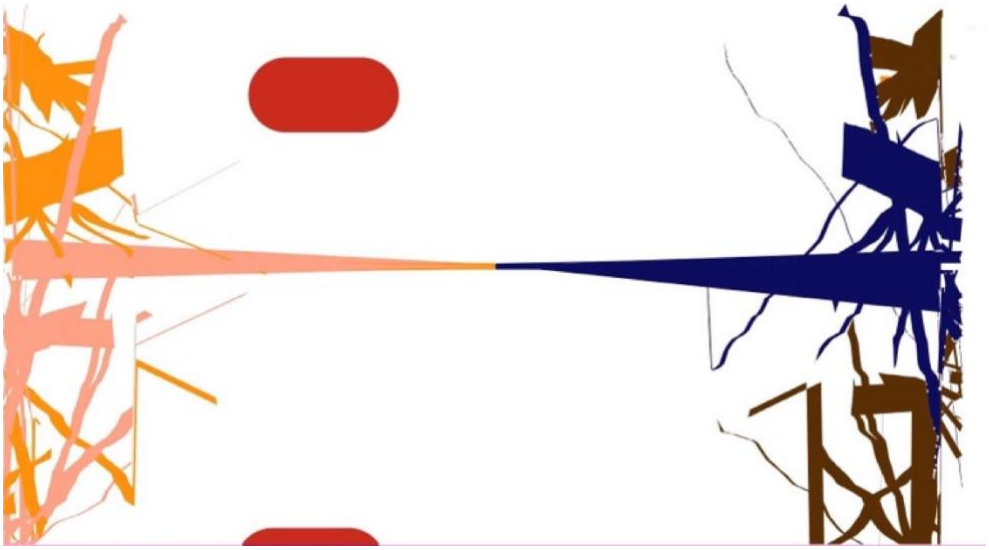
[80] *John Zorn*. Italy, Materiali Sonori Edizioni Musicali, 1998.

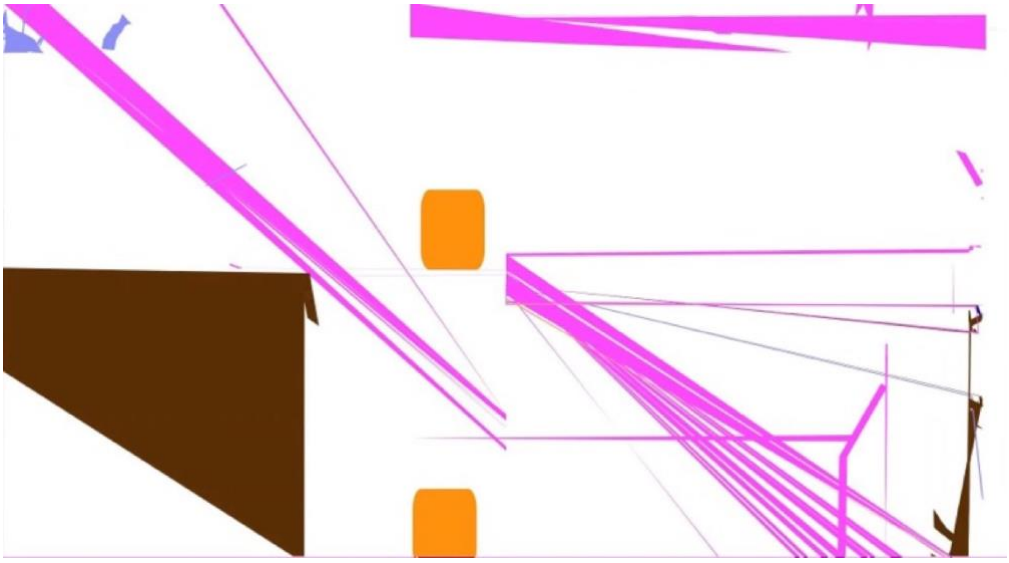
Figure 40. Christian Marclay & Shelley Hirsch performing *Zoom Zoom* at the Museum of Contemporary Art of Barcelona, 2007.

On The Function Of The Two Scores In Practice

Perhaps the first characteristic that stood out while generating my interactive score in performance, was the unpredictable length. Both pieces in my concert were coincidentally ~120 pages in length. The reason for this number was different in each performance. Piece number one was more of an icebreaker; a mediated experiment; learning the ropes and starting with a sense regularity, exposition, not unlike Zorn's *Theatre of Musical Optics.* I believe that my pace in this first performance was to establish a balanced usage of all the tools at my disposal, and of the members of the ensemble, as we got to know our sonic character as a group and delivered our collective improvisation to the audience. By the second half, it was audibly clear that the ice was broken, and a level of comfort had set in. Speaking broadly about piece #1 vs. #2, what I could hear as the ensemble leader was an increase in creativity and investigation of each bit of imagery that I

sent. More exploration and development of each notational passage by the group meant that I then felt freer to pause, relinquish the anxiety of task manager, a focus on more creative responses in dialogue with the ensemble, sometimes with drums. This meant that despite more pauses, there were, in contrast, also more intentionally dense moments of modulation by me, and I would quickly move through several iterations rapidly. This felt comfortable and authentic to the interactivity I was seeking from this concert. This is all to say that the accumulation of ~120 pages had a very different intervallic, temporal, and aesthetic meaning in piece #1 than piece #2. Piece #2 felt considerably more organized and more grounded by the four quadrants system referring to teams of 2-3 players.





Figures. 41; 42. Excerpts from piece #1 of my dissertation concert.

Reflections On Visual Schema

Visually speaking, I found the primary formal components of my second schema to be aesthetically relatable. The stasis of my four color-coded quadrants, combined with the uniformity of entirely white notation, were equally simplistic, overarching features of piece #2. Whereas piece #1 was a bit more unwieldy visually. Within the schema I designed for piece #1, I chose nine colors for nine musicians in order to differentiate parts as clearly as possible, rather than be precious or "design-y" with my ideal color choices, which I felt could have confused musicians based on any number of technical factors (their vision, the lighting at their location on stage, or the clarity of the laptop or tablet device they were using.) For my usual standard of design and aesthetic, the nine colors I chose were a hasty compromise; functional only. As irrelevant as it may sound, this actually impacts my feeling of connectedness to the compelling art object set out to make, and this is a longer discussion about my personal synesthesia and impetus for making this work. This is all

very telling and deserves much further exploration in terms of what I am after as I composer and what ephemeral interpretations of this type of notation means to me.

Looking back on the two resulting scores from my concert, I think the notation I used was truly spontaneous, and I see major differences in style between this and my newer wall scores. The shapes in each have some overlapping qualities, but many divergent qualities also. My static scores have more solid shapes, with more curvature and attention to perspective. As a more fleeting and ephemeral toolkit, my dynamic scores had many more lines, skinnier shapes, and a different, perhaps more drastic feeling of directionality and immediacy in its trajectory. I believe this was reinforced by the many iterative *progressions* of lines and shapes, as I tried to move the music along, perhaps anxiously, with as many permutations as I could come up with. In this way, both visual approaches to notating ask the question: "How can I create syntax?" (or "difference" or transformation). I am trying to show momentum and development, and the two polarized modes of production answer this question differently. In my static scores, I intend for them to contain, potentially "all" of time, and depict a scenario that accounts for the before and after the happening of a performance. To me, they clearly encode the production– the slow and gradual process of refinement and completion that I touched upon in the beginning of this chapter. They broadly illuminate a fat, all-encompassing moment. They represent a monumental event. My dynamic scores, on the other hand, exist perfectly and only in time with the concert performance, and the two are inextricably linked in a different way.

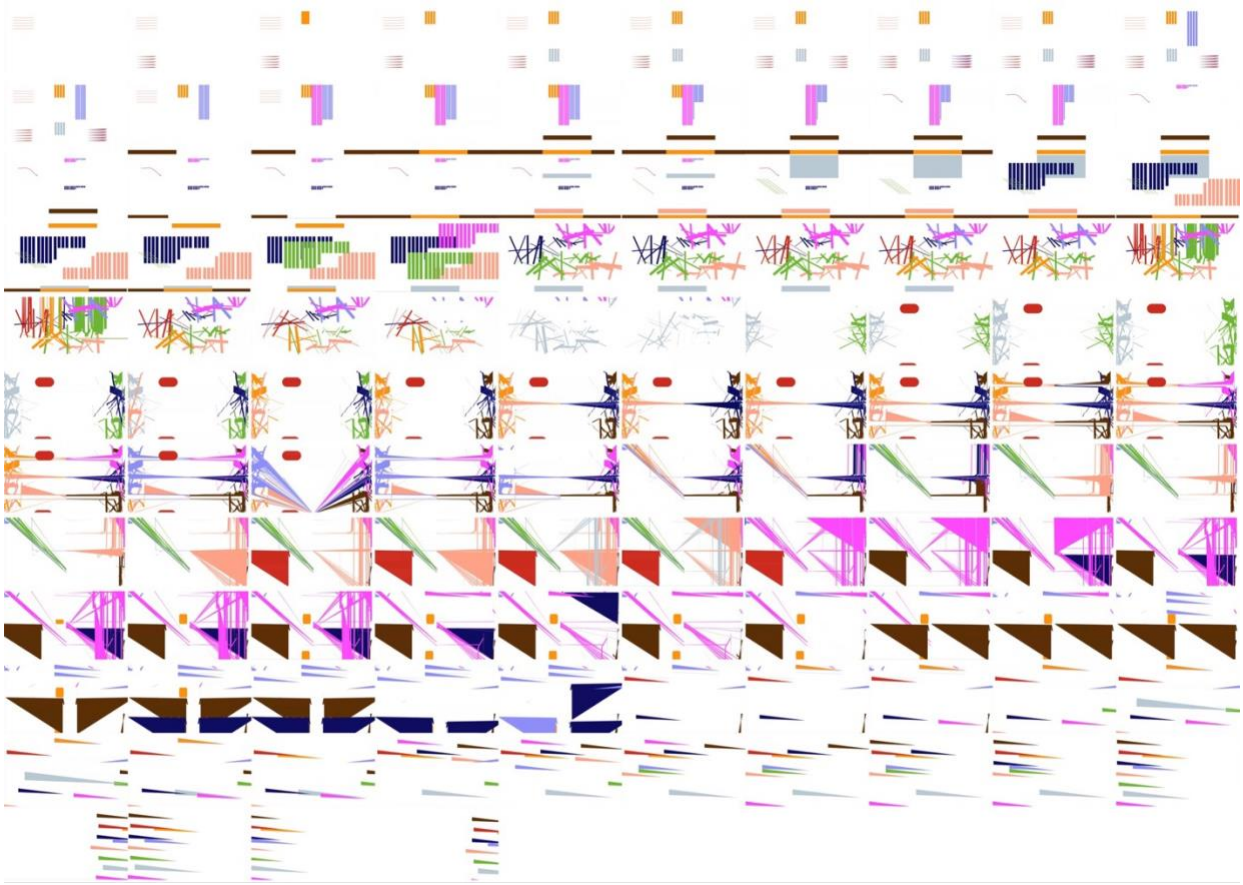


Figure 43. Contact sheet of 114 pages iterated for 1st half of dissertation concert. For entire score, see Appendix D.

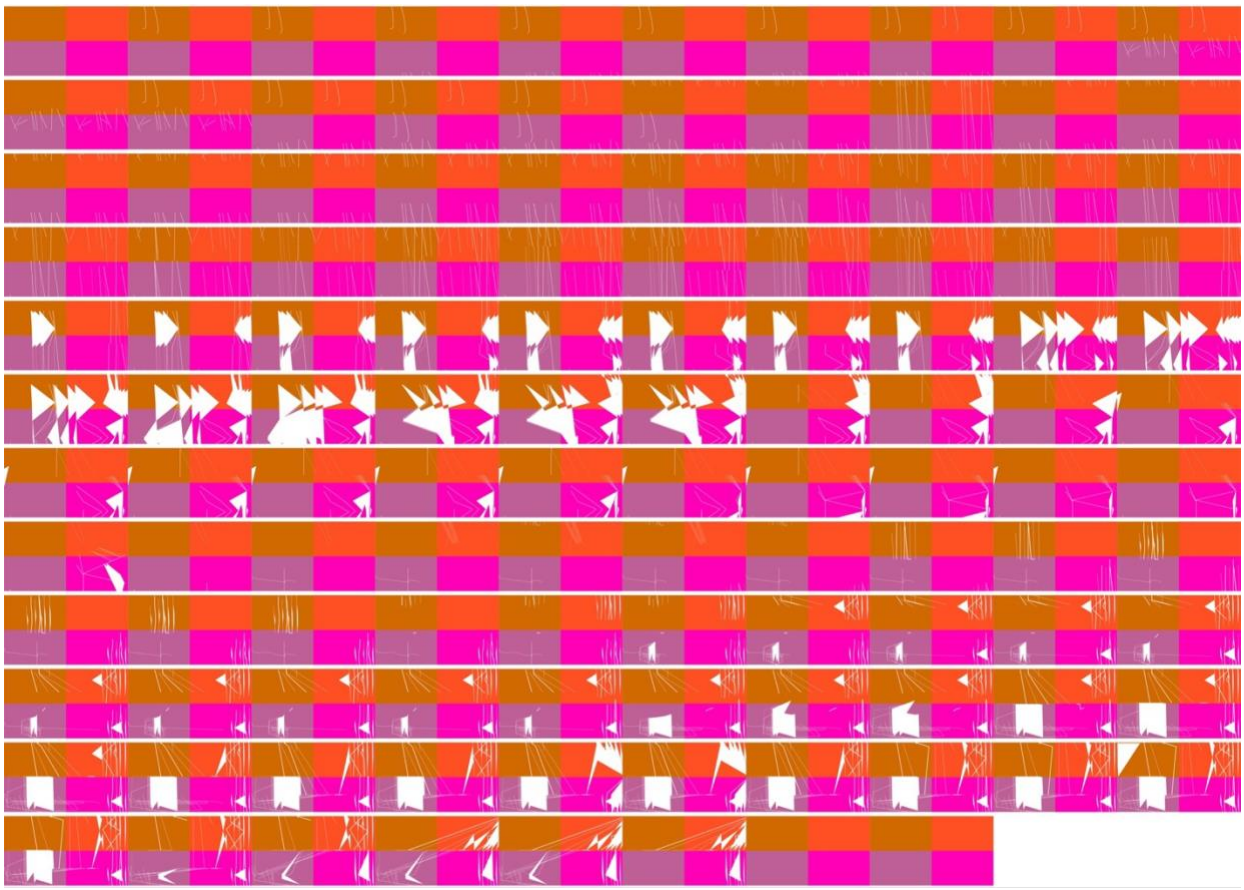


Figure 44. Contact sheet of 118 pages iterated for 2nd half of dissertation concert. For entire score, see Appendix E.

Reflections On The Music

Musically speaking, I believe that, on a basic level of analysis, I got what I asked for from my ensemble. Everyone contributed color, expression, collaborative listening. Conceptually, aesthetically, I don't know if I think of our collective improvisations as synergistic. I think as a group *activity*, there was certainly synergy, and I think it took a certain type of dialed-in, collective patience or restraint for everyone to listen and find a voice in a constantly evolving group idea, especially with the erratic adding and subtracting of instruments in my conducting. I think the musical summary of this ensemble openness was a sort of musical aesthetic neutrality. By this I mean that I rarely heard anyone taking

hold of anything strikingly motivic. I heard mostly 'green light' = sound, and 'red light' = no sound. I thought that in both pieces, I experimented with what I thought could be read as wildly different motivic ideas in my notation, and the collective ensemble voice was largely a drone or a "soup". I think this could be a flaw in my notation concept, and that perhaps i provided too many options from start to finish.

In piece #1, I heard, to my liking, less uniformity in sound, more independent gestures, and more singular events. I believe this was a sort of independence that could be heard and felt throughout the ensemble, compared with piece #2 which afforded players more opportunities to collaborate and coalesce sonically and gesturally, due to the quadrant system I discuss in the previous section of this chapter. The overall feeling was that people saw their cues, and made sound. I didn't hear many group ideas. I heard occasional motifs and some intentional, single gestures, but, even the single gestures sound, to my ears, like incidental, momentary events occurring in brief window / chance to slip in, amidst the group droning- in other words, a lucky punctuation or an interjection, as opposed to motivic development which I may have presumed or may have felt at the time was obviously modeled in the development of my notation. I also feel that my valuation of the music we made indicates the limits of my own listening, and points to my true goals in making improvised music. It brings up questions such as: What am I seeking as an improviser? What am I seeking as an ensemble leader (conductor, composer, organizer) of improvisation?

I feel that there is almost no reasonable way to evaluate good or bad choices. Ultimately, this concert reinforces that my personal aesthetic preferences are embedded in the logic of my notation. How I cook, how I dress, how I joke, how I improvise, and how I

compose are all very much “me.” I am motivated by my favorite feelings and at this stage of my career, in this particular type of creative research, I’ve committed to relinquishing those preferences since I do not have the funding nor the framework to workshop what I am exactly what I am seeking throught this type of composition, yet. This also reinforces the feeling of a binary 1) a teachable method / language of interpretable signs for a wide age and experience range of improvisers, improvising as a process, and 2) working up distinctly composed indeterminacy with trusted and likeminded collaborators. The outcome of either of these would truly determine the potential of this notation. At this stage, its still too ephemeral, and I’m learning, from this concert, that either my experiment was something entirely different, or, that I’m willing to accept that may have required more rehearsal. Not organizing repeated rehearsals speaks to my romanticized trust in the improviser, who uses these pieces as inspiration to do what an improviser does, however, the outcome of the music sounds more like they were dutifully serving the scenario: composer Corey furnishes notation to interpret in order to make a piece, which happened to be on-the-fly, not refined. what ultimately happened was more process than product.

I know that the performance in my concert not precisely what I'm looking for, beyond natural moments of serendipity, and that is a major reflection for how I will treat this method of composing and improvising in the future. it also genuinely reinforces my controversial ideas about abstract notation being propositional, theoretical, and "impossible" as a set of musical ideas that can and cannot be conceived and 'accurately' realized, the way I am thinking of them. As a fussy artist with a voice, I can only work so hard to reconcile the process and the desired product. This experience brings up new ideas

that binarize me role as "composer" and "architect" (of facilitator), one of whom is seeking a product, and the other, relinquishing desired product-results in favor of process.

Weaving Between Sound And Vision. The Combined Art Object

I improvised these dynamic scores, both thoughtfully and also hastily, in whatever stylistic way I could under the circumstances. The visual details of the concert scores are more tit-for-tat with the ensemble interaction– they make a sound, I make a new adjustment, sometimes to a nervous or fidgety extent, or need to remain active. As such, it brings up new questions of authorship and of responsive, collaborative improvisation, because of my functional pace of trying to move things along. It is possible, given the types of musical responses I often get from static scores, that my efforts to shape and move musical ideas forward were futile, and might have made no real difference than a much slower pace yielding a much shorter score with half the pages. In that sense, my pace and the resulting number of pages mostly describes my own listening and psychic energy as a performer/conductor/ composer. This is all a highly subjective, illusive, or what I like to call a “forced marriage,” difficult to evaluate in terms the notation and the music’s actual *coalescensce*. The aspects of my schema that can demonstrate clearer moments of unity between the sound + vision, and therefore an efficacy of my notation, are the addition and subtraction of entire colors (piece #1) or entire quadrants’ notation (piece #2). Other clearer relationships between the music and the notation were highly contrasting passages from tiny bits to large shapes; extreme density to extreme sparseness. However, the majority of my explorations could be taken as fairly arbitrary in the way they impacted the music and vice versa. Or, they could also be perceived as clearly contrapuntal, independent

streams that widened the dimension of this multilayered object, as opposed to an inseparable, unified multifaceted form. I do not expect this concept to be explainable in plain terms. [81]

[81] This discussion is of a more philosophical and ontological nature, suitable for deeper investigation in the future. See Wolterstorff, Nicholas. “Toward an Ontology of Art Works.” Noûs, vol. 9, no. 2, 1975, pp. 115–42. JSTOR, https://doi.org/10.2307/2214597 and Anderson, James C. *MUSICAL KINDS*, The British Journal of Aesthetics, Volume 25, Issue 1, WINTER 1985, Pages 43–49, https://doi.org/10.1093/bjaesthetics/25.1.43

Summation and Conclusion

This experience has reinforced that the scholarly study of graphic notation is highly chaotic and will continue to be for a long time. Attempting to apply dissertative order to a completely subjective and emerging modality has been one of the most challenging things ever, along with a naive refusal to admit this to myself for most of the period during which I conducted my research. Abstract notation is entirely, wholly, intricately woven in and around itself and every implication it has or could ever have on language, and signs, and sound, and art, and cognition. Its effects on known cultural signifiers is a metaphorical lasagna of invasive species, in that it cannot be contained. It is boundless, and this dissertation was an attempt to tease out and cobble together some of my favorite, most confounding, and most stimulating attributes that I feel could push it forward with new and atypical recognition. I wanted to break apart graphic scores from graphic notation, spill the contents out on the floor, and create a constellation of phenomena and affordances across contexts, before repacking the notion of the score and notation, in a graphic domain.

A few points of serendipity have arisen through the reflection of my creative research. Though my focus has naturally undergone many iterations of narrowing and refining, the gestalt of my iterative scores intertwined with the resulting ensemble improvisation hearkens me back to the original motivation to explore graphic notation as an ontologically defiant phenomenon. Truly, for me, the result of my concert is more than simply a multimedia object. When I describe moments of sound or vision, those are distinctions in name only. My perception ultimately, genuinely disregards which media form is which, and looks at the intensity, dynamics, and pacing of each component

intermingled in this project. Secondly, what I am left to deal with in the two concert artefacts is similar in volume to both Cornelius Cardew's *Treatise* and Mark Appelbaum's *The Metaphysics of Notation,* and this comparison too feels like a circle becoming complete, as these are the two scores that have probably influenced me the most, through performing and analzying them at various points over the last two decades.

How I deal with (handle, exhibit, produce, canonize) the indexical result of my concert performance remains unknown. I have two 120-page scores that could be animations, books, or videos. Their life begins immediately after the performance of which they are a record, while my static scores are designed first, and can exist without ever being played, as long as they can be exhibited in some tangible fashion.

As documentation, my pieces presented new information to investigate. While organizing and analyzing both scores, I observed a certain dissonance between my own comprehension of the creative content then and now. I am now of two minds about the syntactical progressions that I generated, and this reflection could have only occurred through engaging the documentation after months away from it. "On the ground," when I recall my creative process on stage, my overarching goals for the project, for this notation, and the creative motivation behind each graphic iteration, I can effortlessly remember feeling that nearly every visual 'move' or modulation was highly dynamic, compelling, and intended to create an obvious, audible shift. However, from a distance, a different sort of reflection took root while populating my Appendices, and compiling and editing my video. I found myself occasionally losing track of the visual activity between slides, to the point where I was certain that I had duplicated a page. In some instances, it would take multiple minutes to identify the modulation between two pages, and this altered my idea of what

impact my apparently subtle embellishments may have made musically. In other words, my slight nudge of a line or resizing of a triangle meant the world to me at the time, and much less looking back. I think I inadvertently created *more* visual > aesthetic > conceptual uniformity than I had intended in my graphic designer-conductor chair, eagerly fidgeting with my notation. I recall intending more drama; more dynamism; more angularity to inspire my ensemble. This is parallel to experiences I have as an improvising solo performer, when I feel utterly connected to a motif I play and develop in the moment, then listen back to a recording and hear nothing but a singular, indistinguishable wash. This is my own frustration with improvisational music taking form, and why troubleshooting is central to my creative research in composing for improvisers and applying structure to chaos. It is why I make static scores, so carefully and thoughtfully, with regard to syntactical notation on a single page. It is and will likely remain a quest for a romantic ideal in compositional, free improvised music.

If an improvisation comprises a dynamic range of magical, memorable, unmemorable, and indistinguishable moments, it is usually the case that "forgettable" parts, or lulls, are perceived as forgivable filler between beautiful, magical moments, i.e., periods in which musicians are figuring things out, regrouping, and finding the next current on which to sail into spontaneous, serendipitous musical glory. However, when viewed as a process or an applied activity, that trademark dynamic arc of search-and-discovery within an improvisation is compressed from lull-magic-lull-magic, into a something of consistent, relatively flat line of faithful graphic score-reading and interpretation. What this means to me as a composer, is that all "good" and "bad" moments are moments that I have asked for, and that is how I hear these results; how I perceive my proposed art form rendered by

performers. This means that, as mentioned in Chapter IV, I am beginning to feel more like an architect and less like an artist, engineering scenarios in which an experimental process is successfully conducted, but the chance elements prevent me from getting the desired, formal outcome that typically emerges at the hands of the composer in a traditional role. In other words, I am finding this degree of chance to be unsatisfying, and, as I've spent many years considering an analyzing, it is mostly the sense of inherent stylization in experimental, free improvisation that has mislead me into believing that I was aesthetically in control. I am architecturally in control, and I am confident in the types of results yielded according to the criteria for a fruitful sound experiment, even with the potential for moments of spontaneous, serendipitous or transcendent, musical glory (in this analytical passage, I am deliberately aiming to distinguish between sound and music or musicality)

Overall, the level of zoom-in analysis, scrutiny, and reflection on my creative research is roughly equivalent to the written dissertation, in terms of just how much work one can do within these time and volume constraints- narrowing the scope in particular ways; giving overviews in other ways. To really look at musical results under a microscope would take years of work and more detailed experiments. Rehearsing an ensemble consistently and building their rapport with my notation was simply beyond the temporal scope of this project. Not unlike Butch Morris, who mandated extensive rehearsal with any ensemble he presented, I can no longer rely on purely spontaneous engagement with my notation, as much as this spirit reflects that of free improvisation.

How, then, does this trial end? On one hand, I am nearly certain that graphic notation alone is not serving me to get the results I want as a composer. However, considering graphic notation as a resource to conduct this experiment complicates the

verdict. This research project reinforces a goal to teach my notation as an evolving methodology, much like Vinny Golia and Wadada Leo Smith's student ensembles, incubated in a institutional setting. In such a scenario, I anticipate hearing and noticing growth, and that this tool will afford me specific enough, personalized, aesthetic results. Until such time, I will ultimately reserve my judgment on the efficacy of entirely open, graphic notation. A crucial litmus test would be to imagine how extended work with my spontaneous notation system could be researched and canonized years or decades from now, as I've researched chosen subjects for this dissertation. I will always sing the gospel of graphic notation, and the playing of graphic scores as unparalleled tools to facilitate spontaneous music, as a discipline and a practice, across contexts, backgrounds, literacies, and experiences. In this way, I feel that it was useful and instructive to put Graphic Score on Trial.

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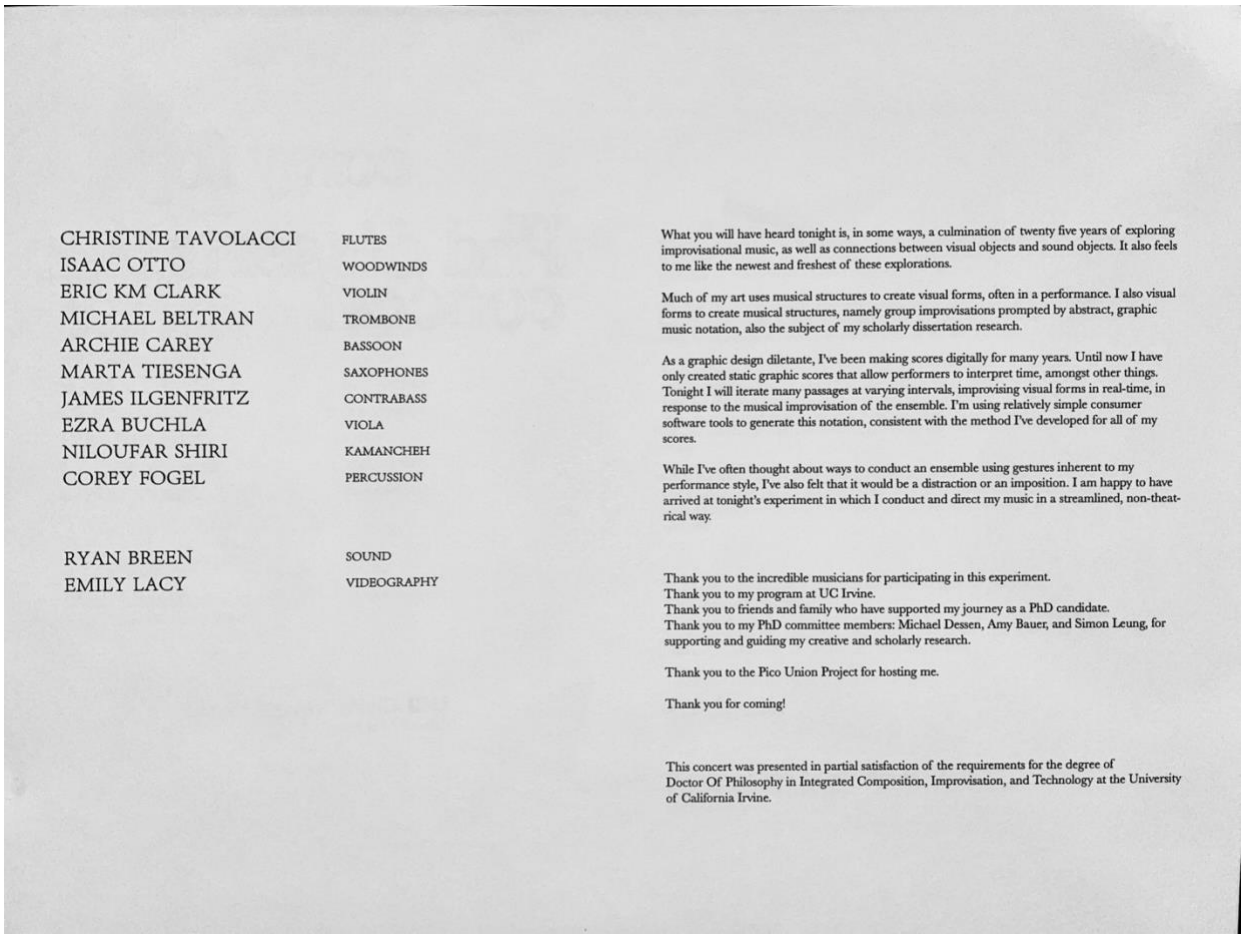
Appendix A: Video Documentation

http://coreyfogel.com/dissertation.html

Appendix B: Concert program



CHRISTINE TAVOLACCI	FLUTES
ISAAC OTTO	WOODWINDS
ERIC KM CLARK	VIOLIN
MICHAEL BELTRAN	TROMBONE
ARCHIE CAREY	BASSOON
MARTA TIESENGA	SAXOPHONES
JAMES ILGENFRITZ	CONTRABASS
EZRA BUCHLA	VIOLA
NILOUFAR SHIRI	KAMANCHEH
COREY FOGEL	PERCUSSION
RYAN BREEN	SOUND
EMILY LACY	VIDEOGRAPHY

What you will have heard tonight is, in some ways, a culmination of twenty five years of exploring improvisational music, as well as connections between visual objects and sound objects. It also feels to me like the newest and freshest of these explorations.

Much of my art uses musical structures to create visual forms, often in a performance. I also visual forms to create musical structures, namely group improvisations prompted by abstract, graphic music notation, also the subject of my scholarly dissertation research.

As a graphic design diletante, I've been making scores digitally for many years. Until now I have only created static graphic scores that allow performers to interpret time, amongst other things. Tonight I will iterate many passages at varying intervals, improvising visual forms in real-time, in response to the musical improvisation of the ensemble. I'm using relatively simple consumer software tools to generate this notation, consistent with the method I've developed for all of my scores.

While I've often thought about ways to conduct an ensemble using gestures inherent to my performance style, I've also felt that it would be a distraction or an imposition. I am happy to have arrived at tonight's experiment in which I conduct and direct my music in a streamlined, non-theatrical way.

Thank you to the incredible musicians for participating in this experiment.
Thank you to my program at UC Irvine.
Thank you to friends and family who have supported my journey as a PhD candidate.
Thank you to my PhD committee members: Michael Dessen, Amy Bauer, and Simon Leung, for supporting and guiding my creative and scholarly research.

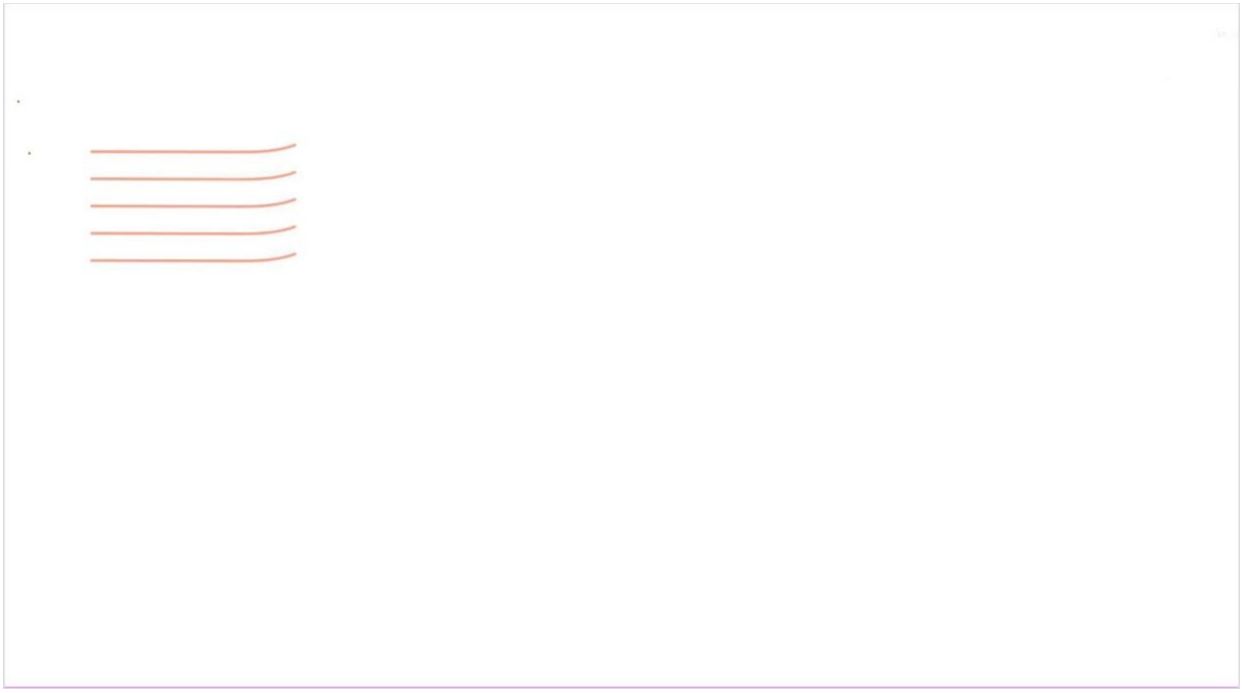
Thank you to the Pico Union Project for hosting me.

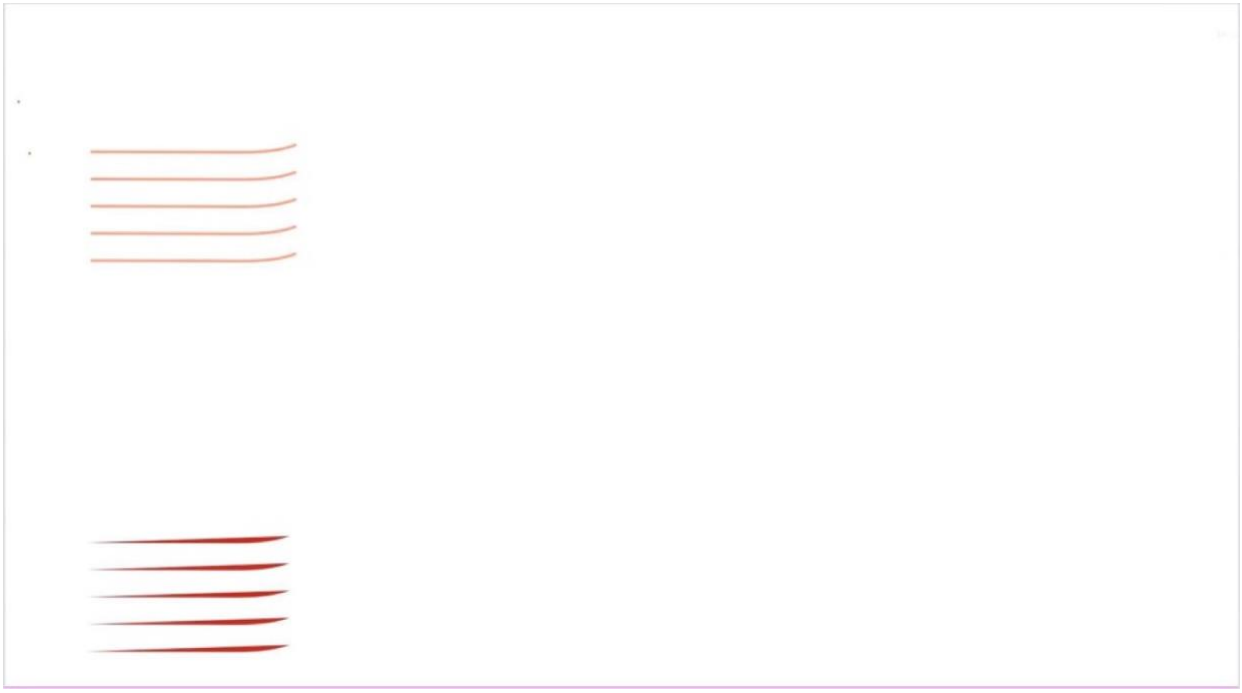
Thank you for coming!

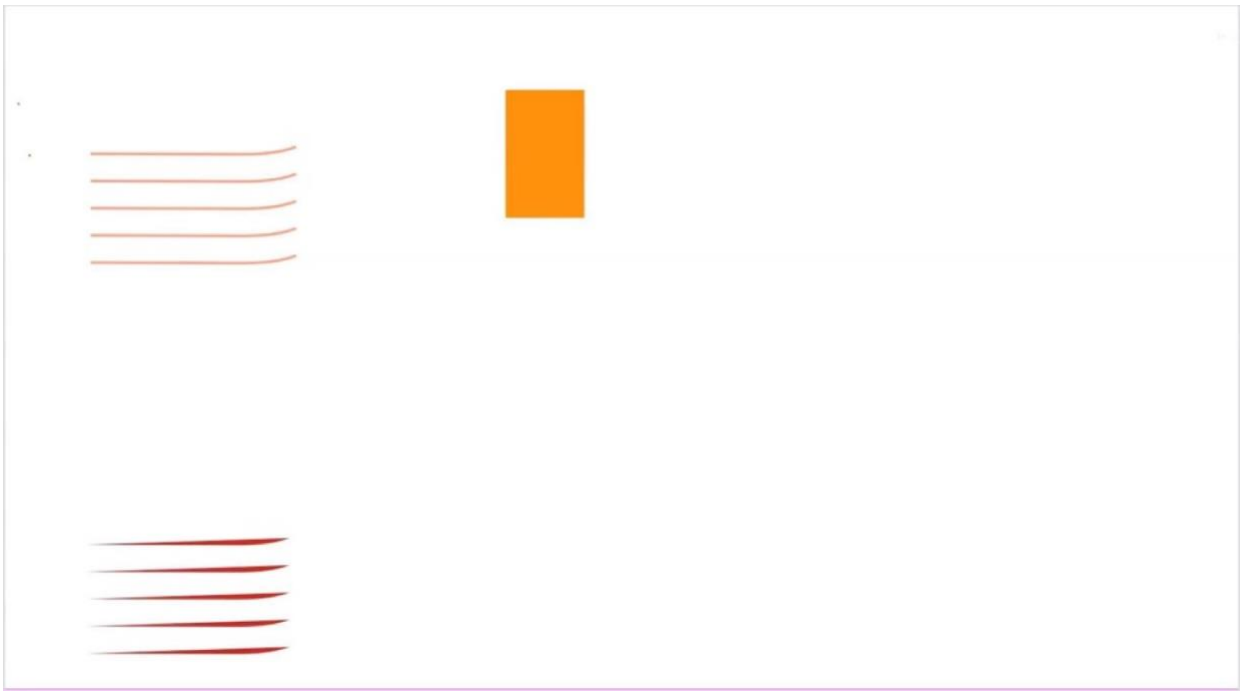
This concert was presented in partial satisfaction of the requirements for the degree of Doctor Of Philosophy in Integrated Composition, Improvisation, and Technology at the University of California Irvine.

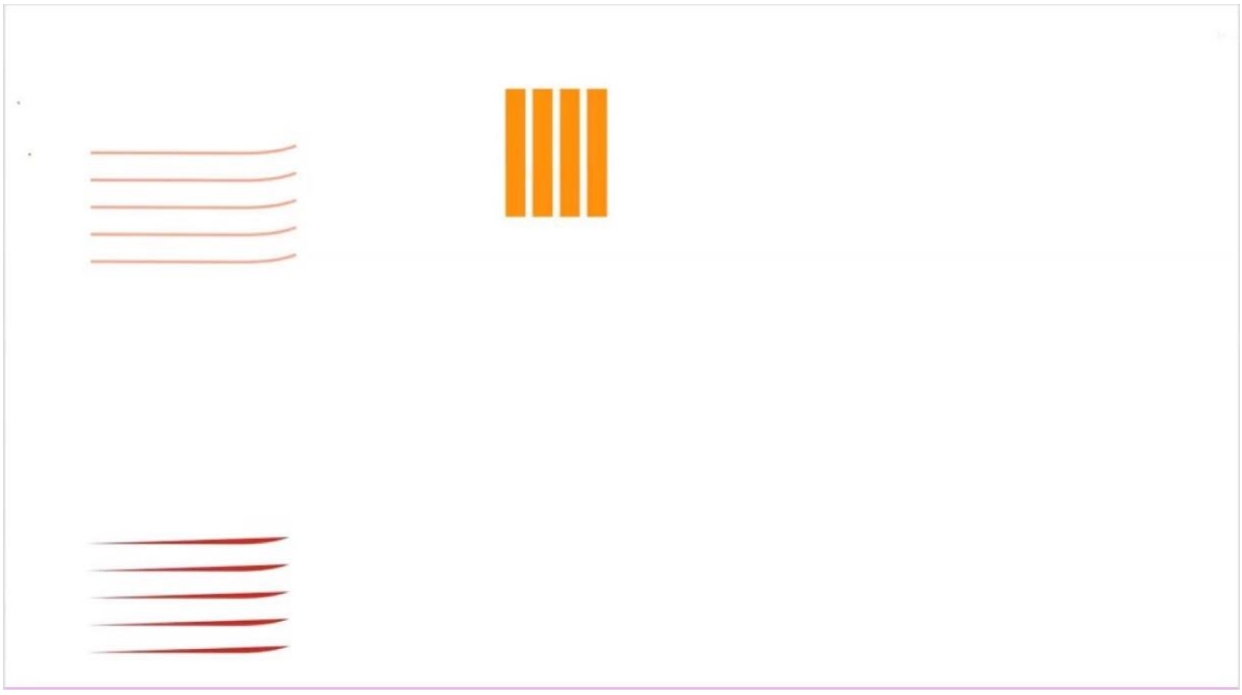
Appendix C: Poster for Dissertation Concert

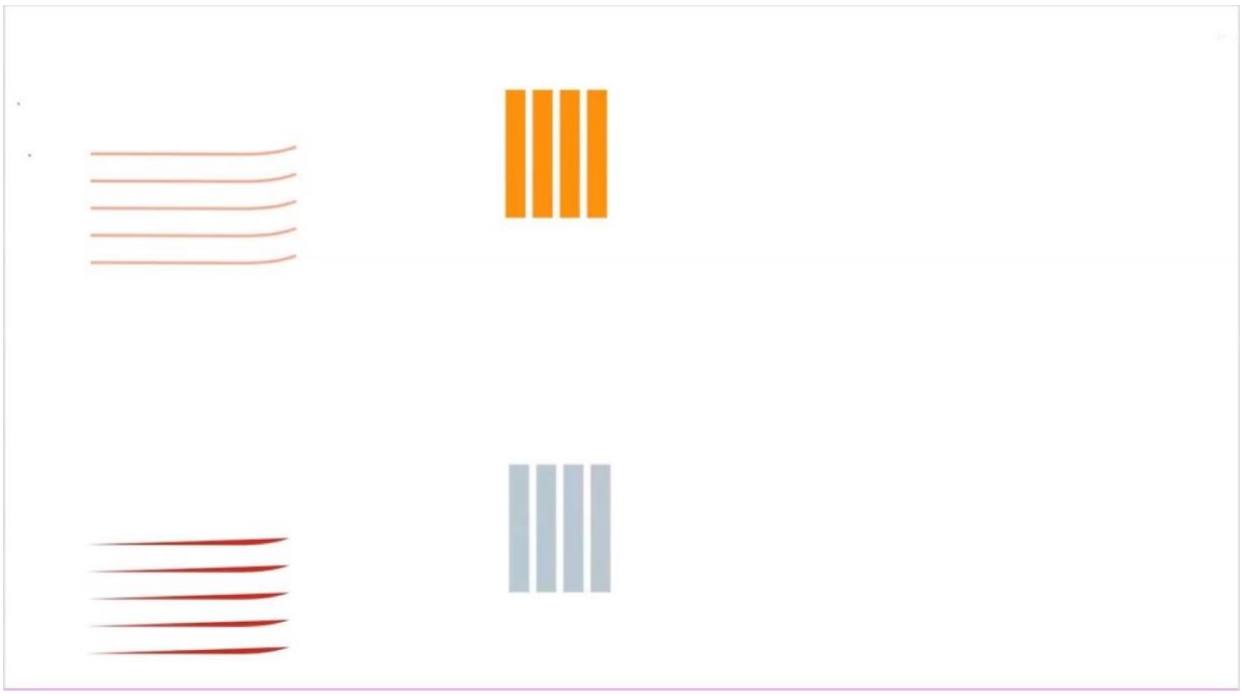
Appendix D: Computer Generated Score #1 of 2

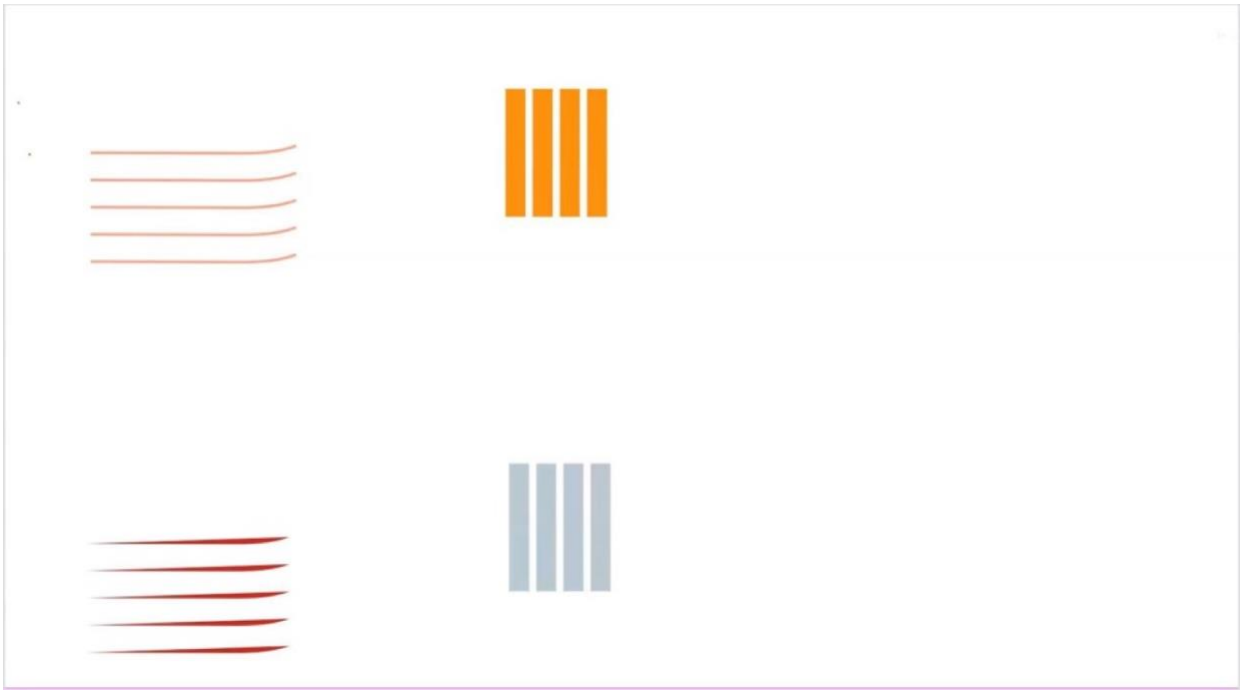


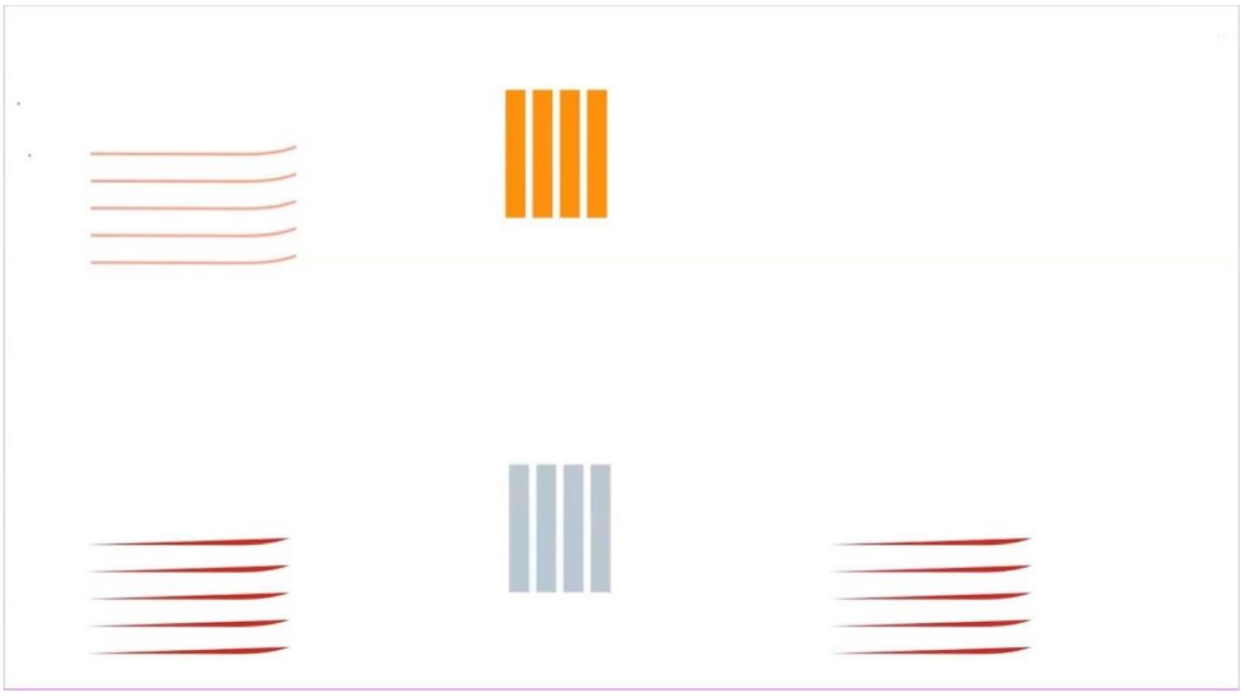


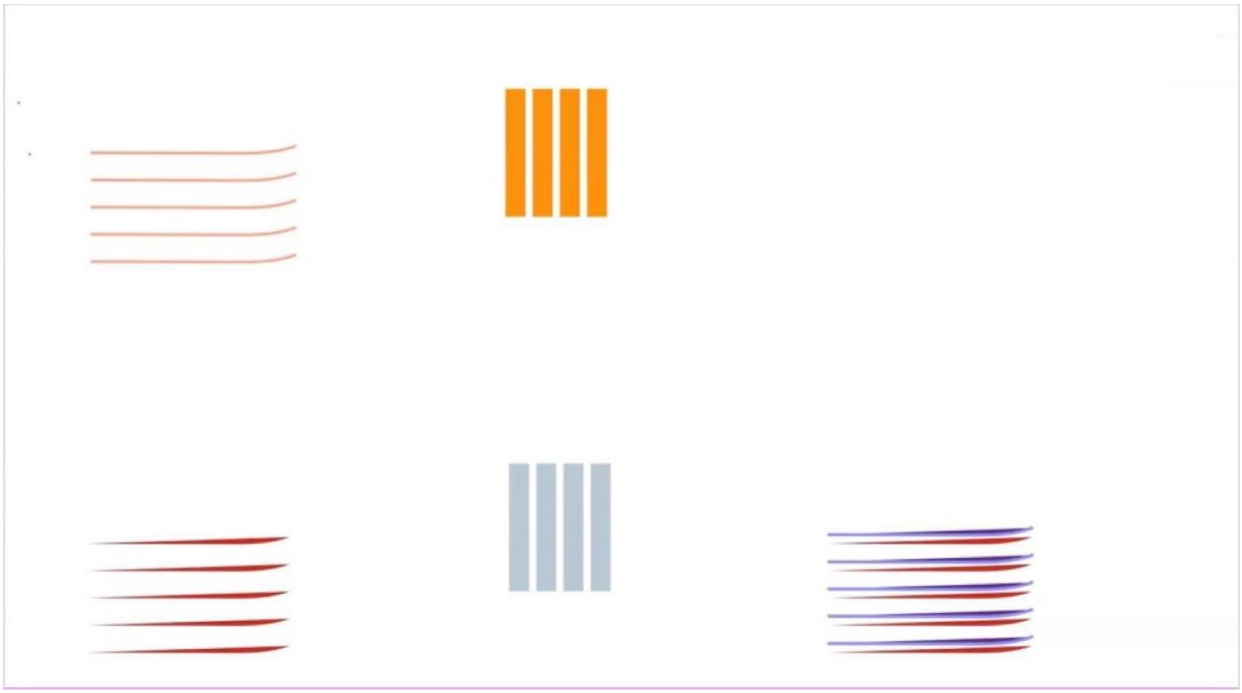


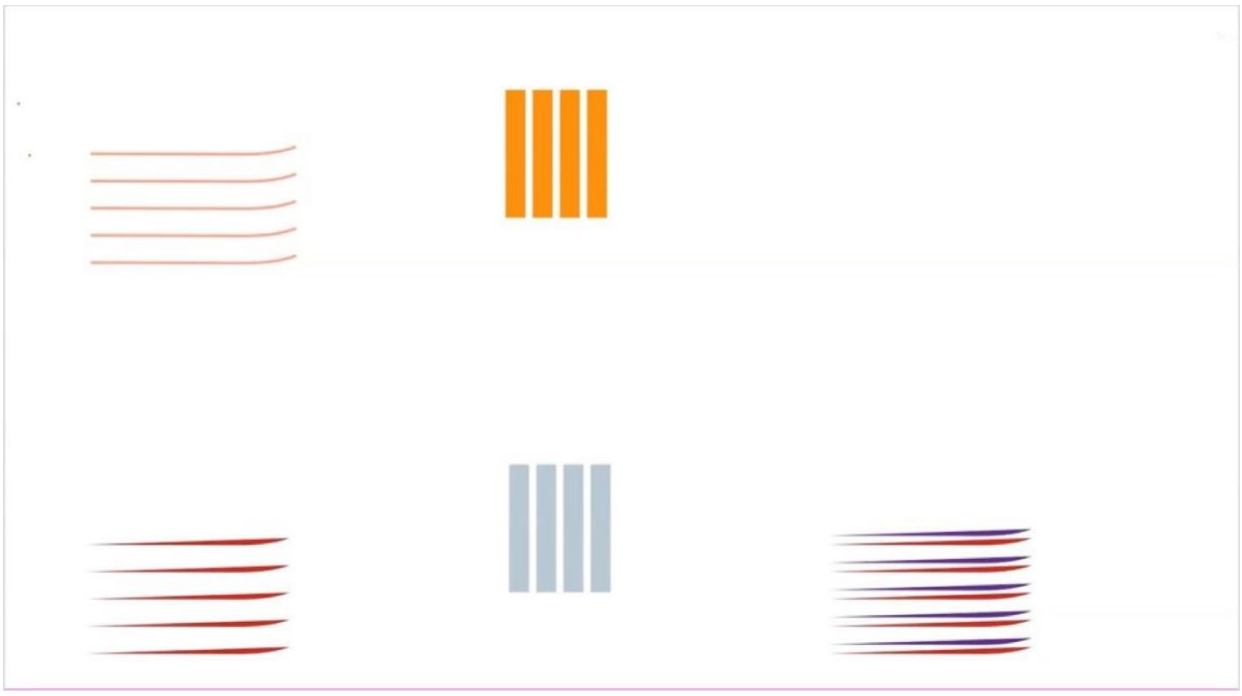


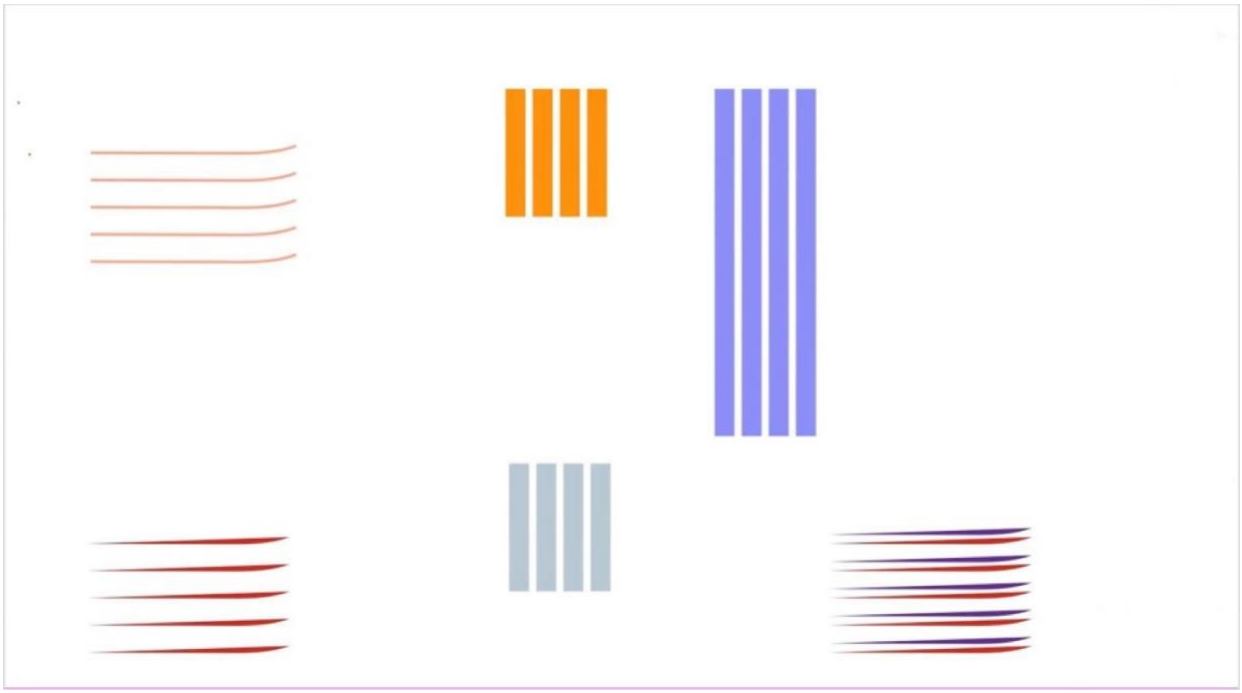


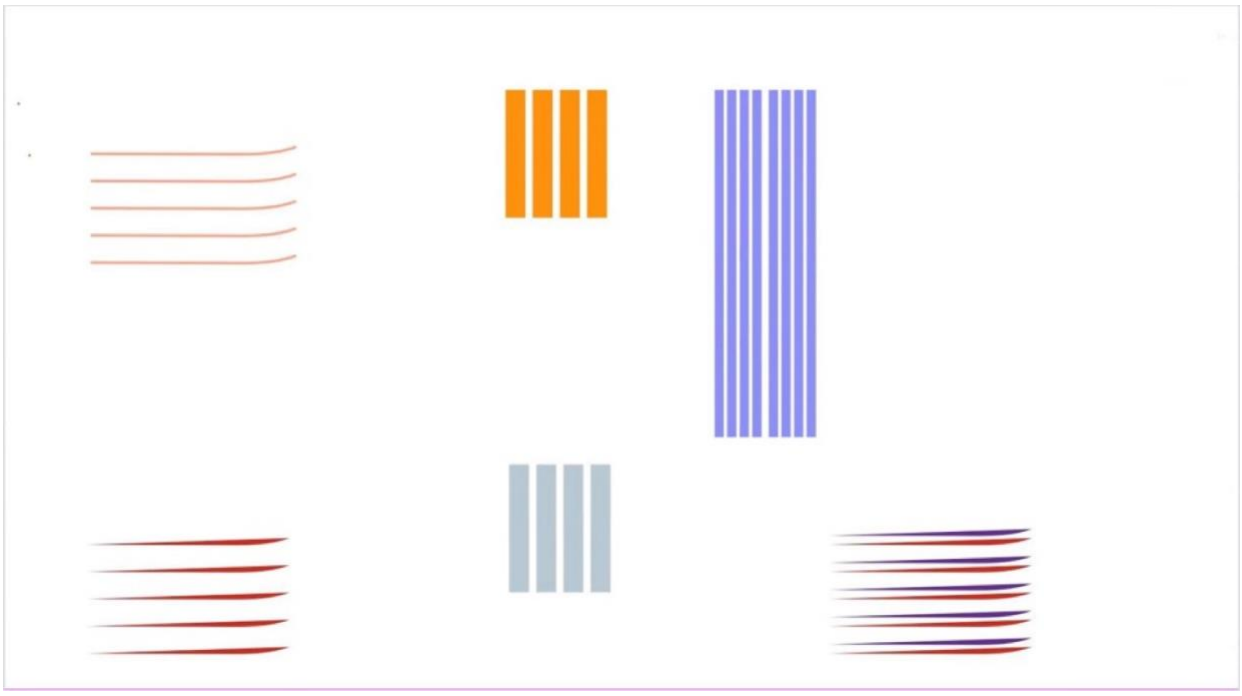


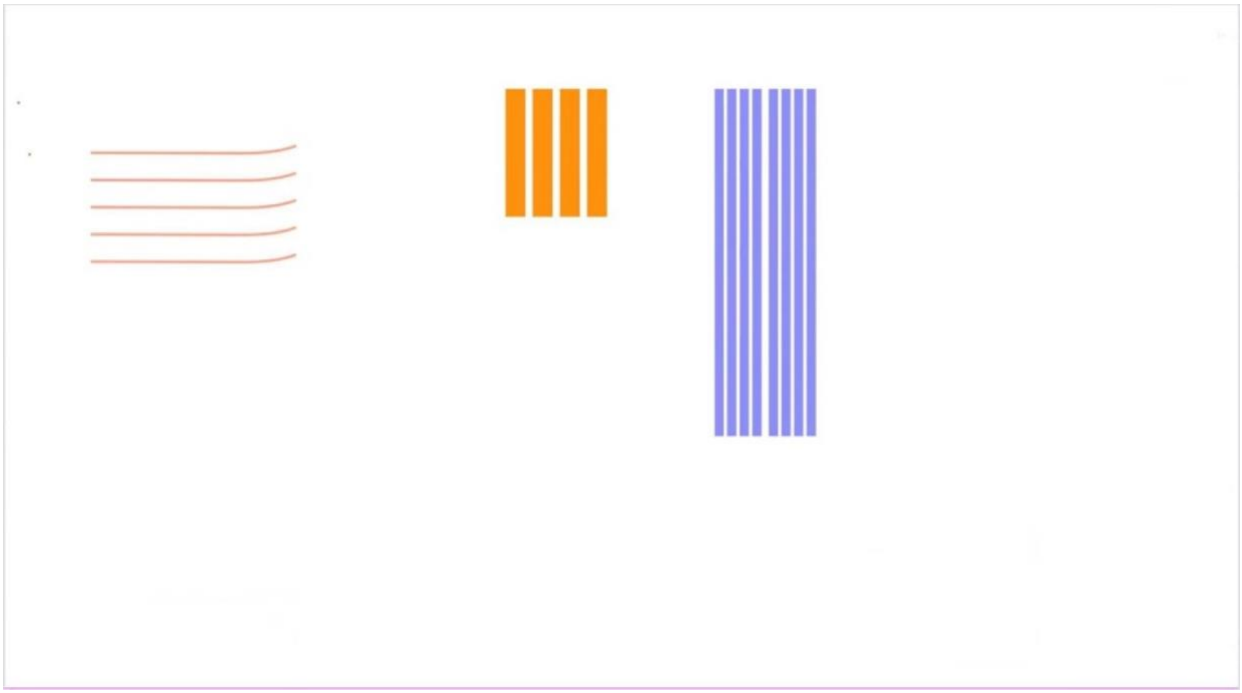


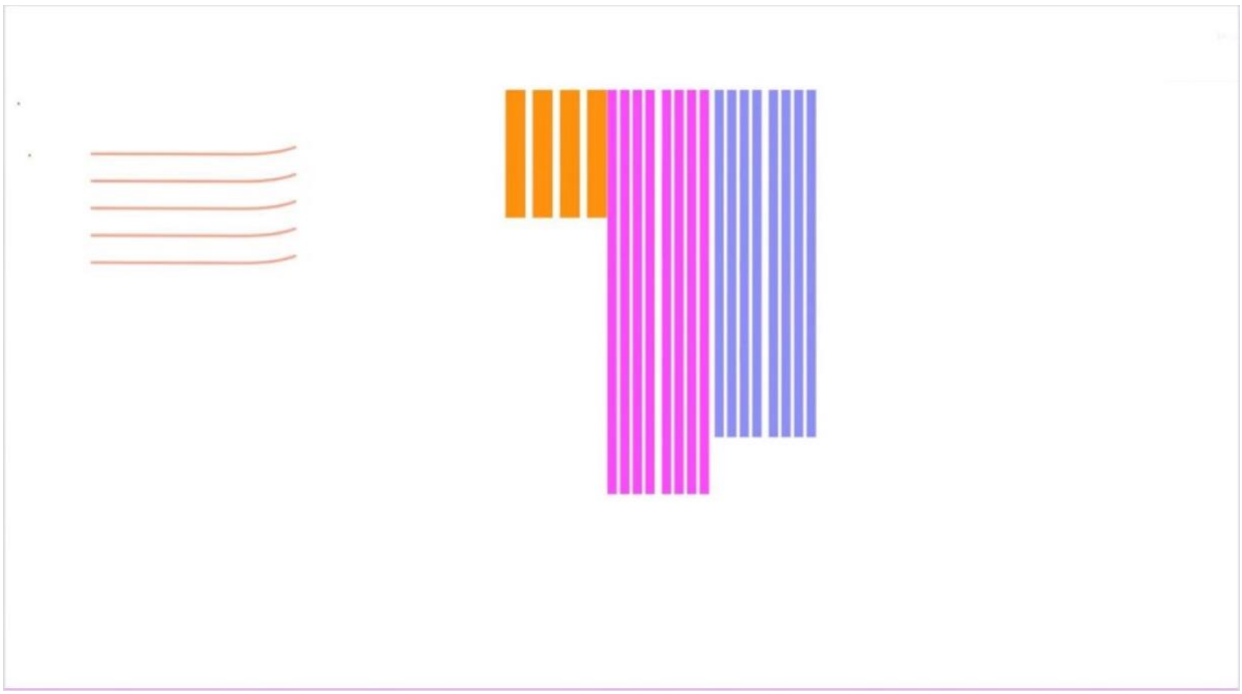


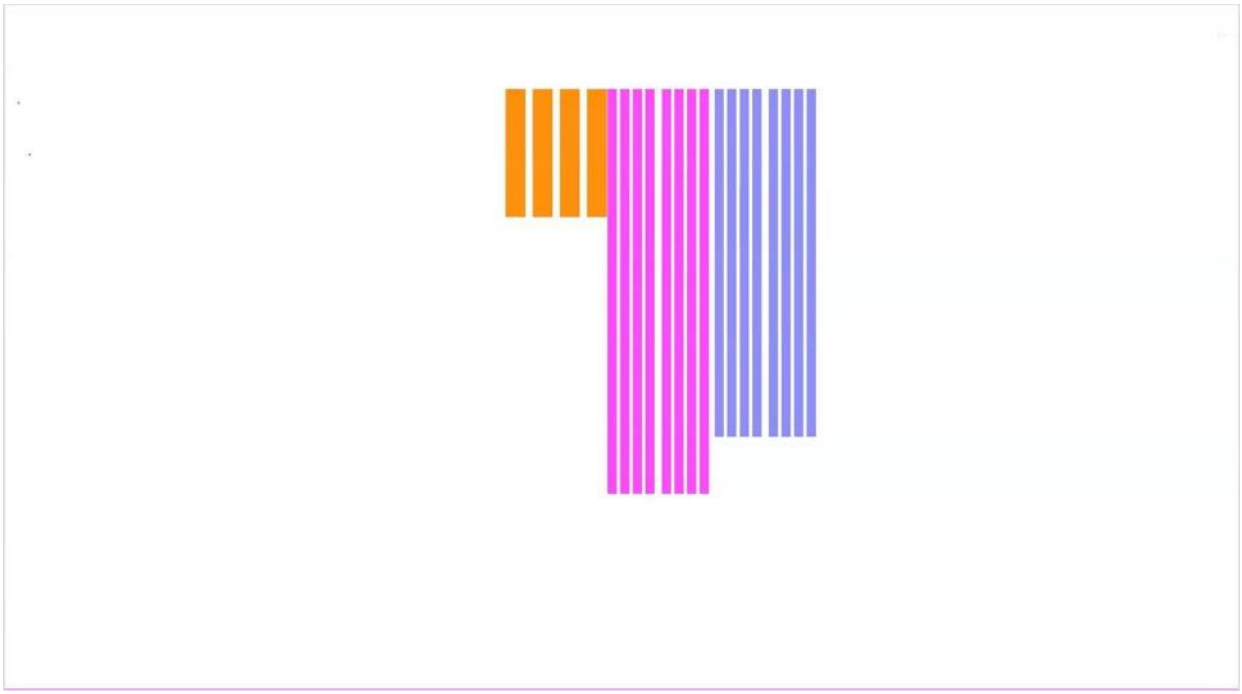


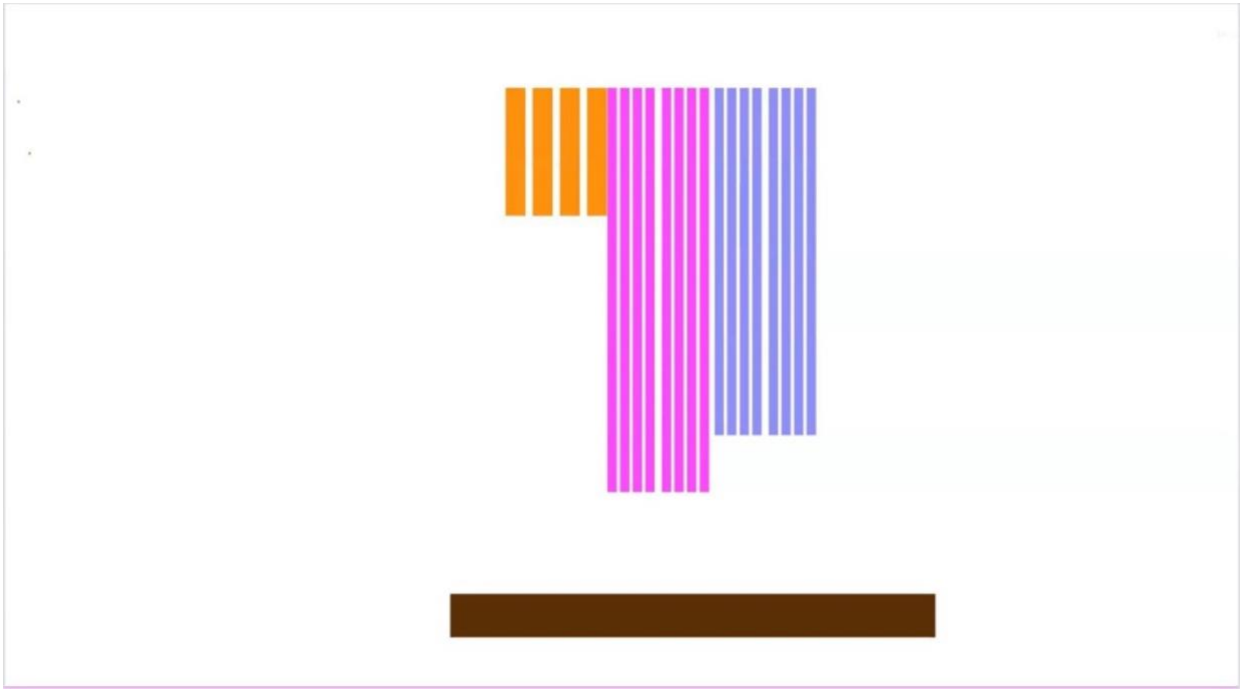


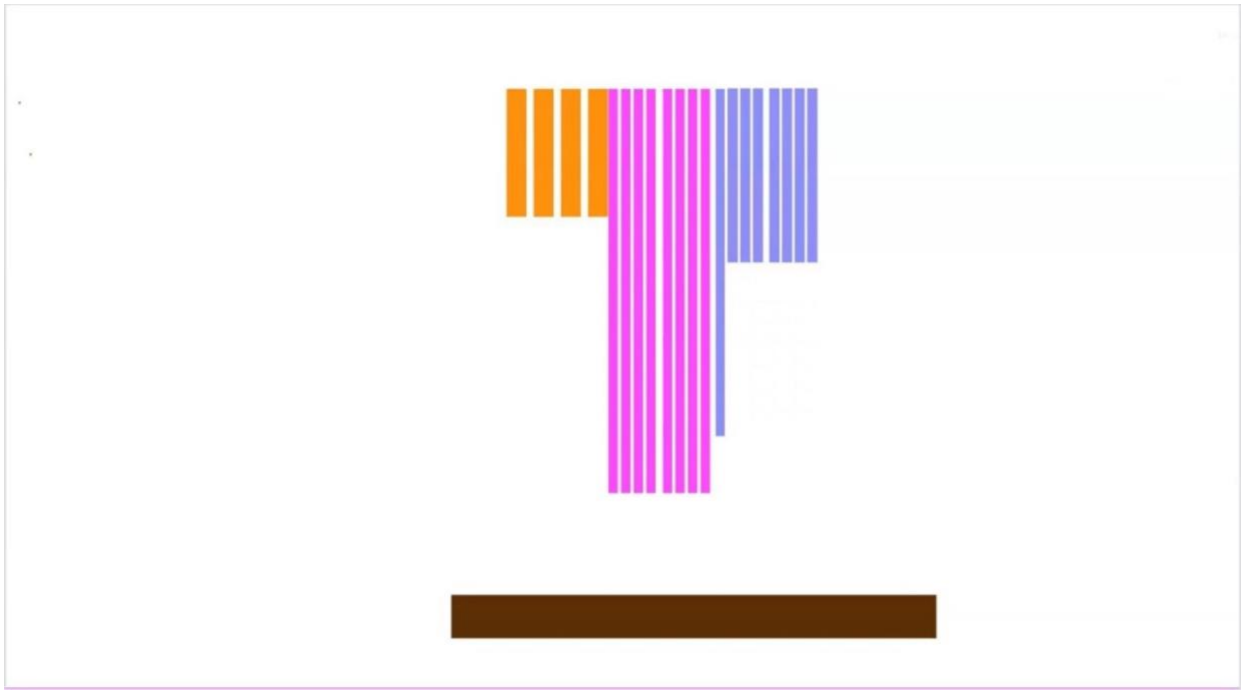


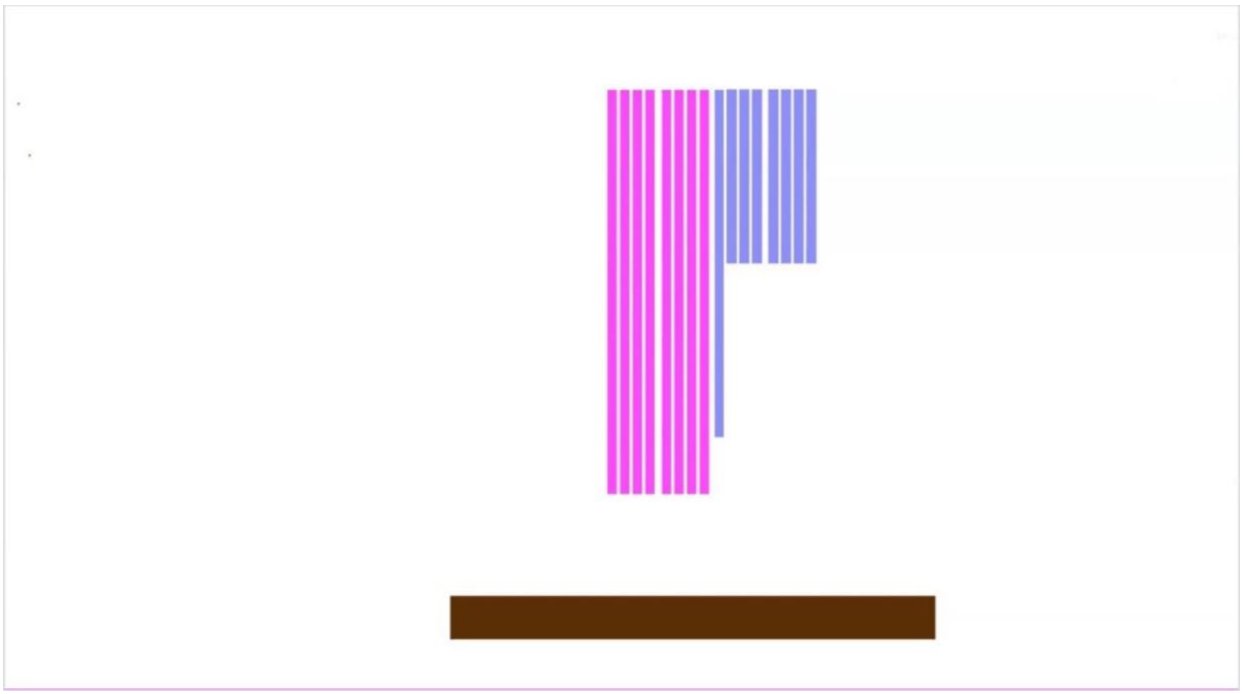


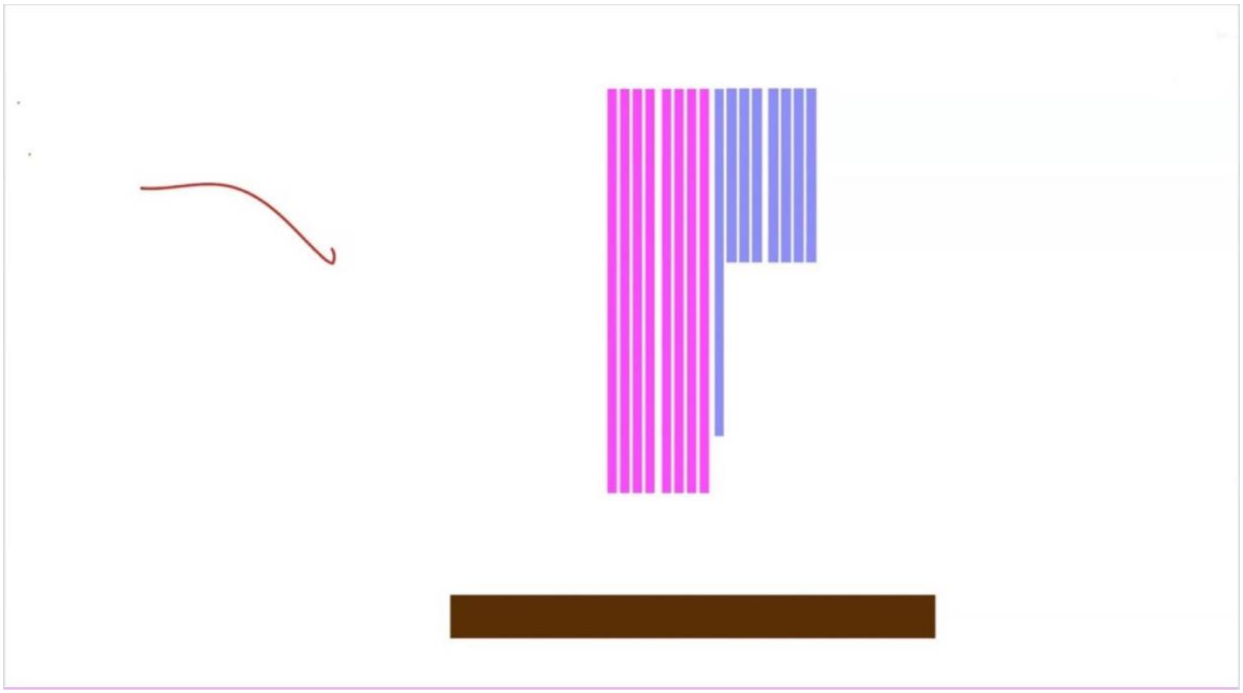


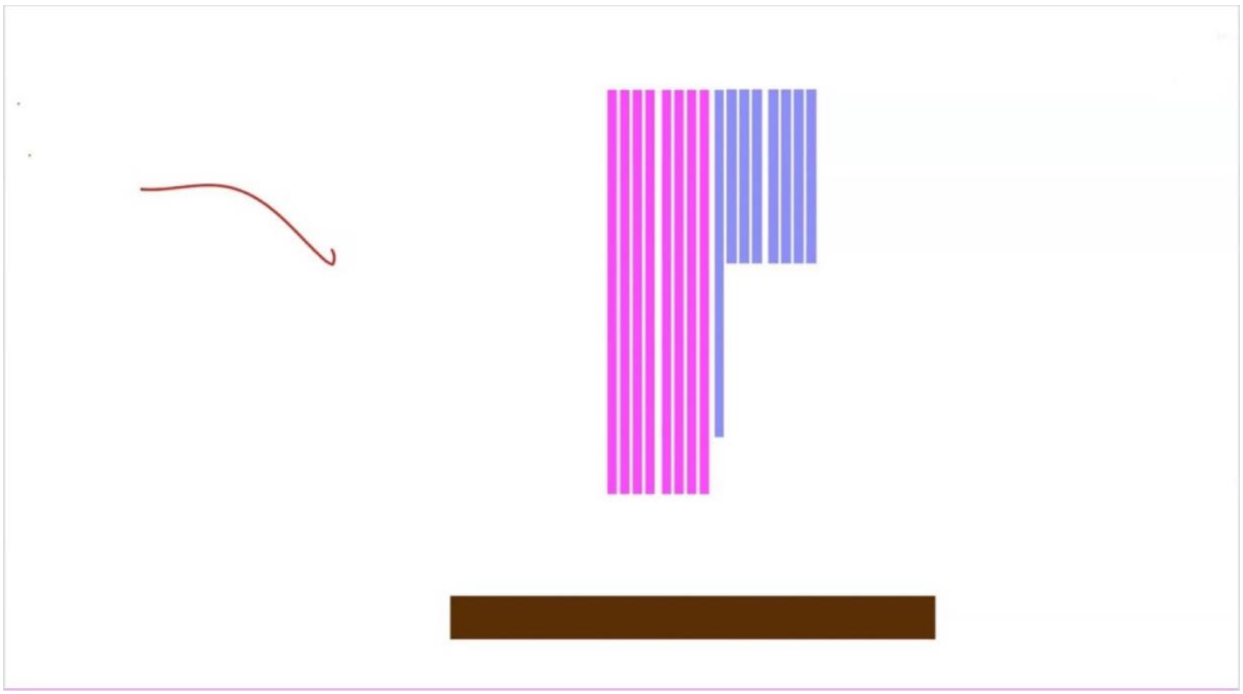


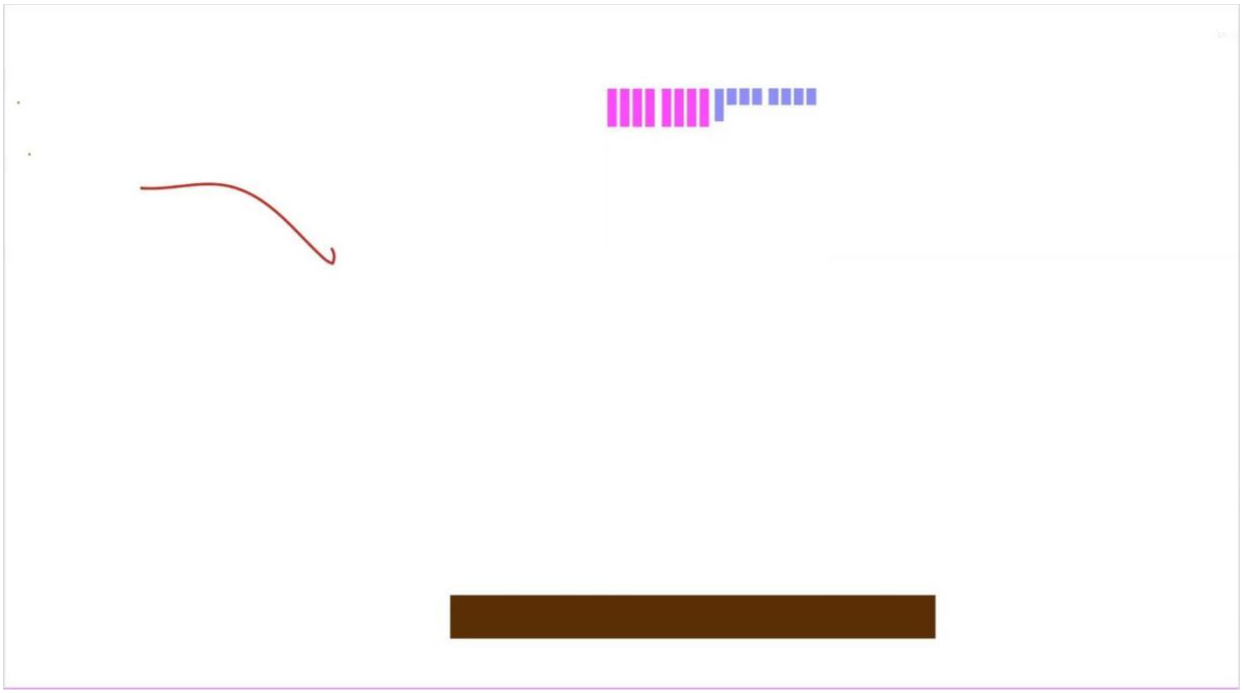


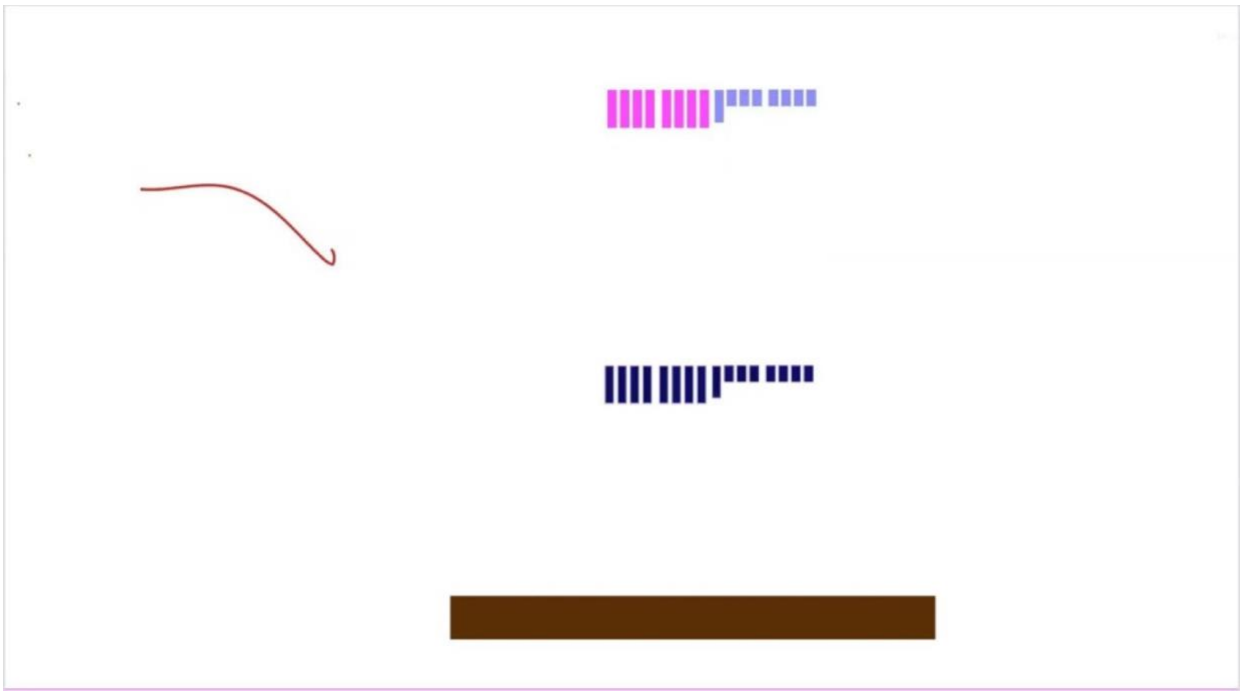


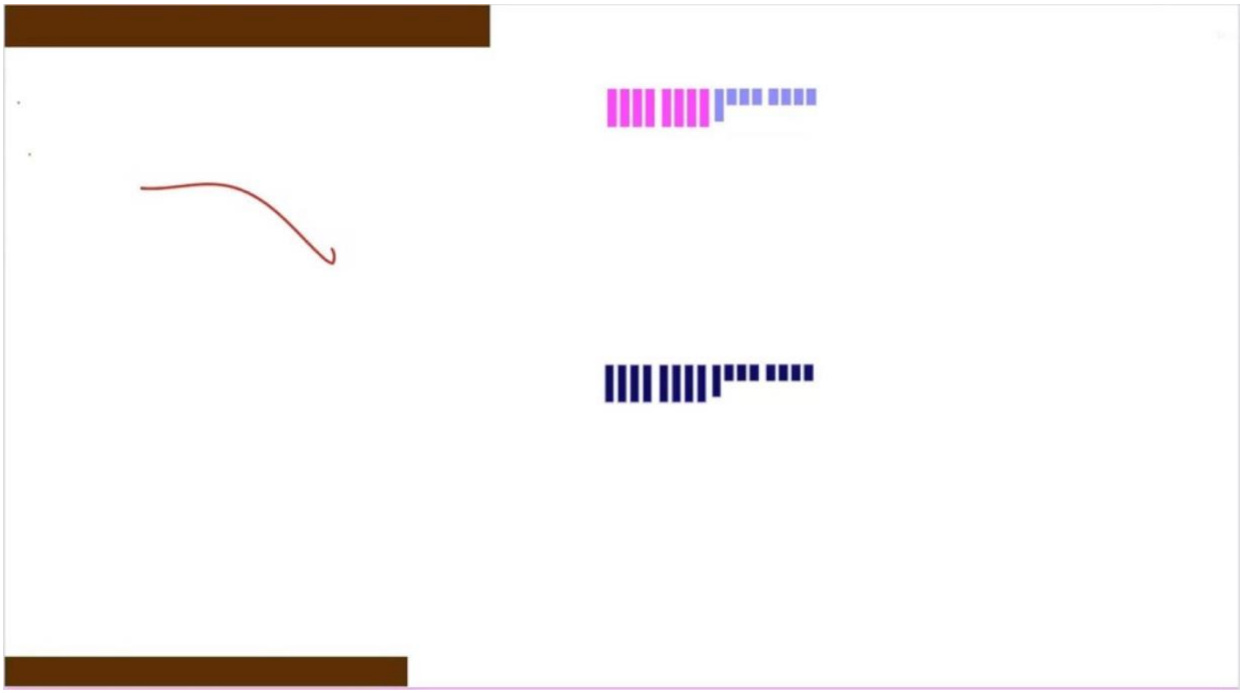


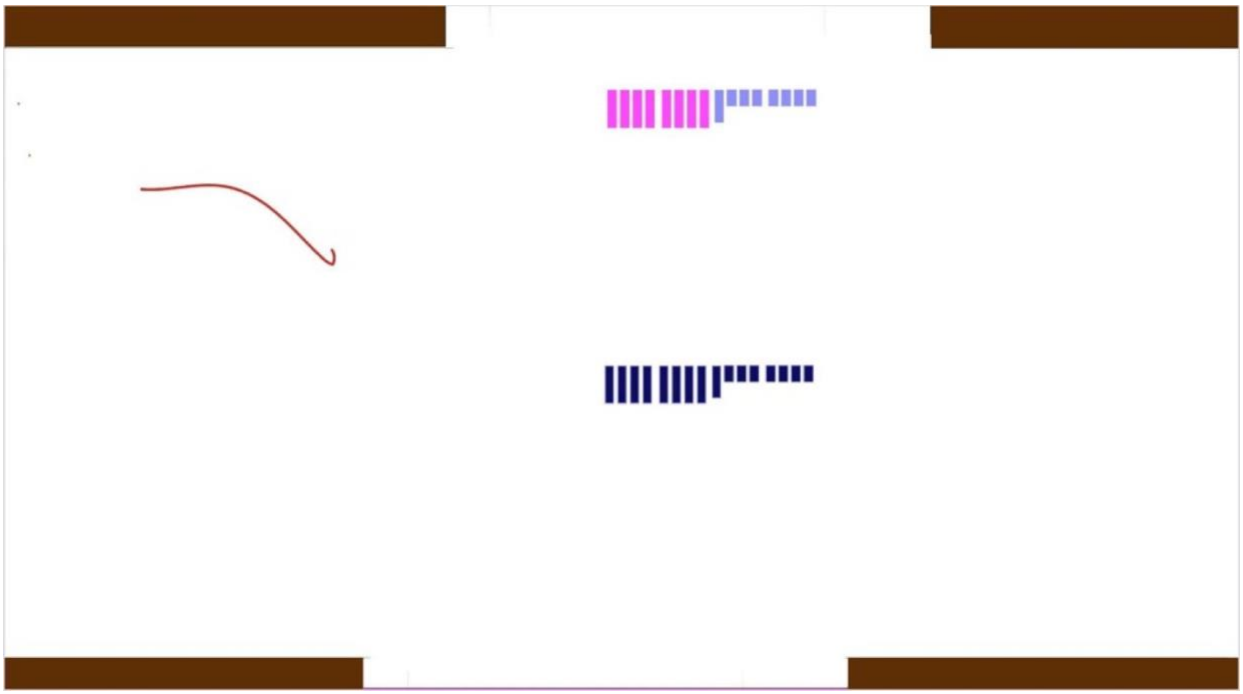


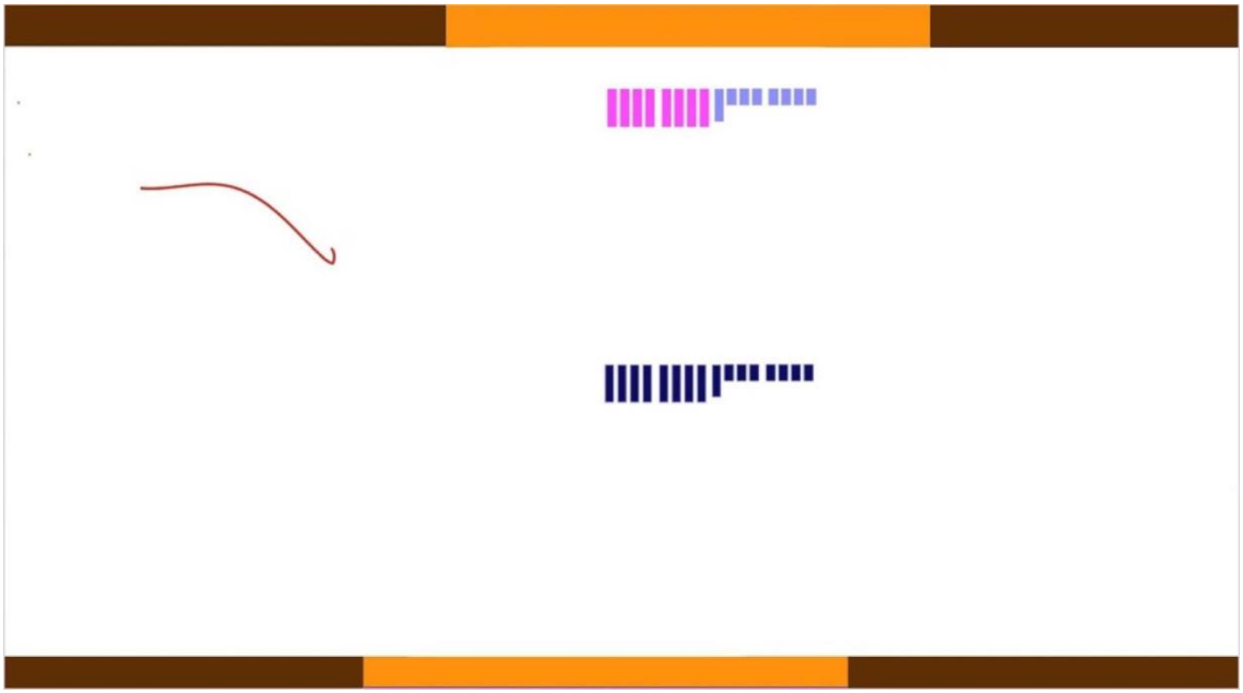


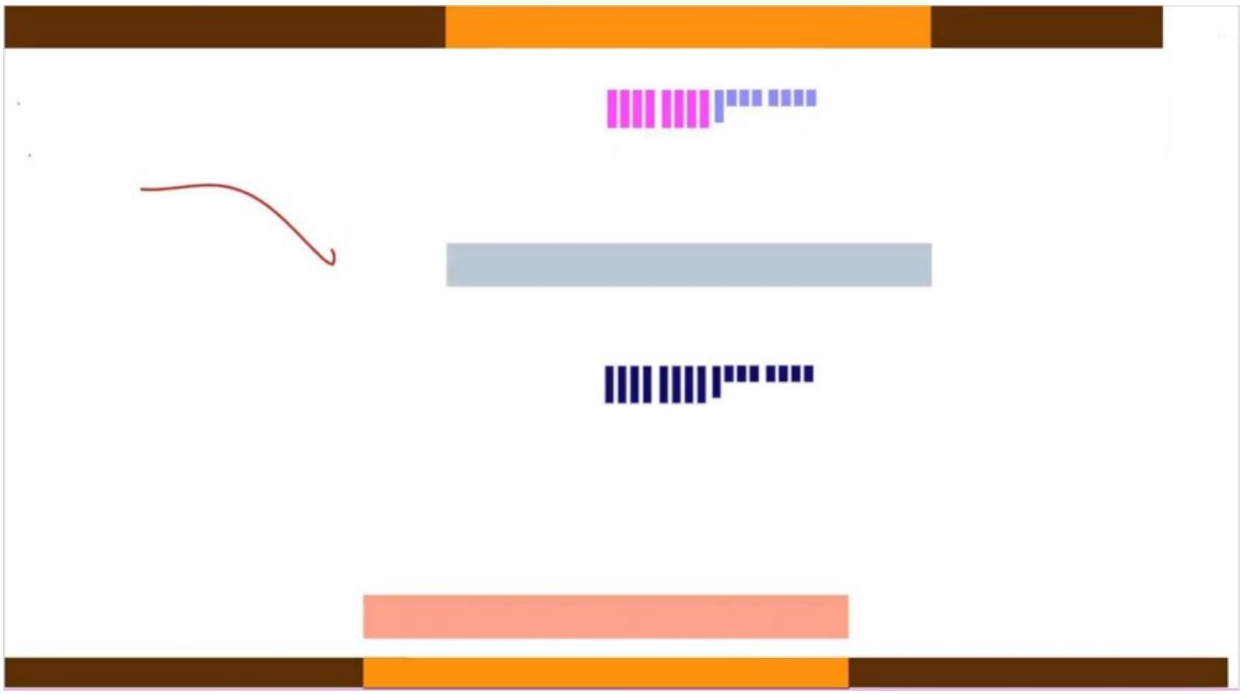


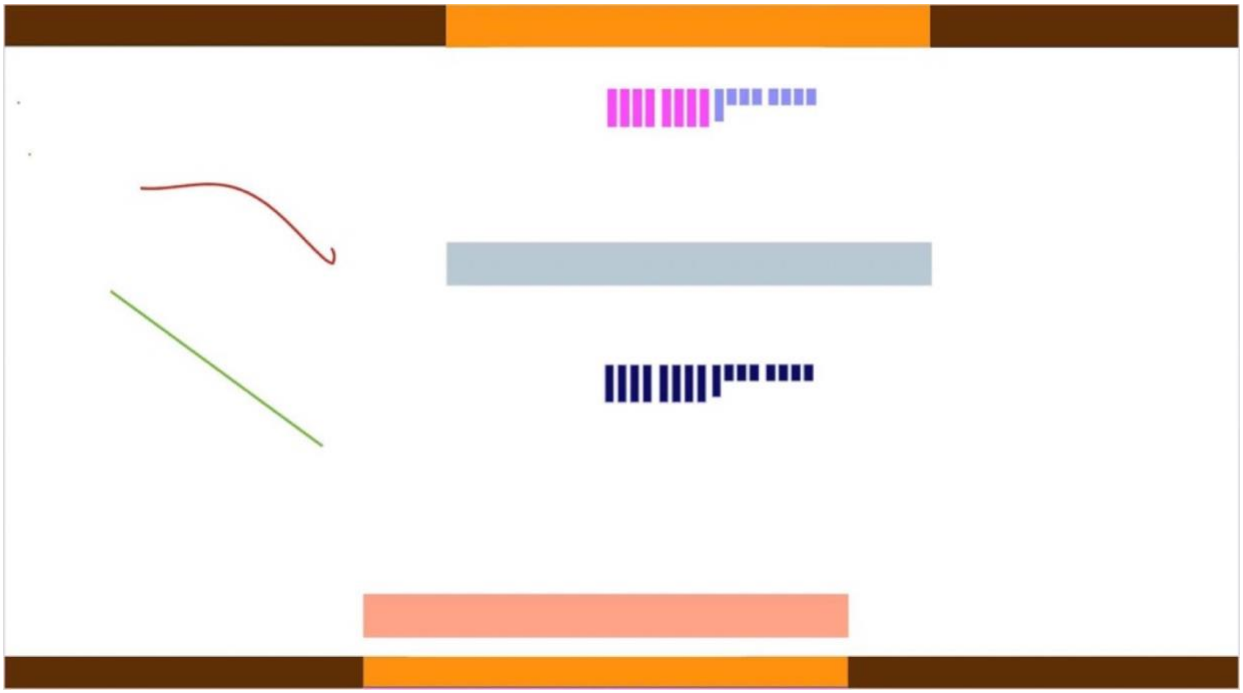


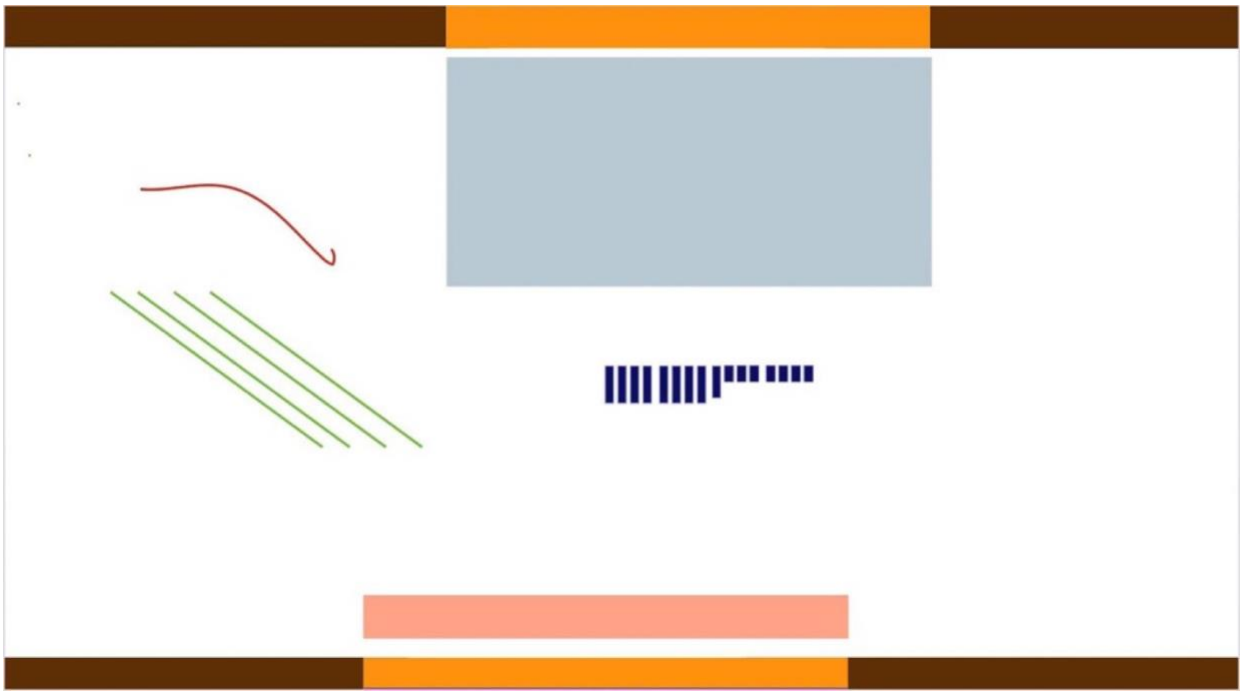


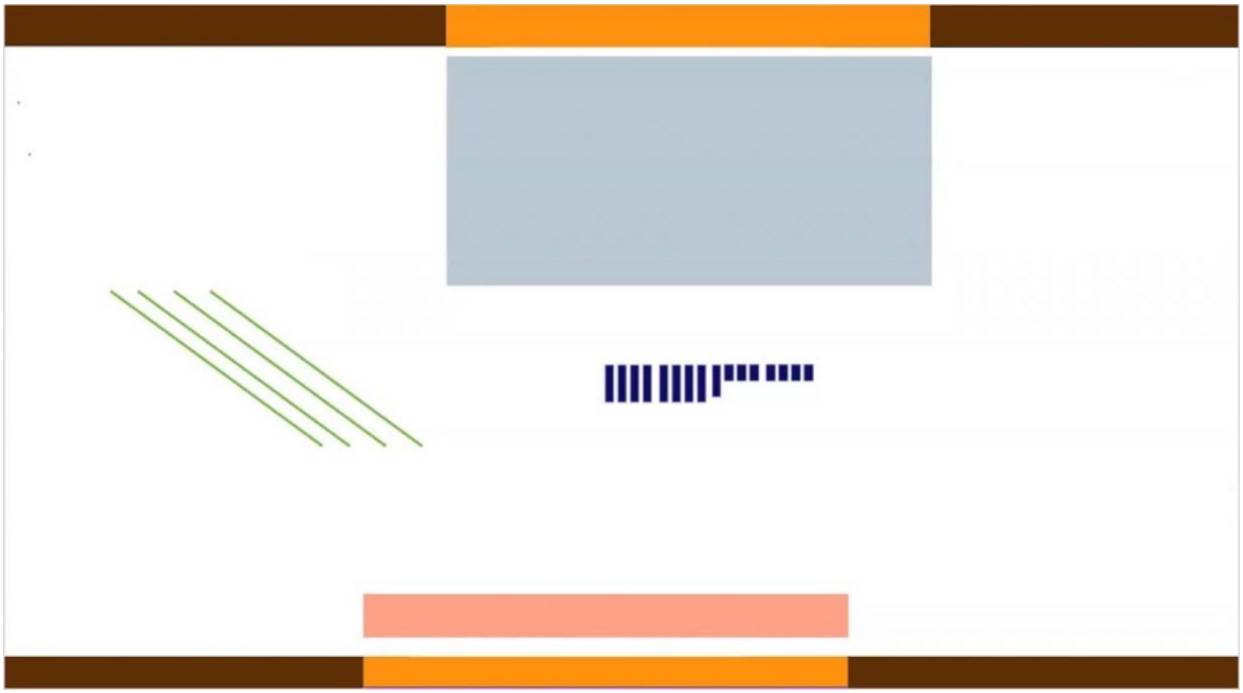


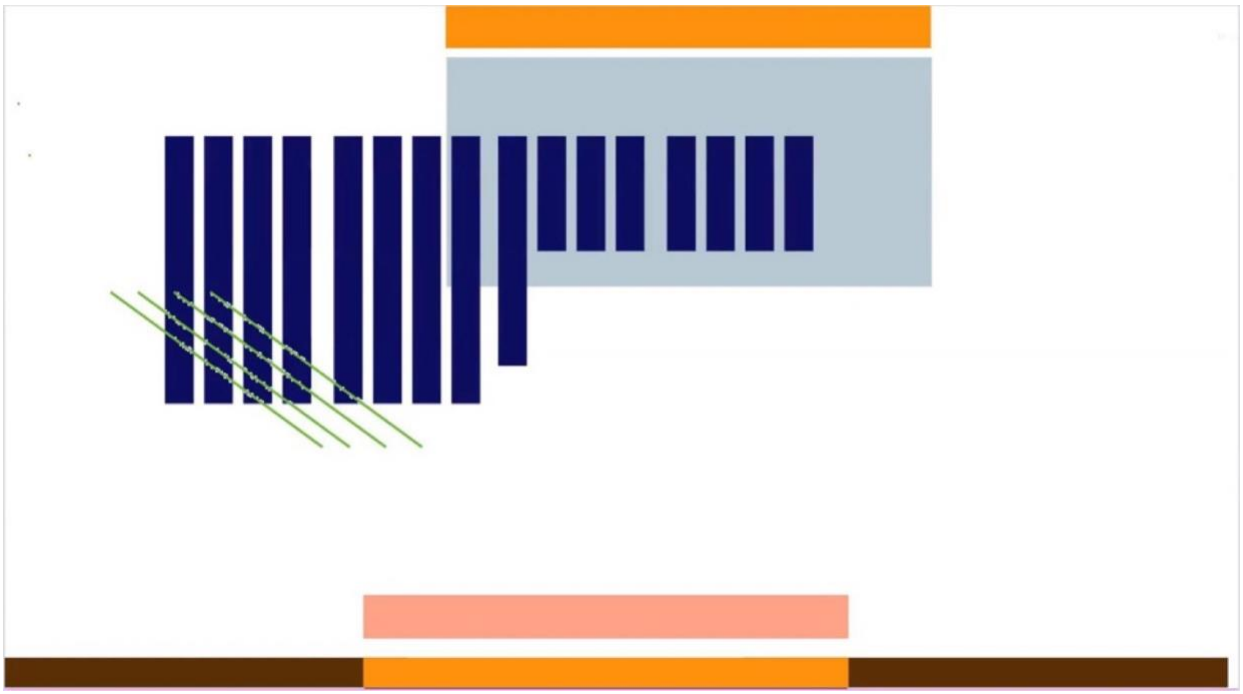


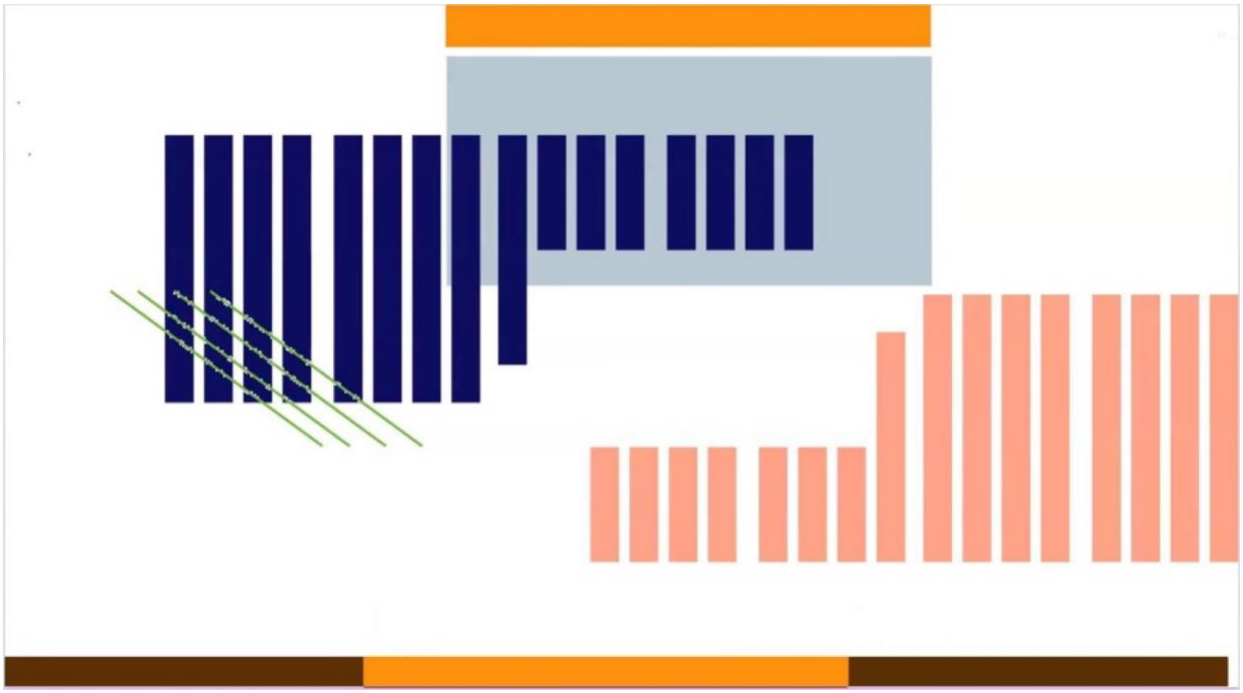


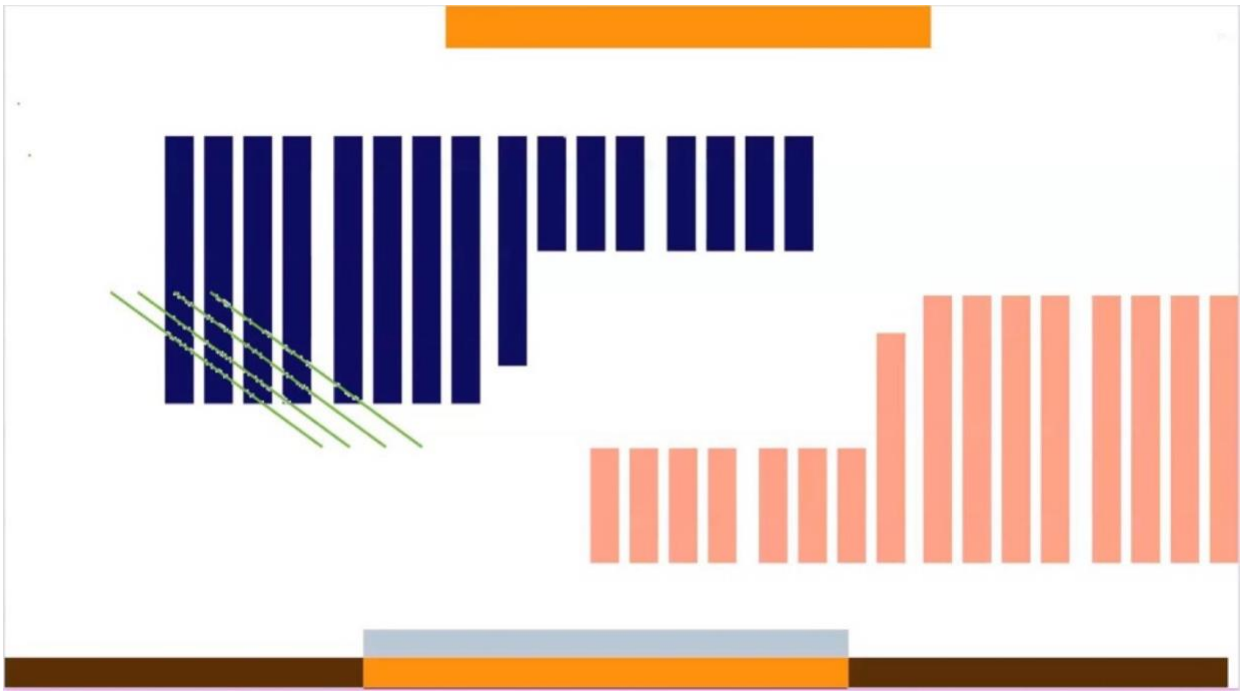


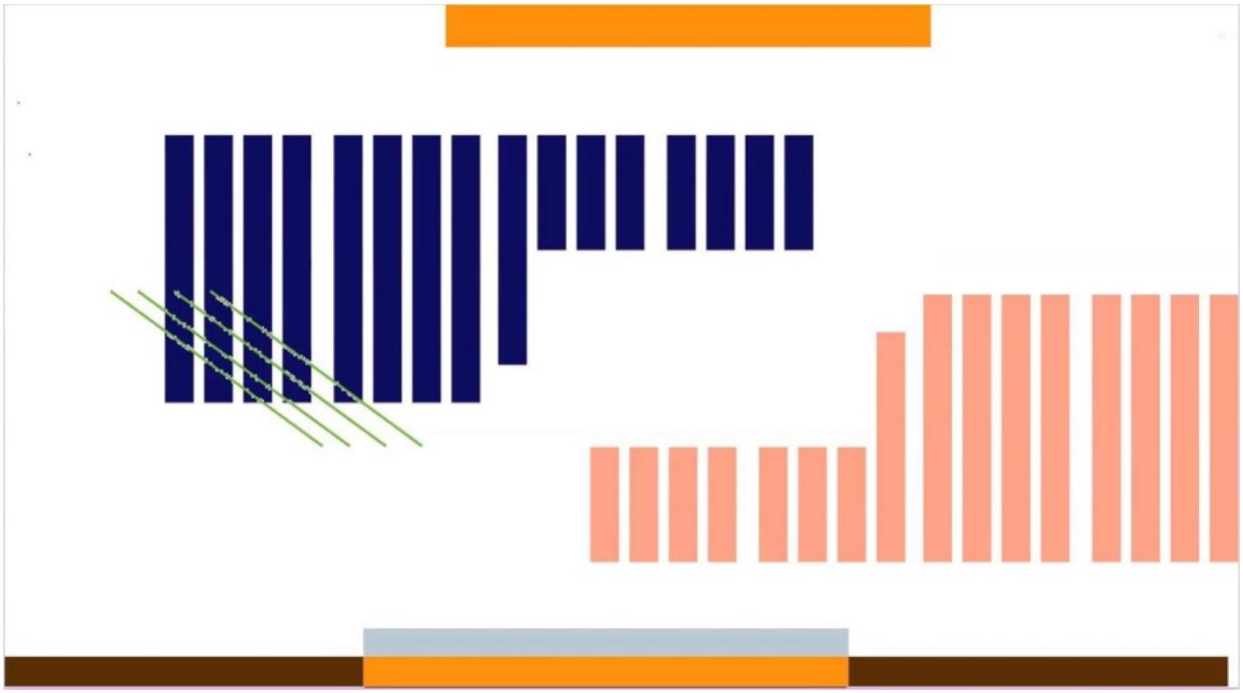


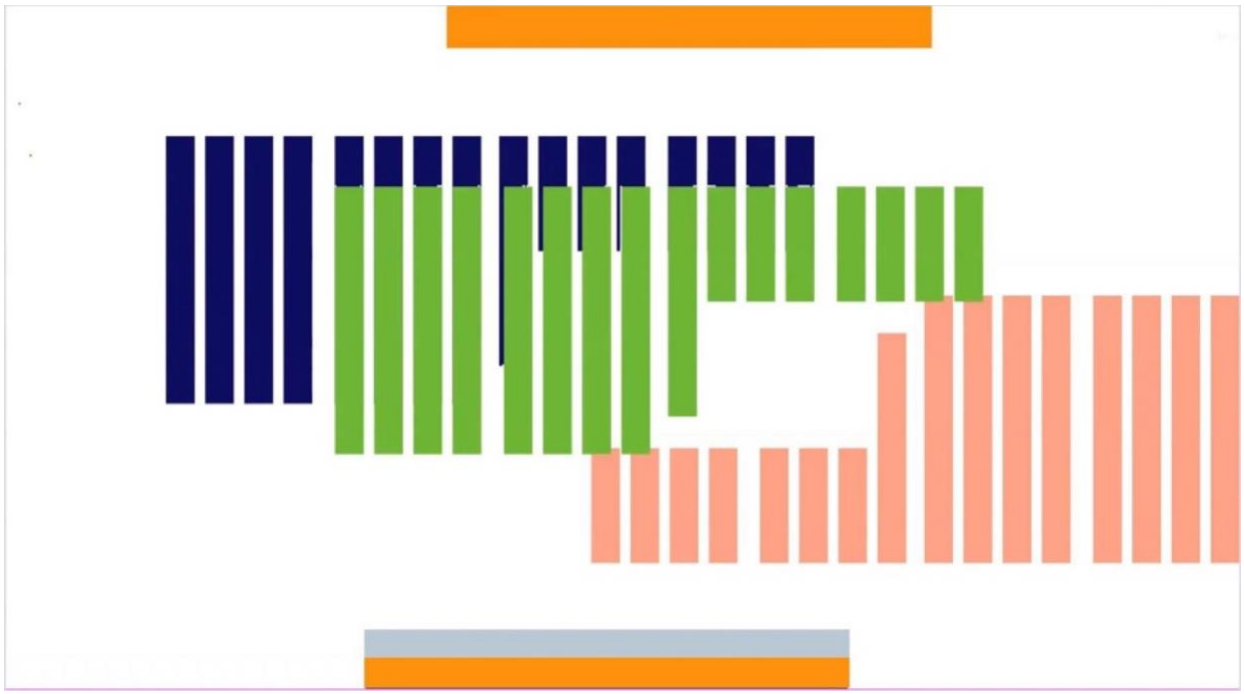


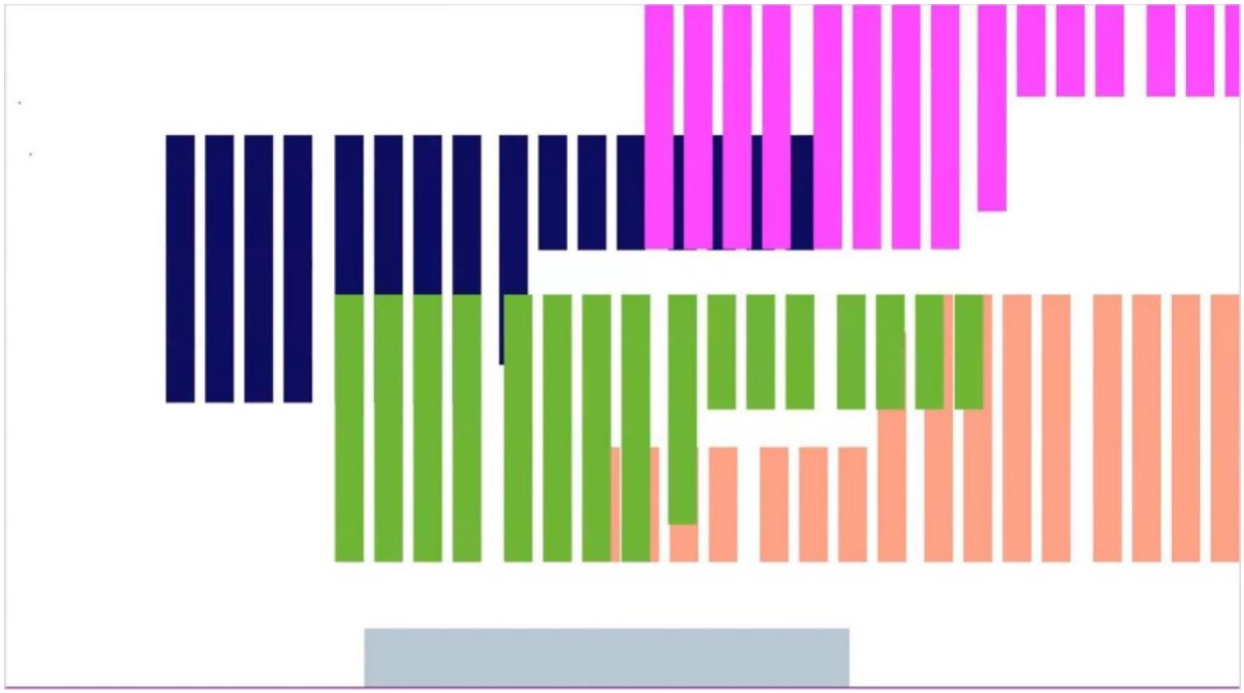


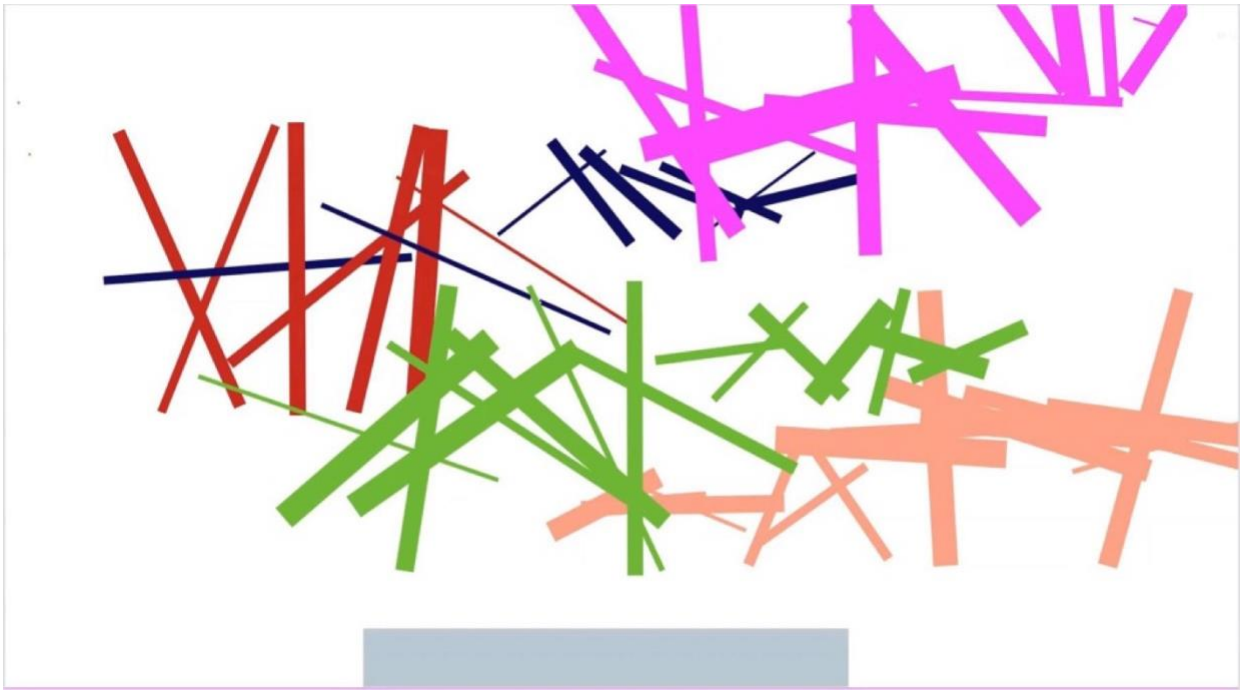


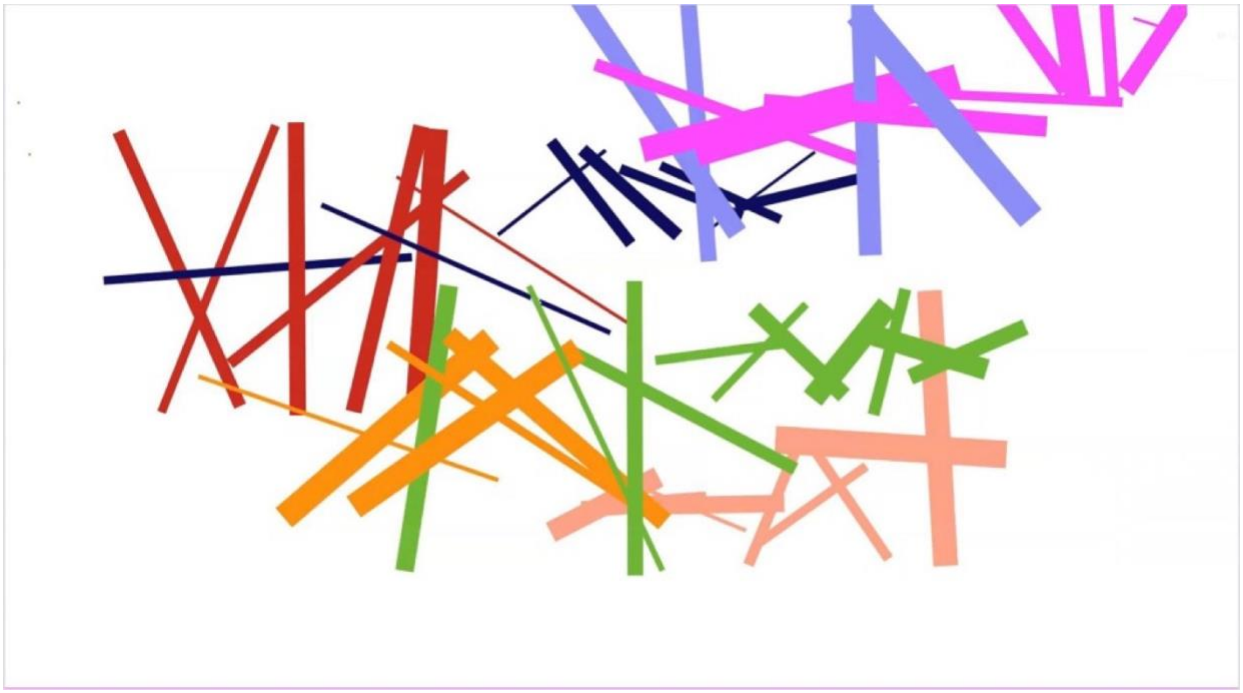


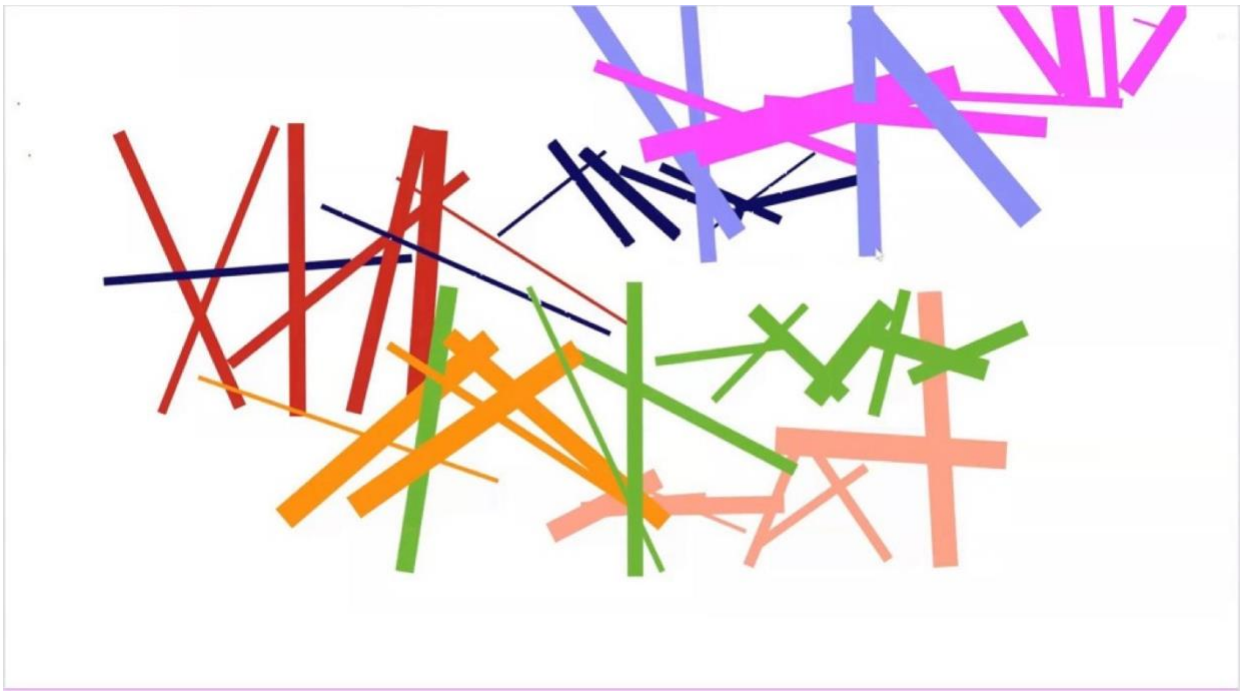


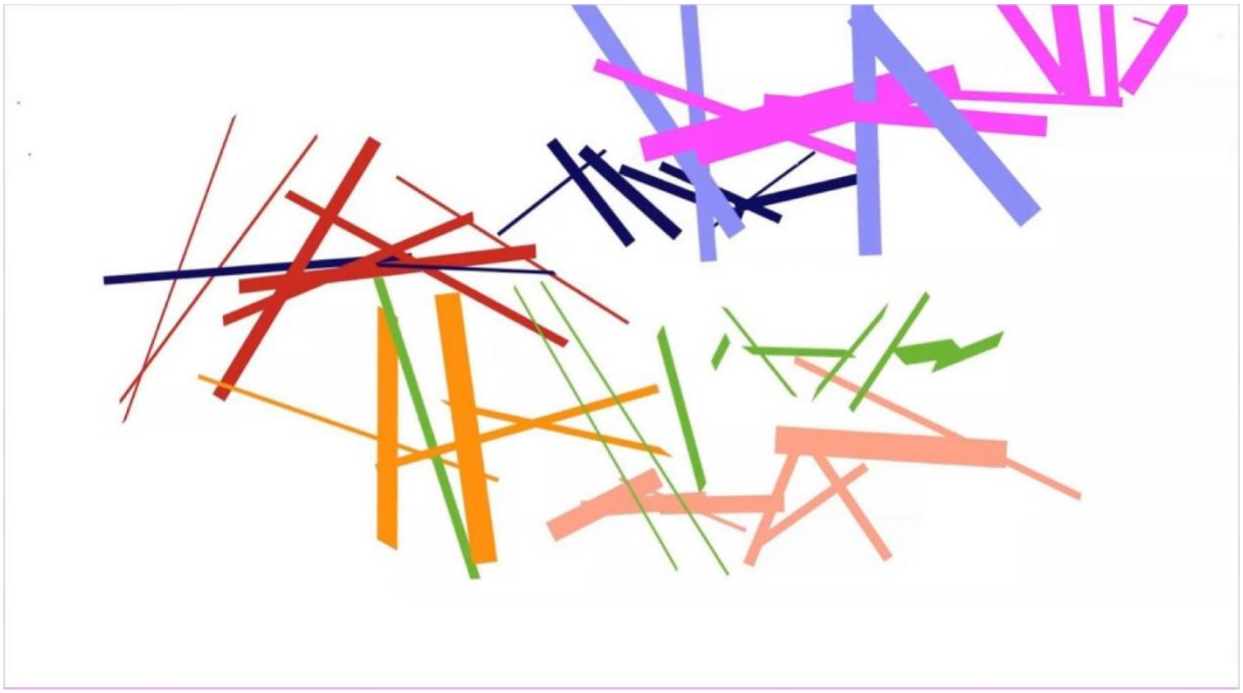


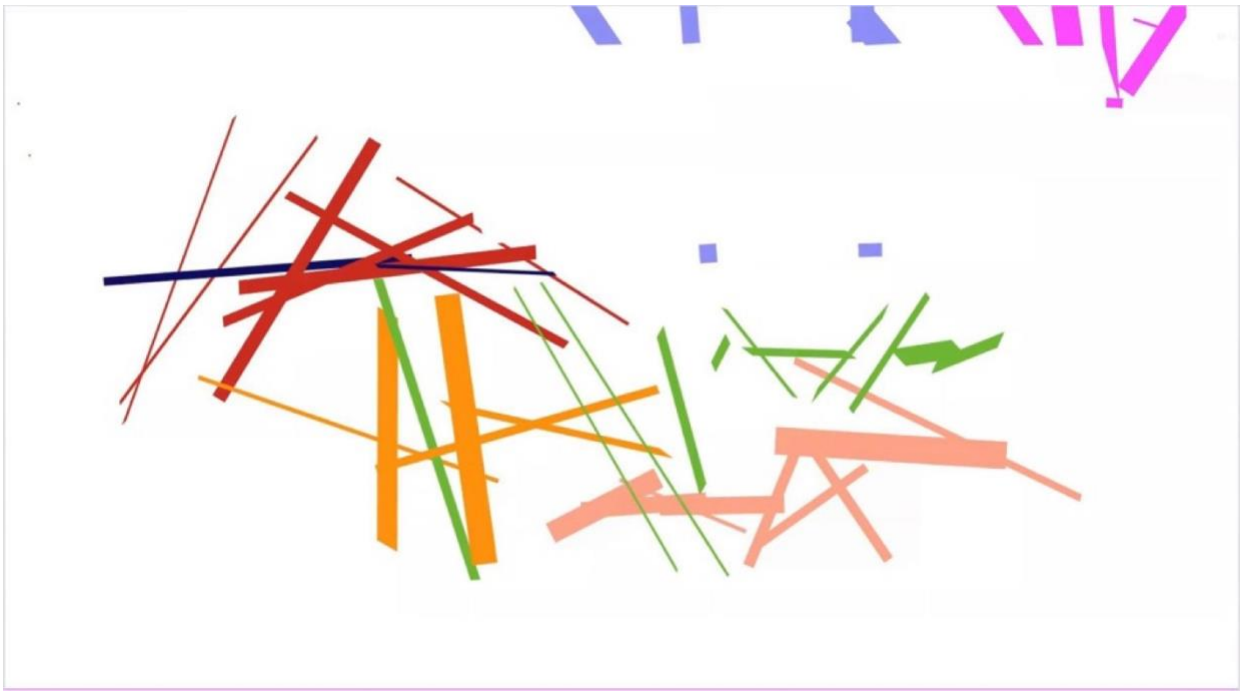


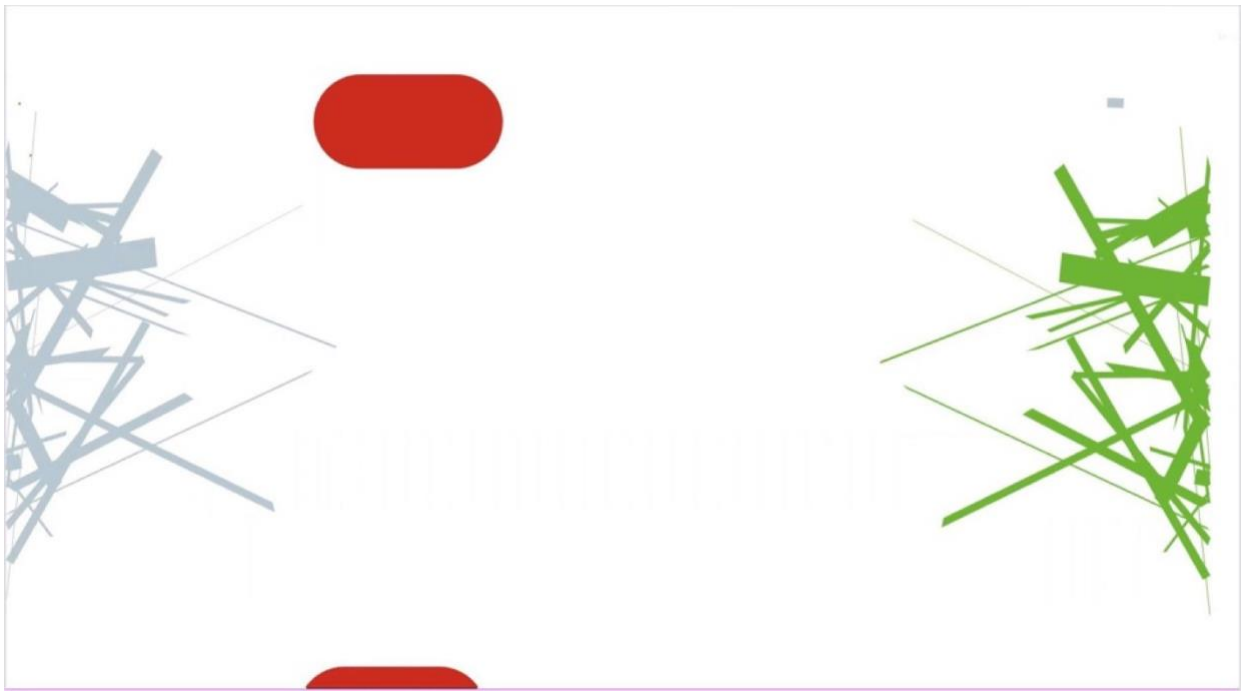


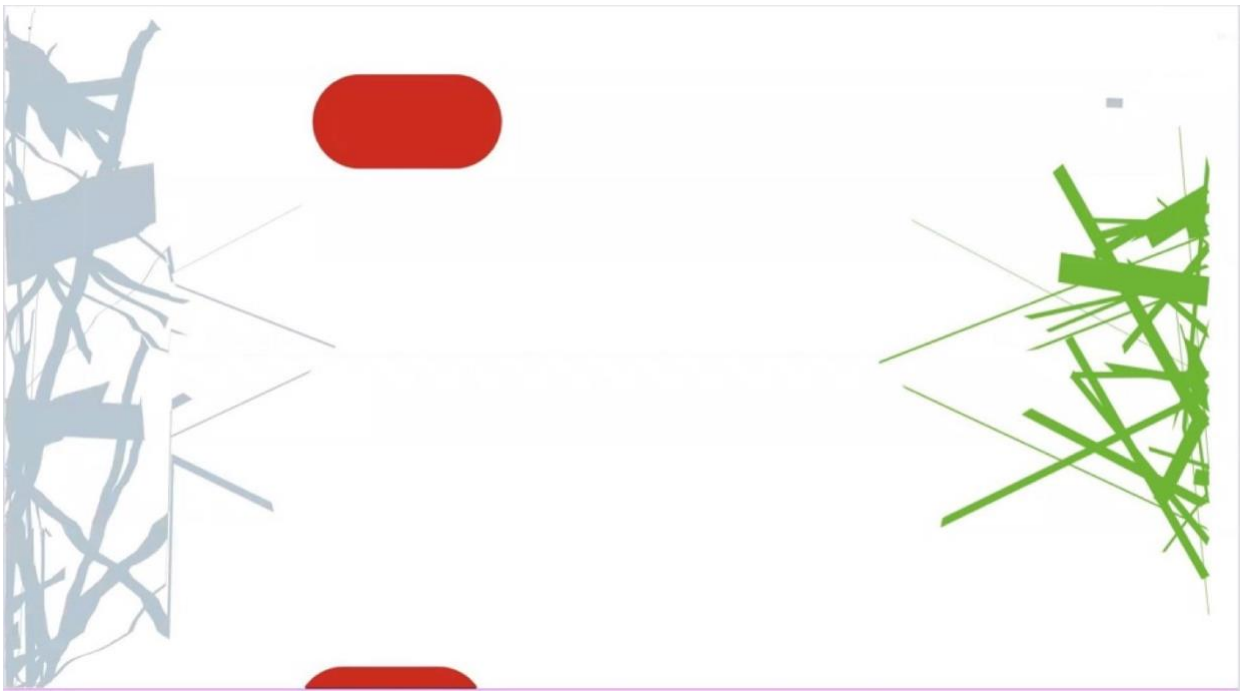


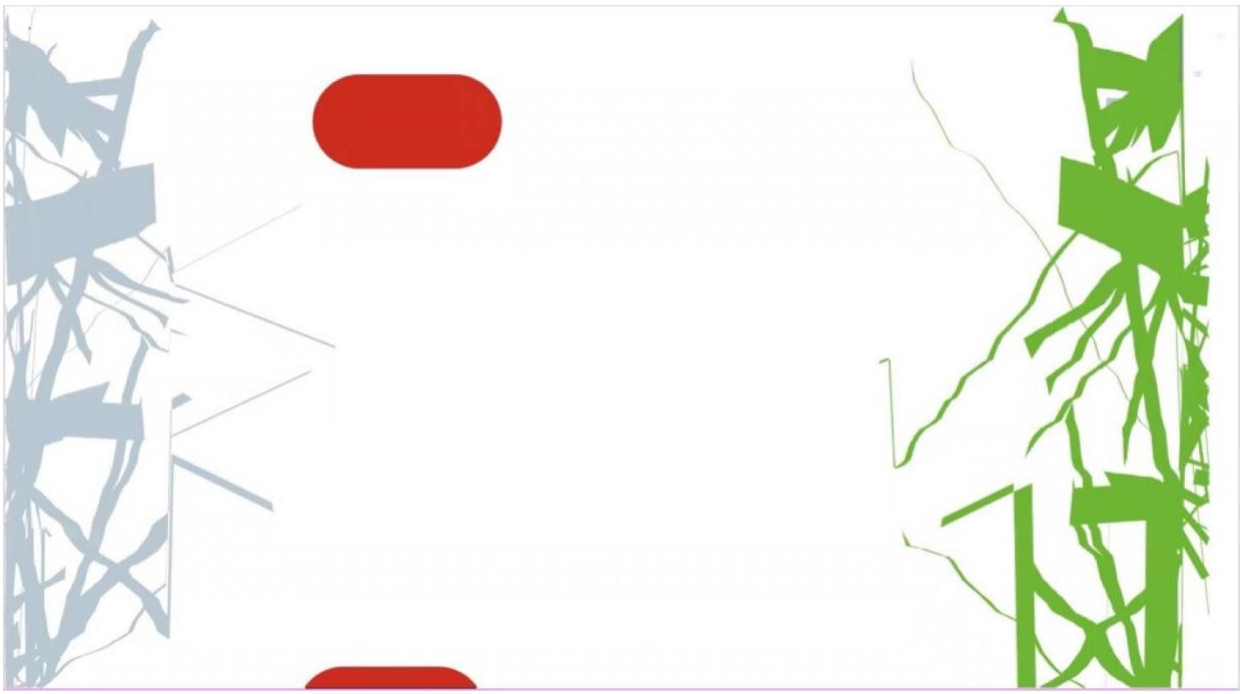


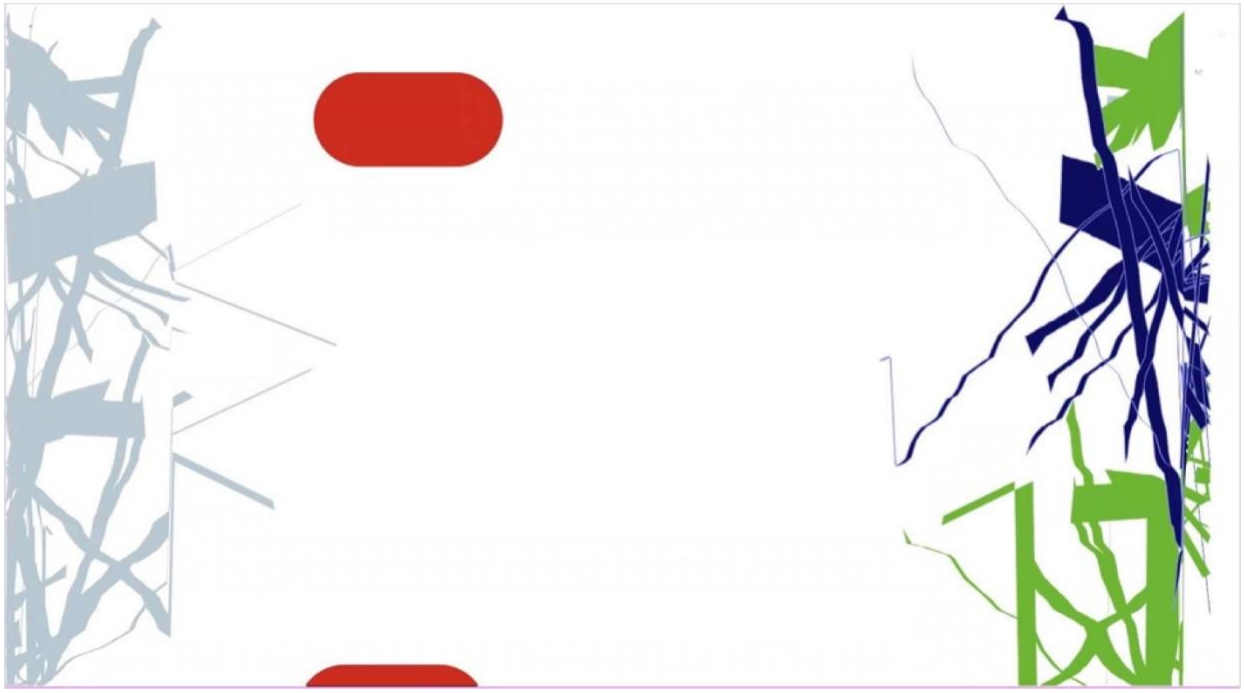


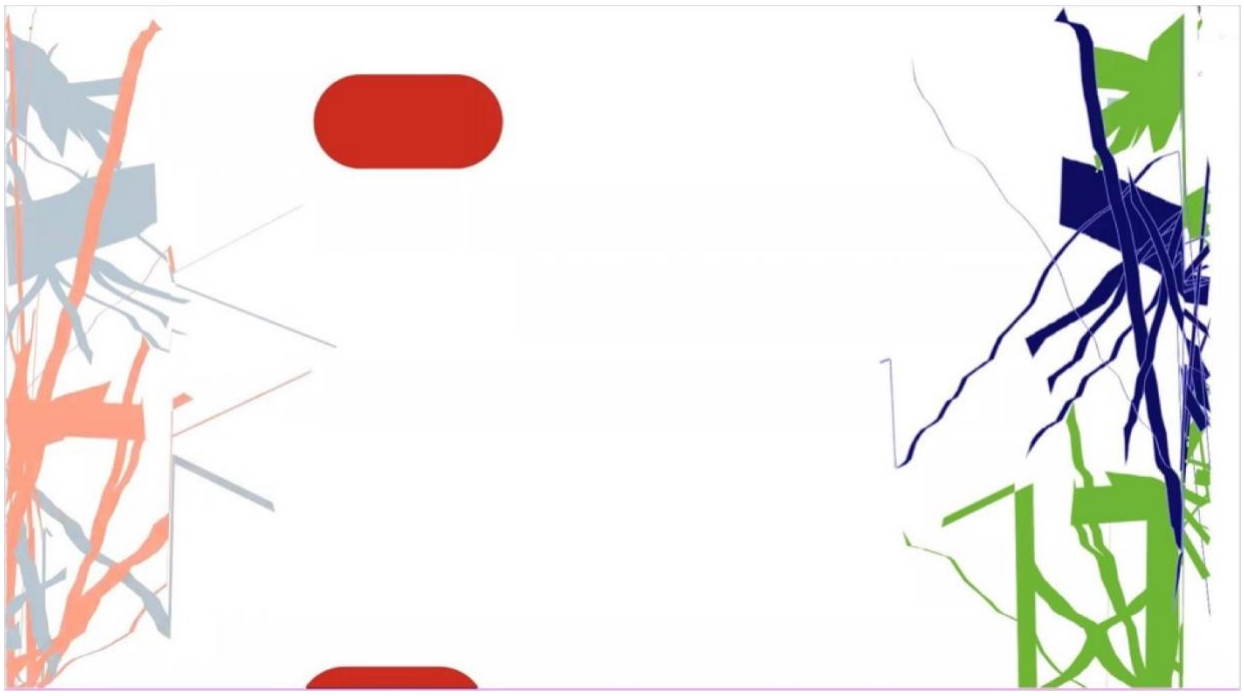


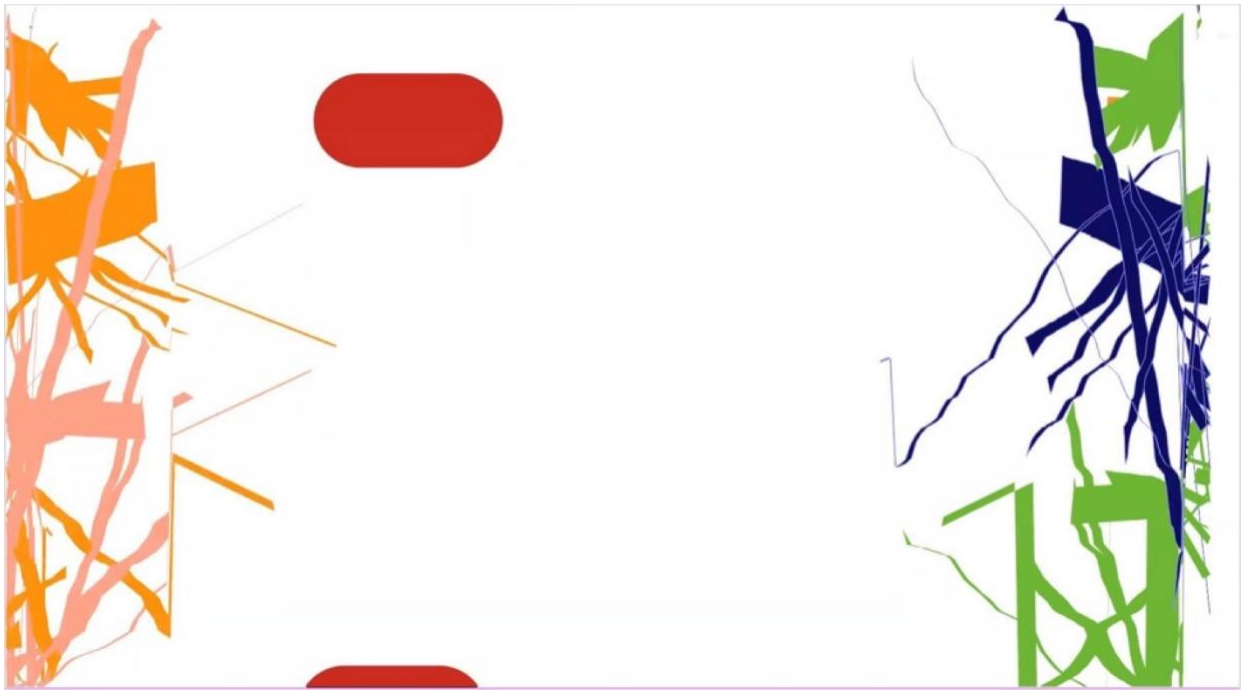


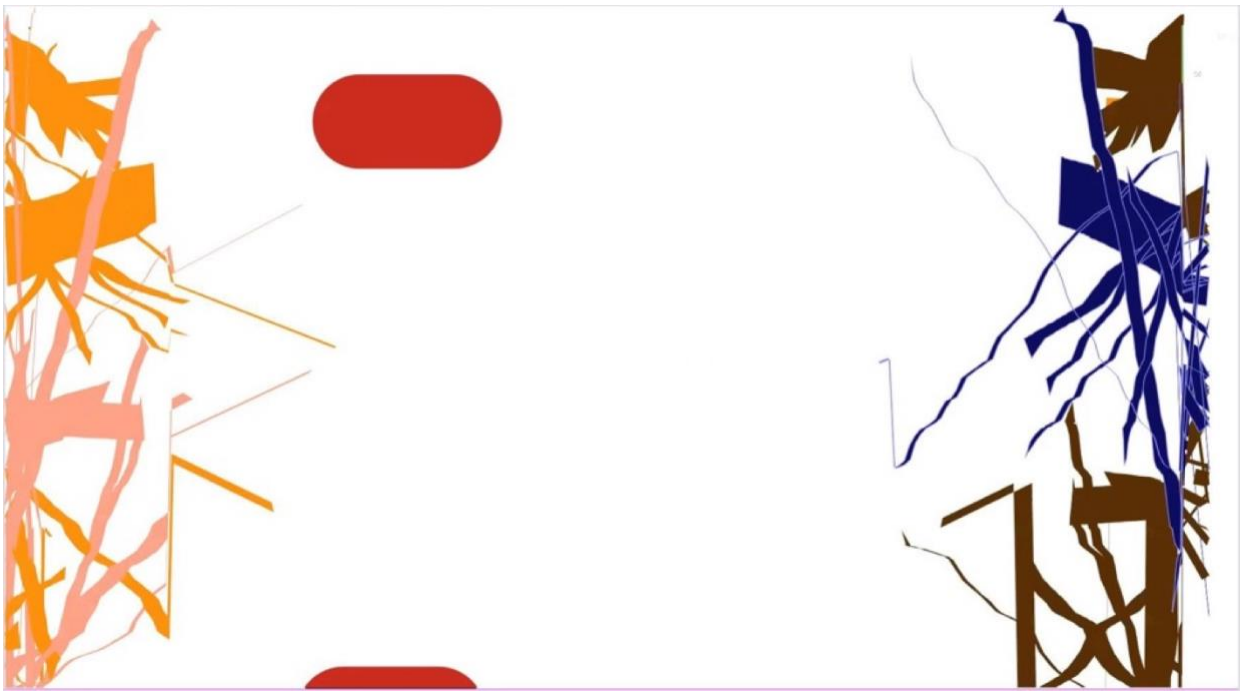


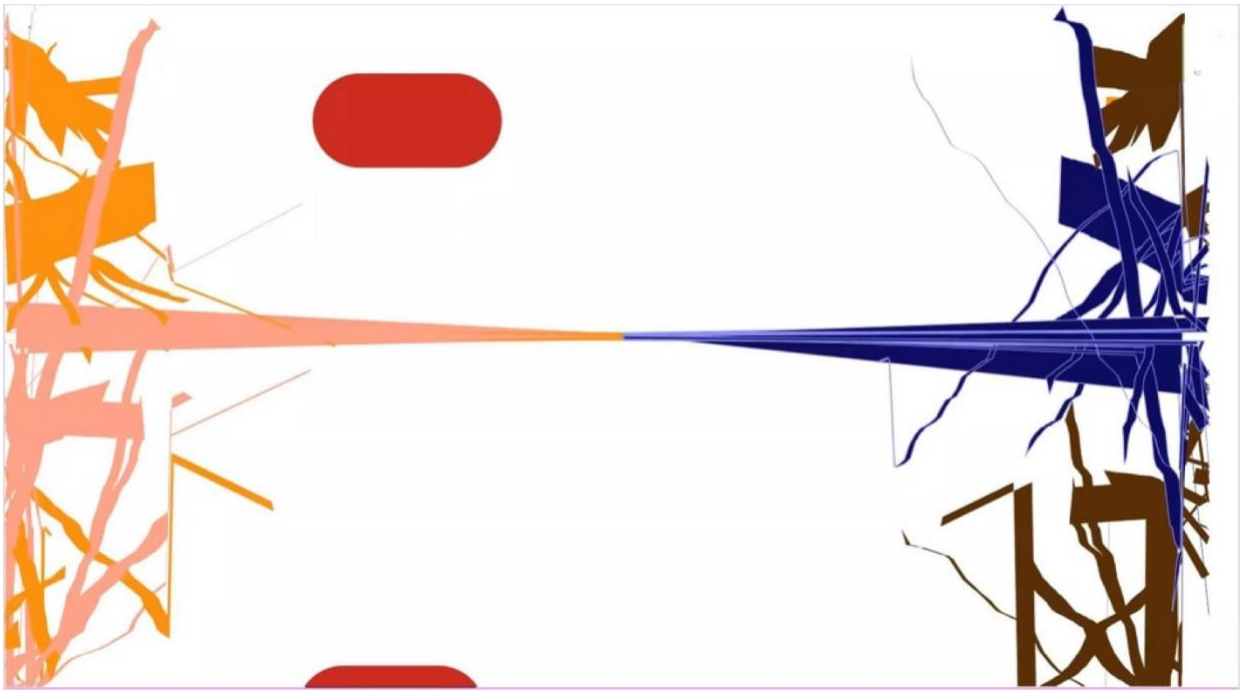


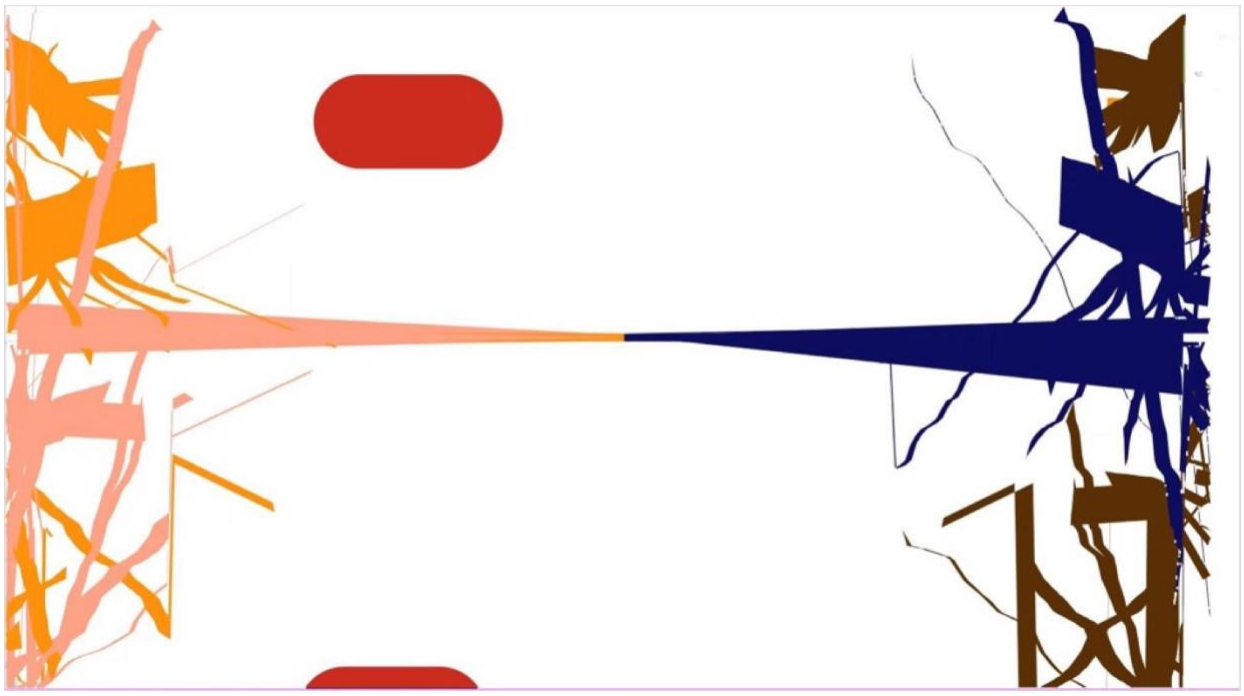


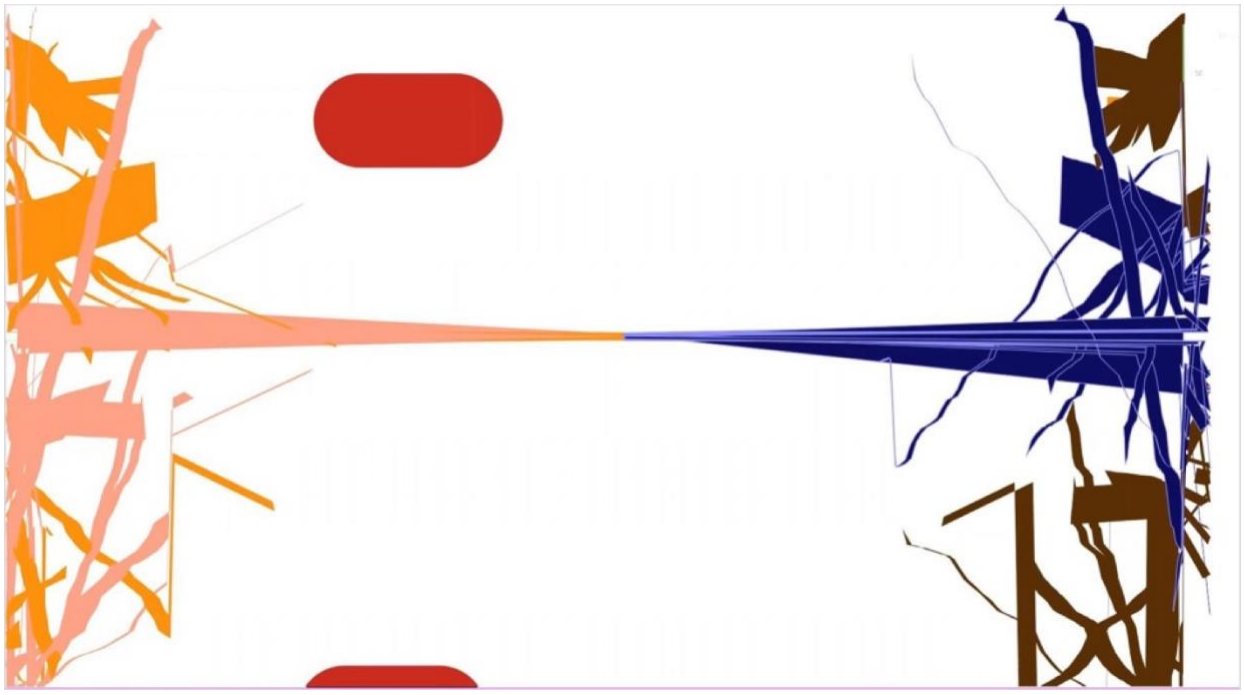


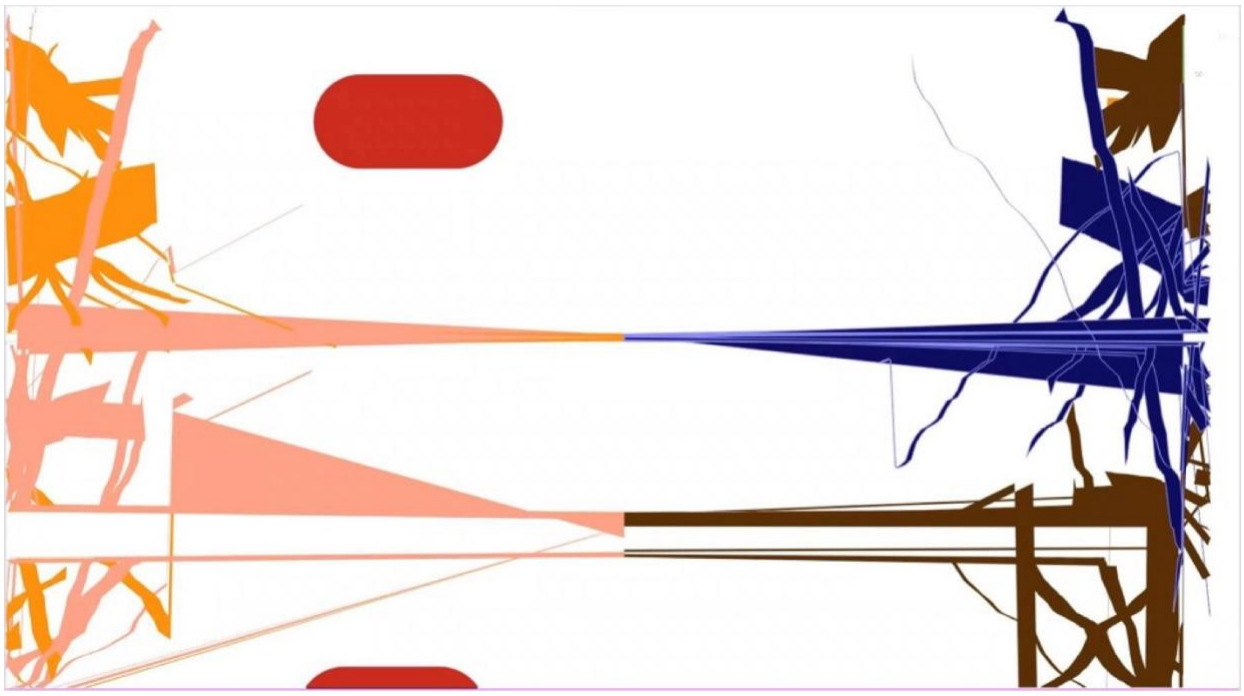


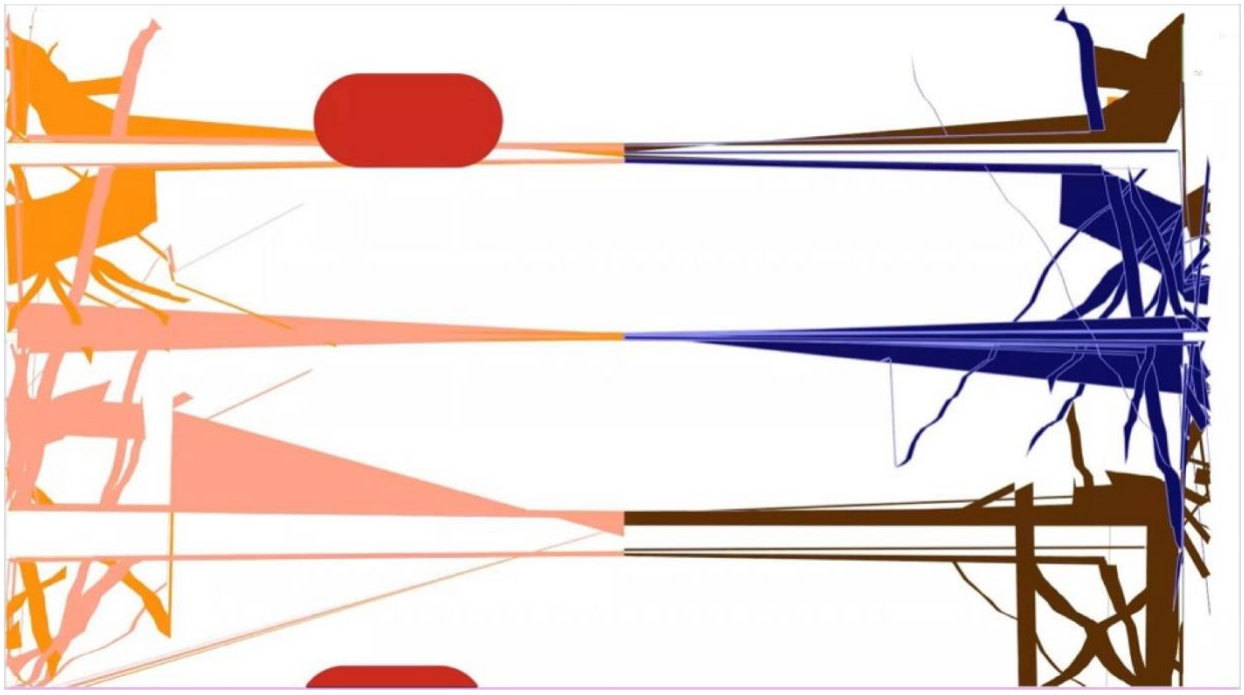


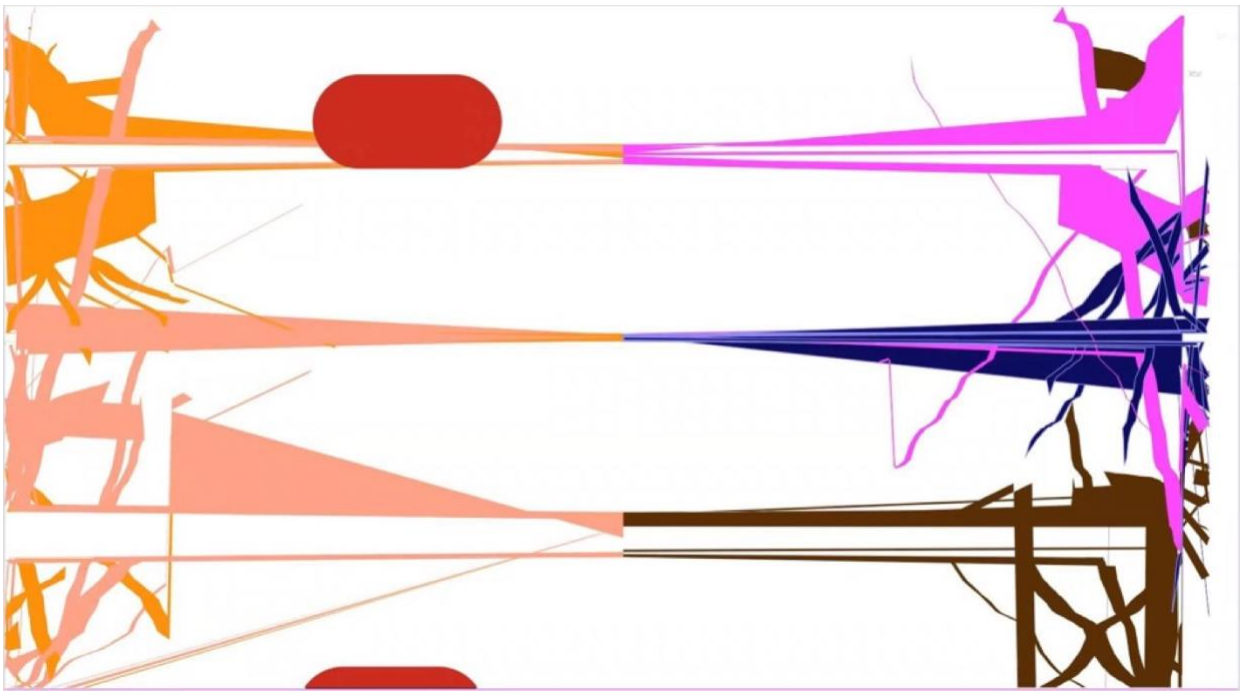


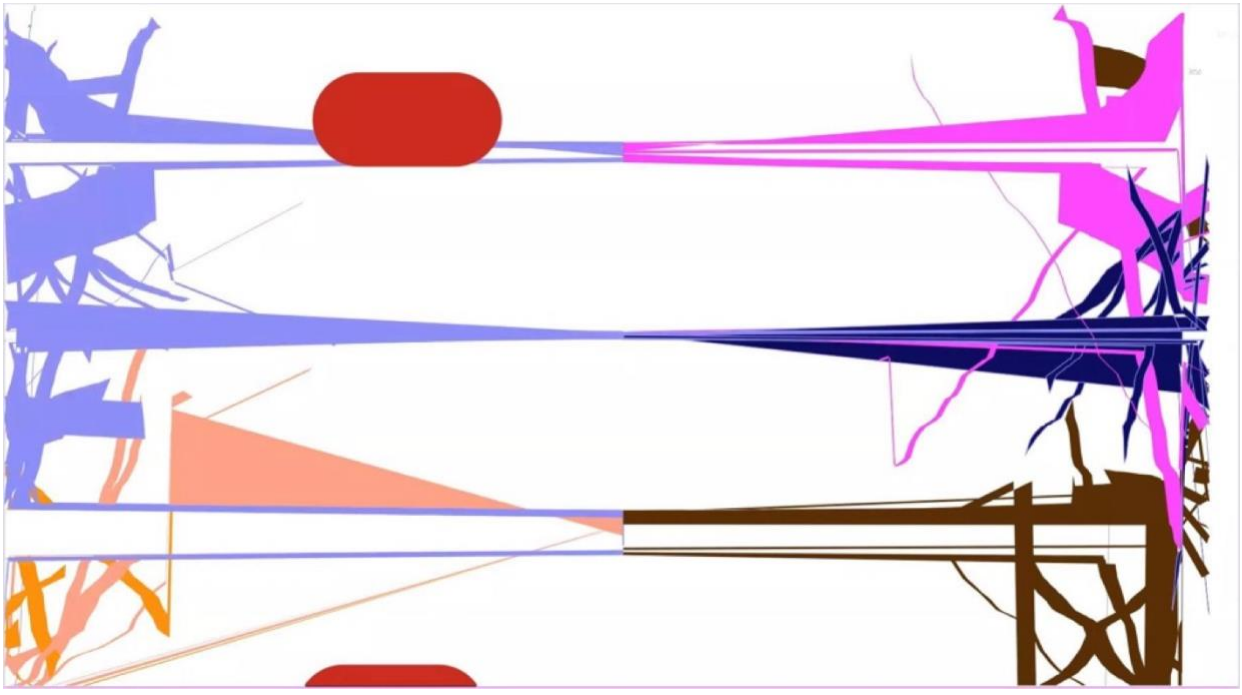


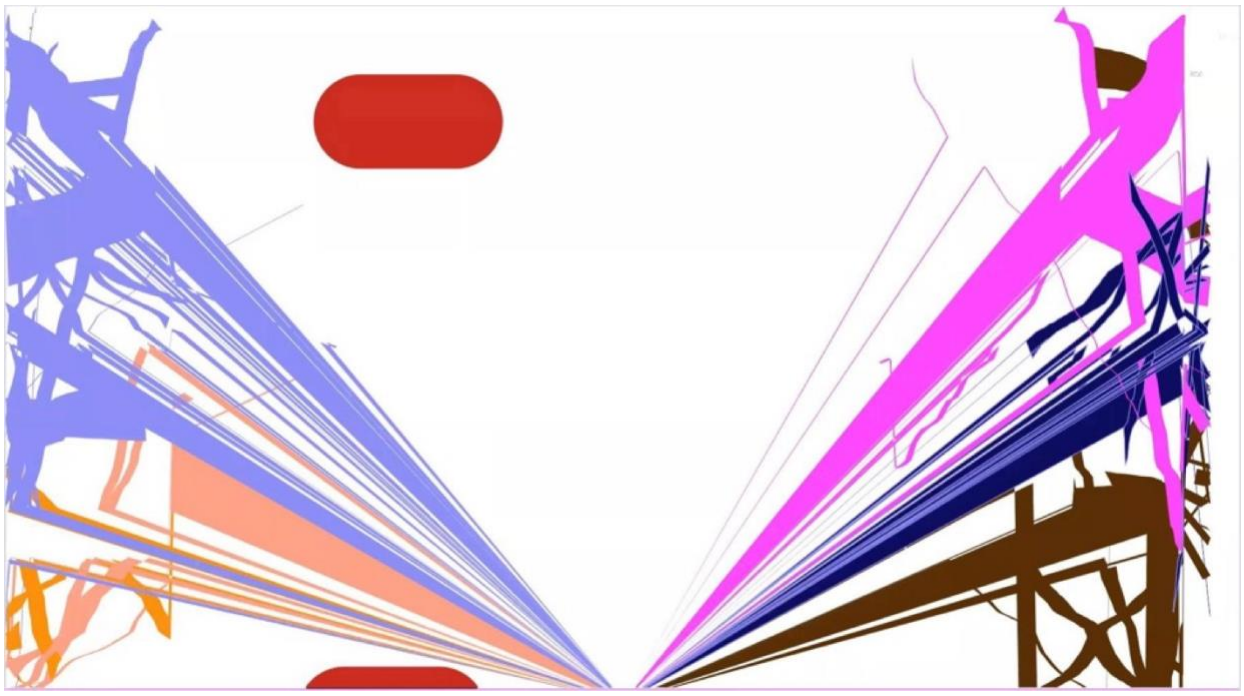


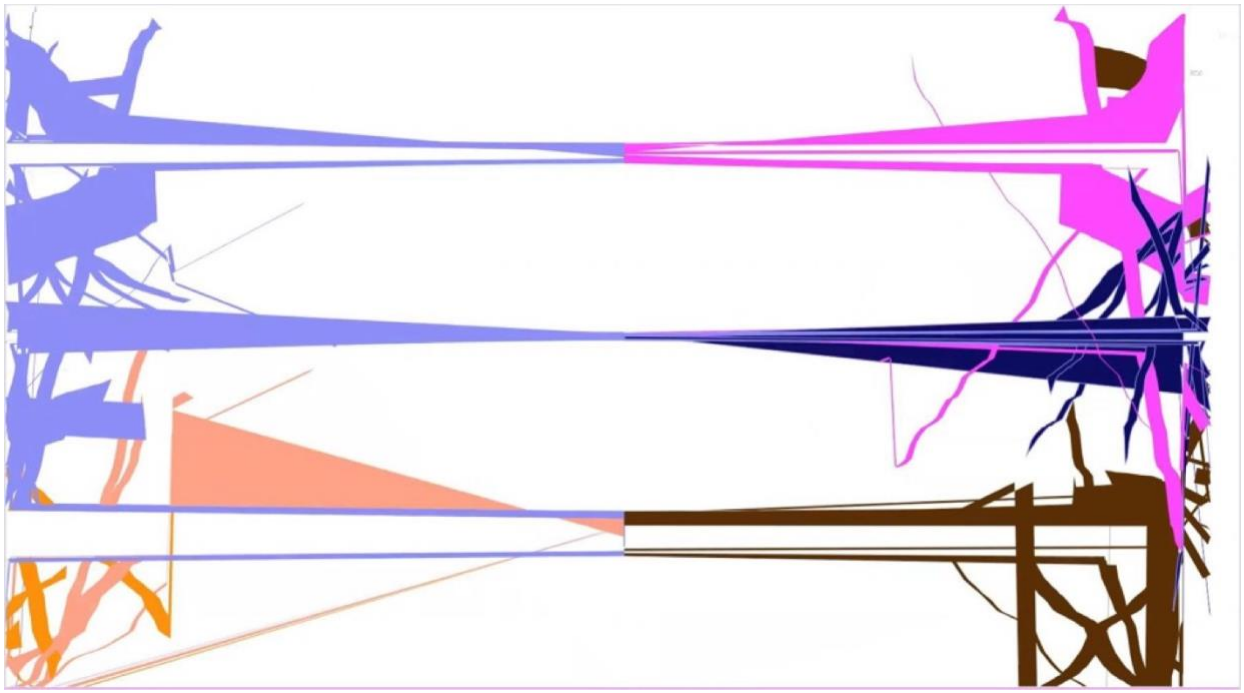


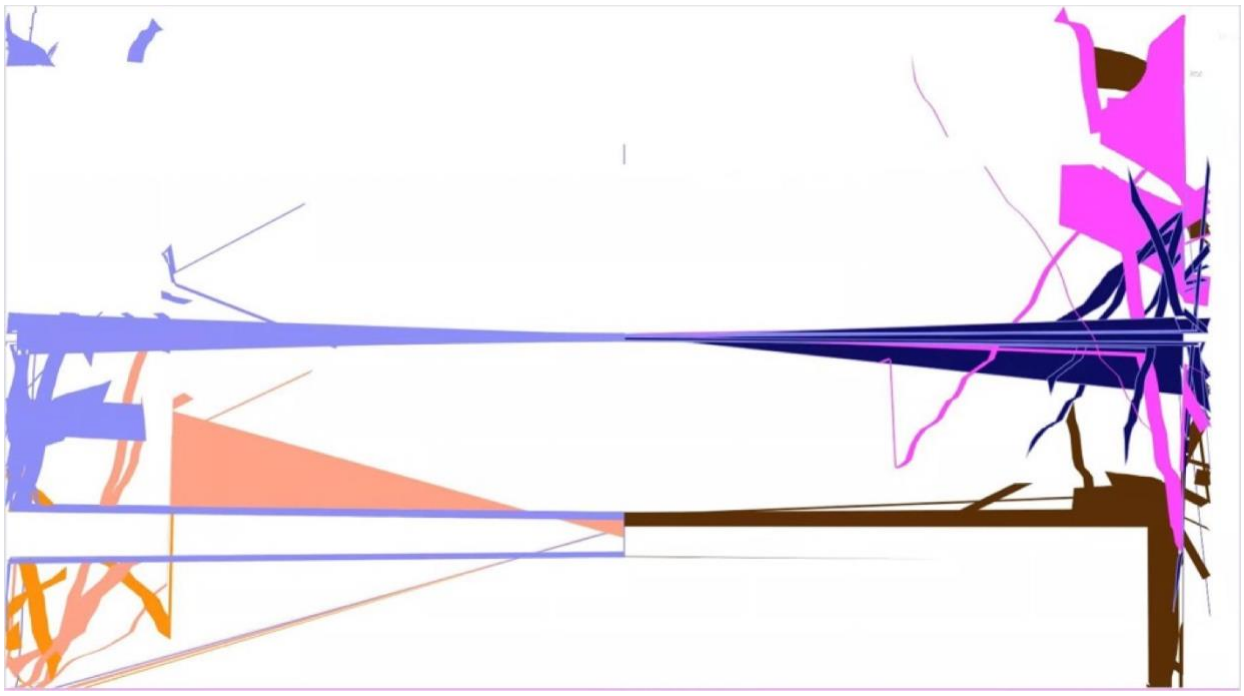


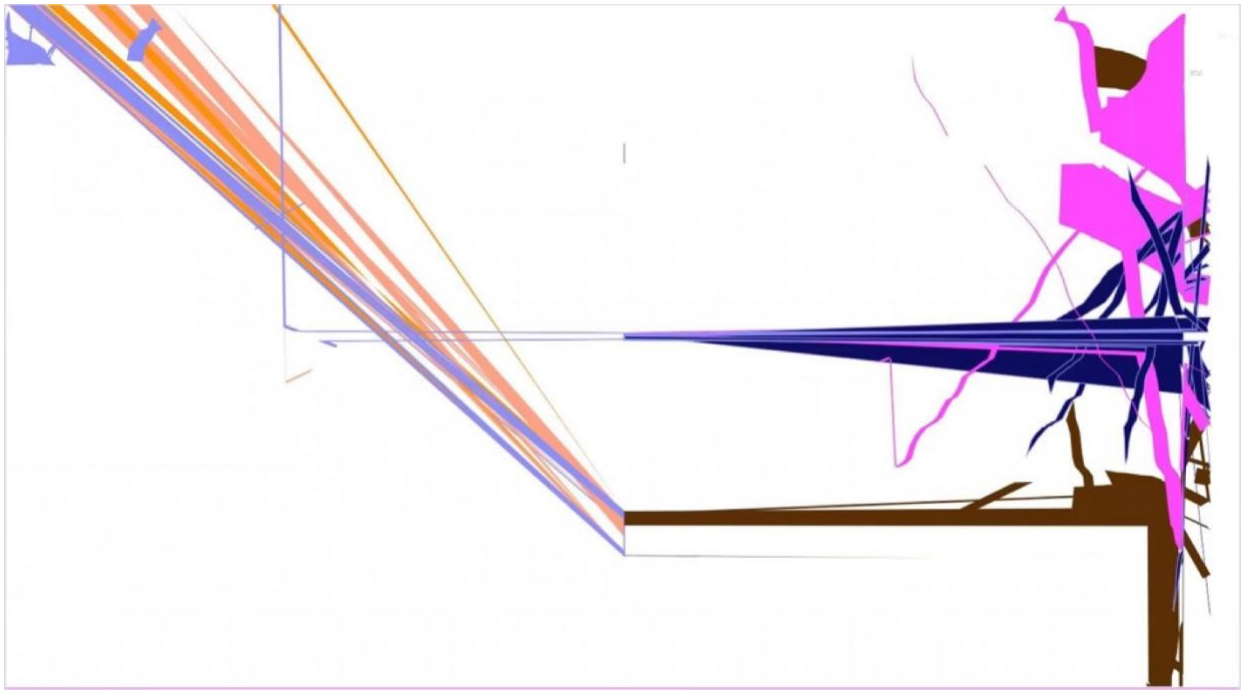


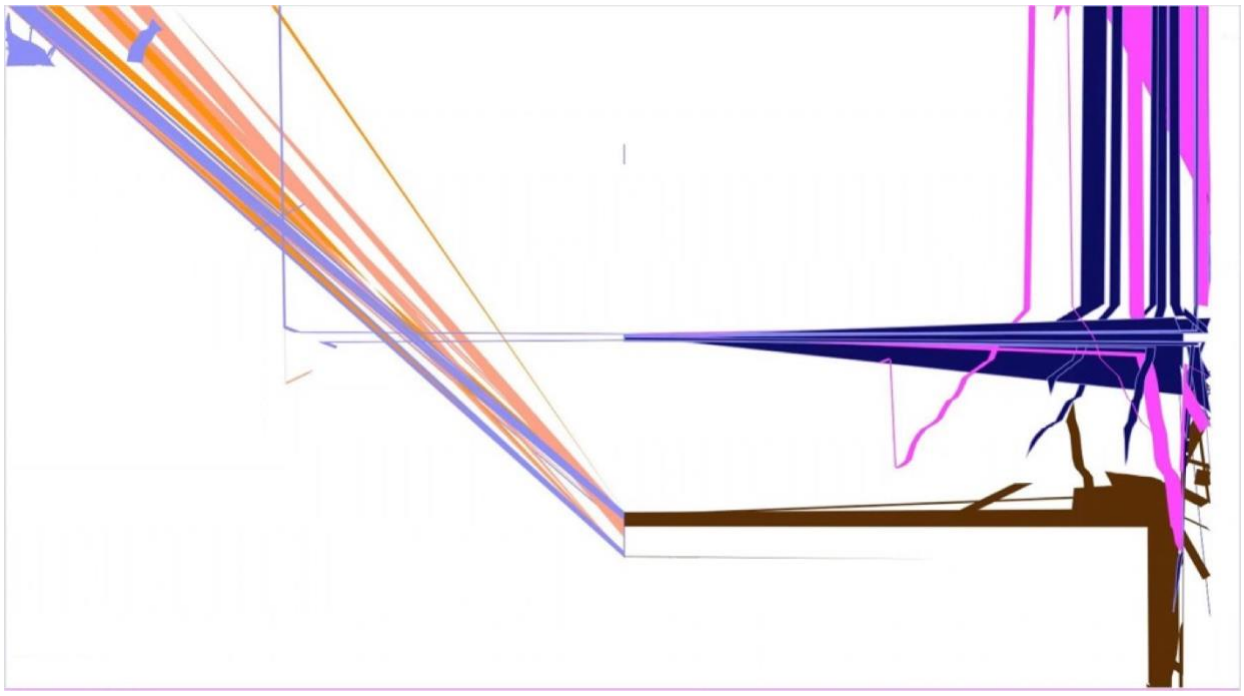


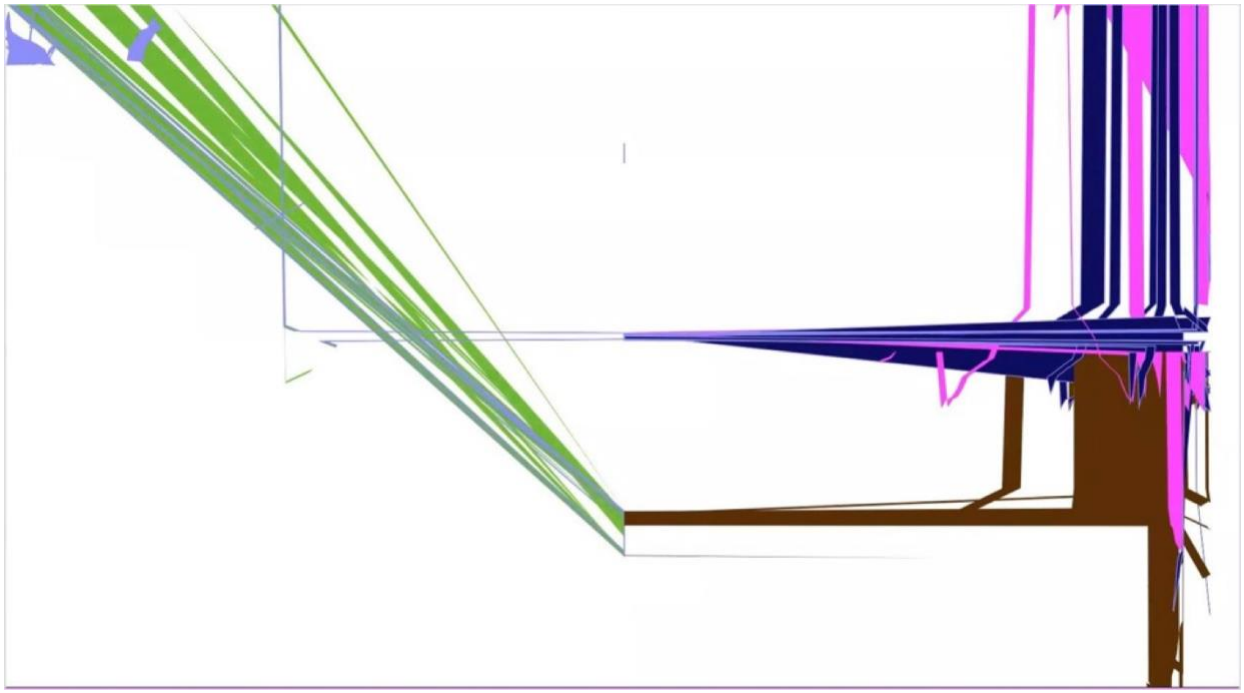


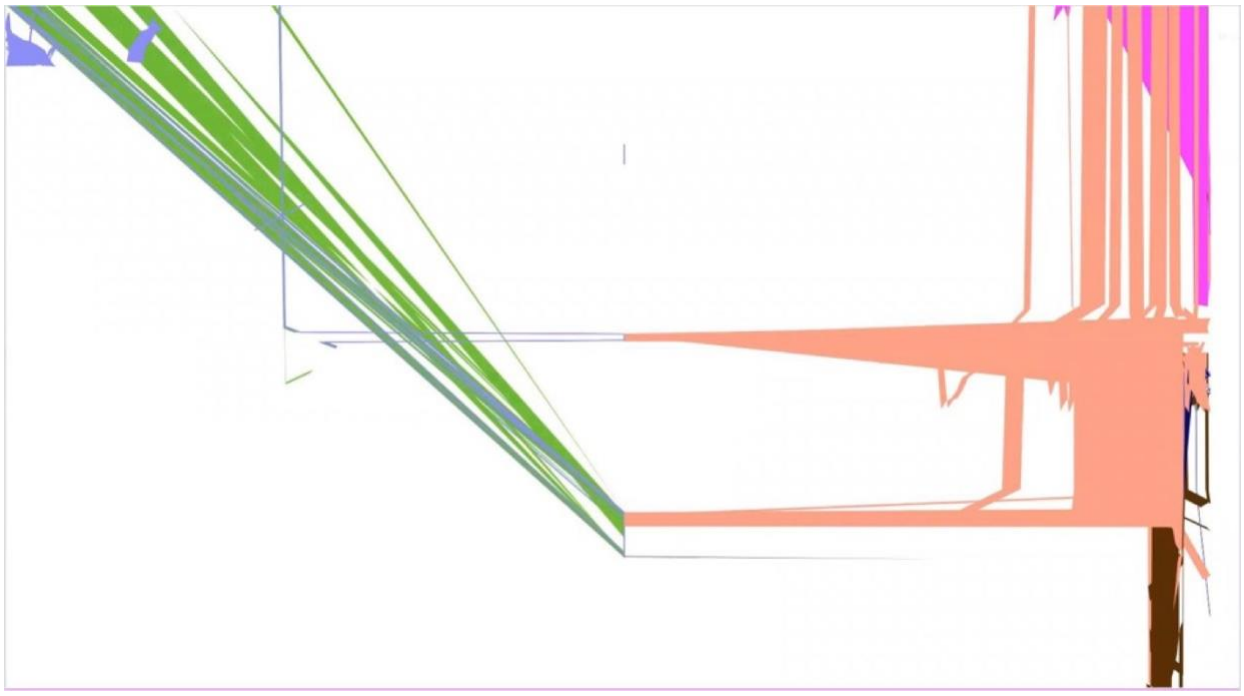


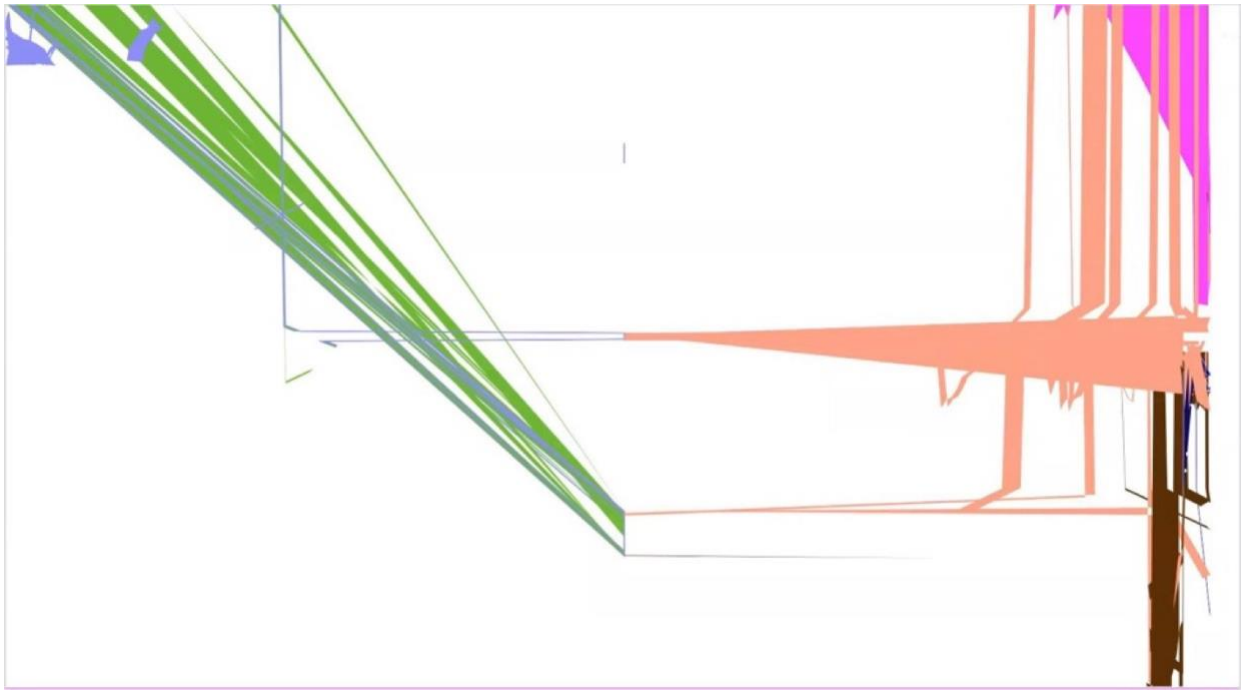


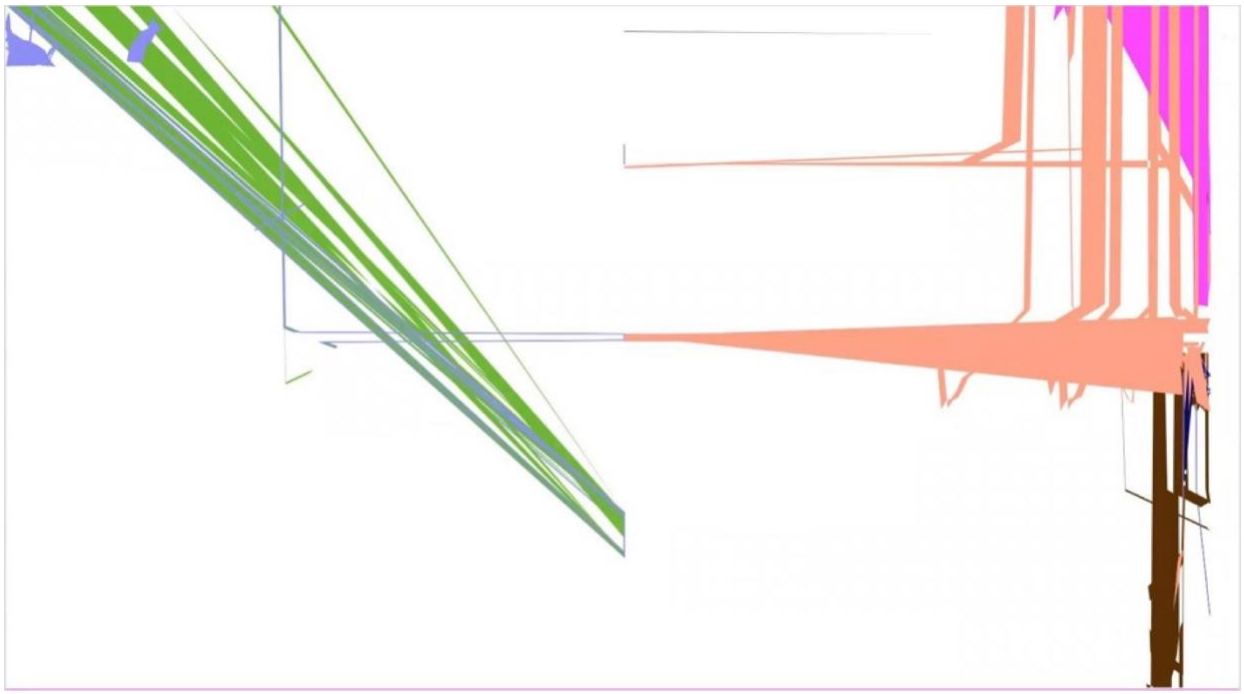


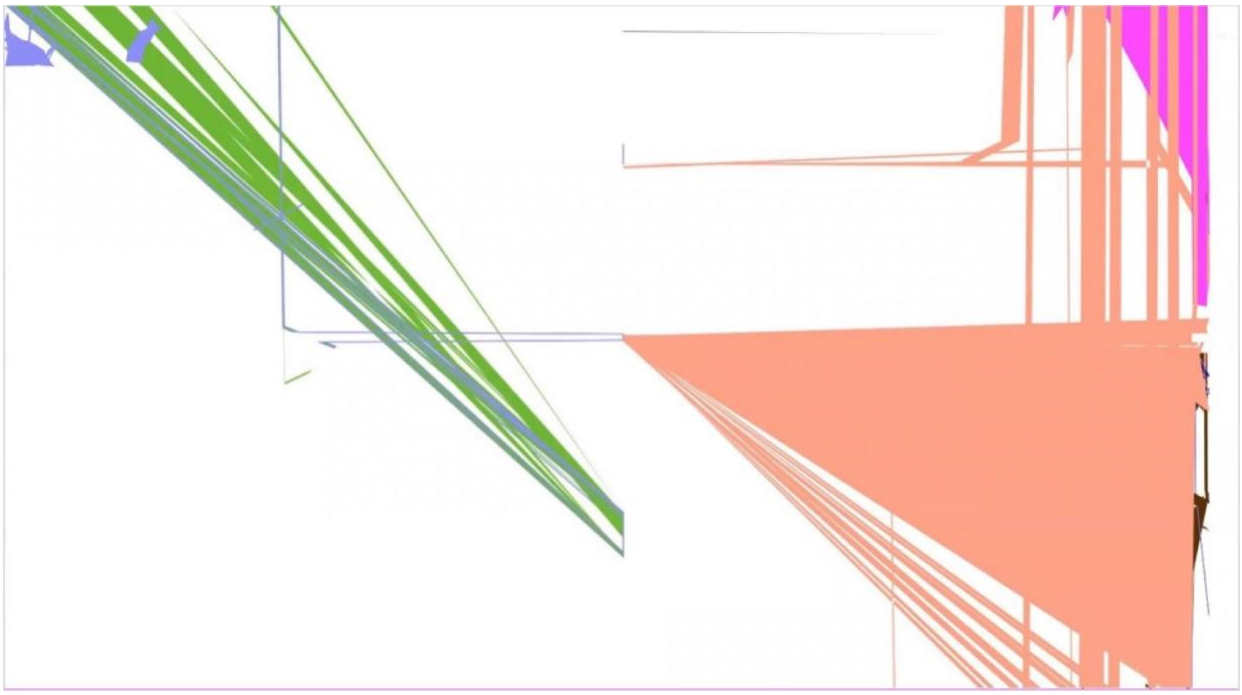


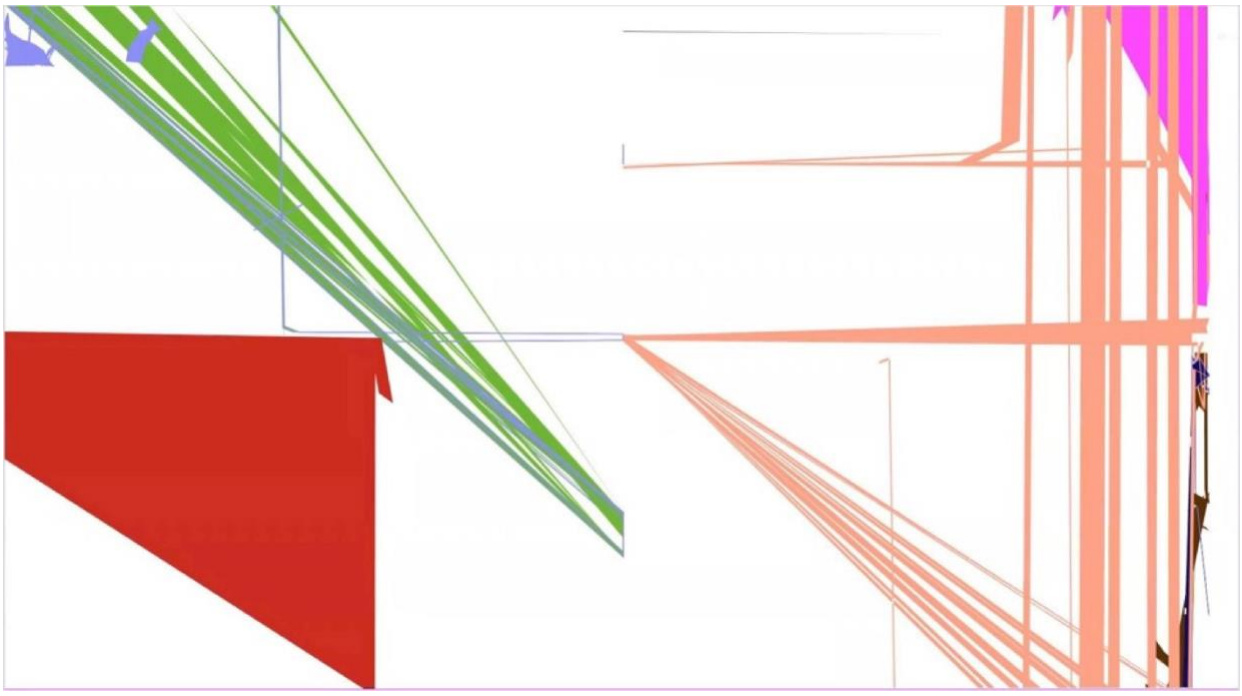


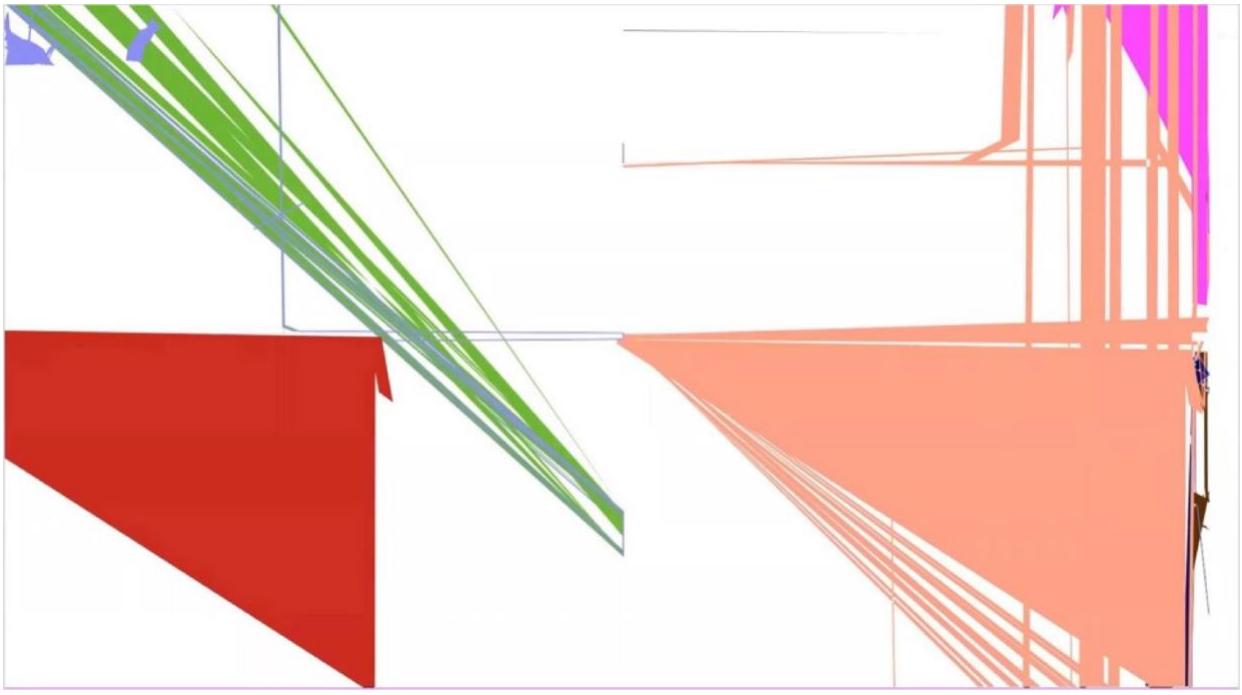


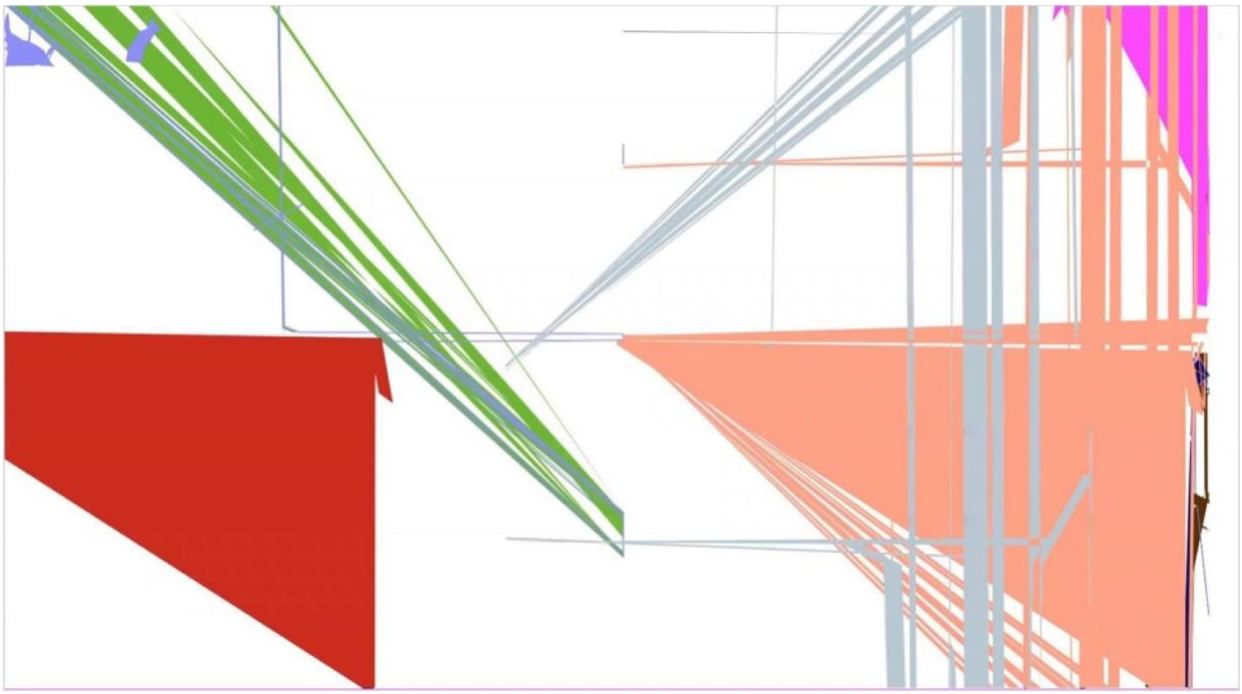


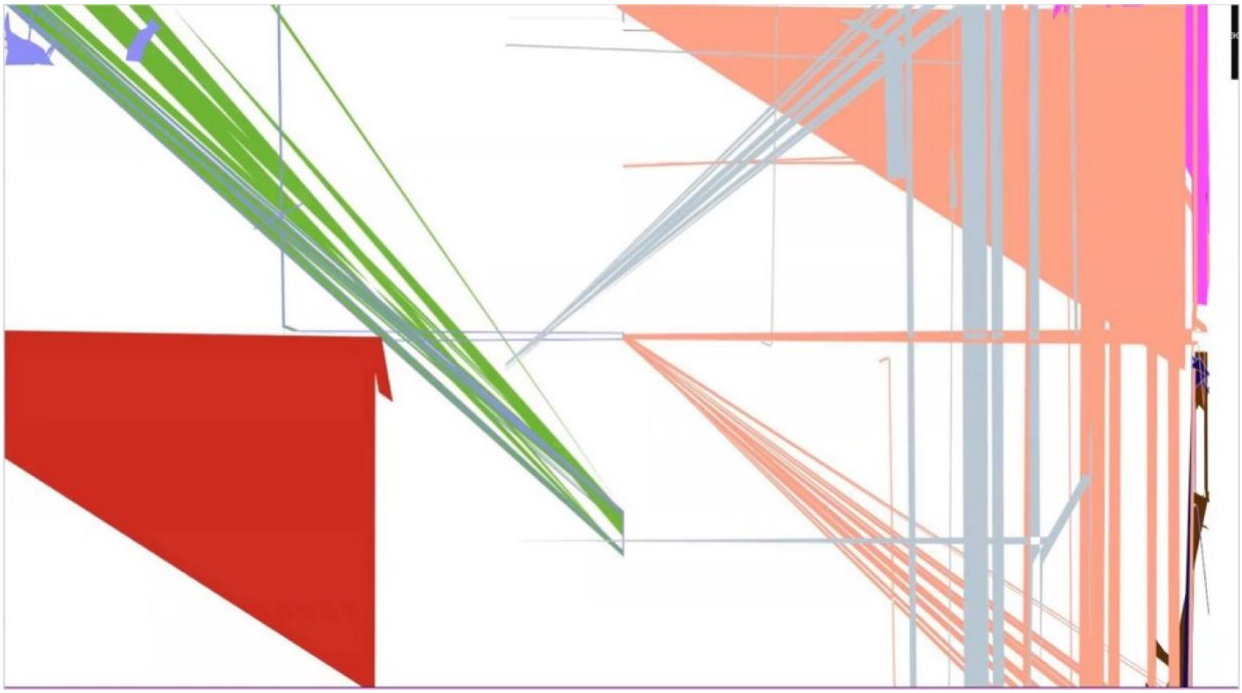


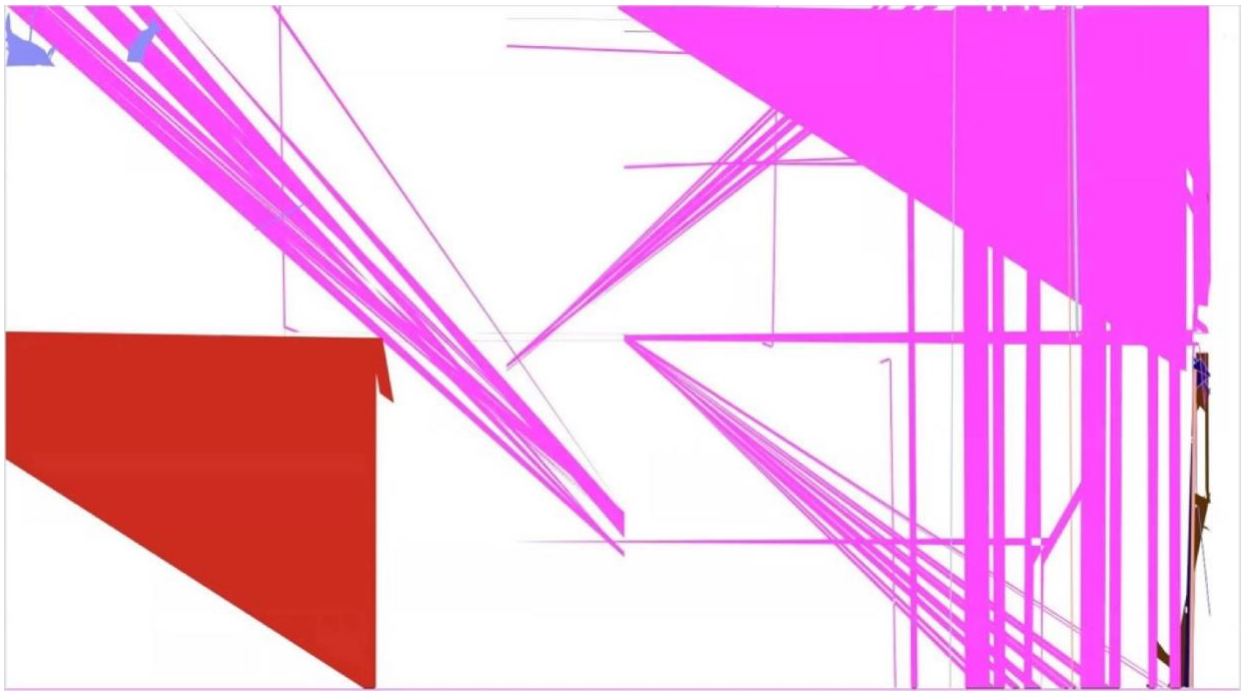


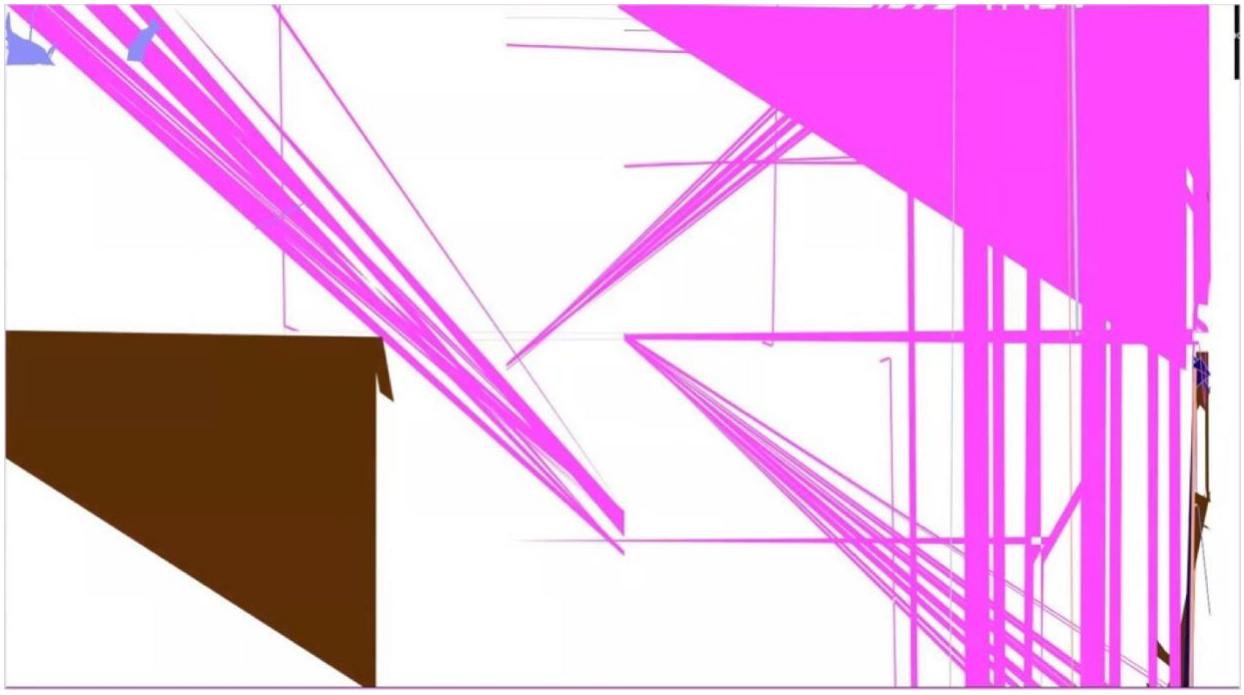


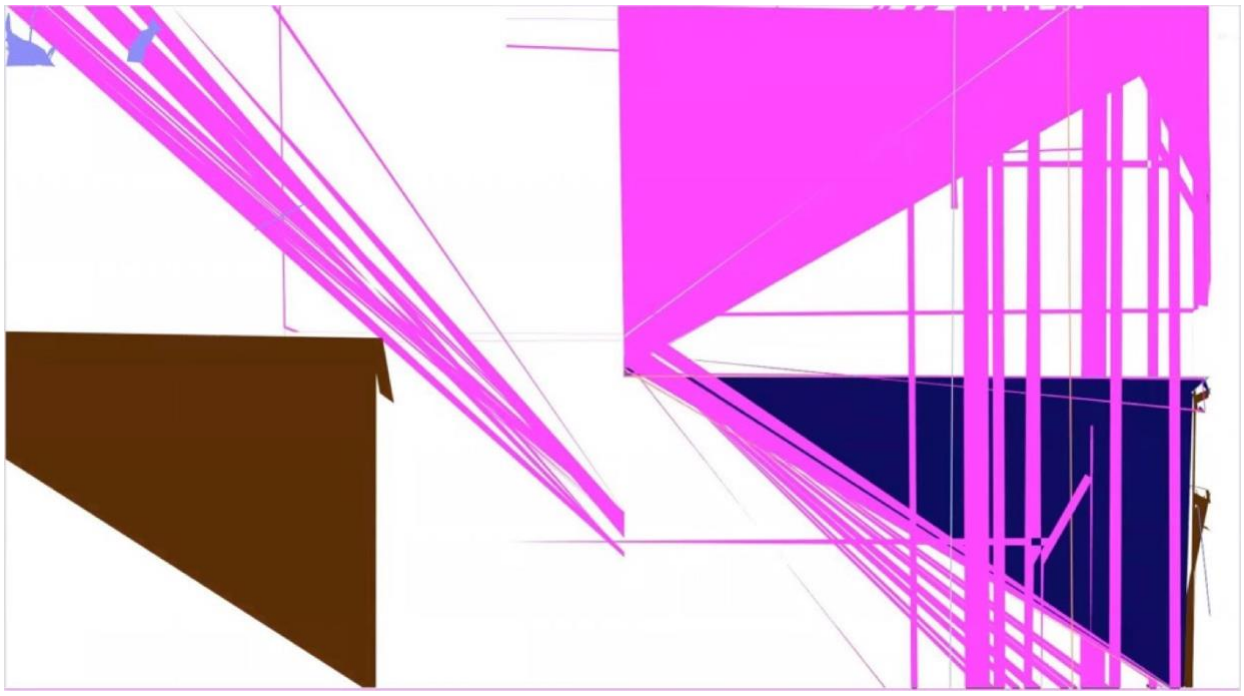


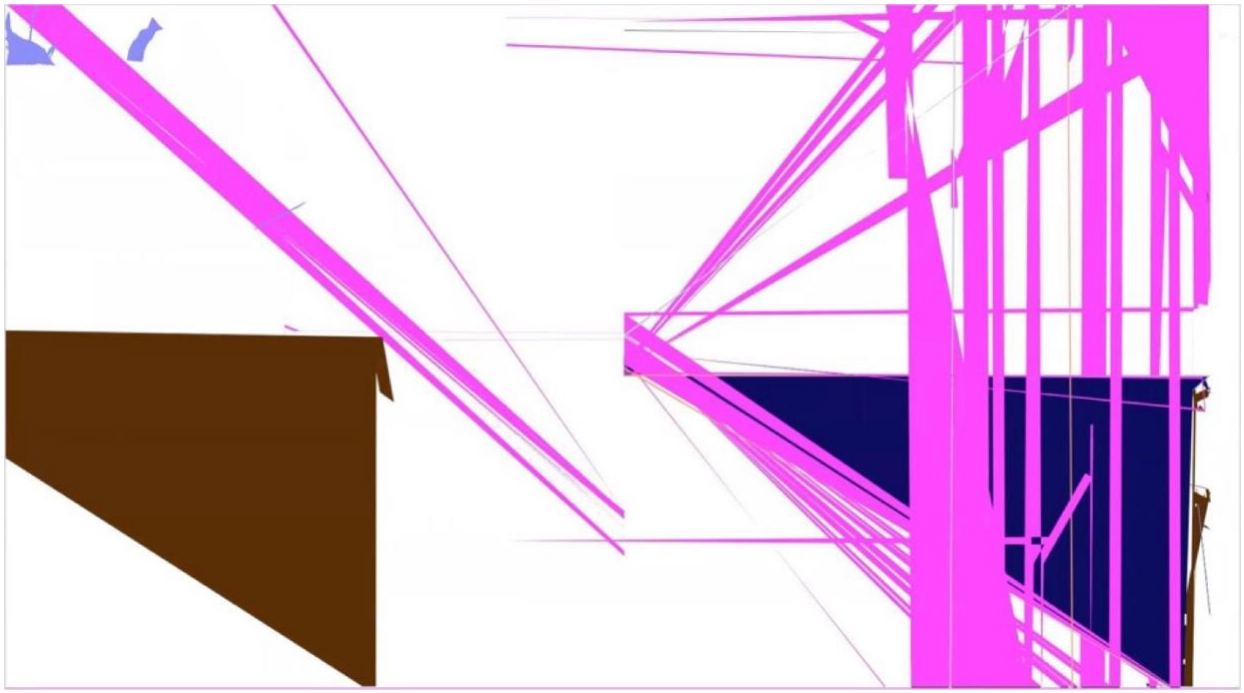


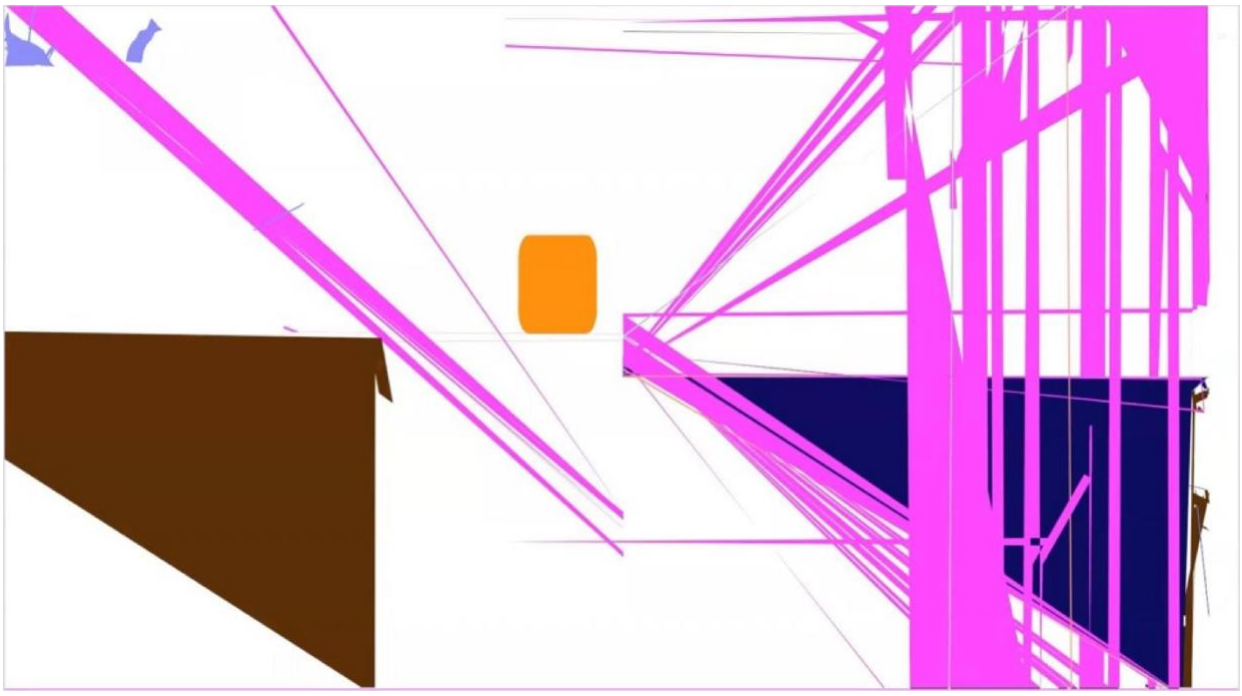


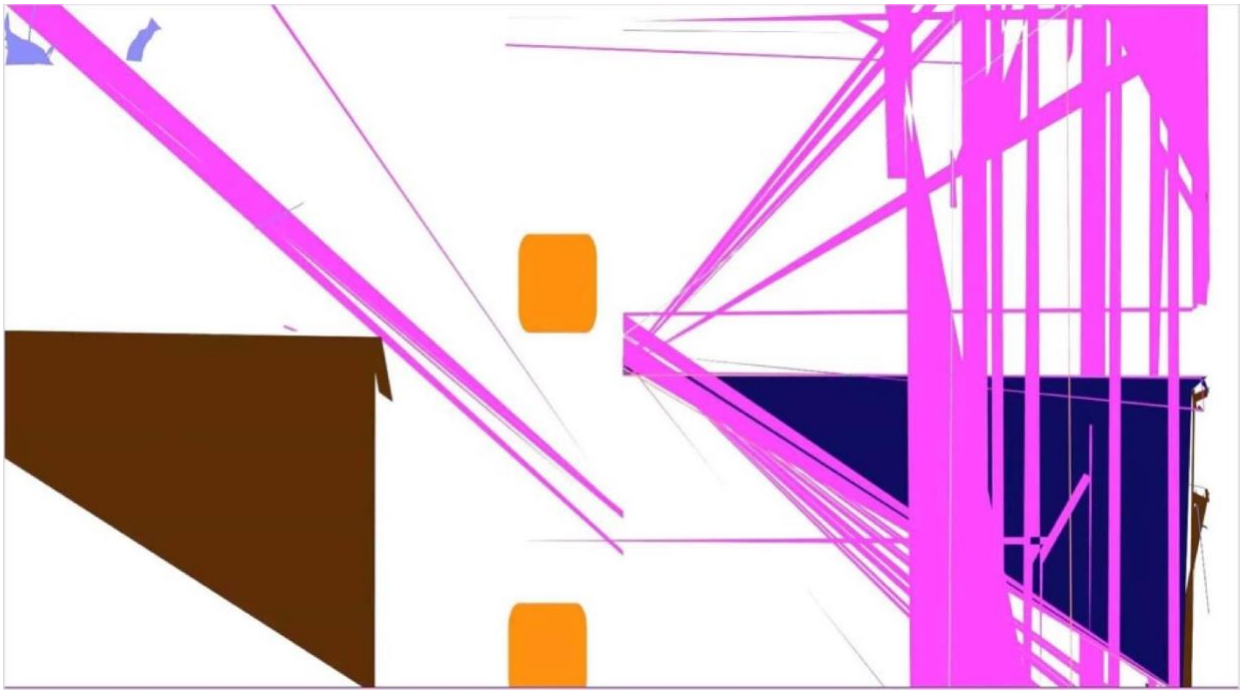


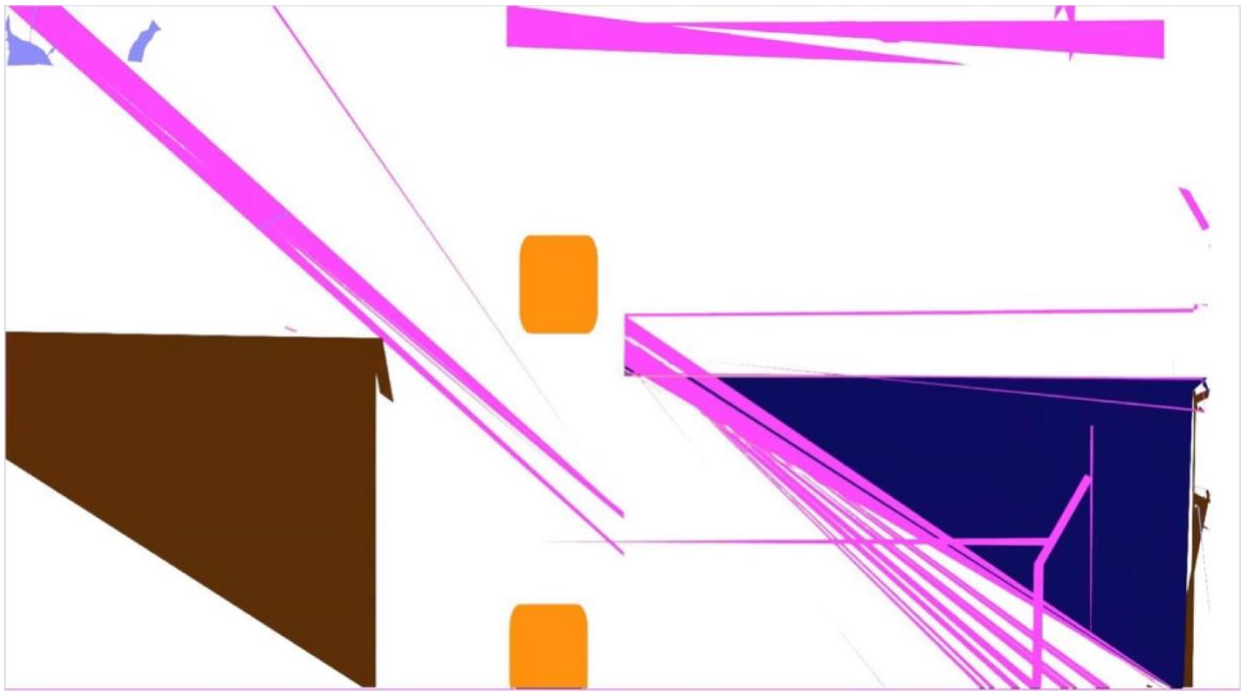


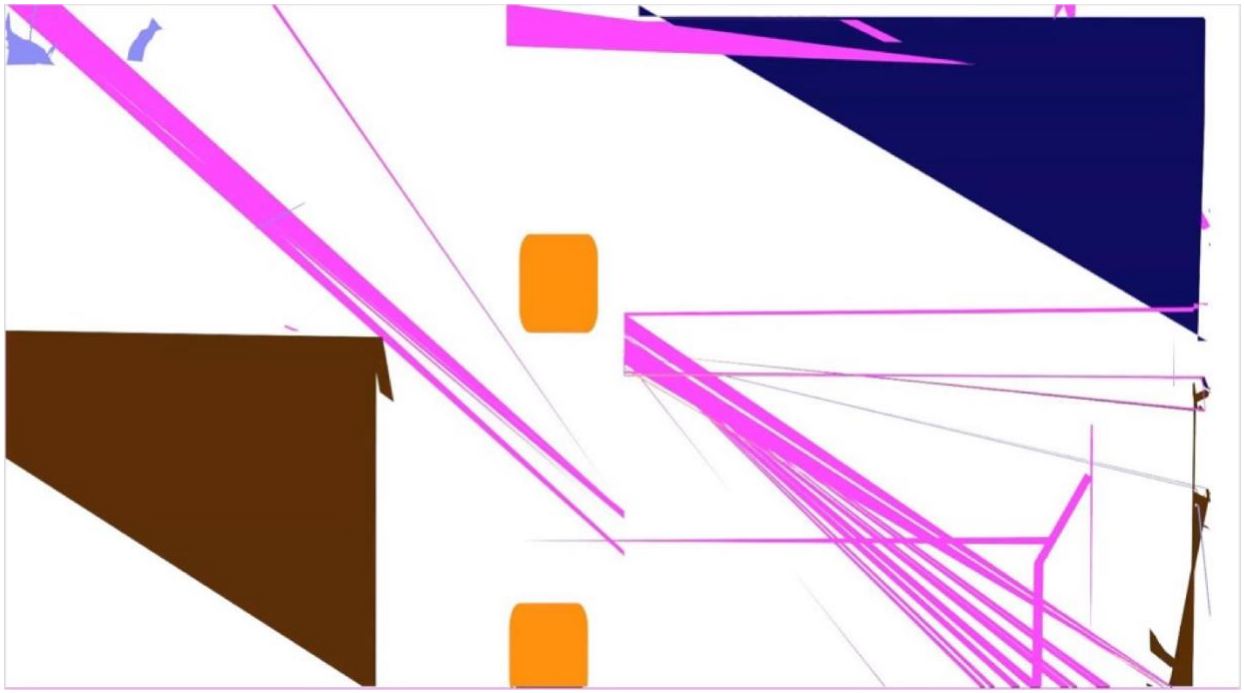


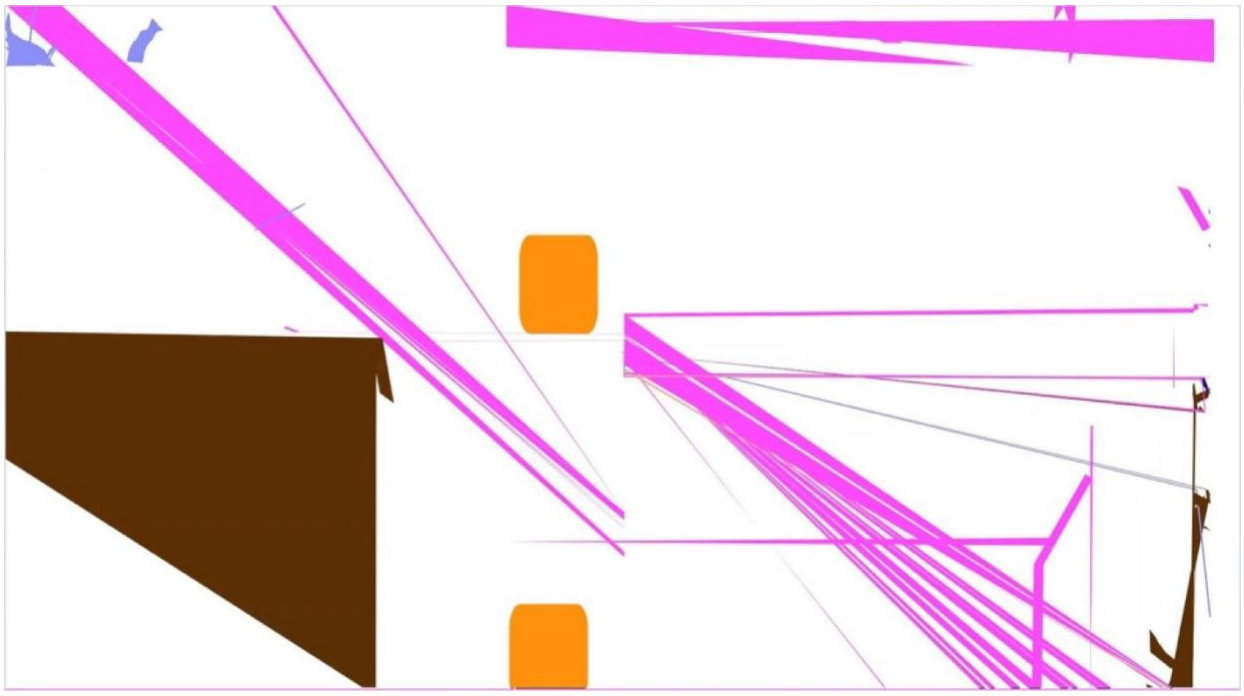


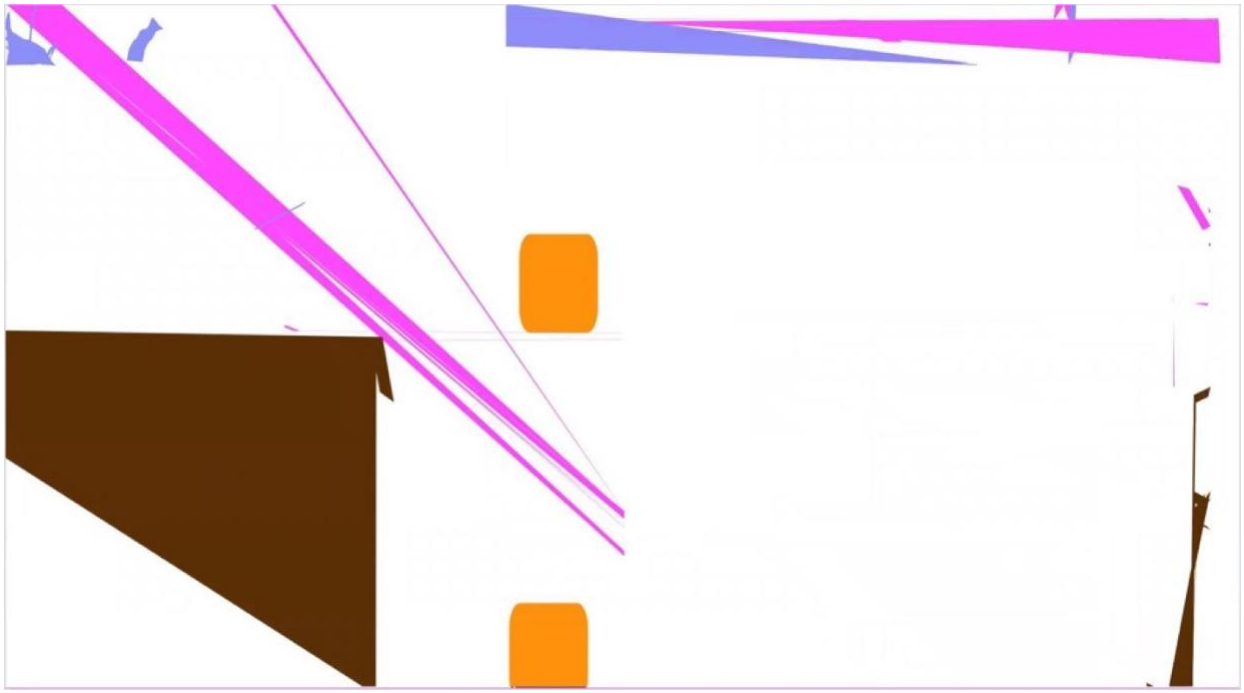


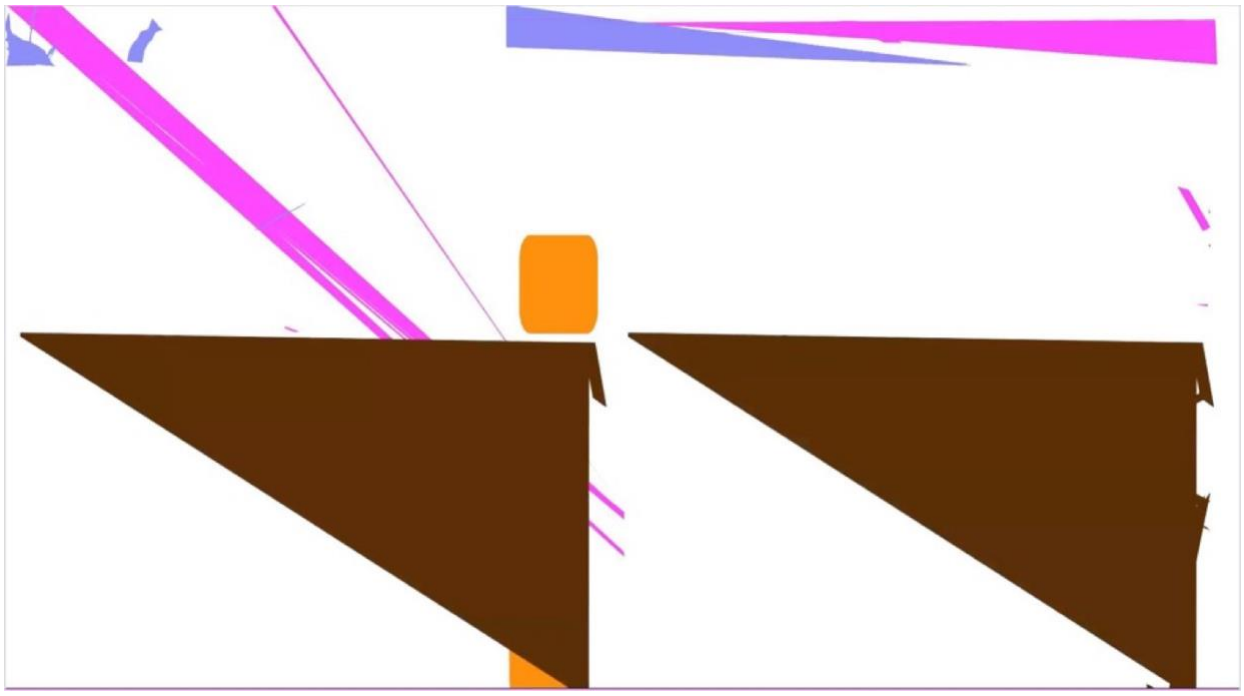


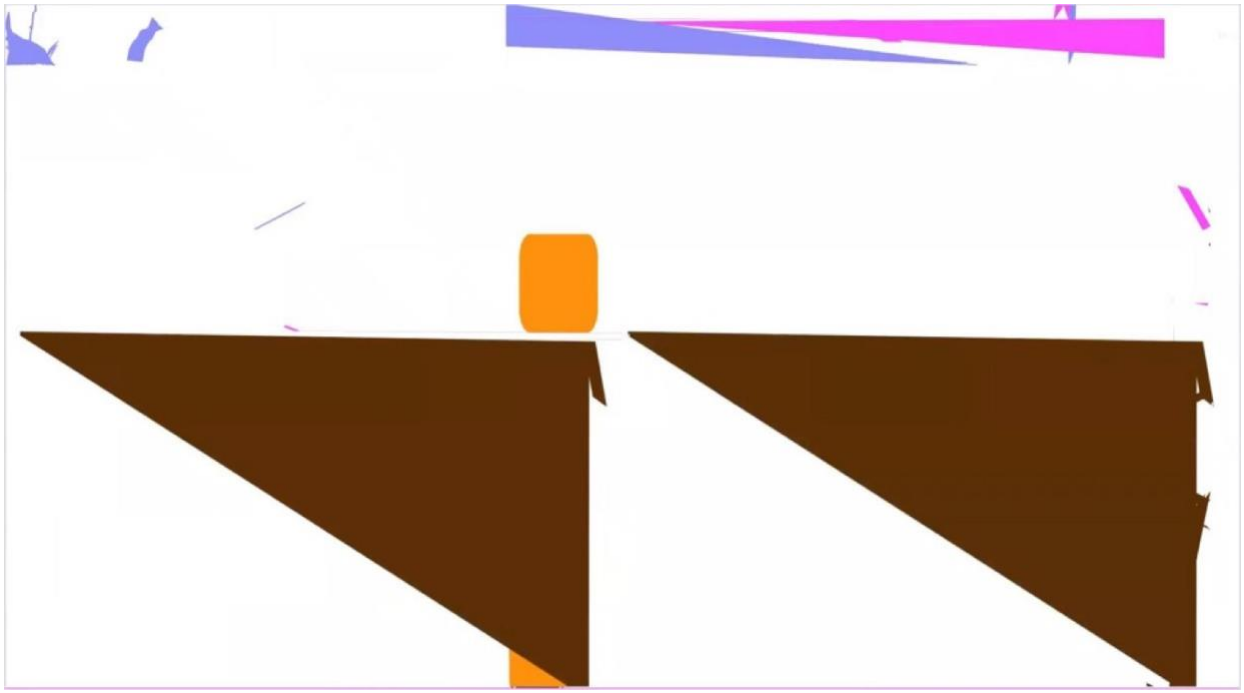


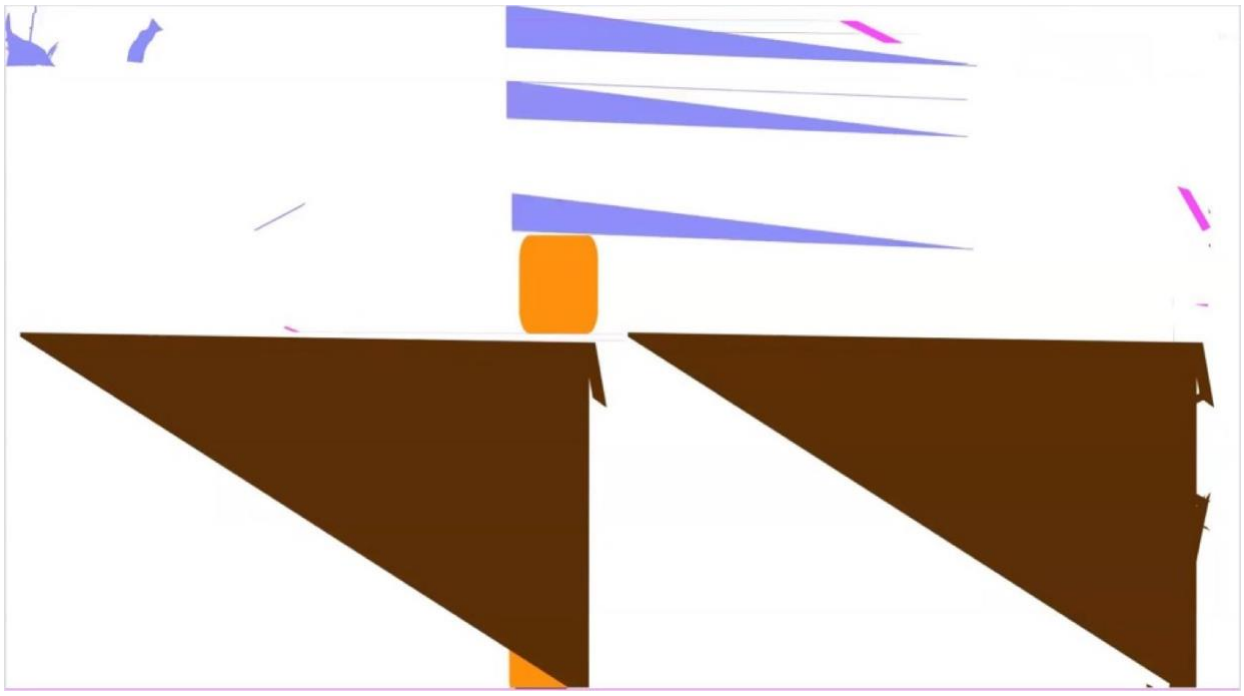


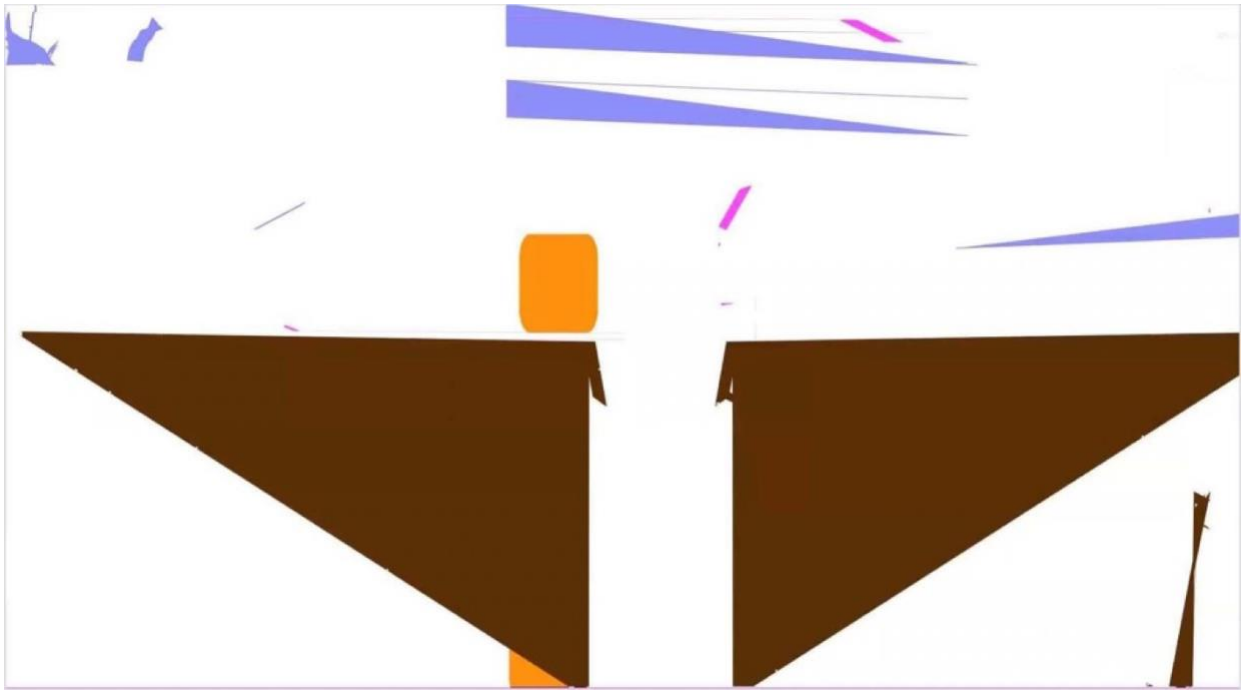


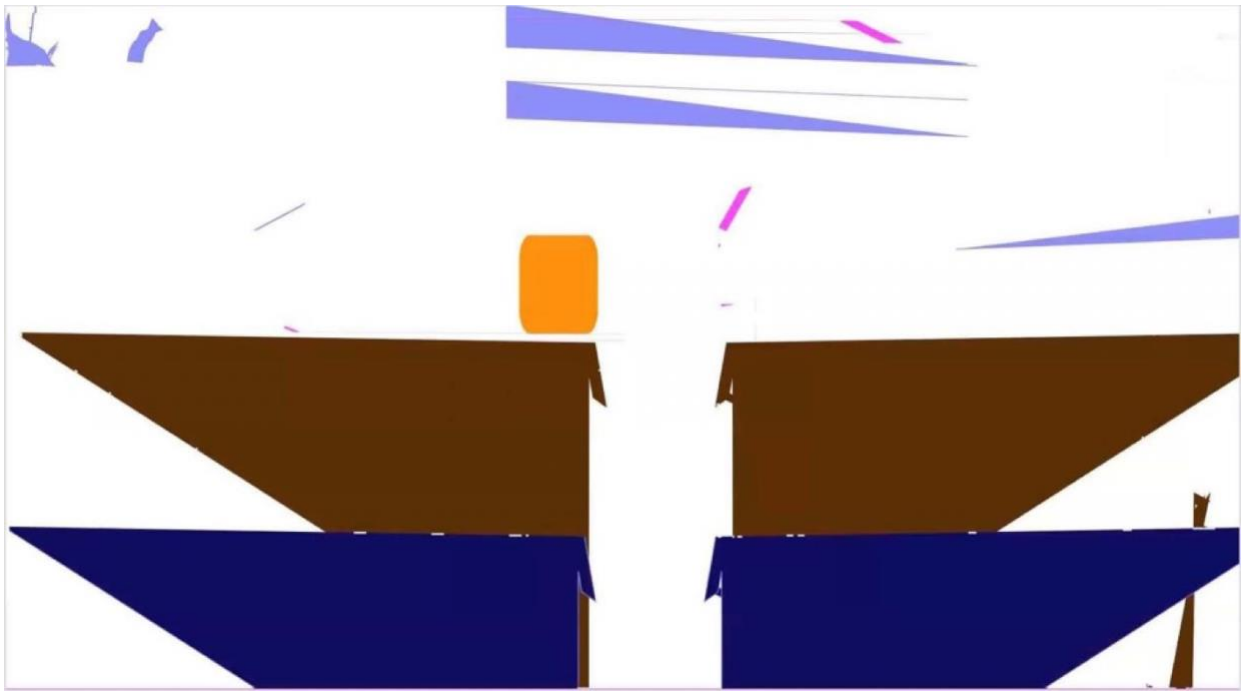


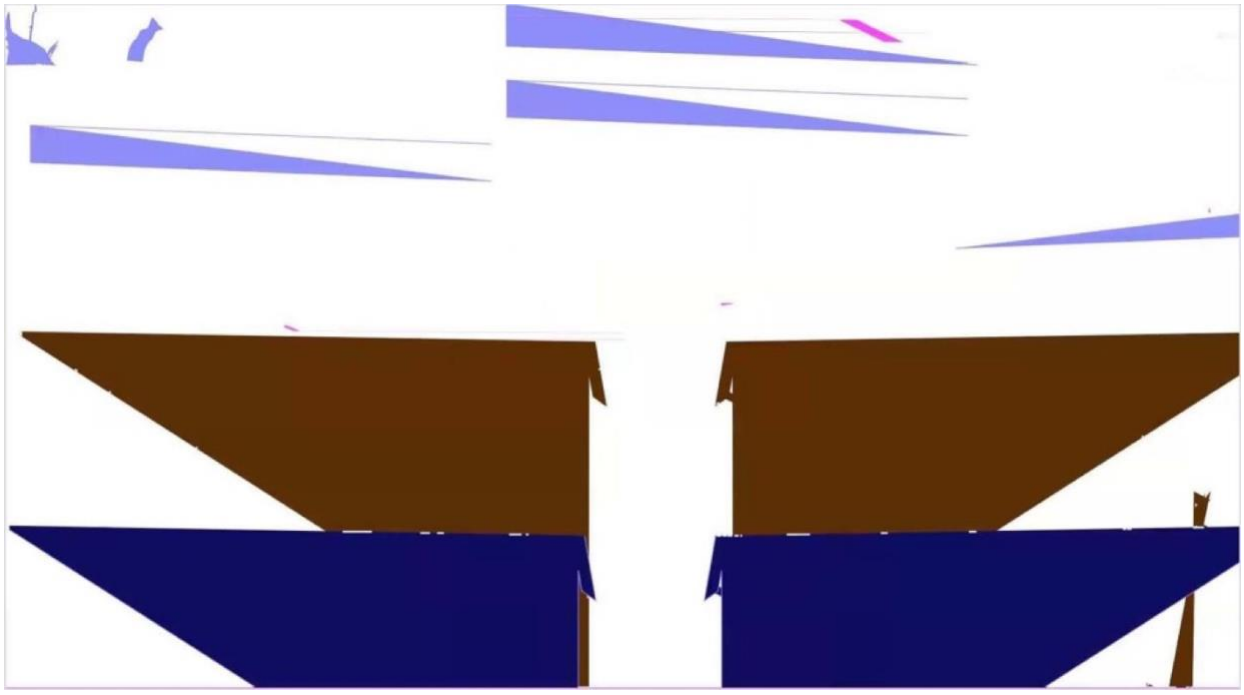


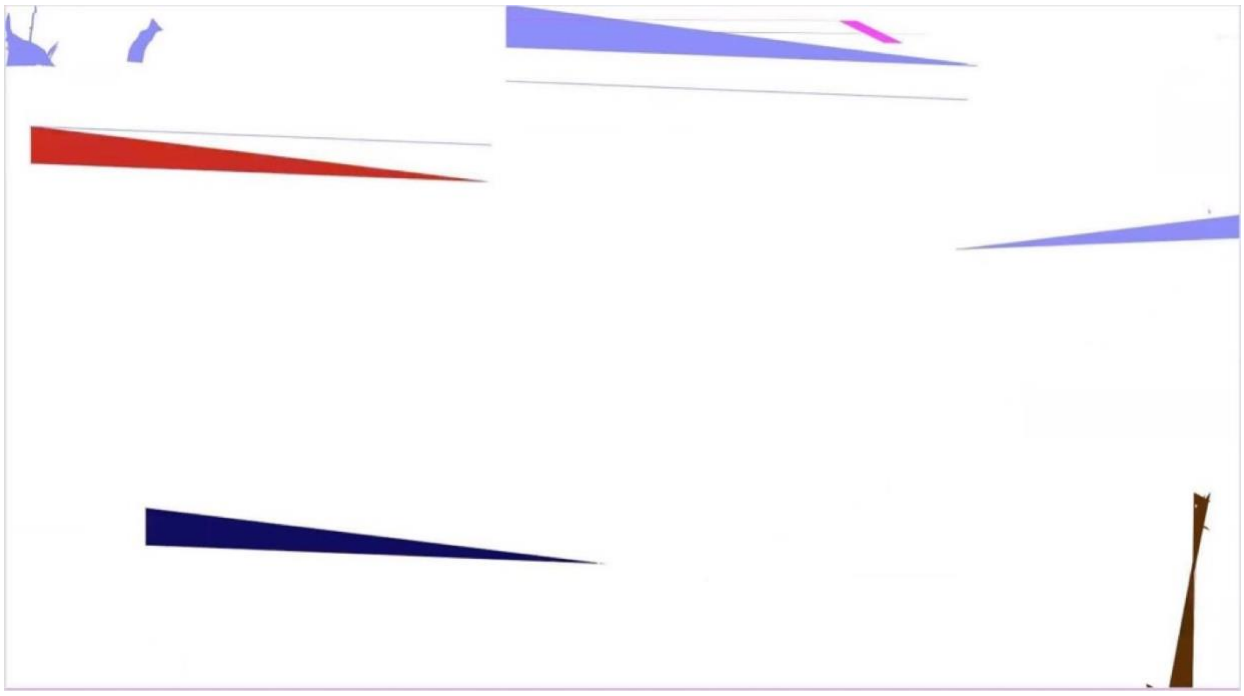


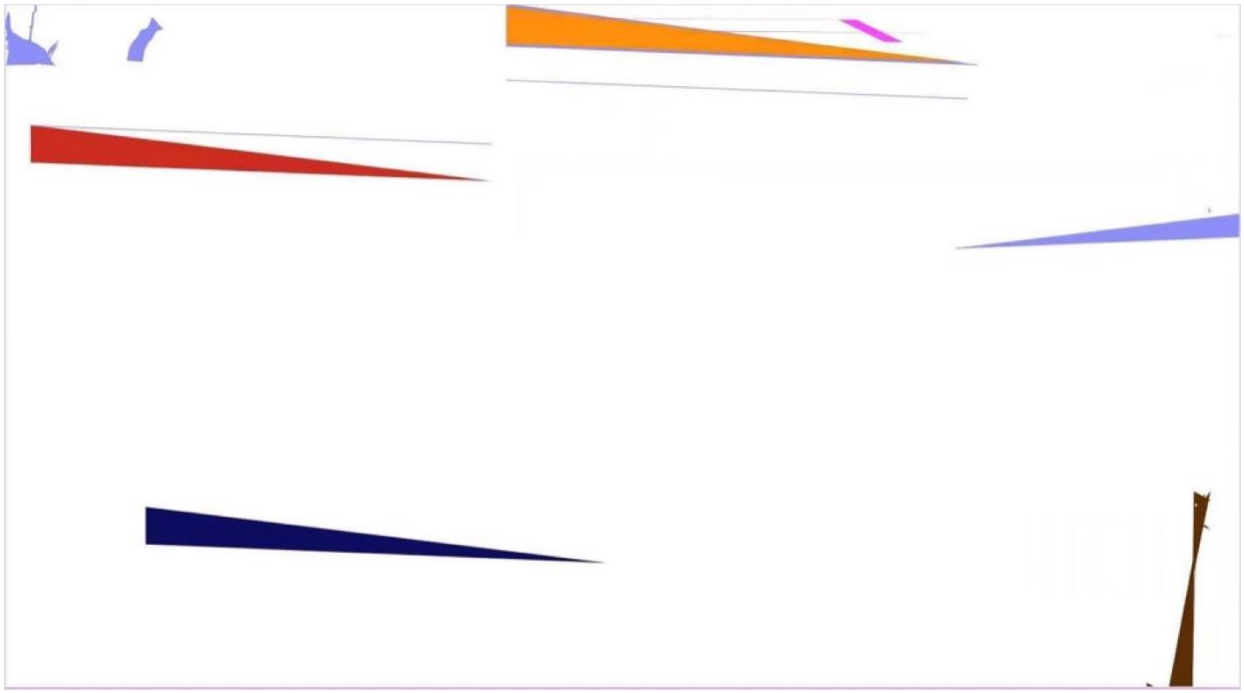


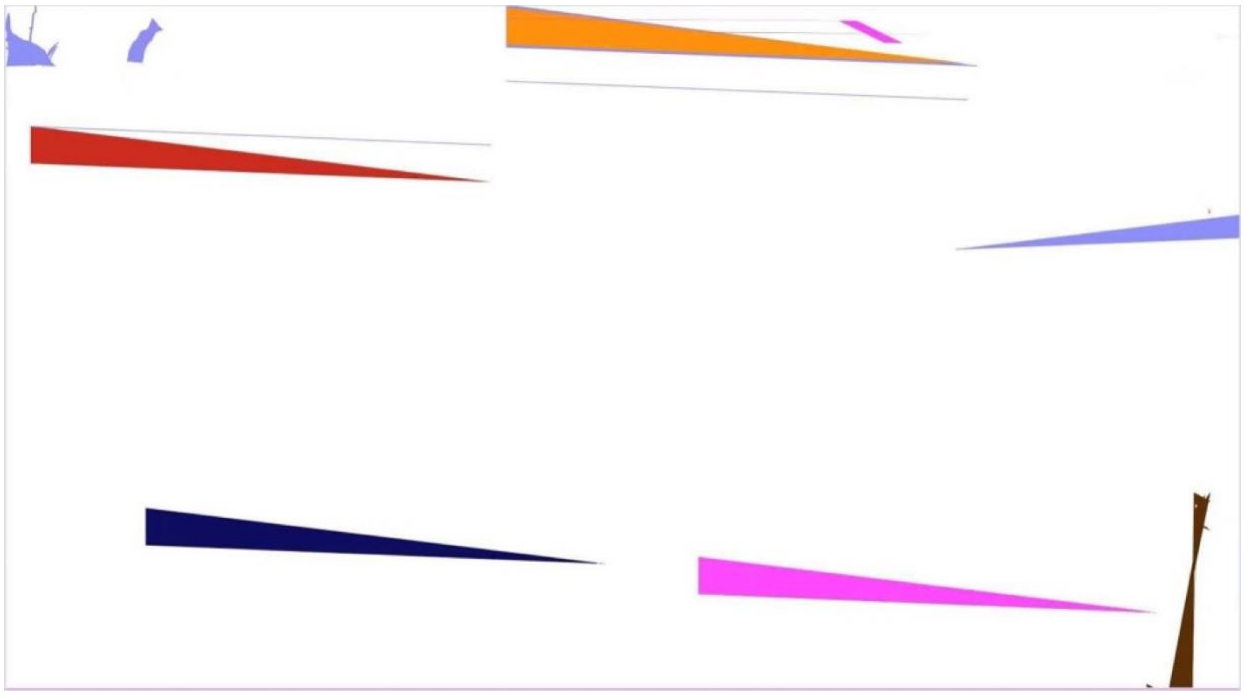


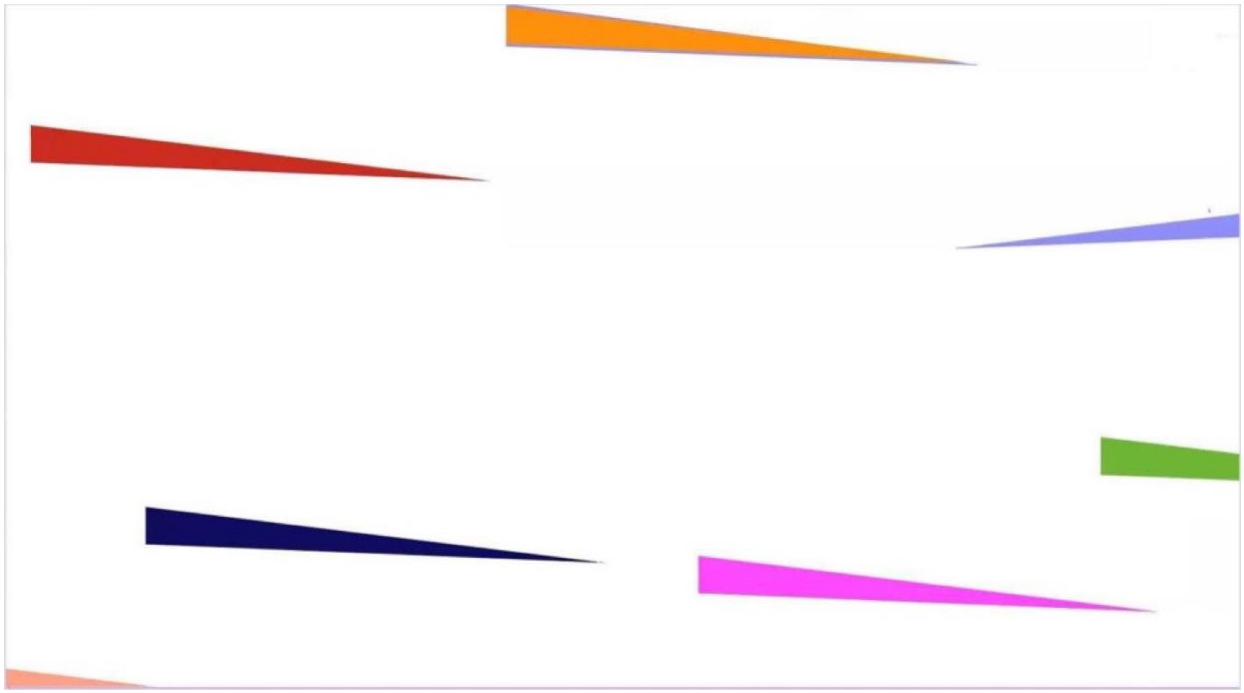


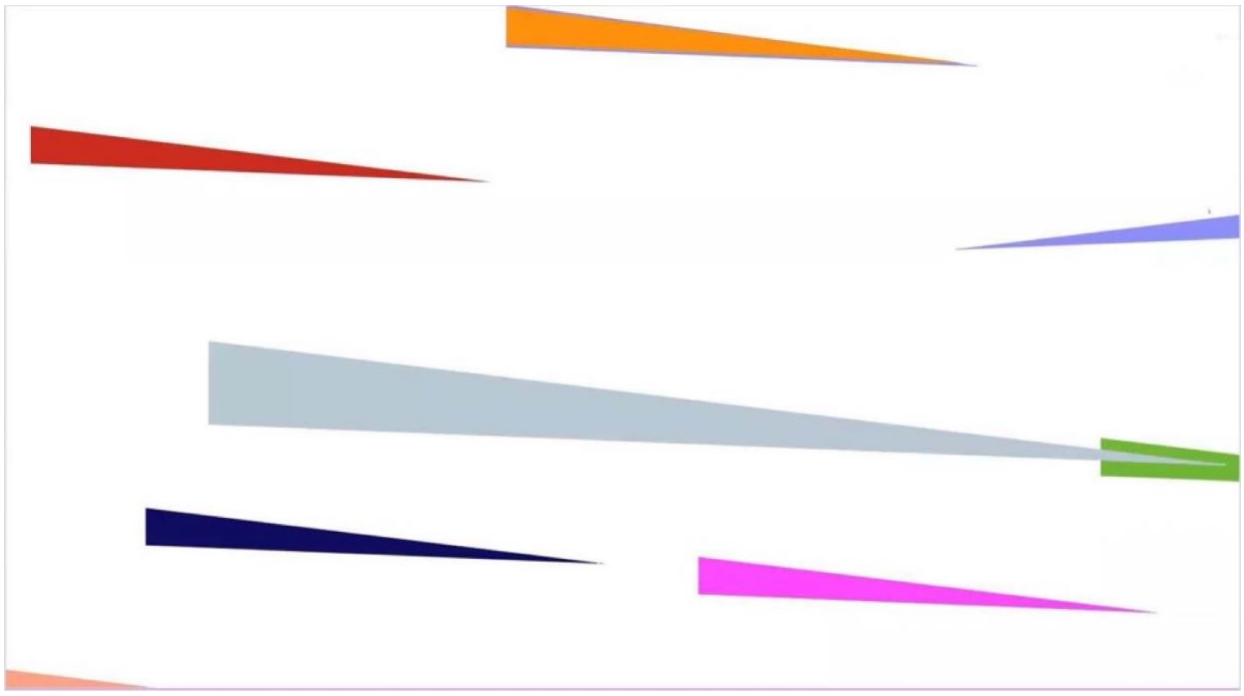


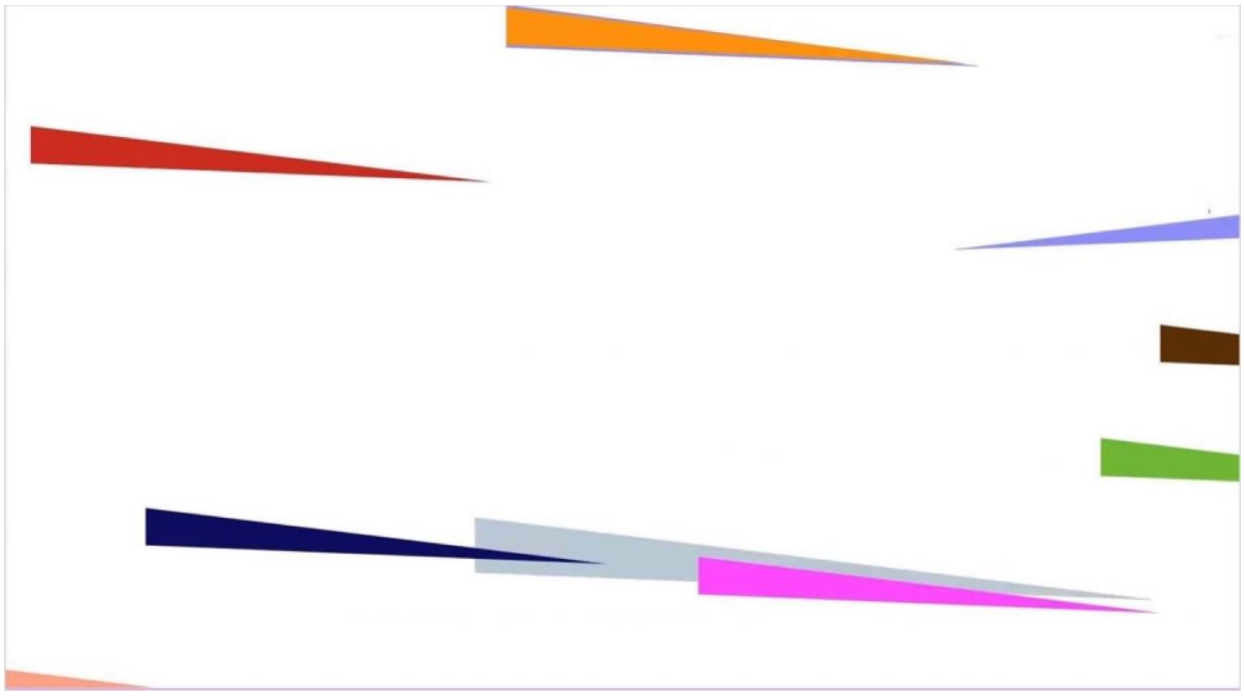


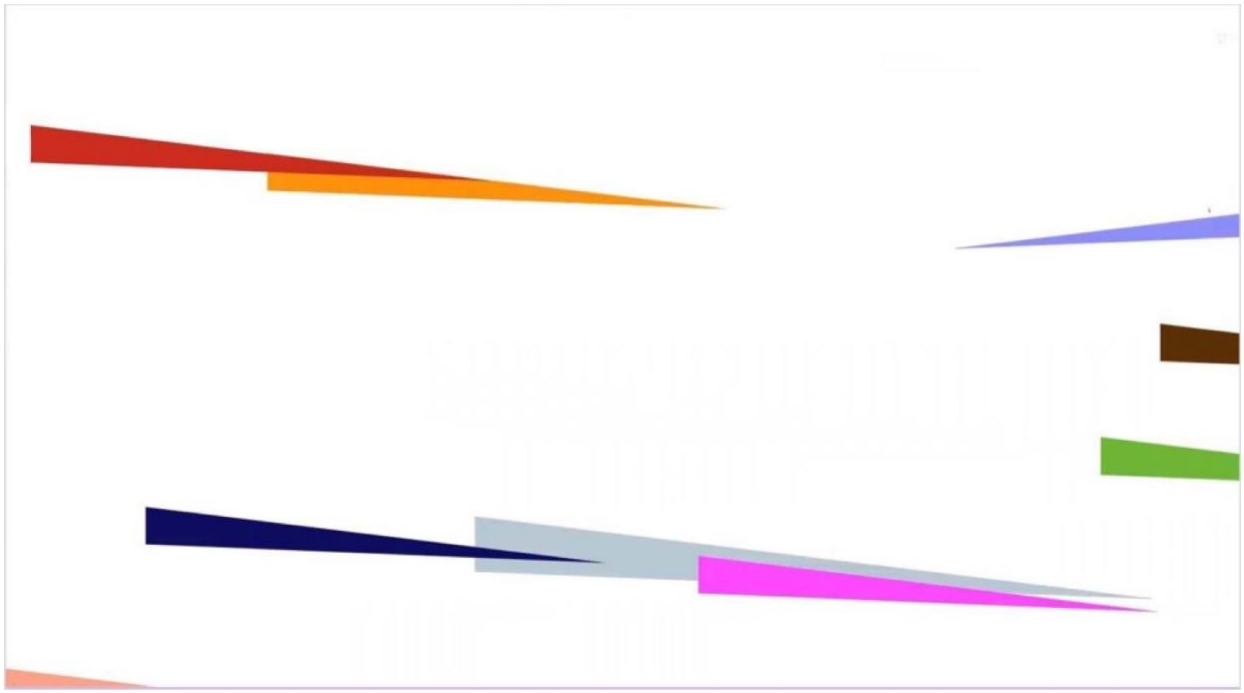


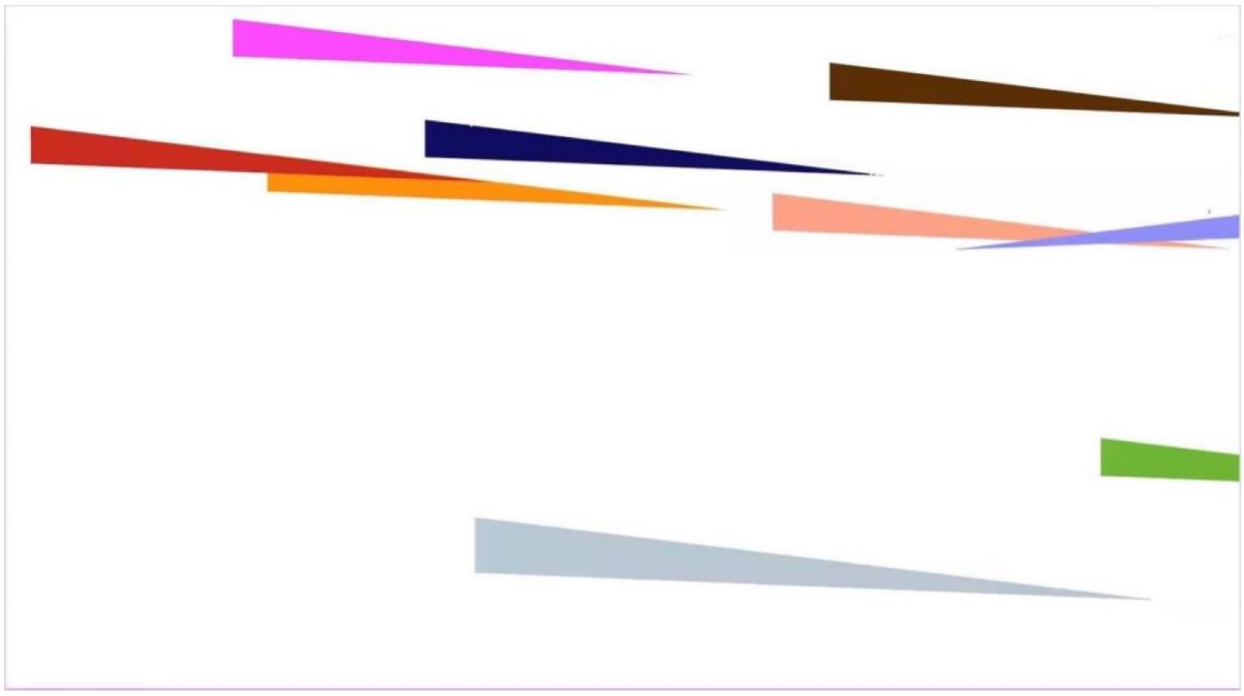


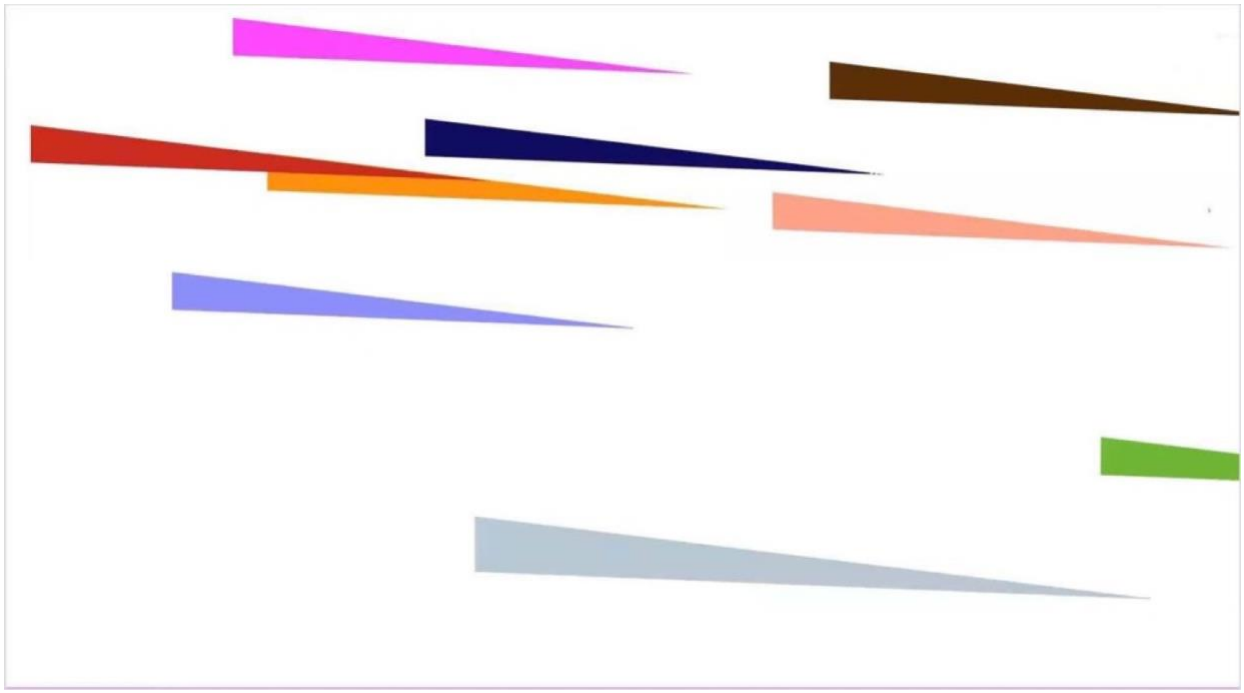


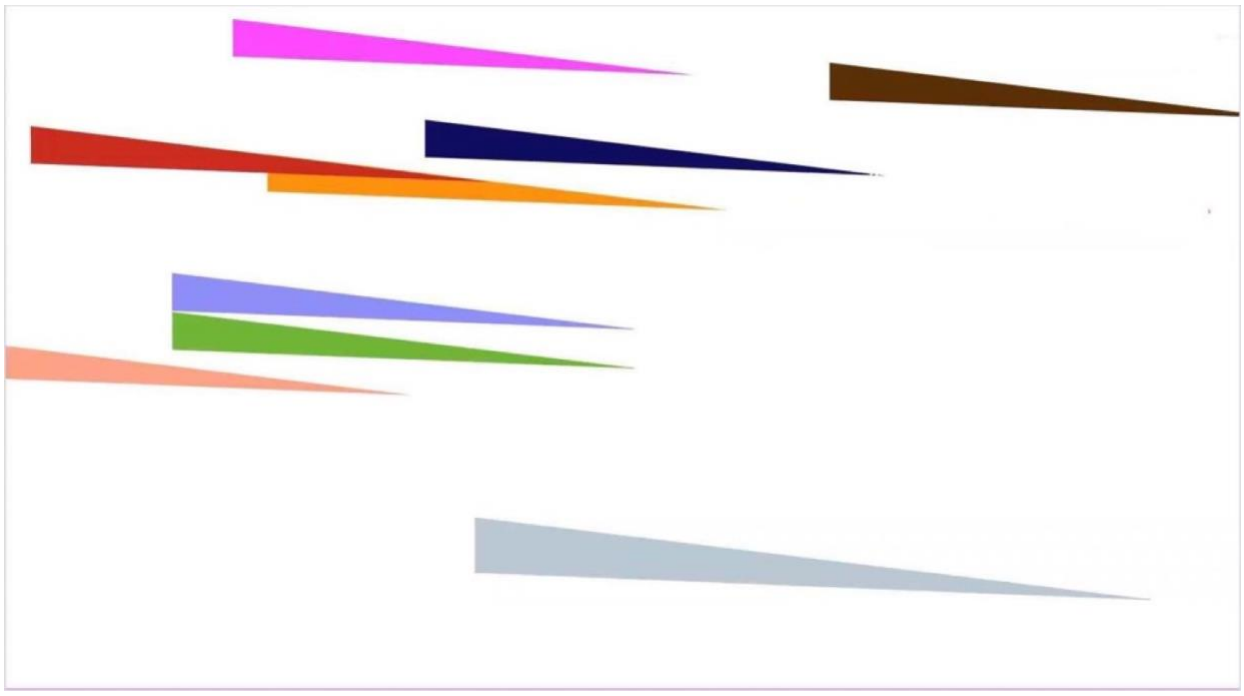


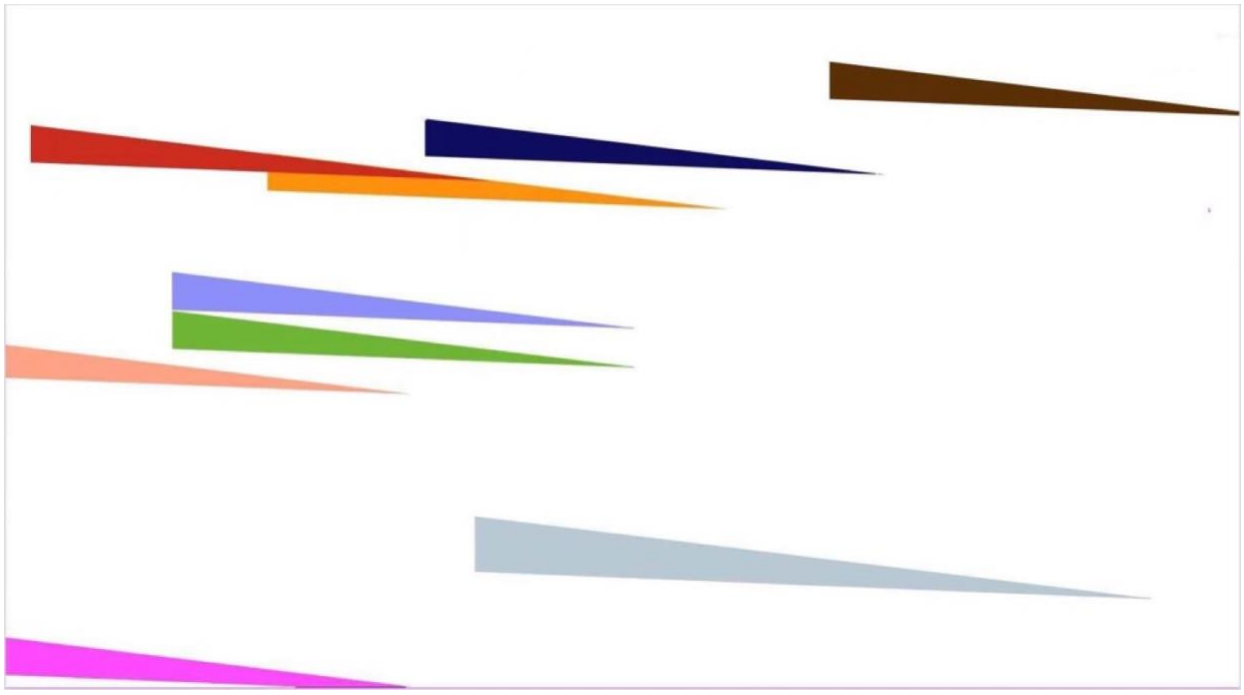


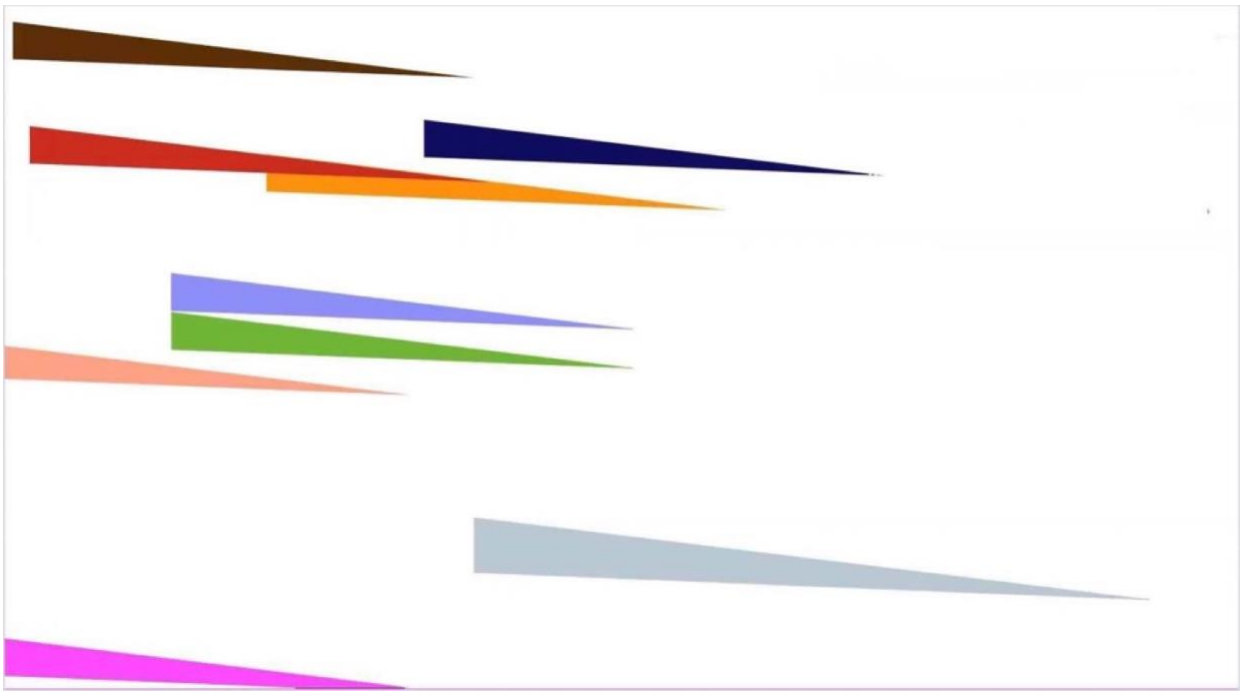


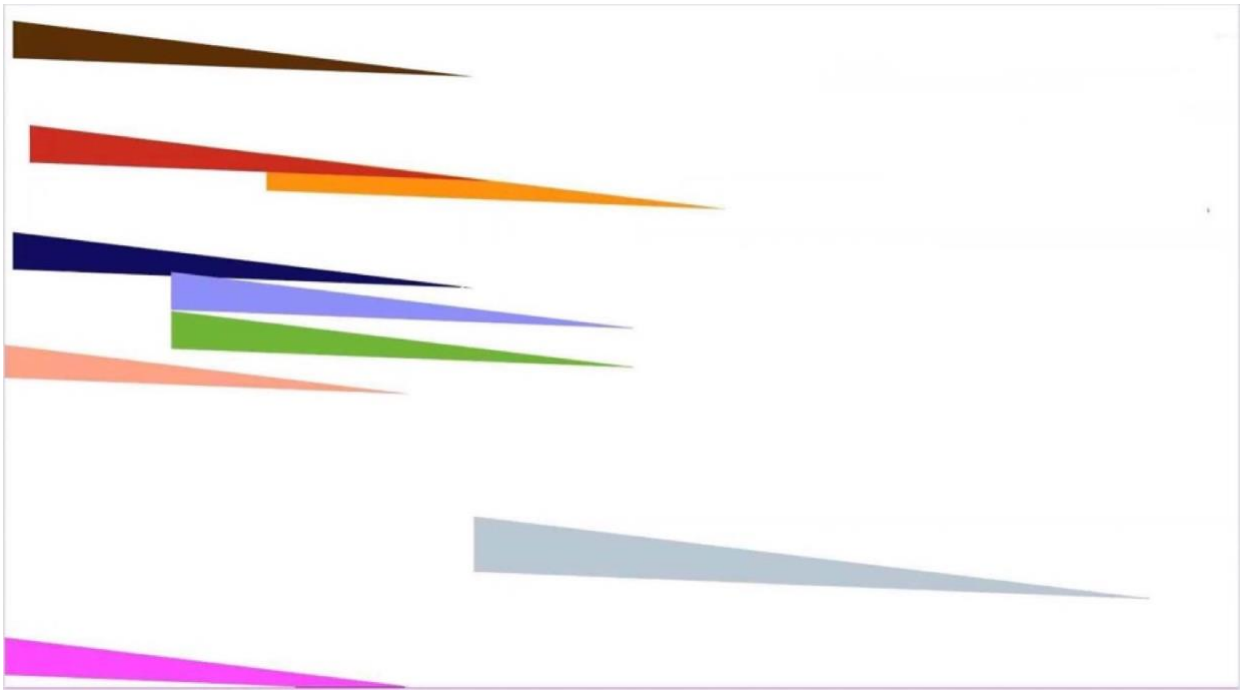


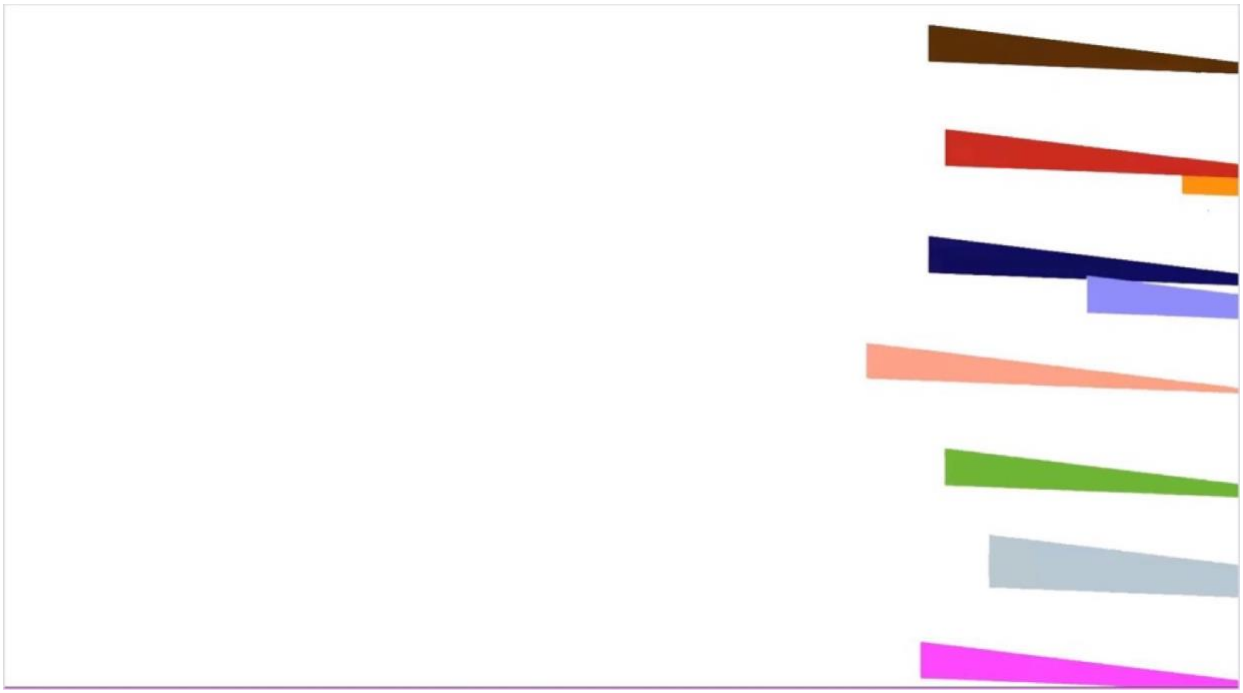


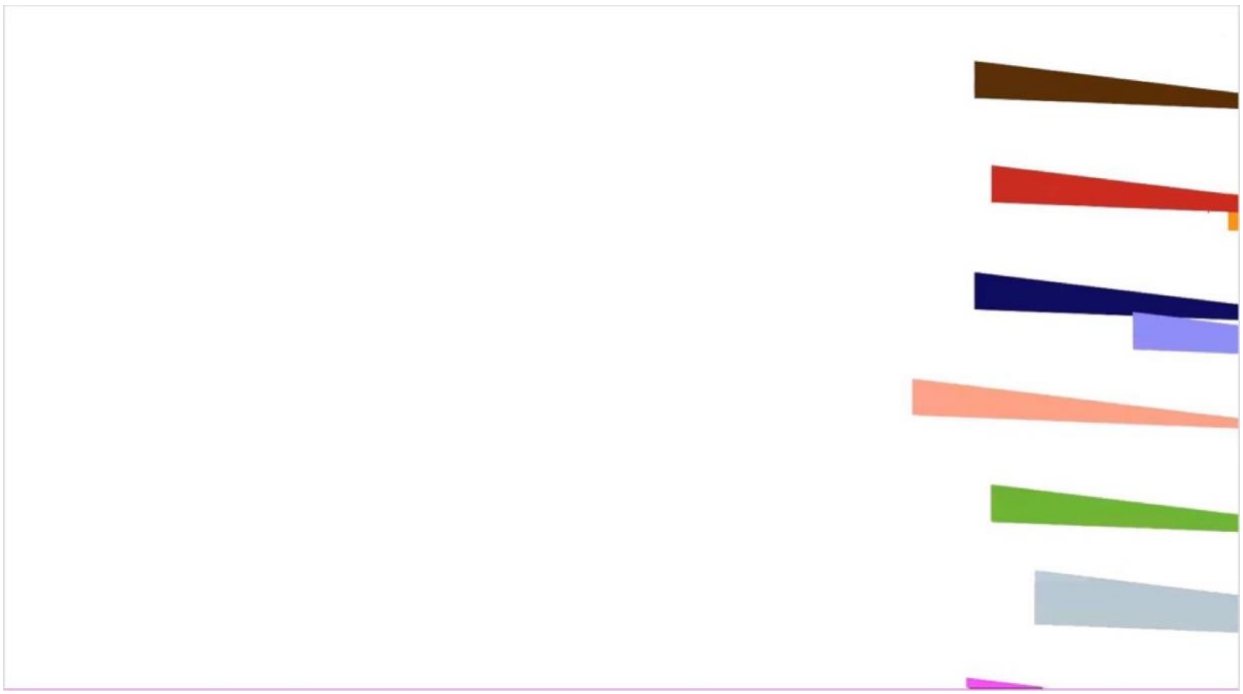




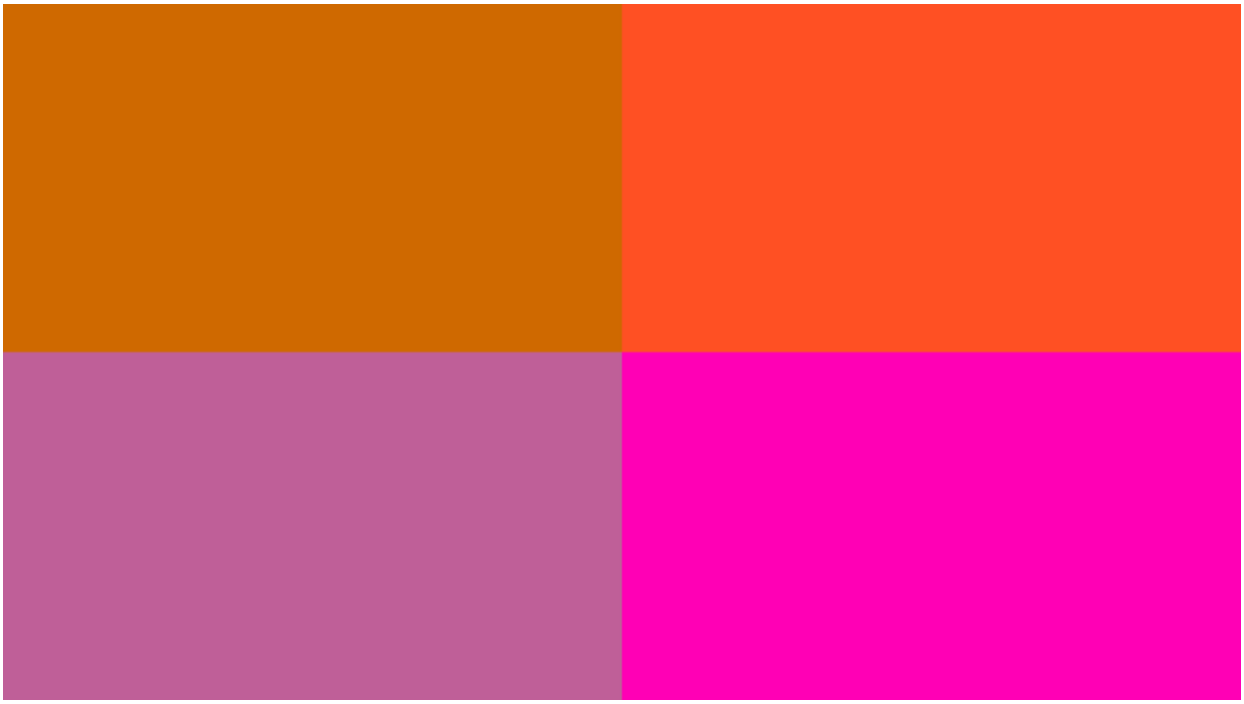


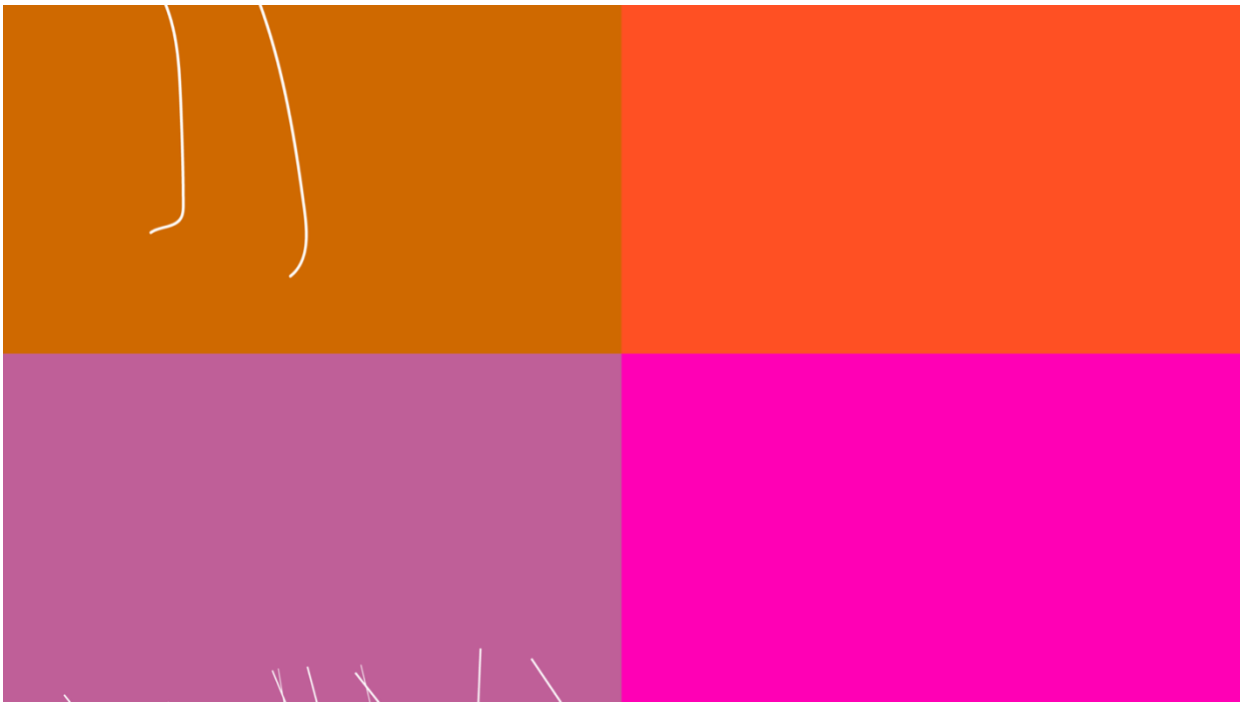


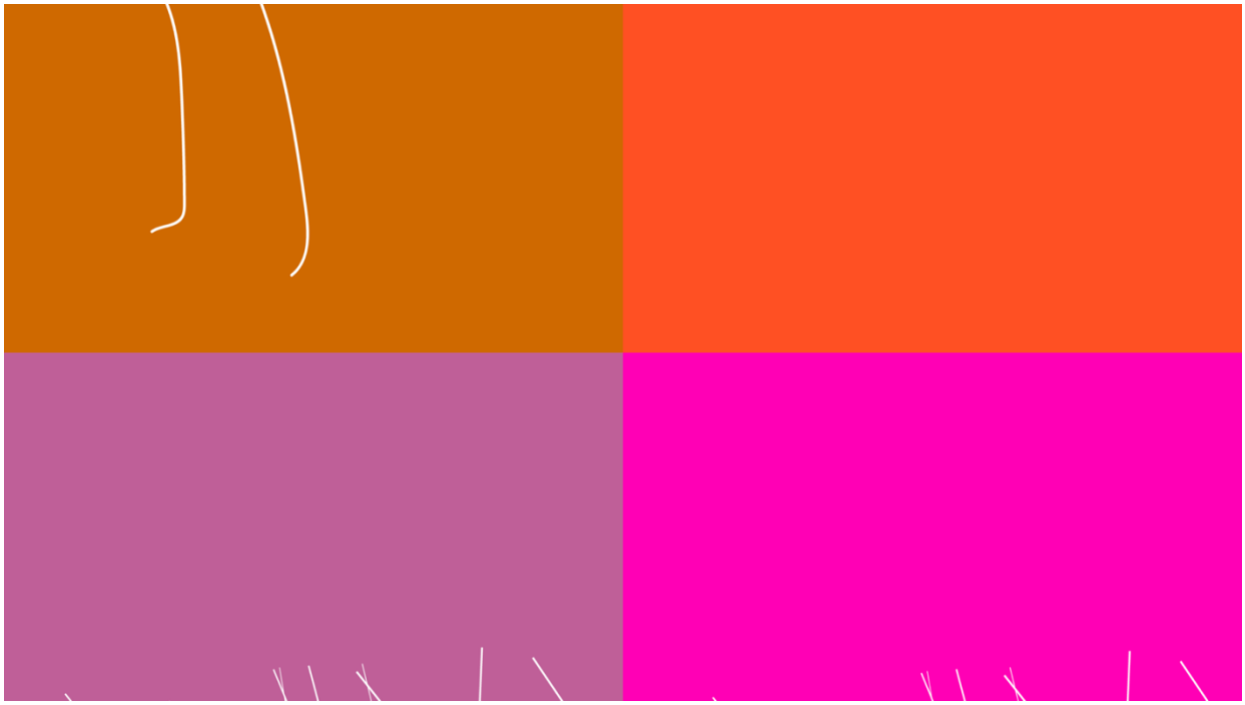


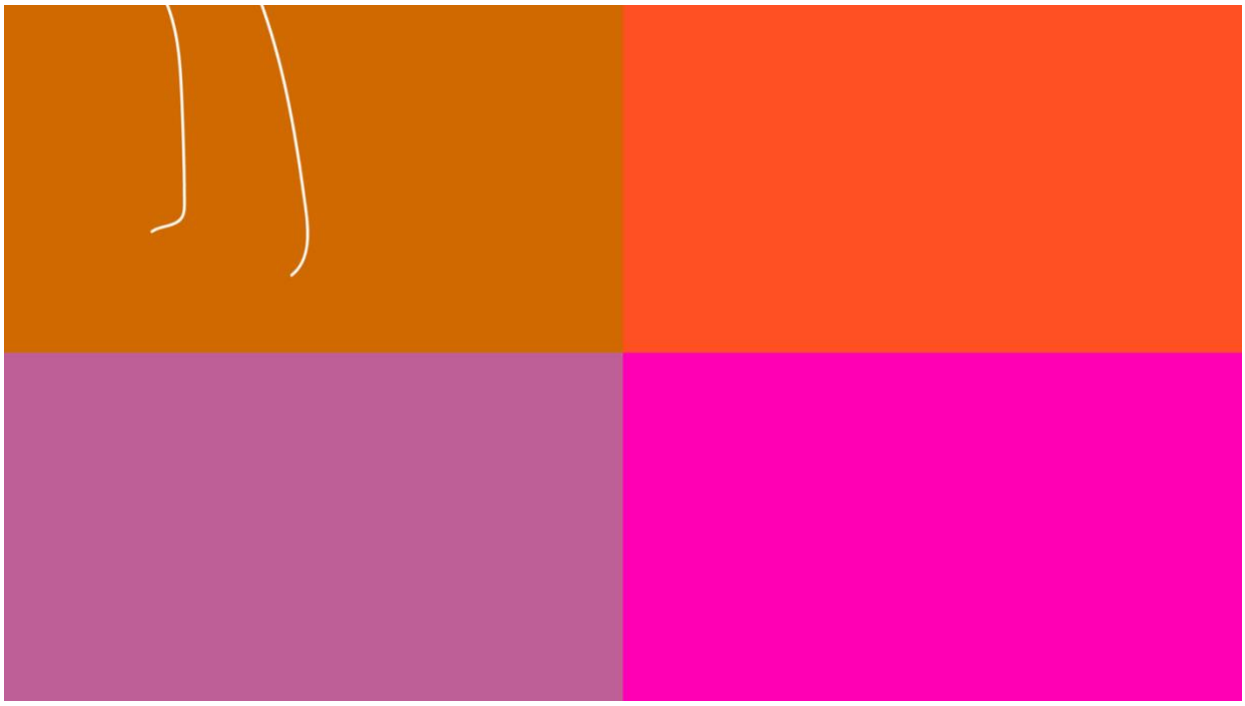


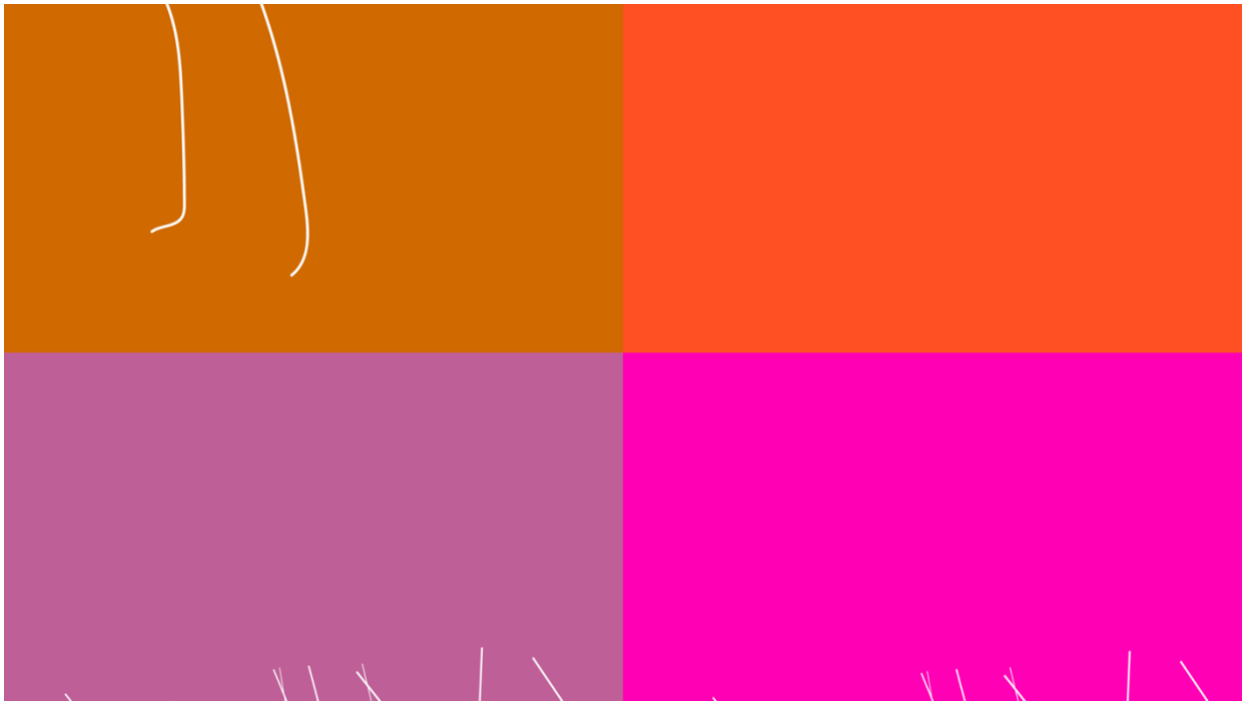
Appendix E: Computer Generated Score #2 of 2

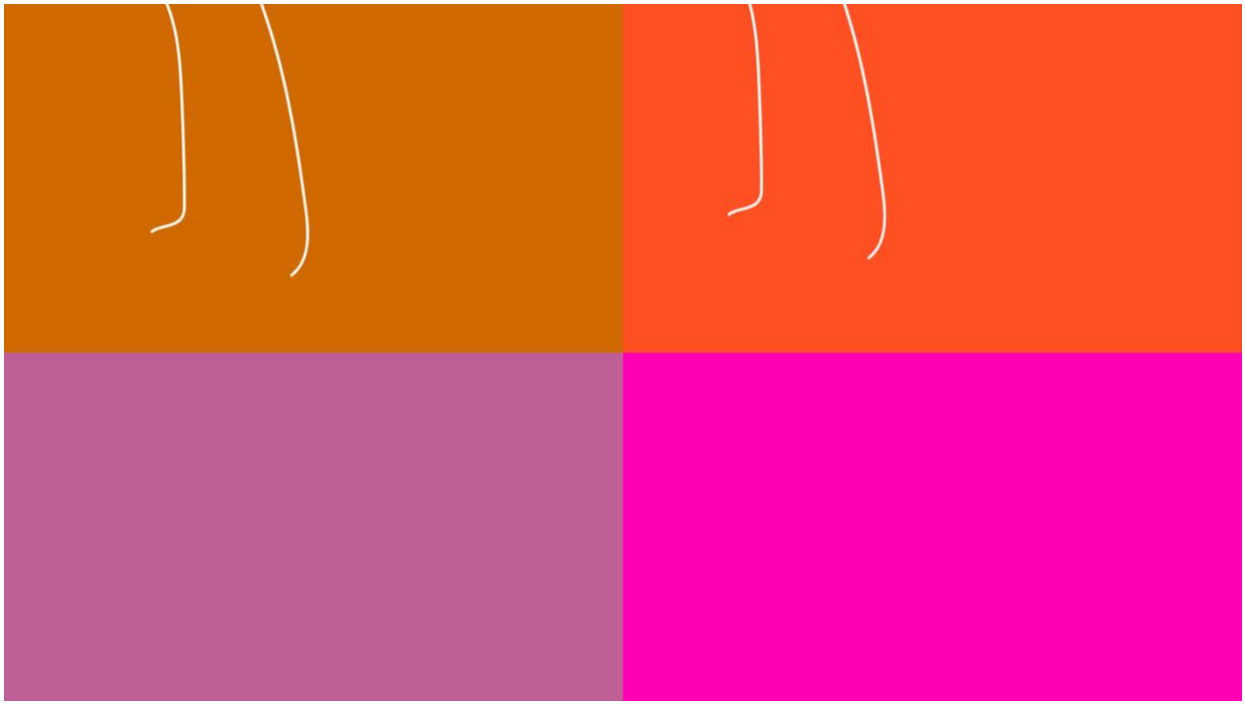


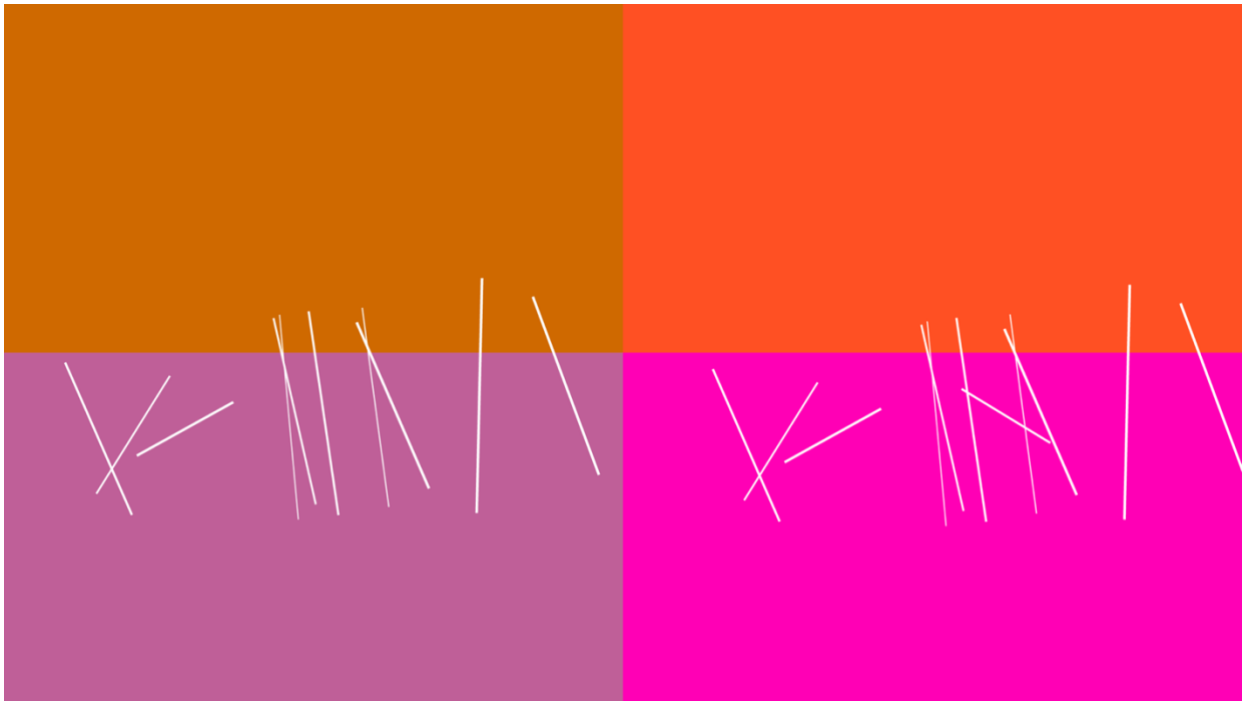


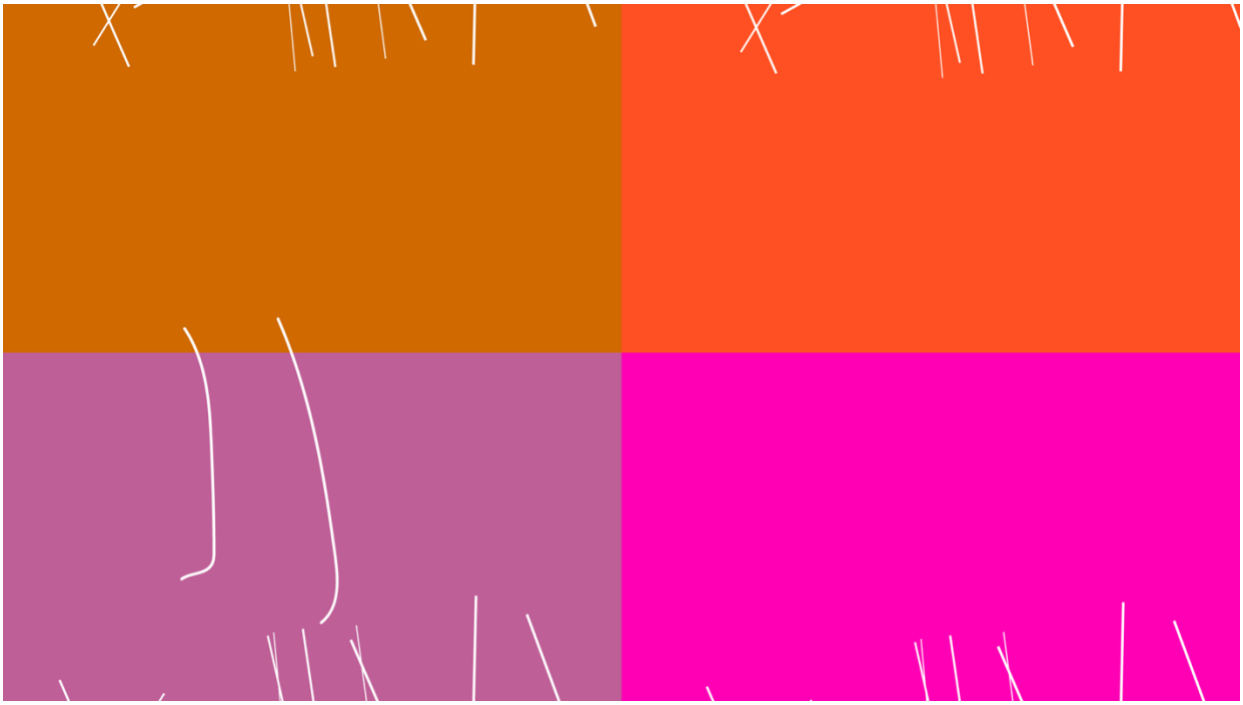


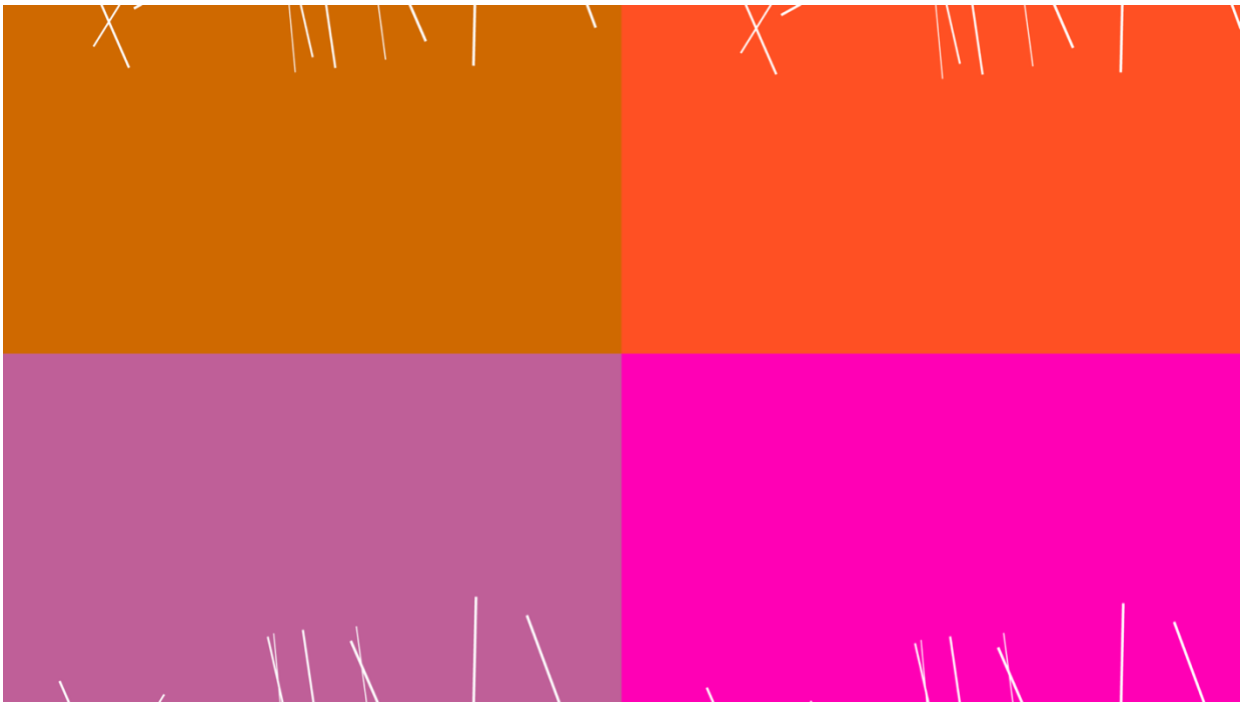


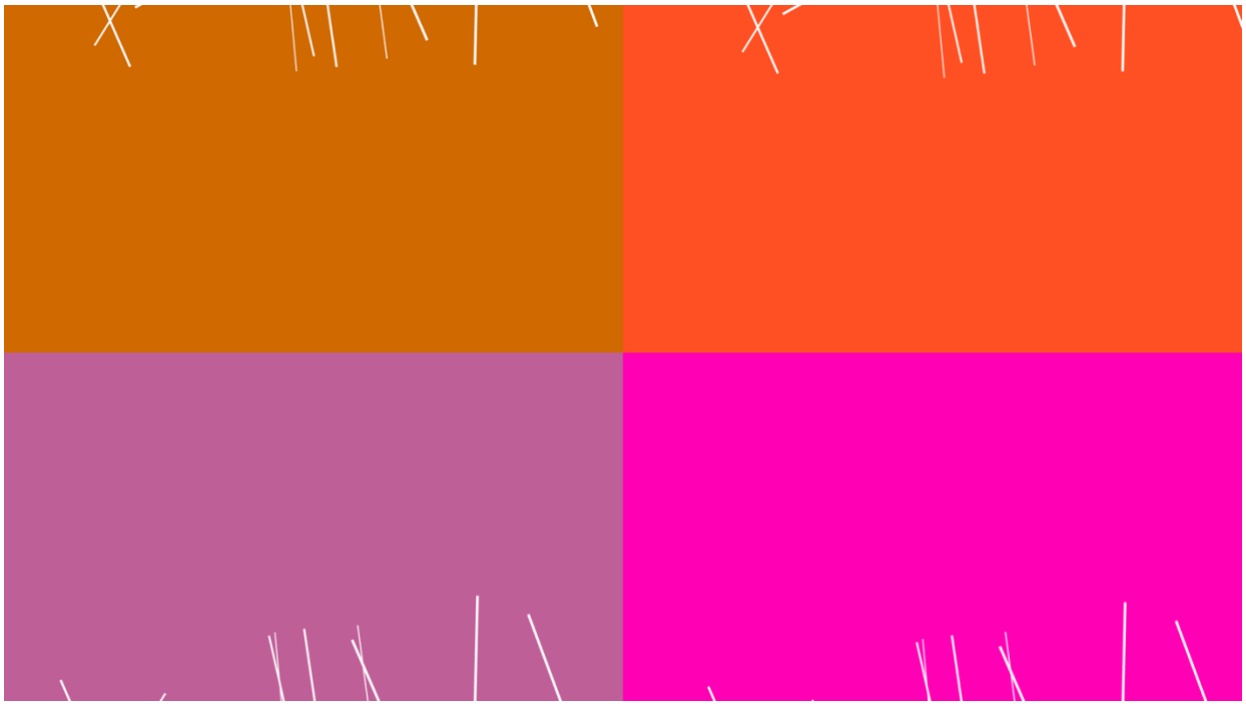


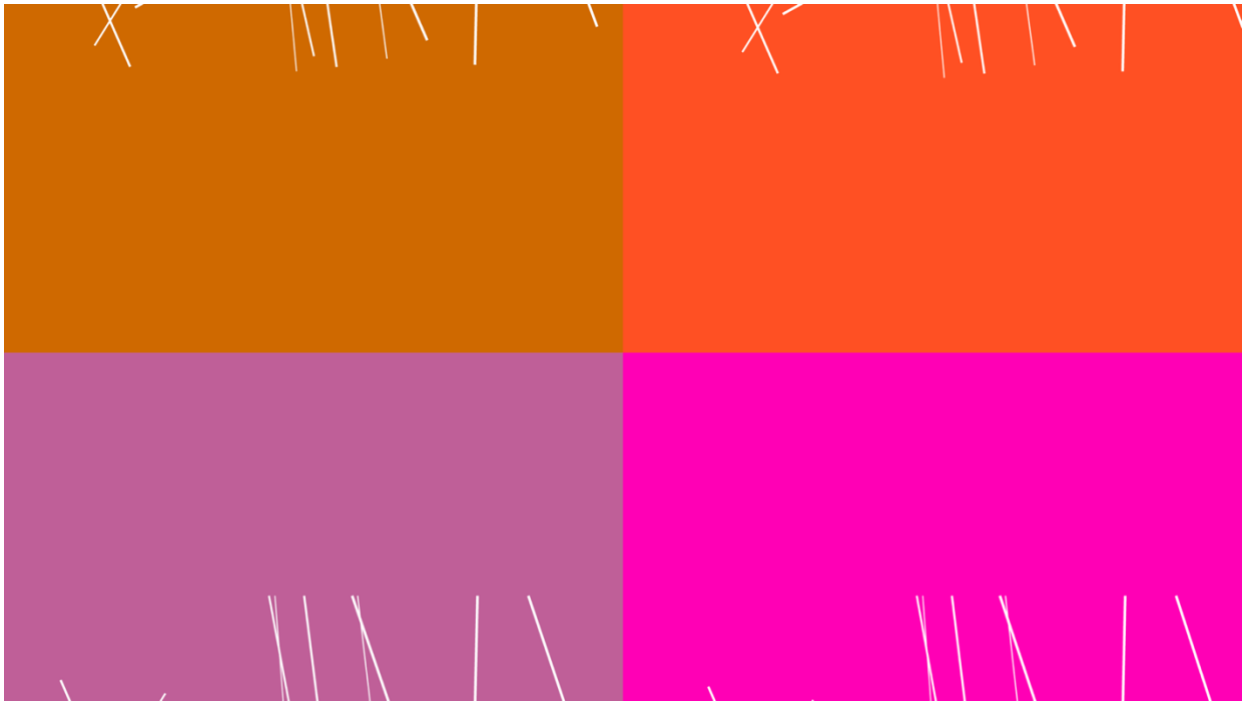


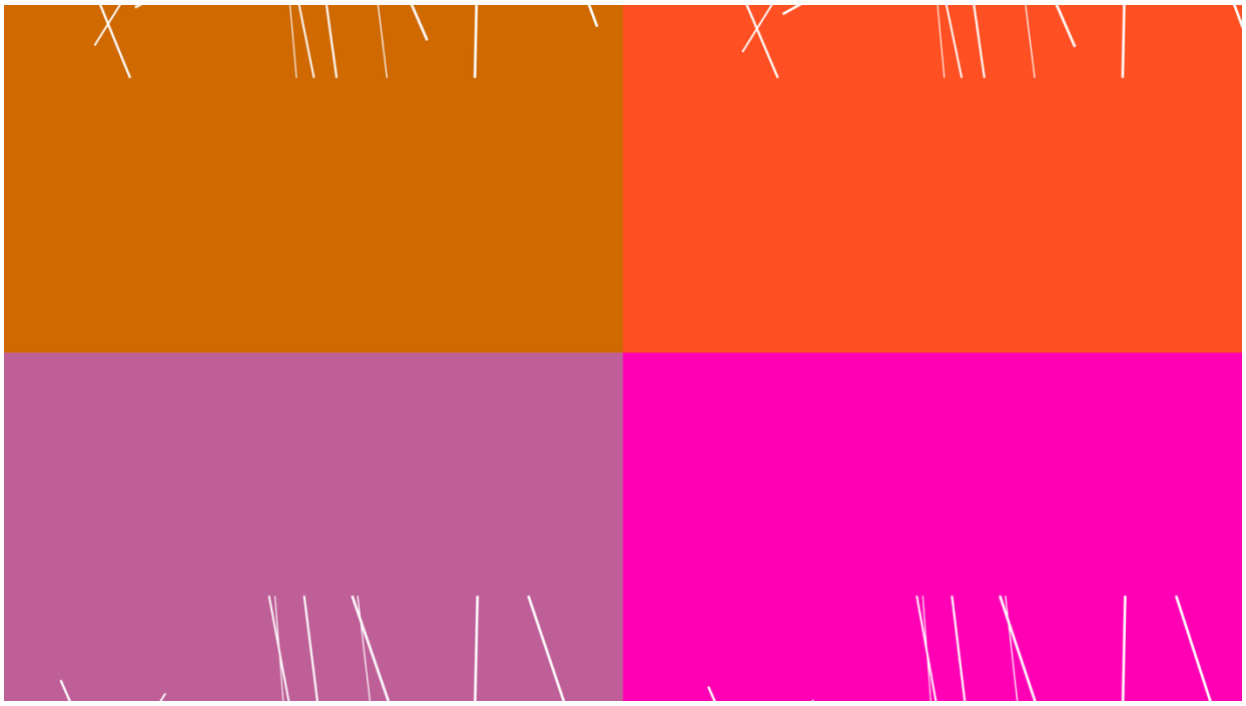


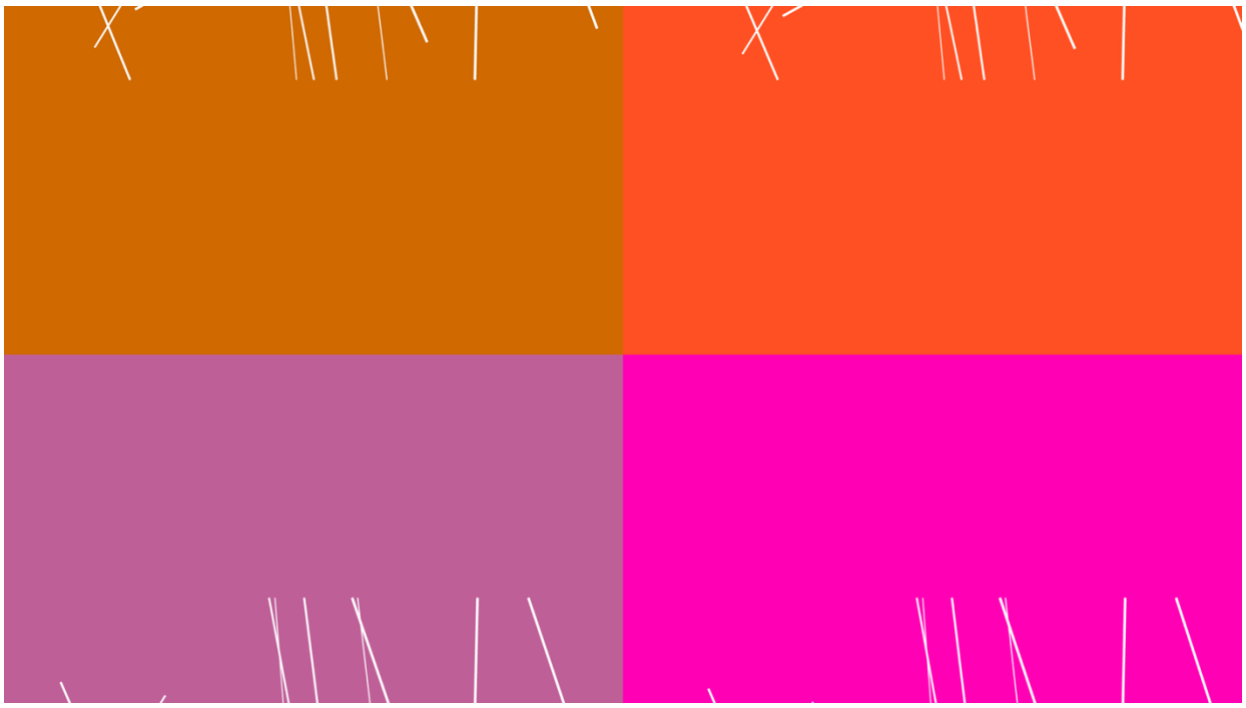


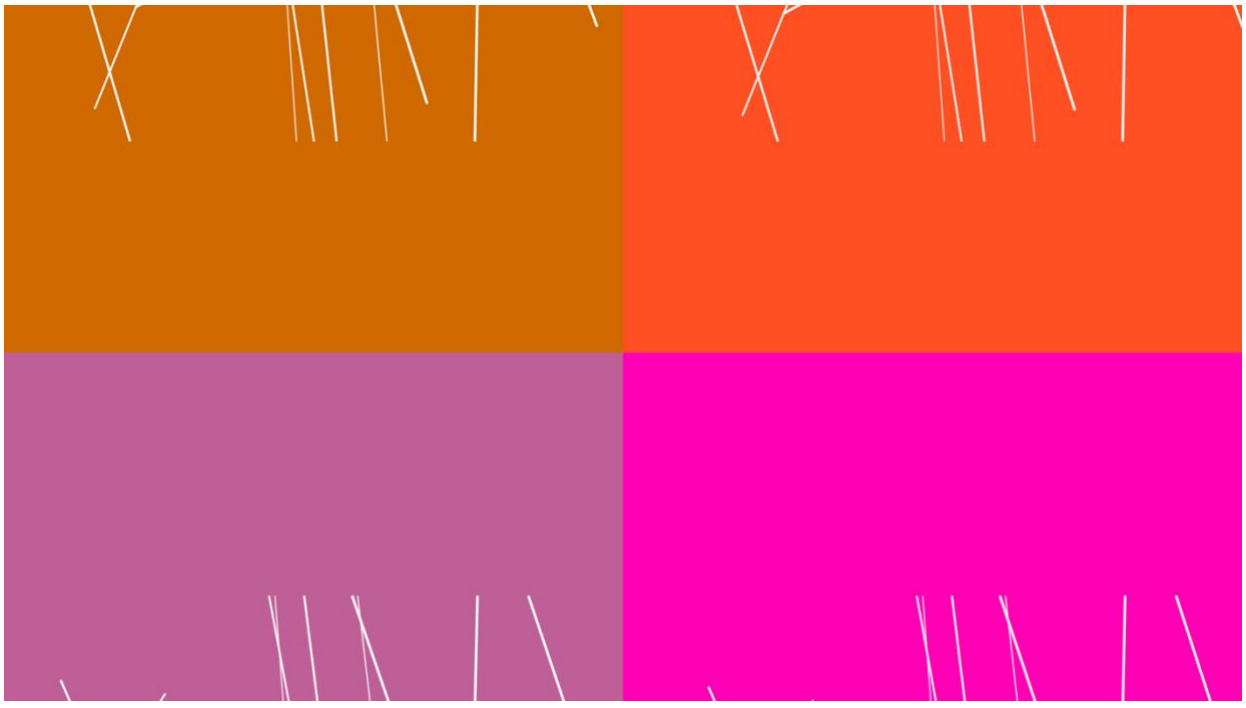


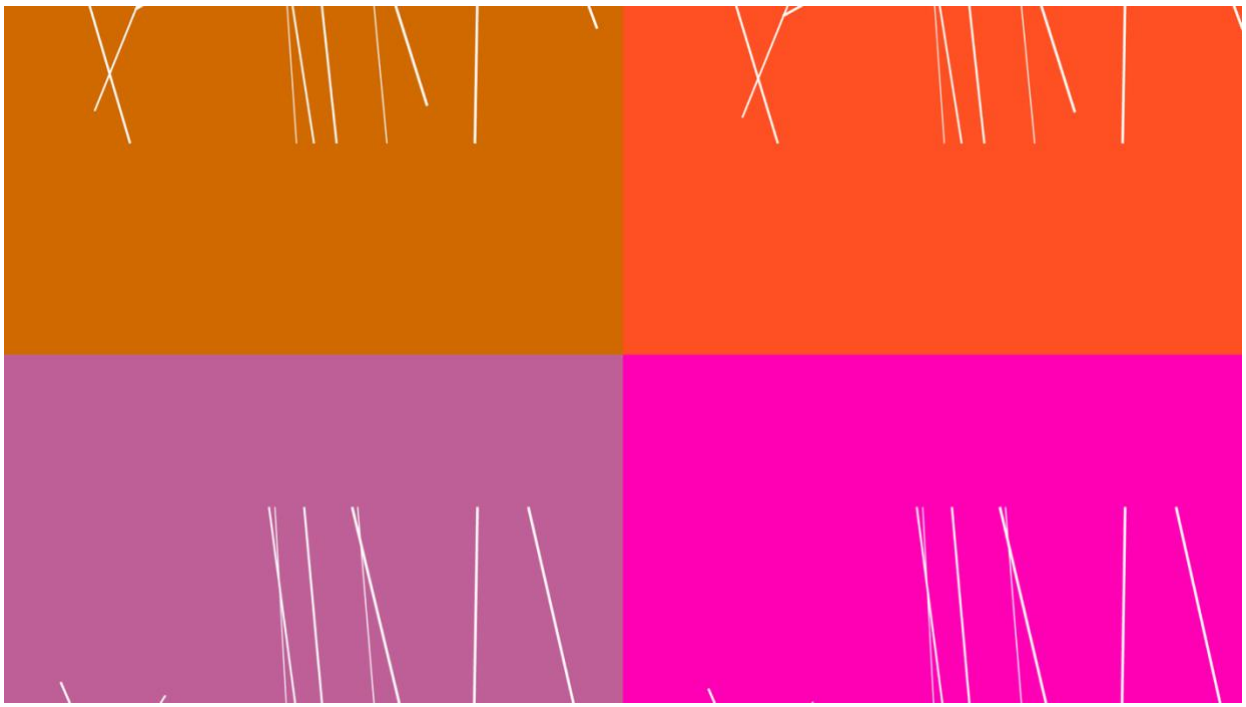


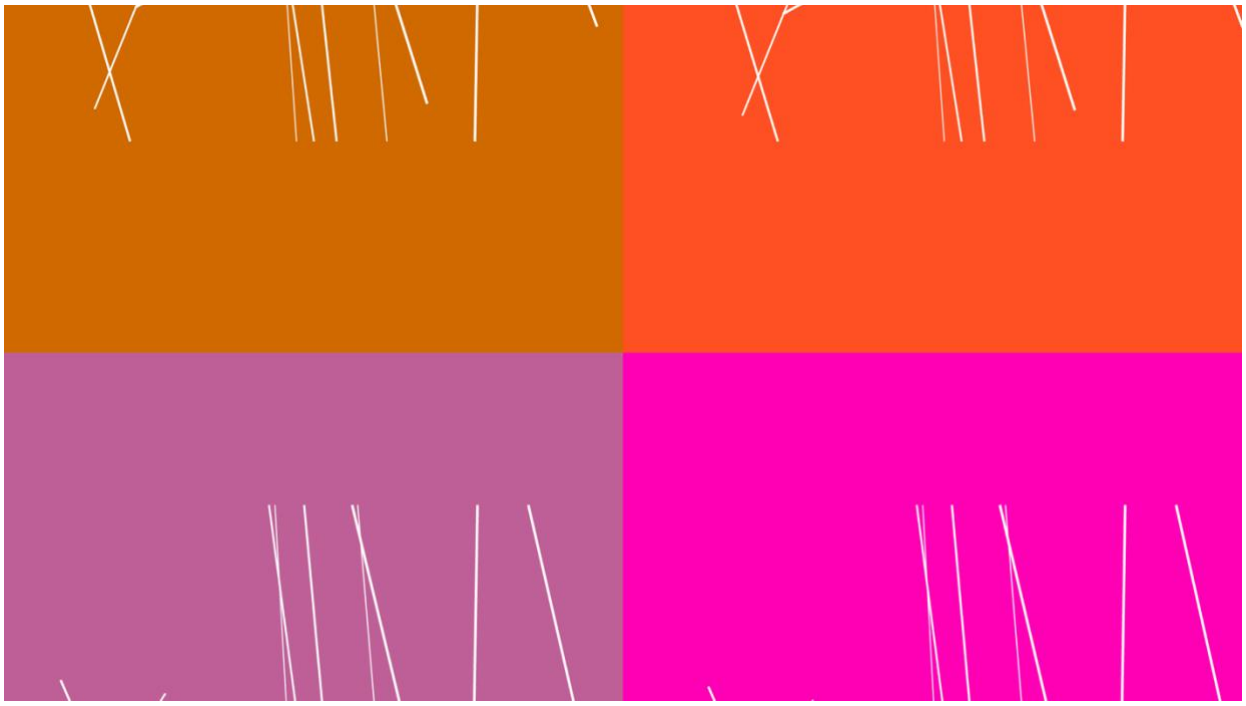


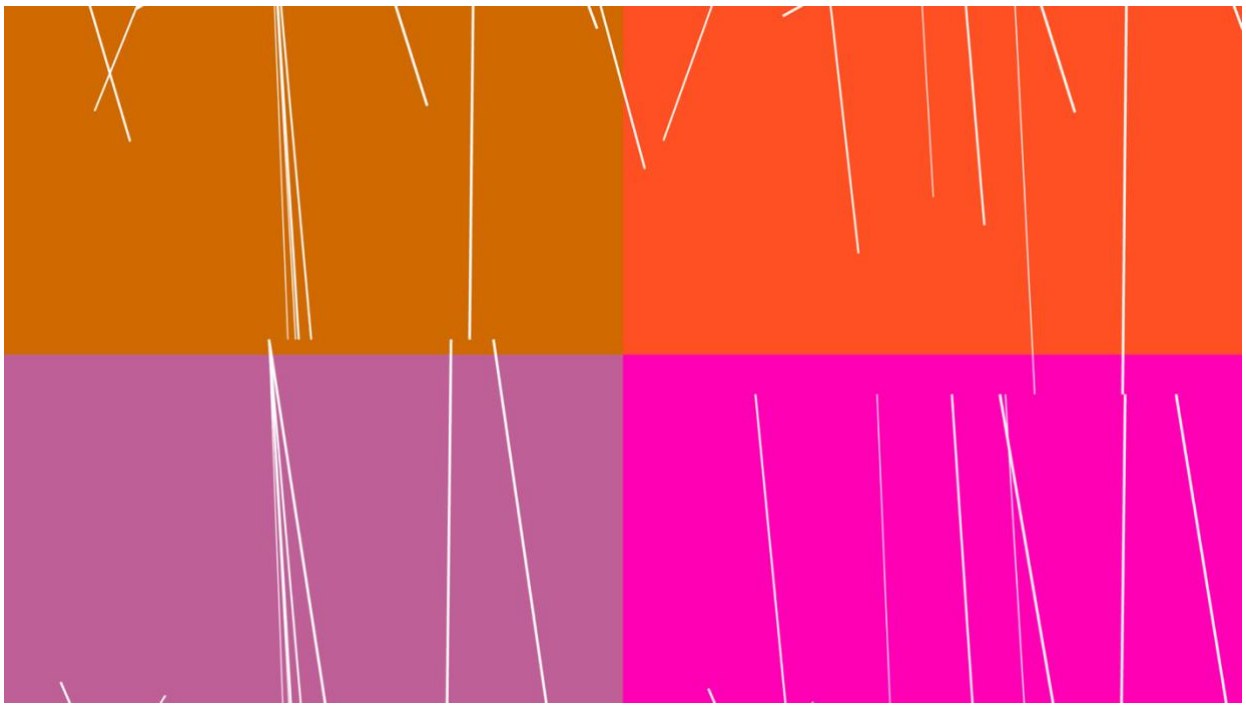


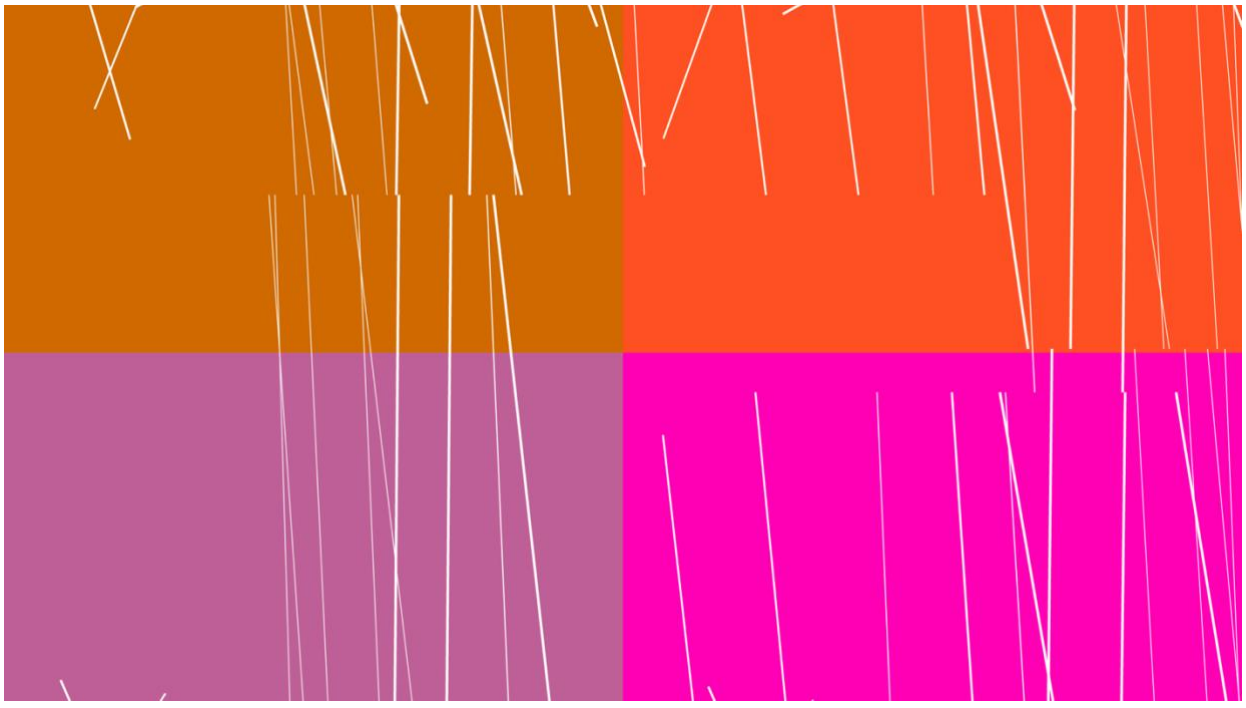


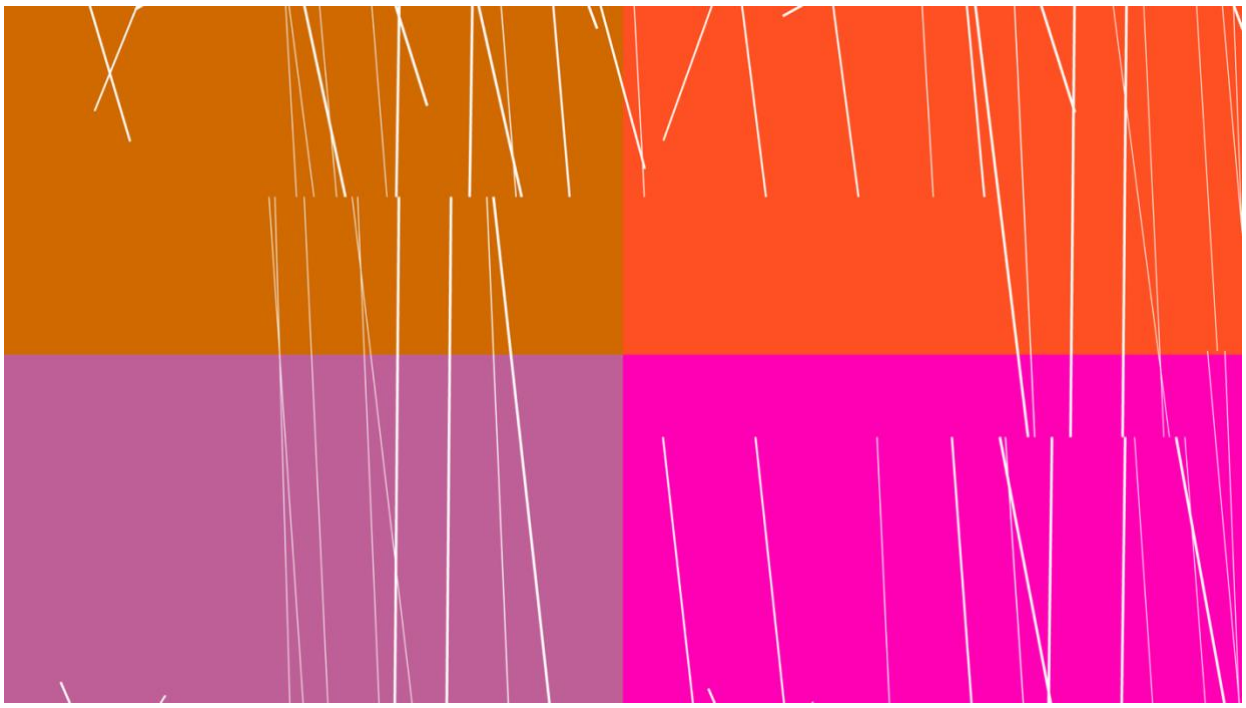


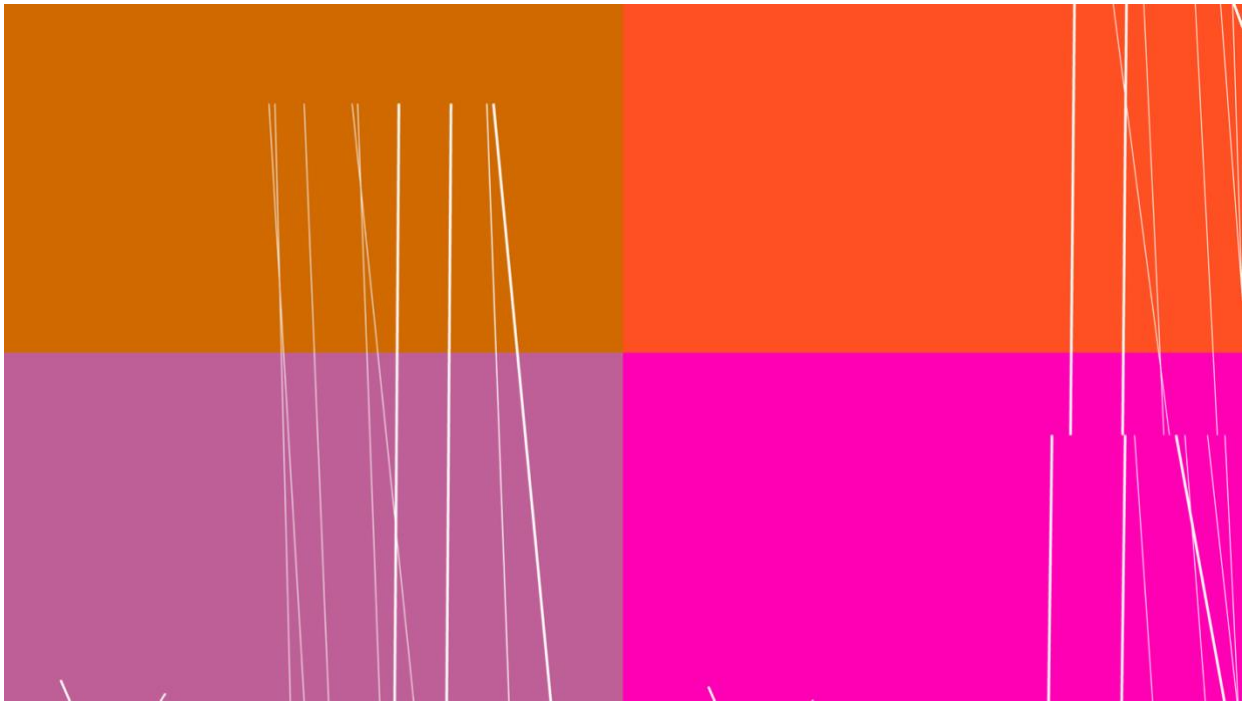


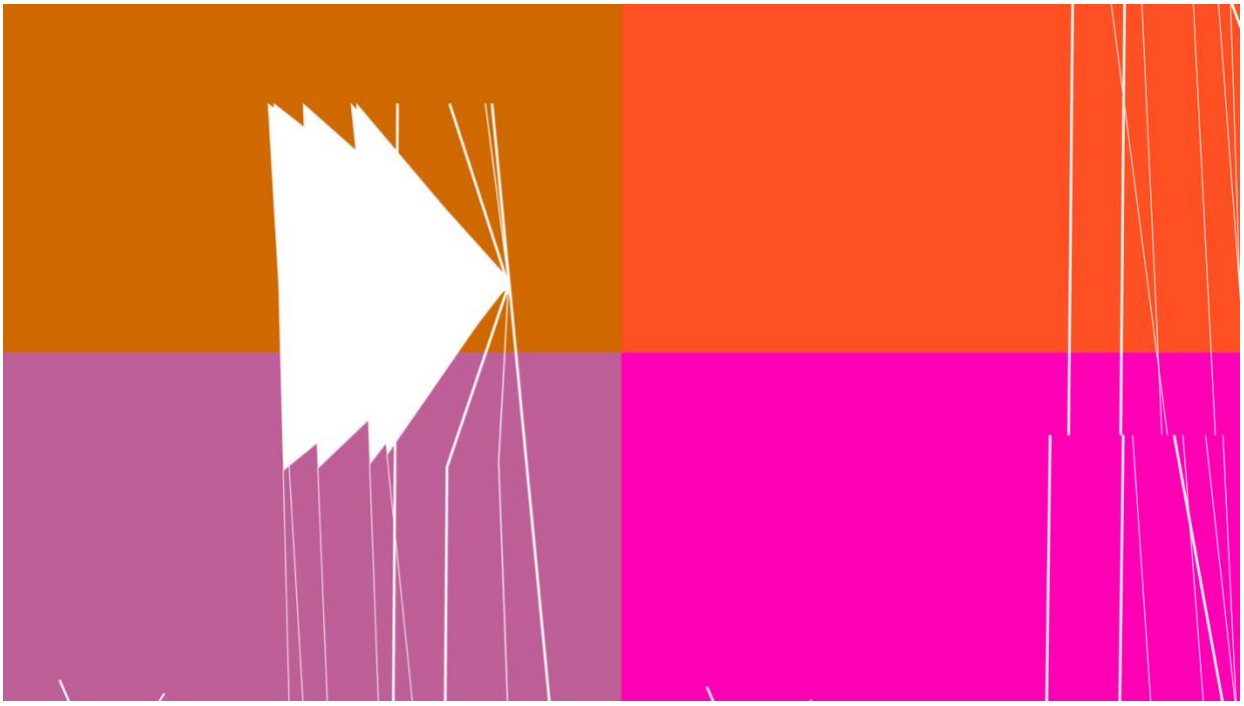


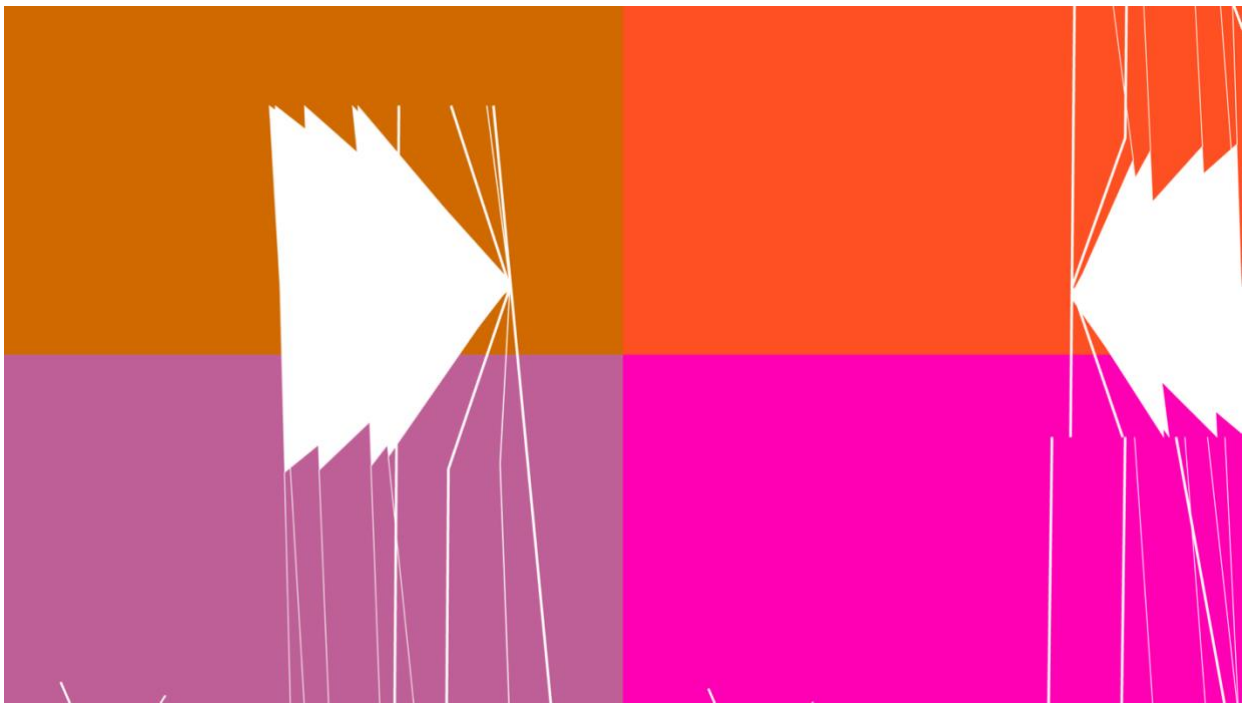


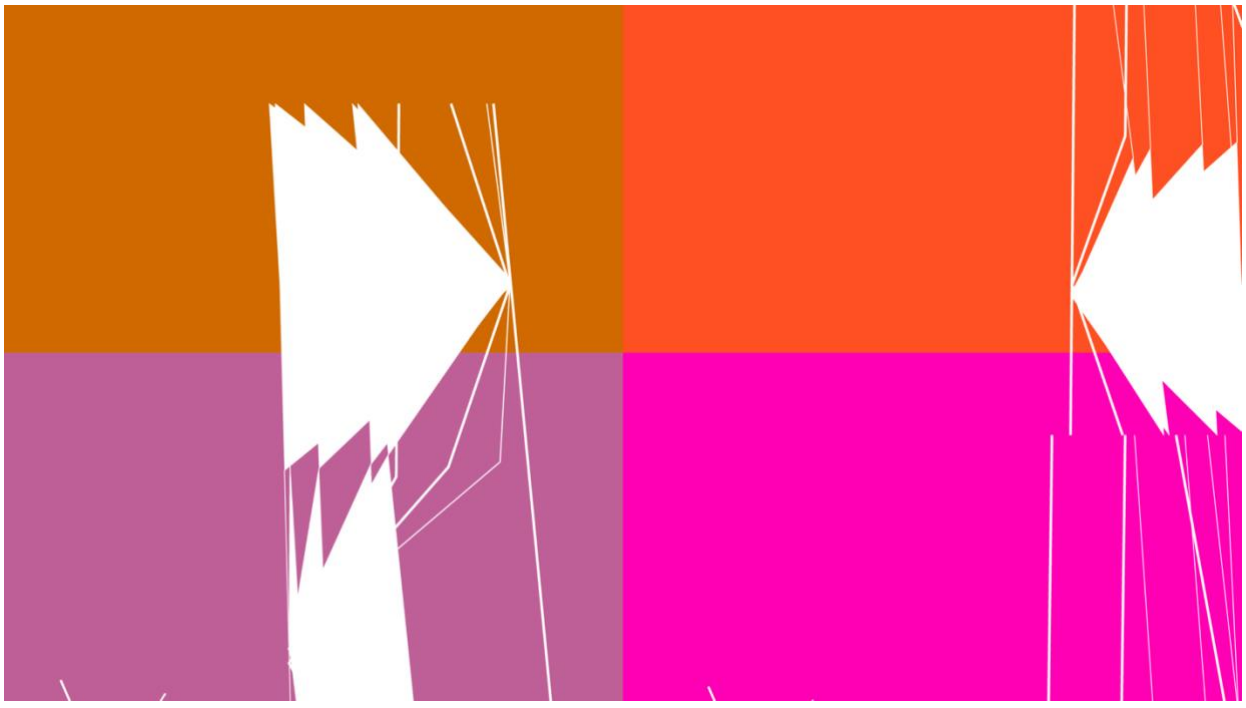


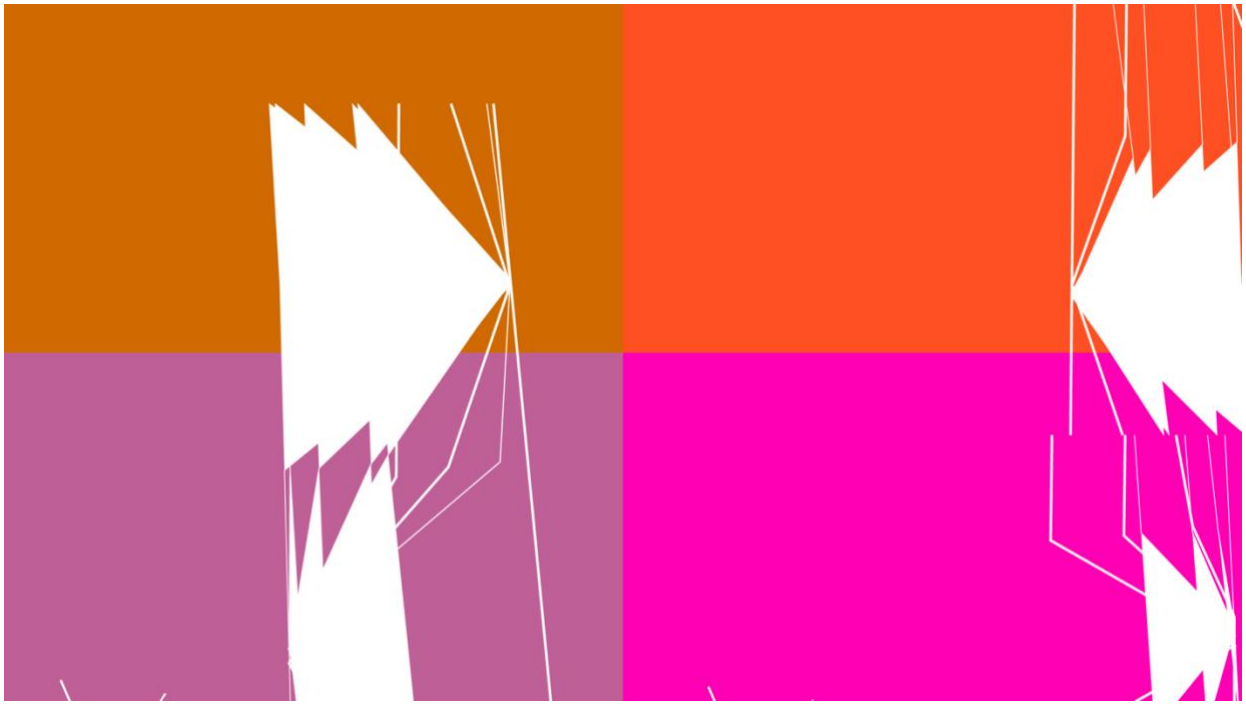


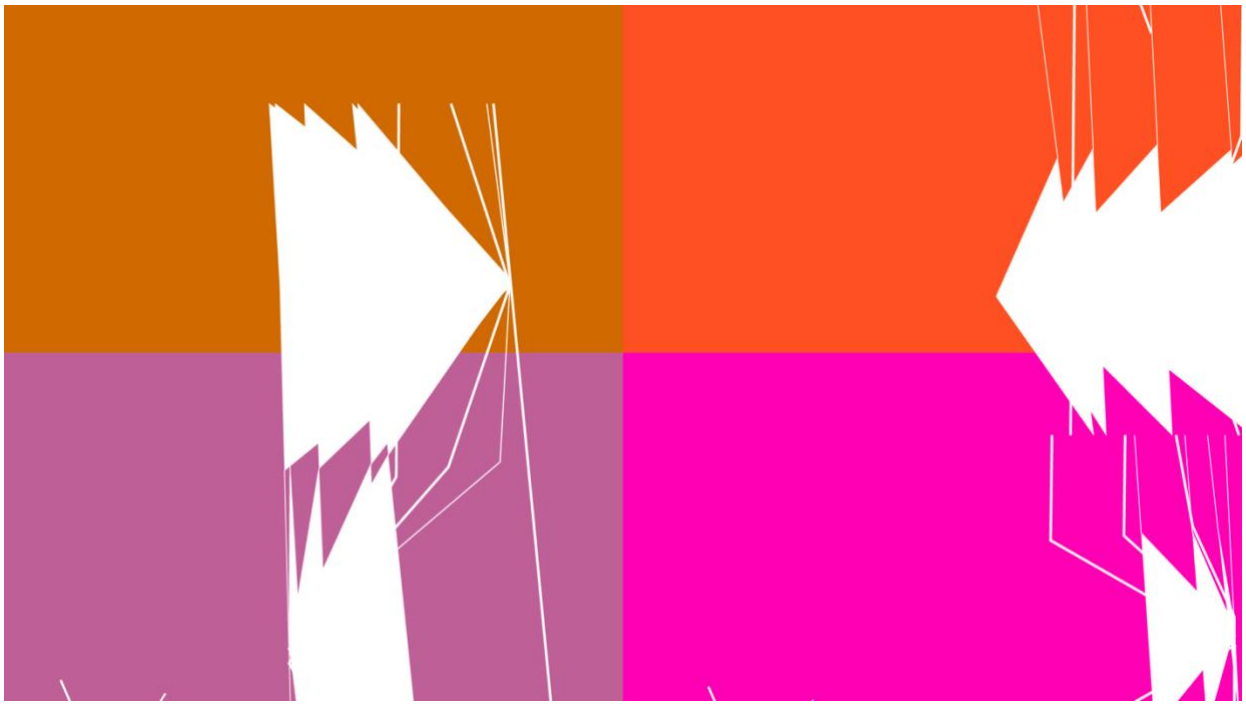


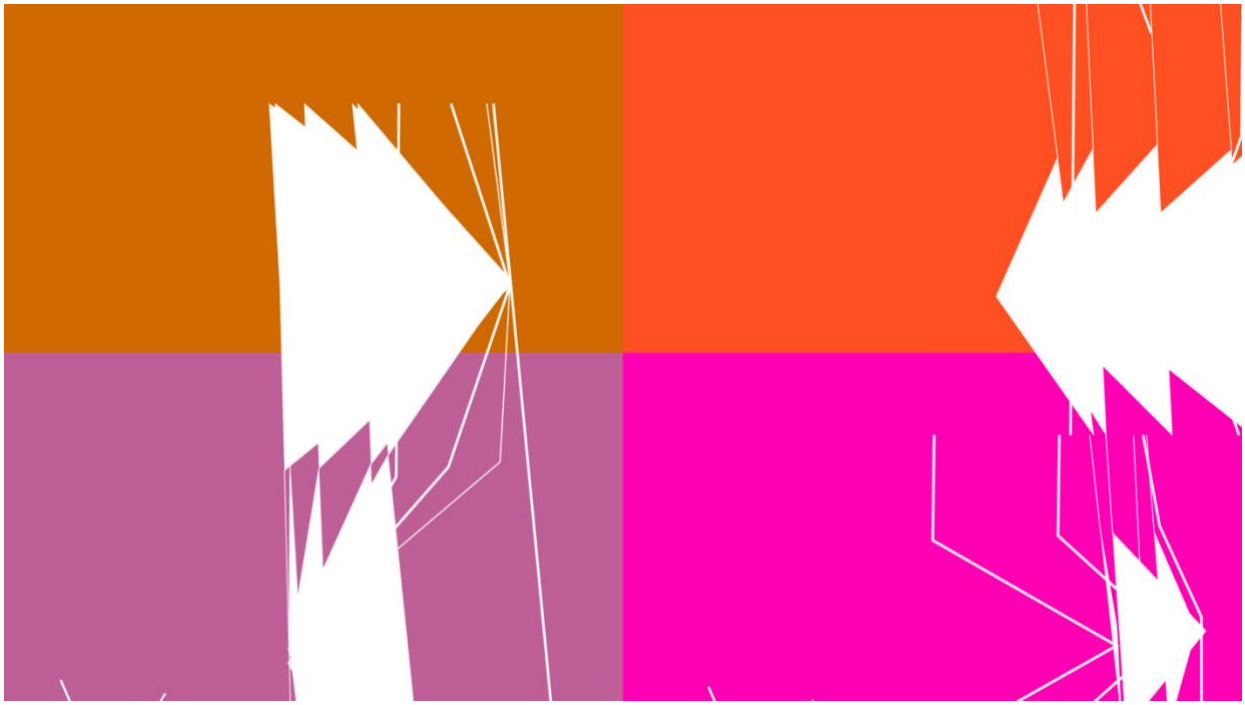


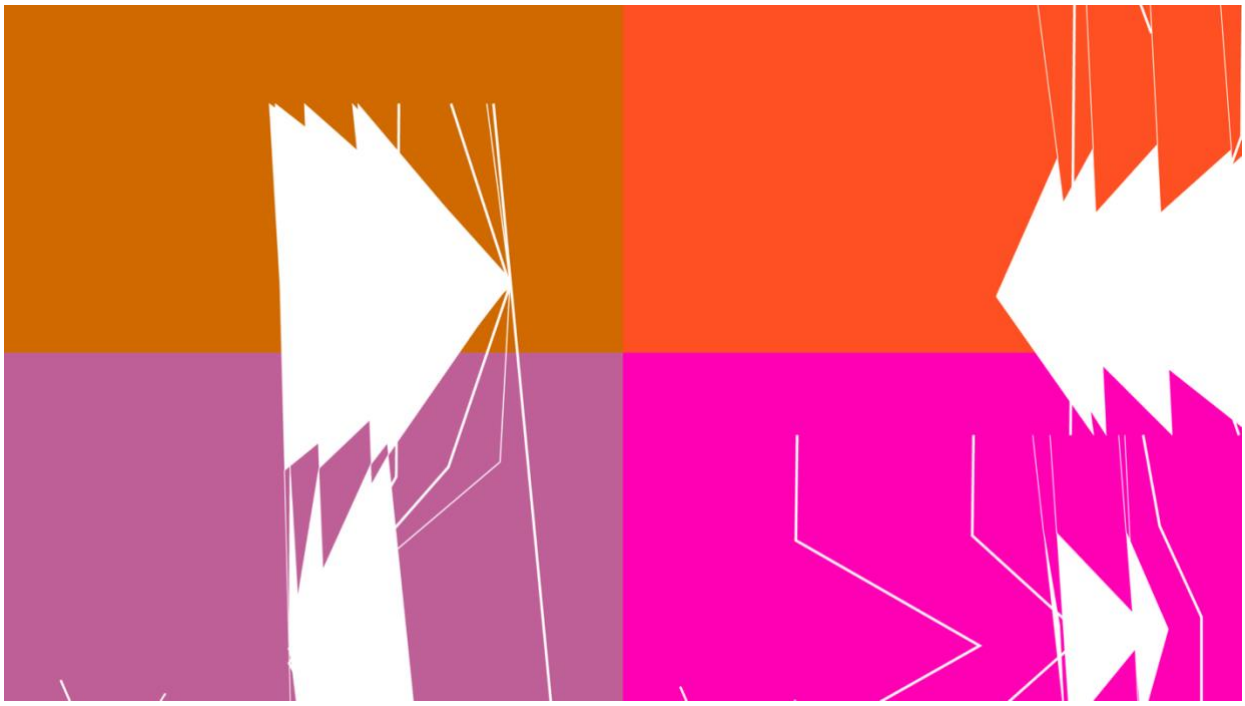


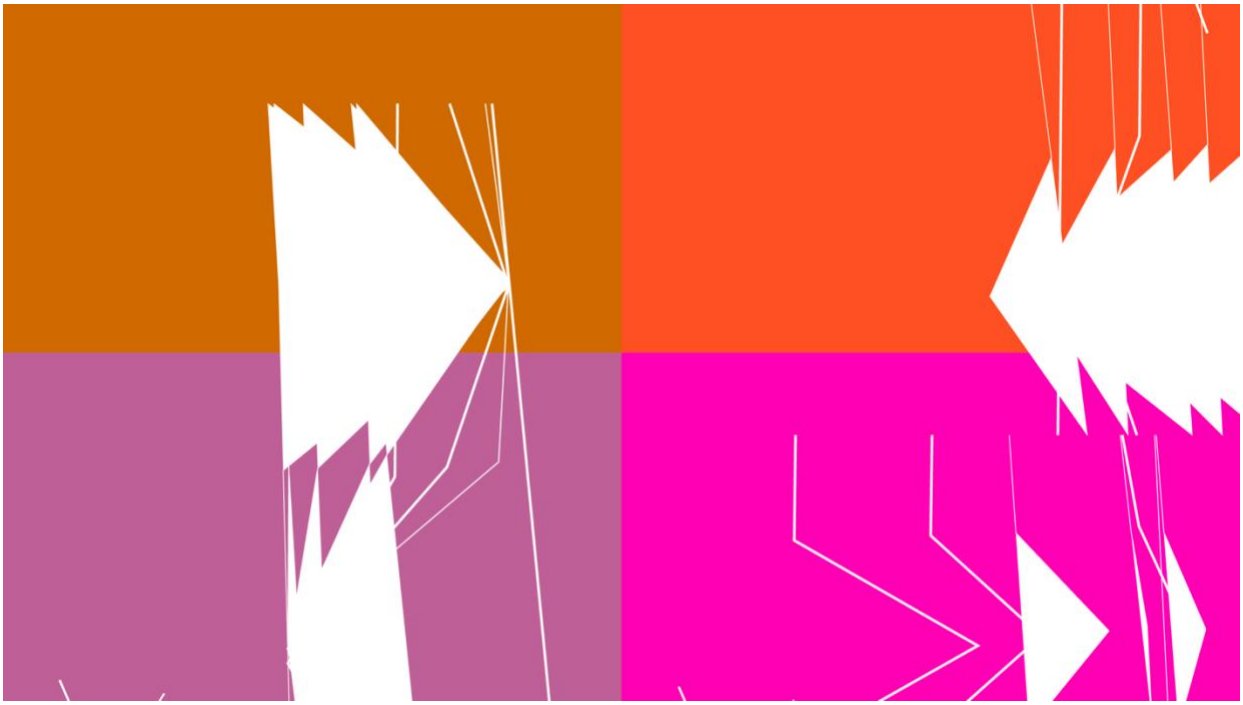


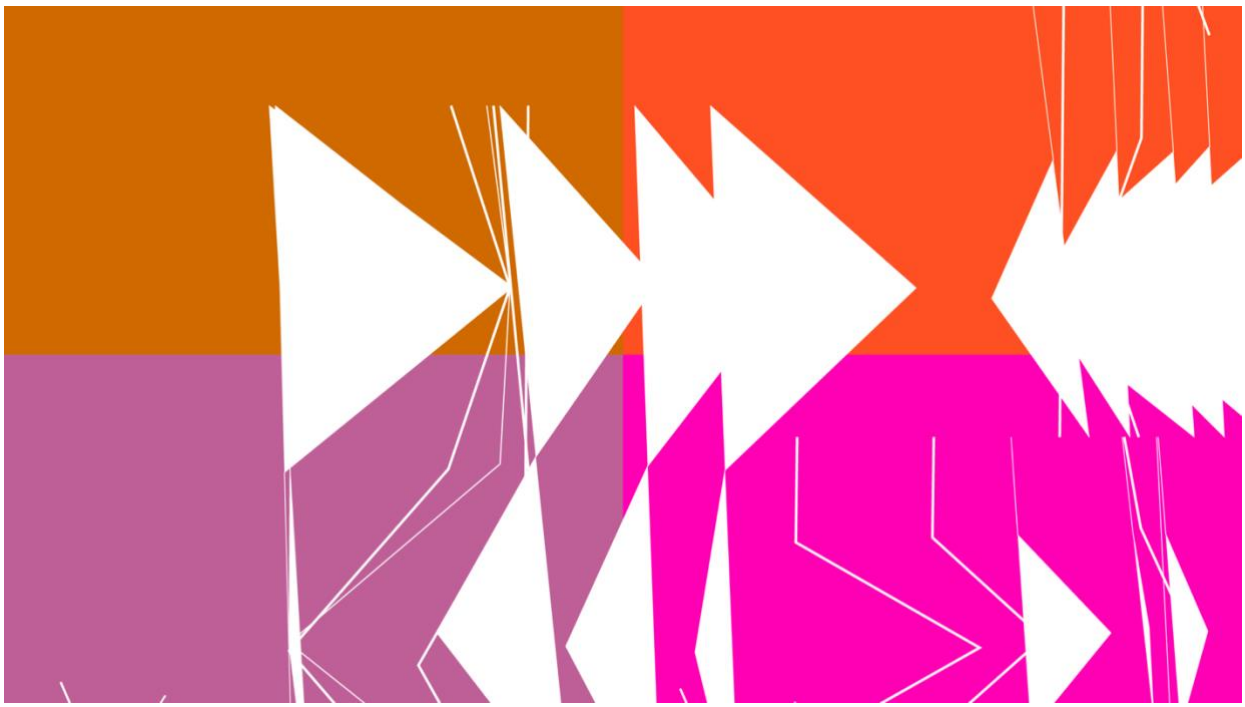


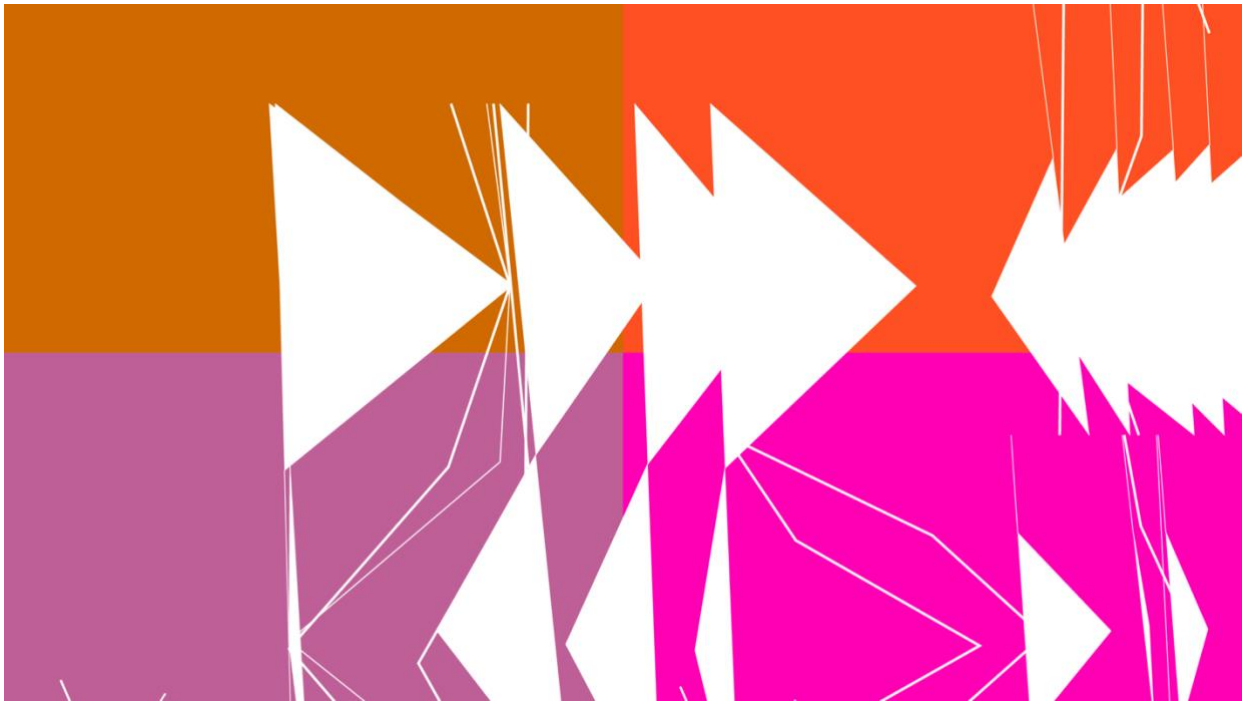


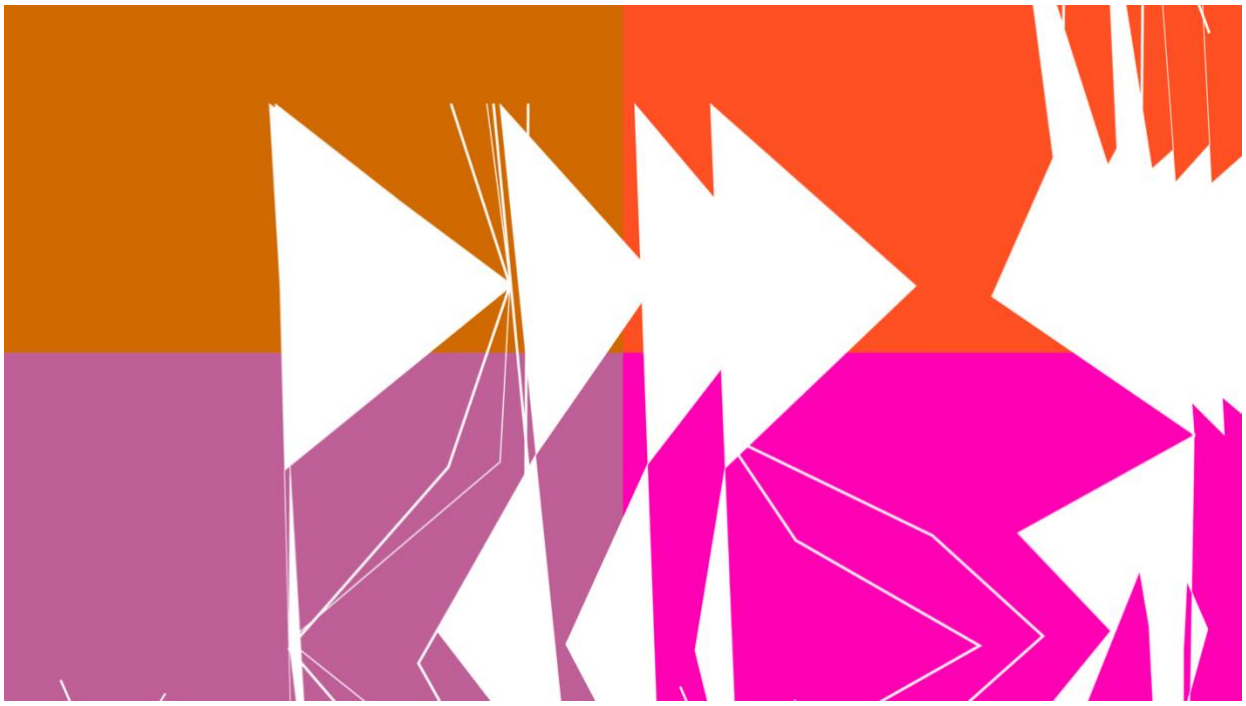


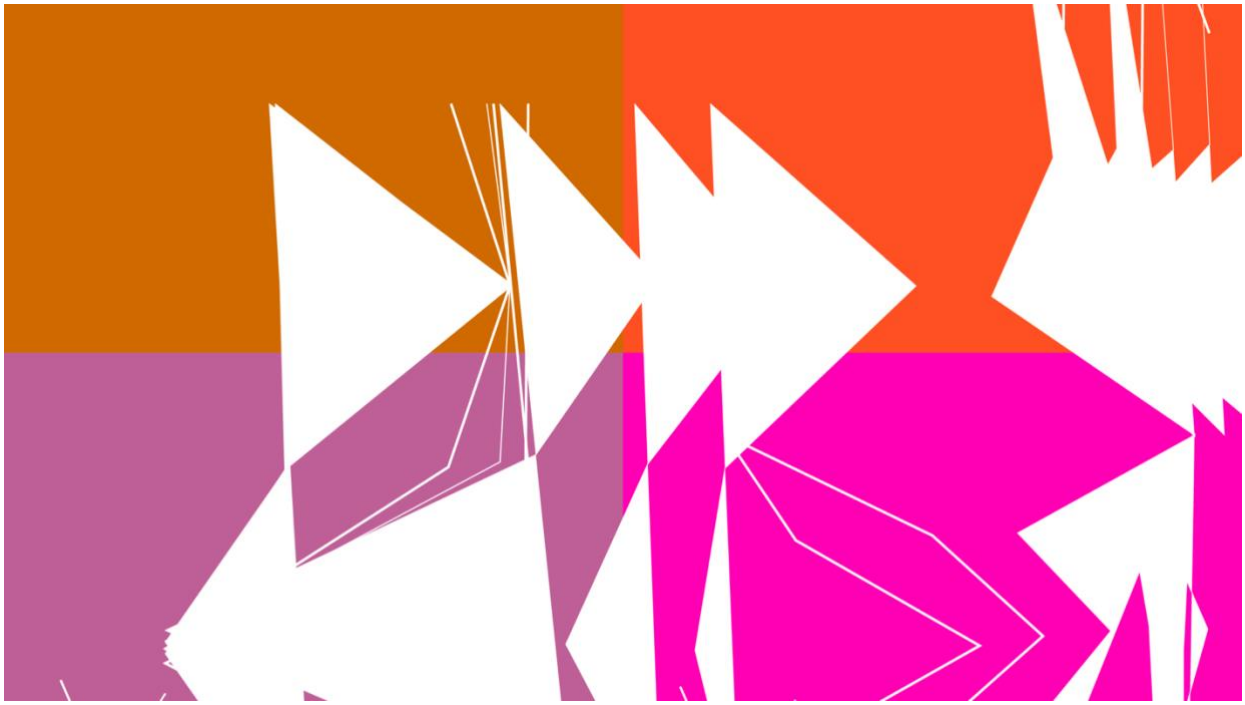


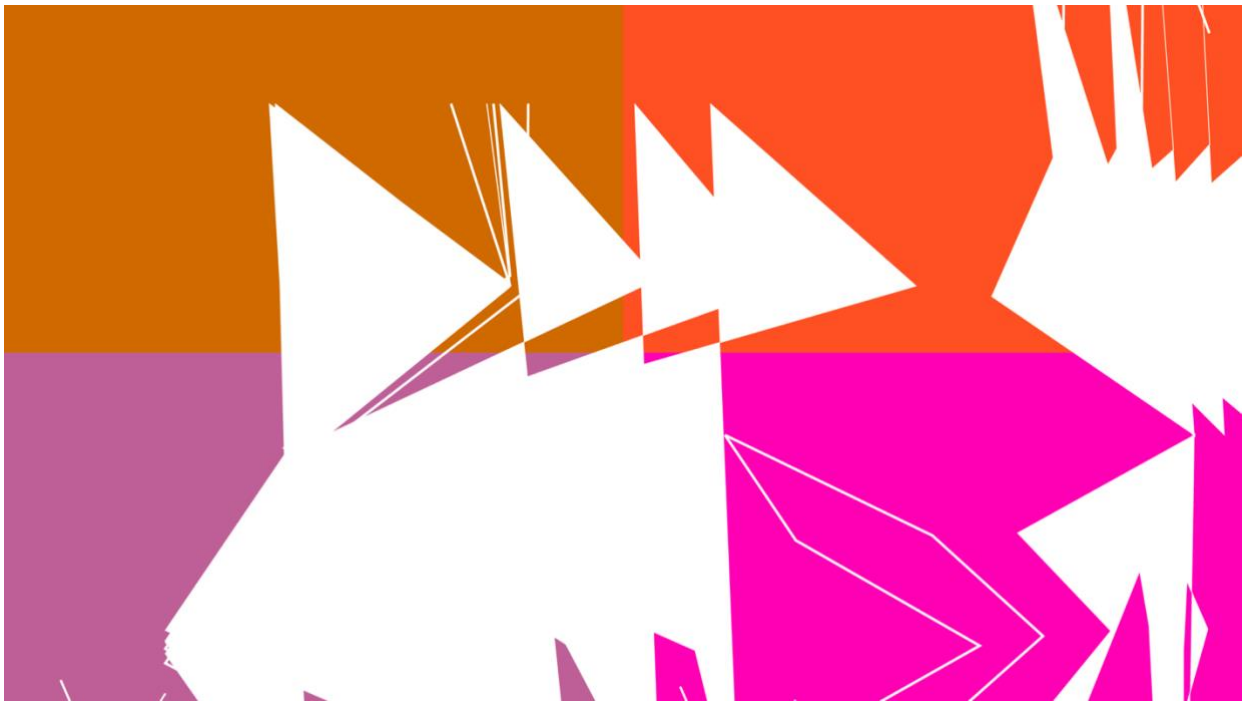


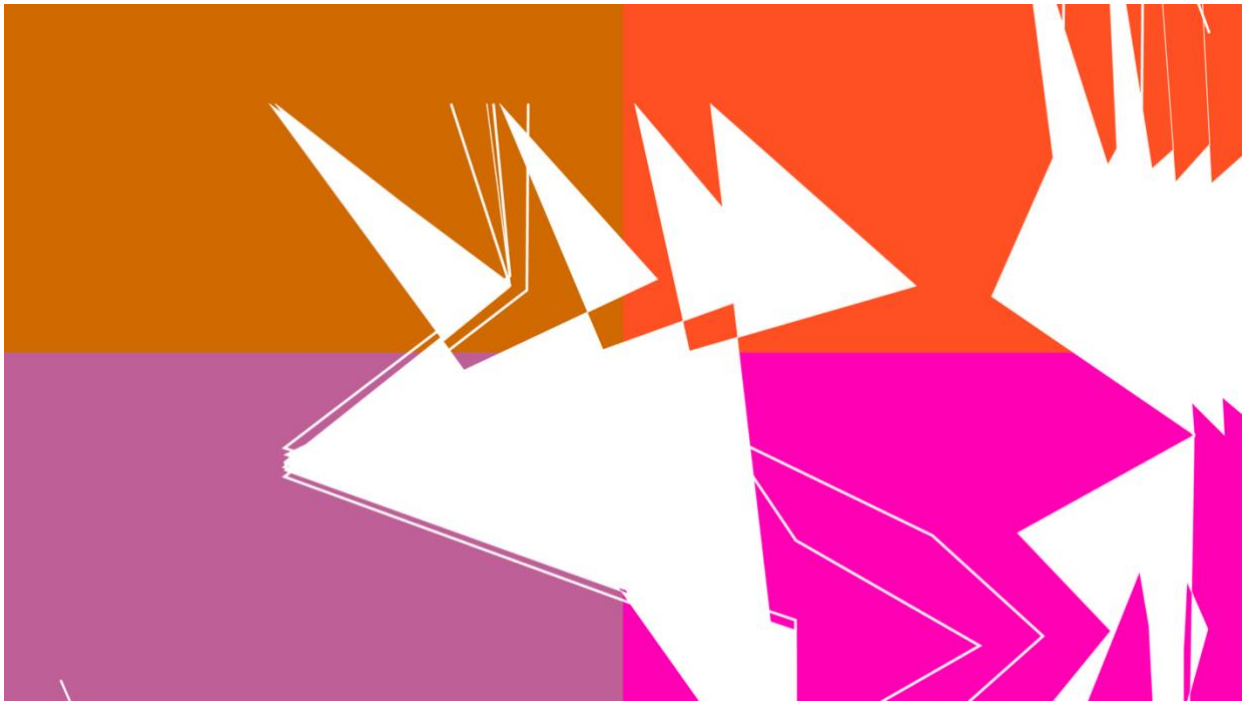


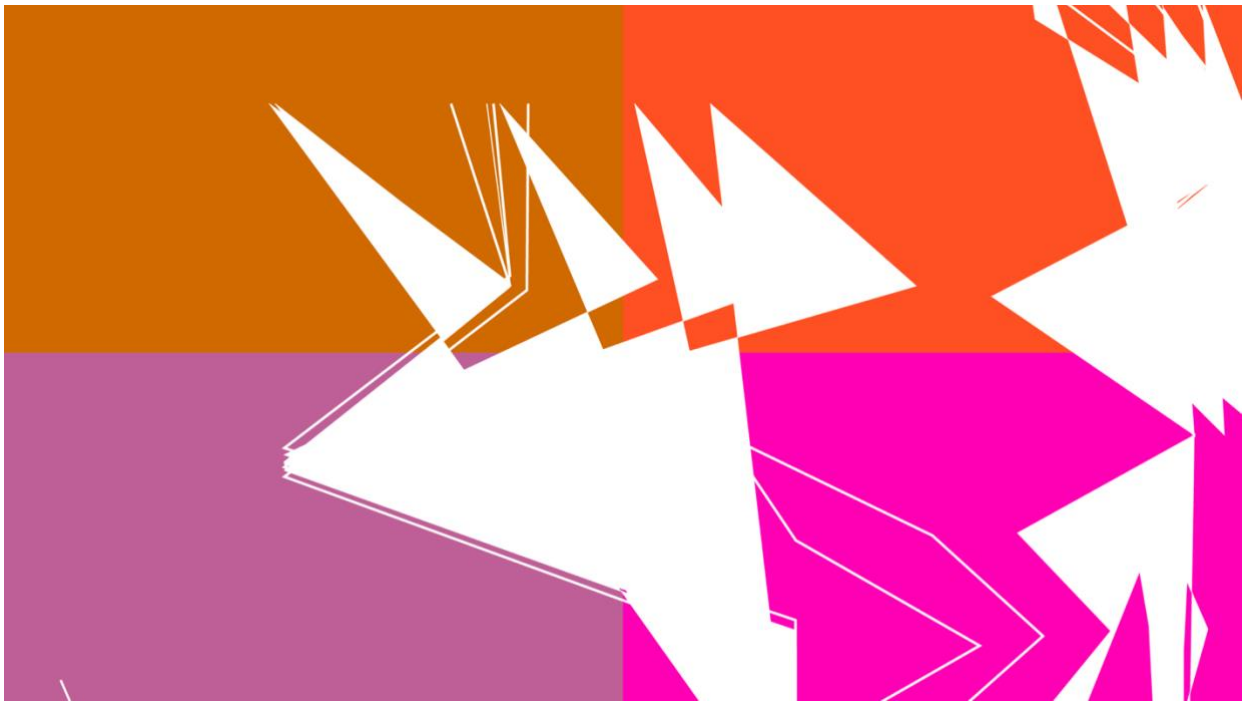


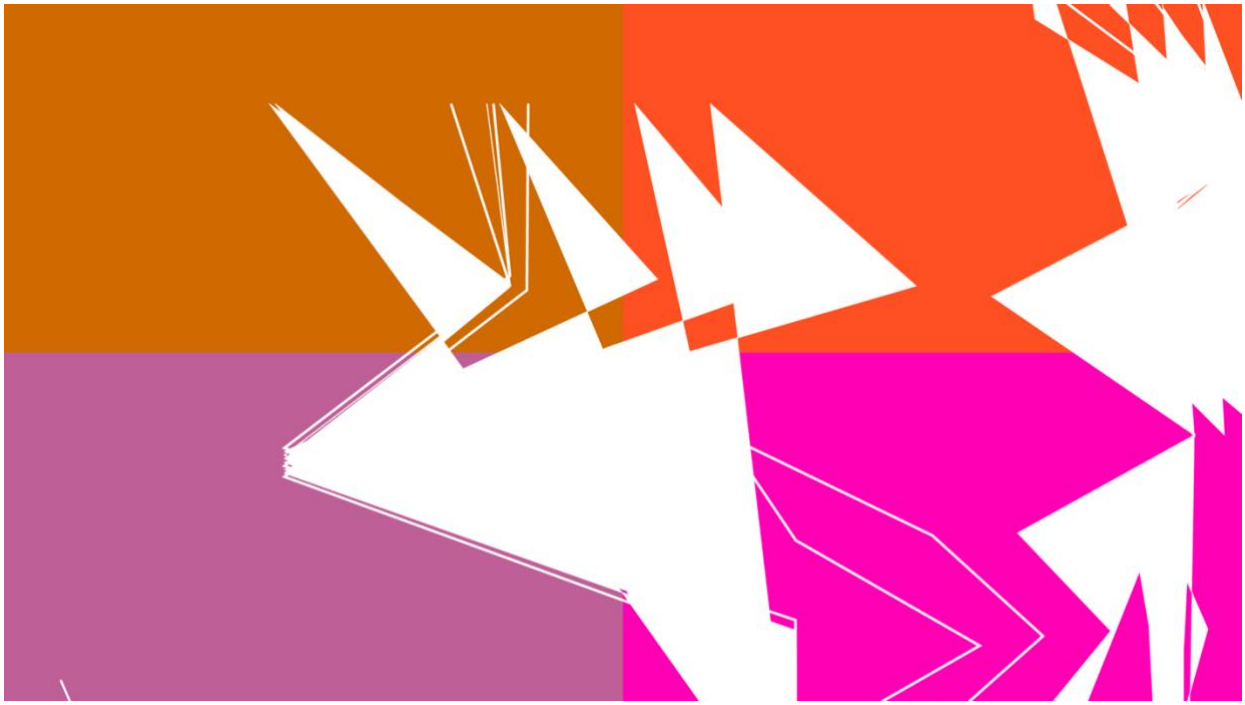


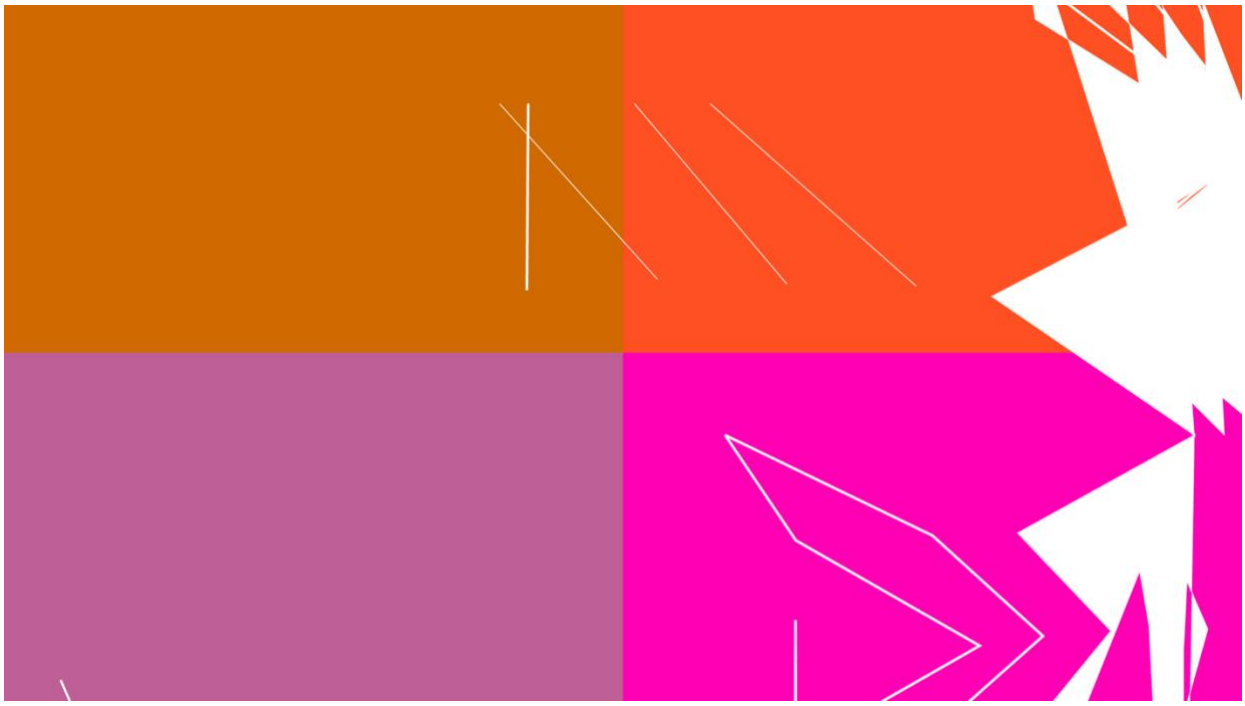


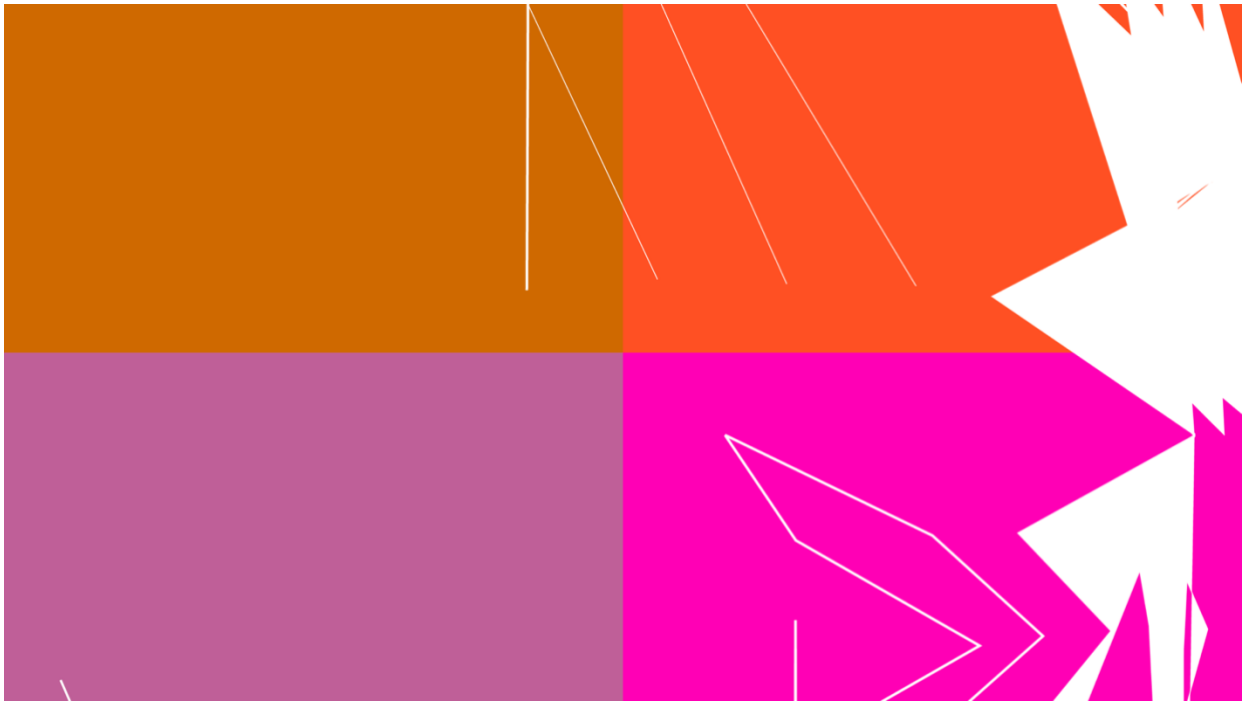


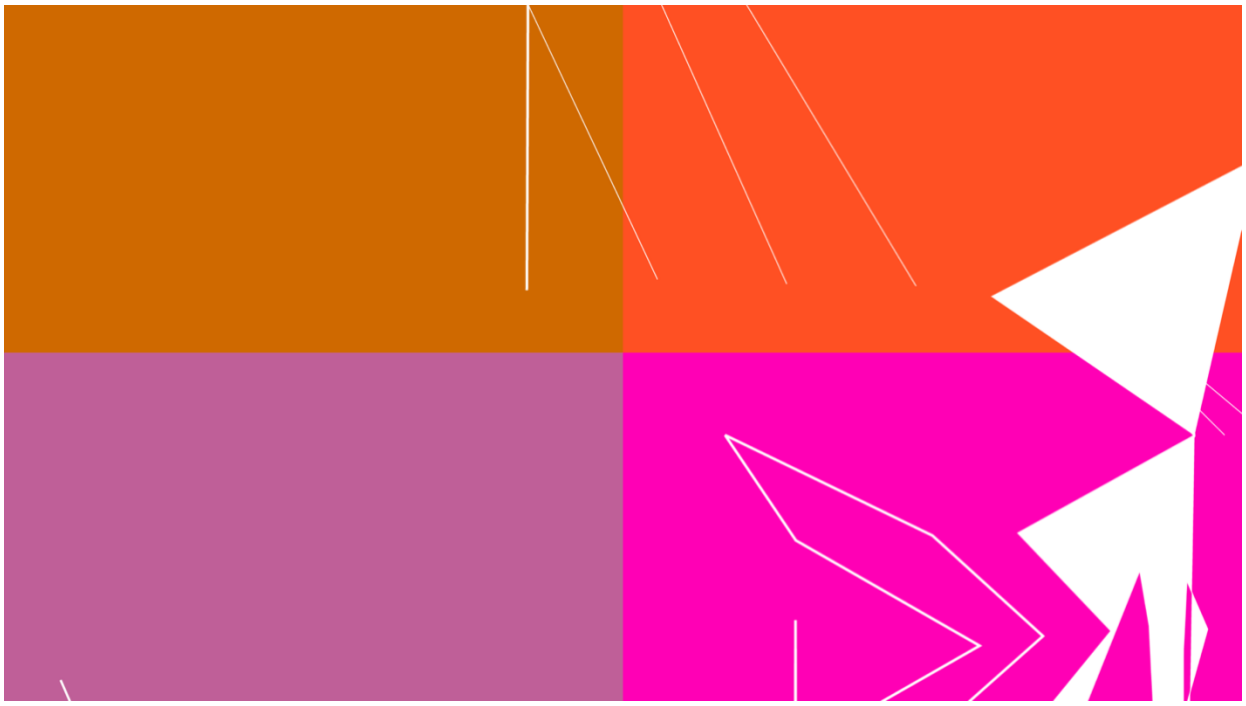


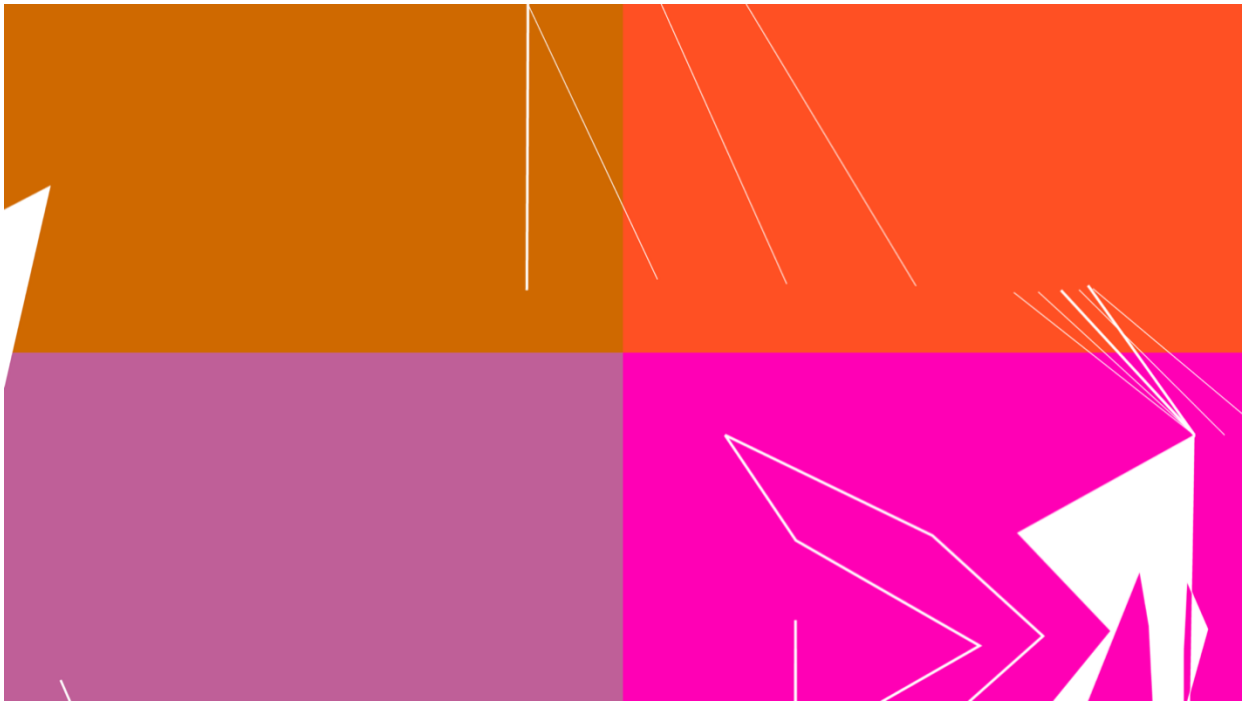


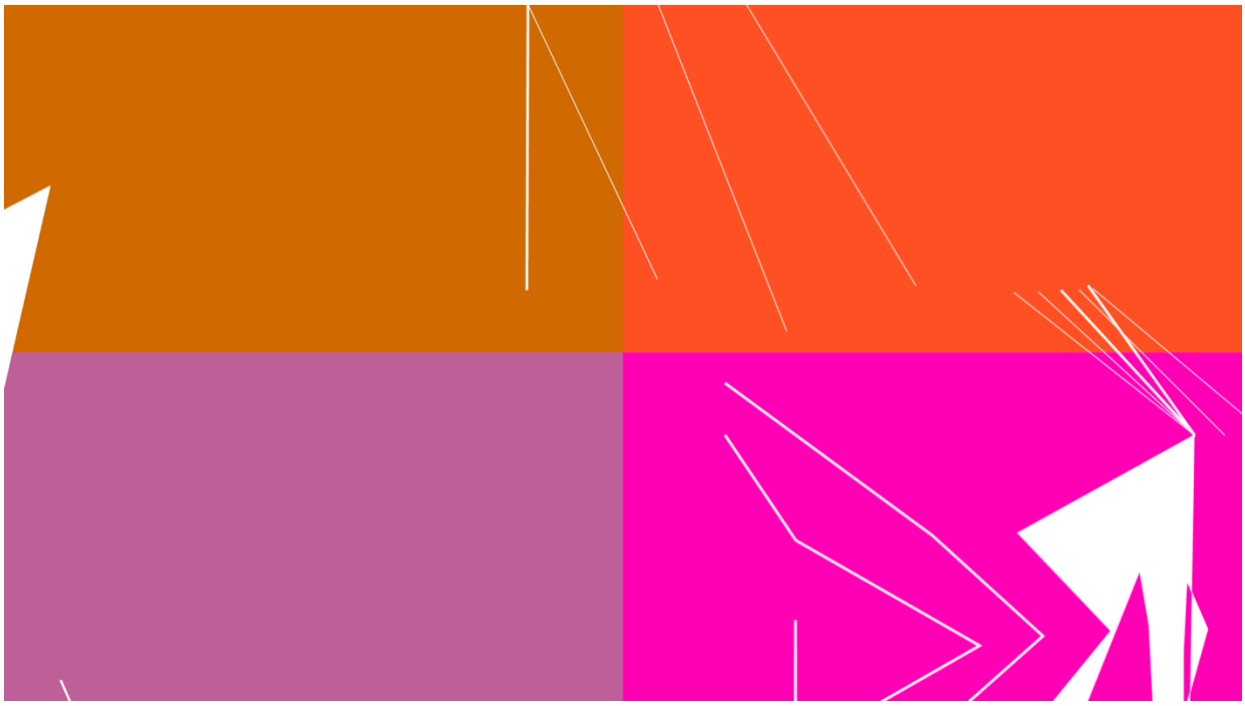


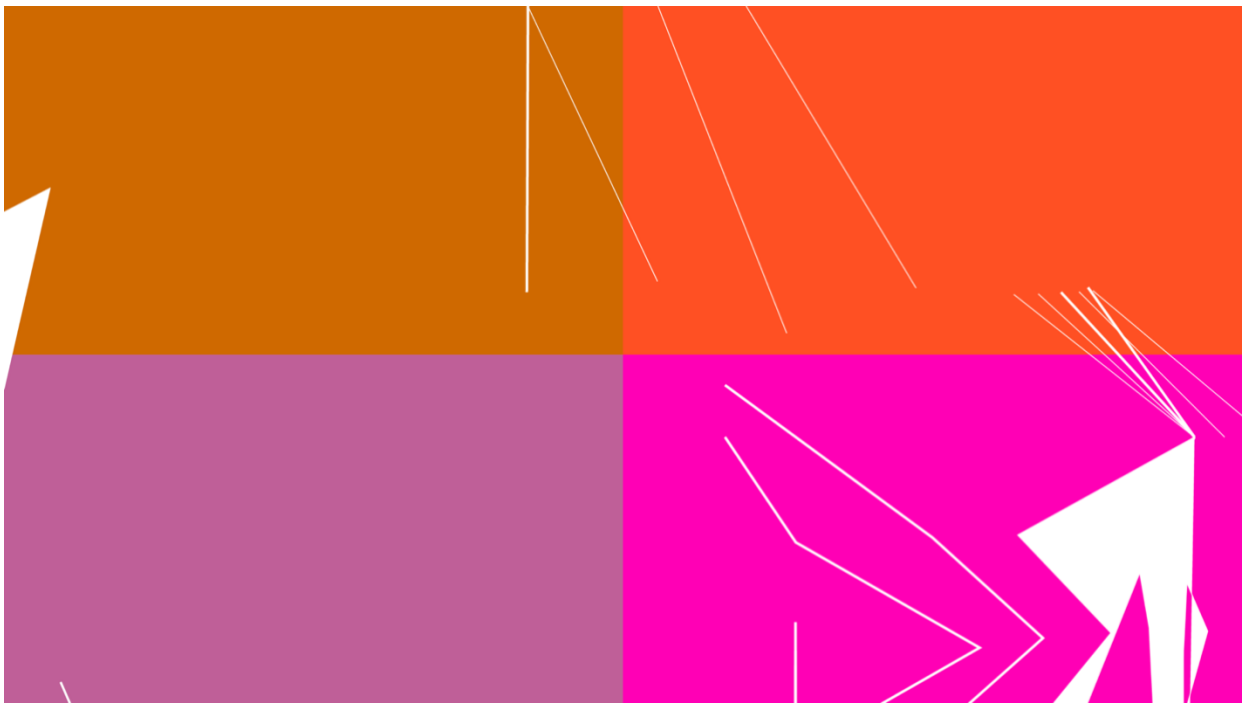


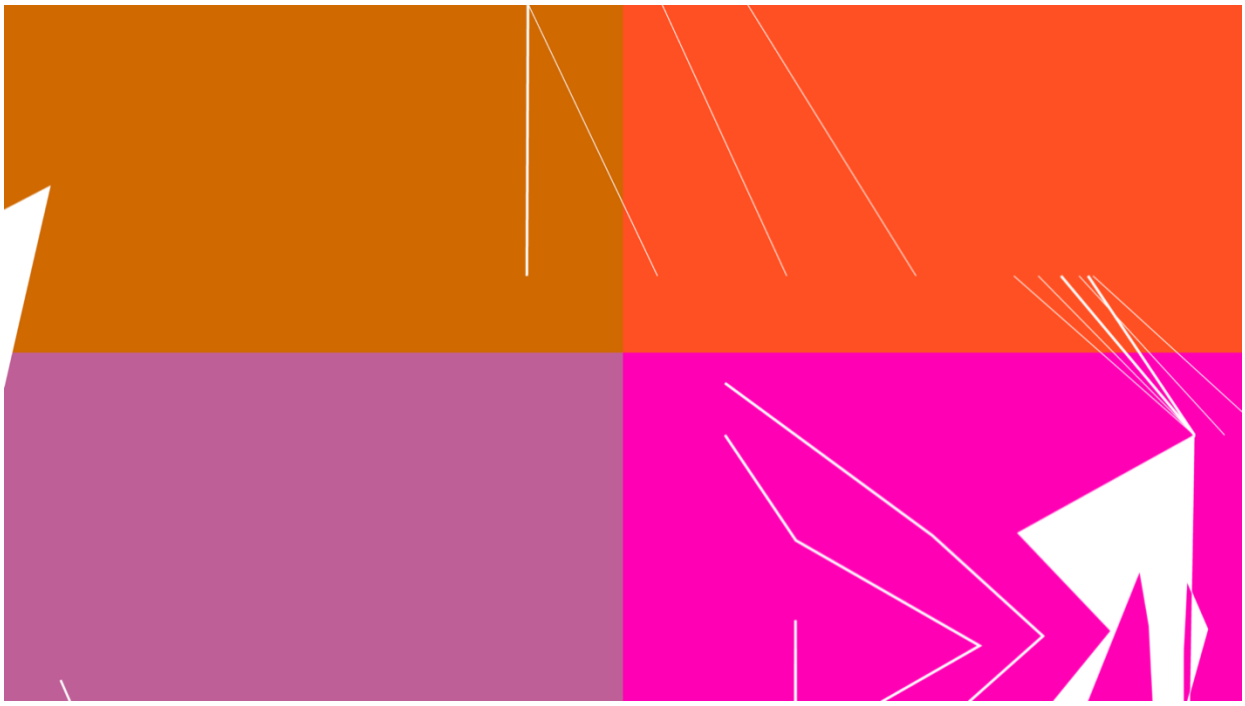


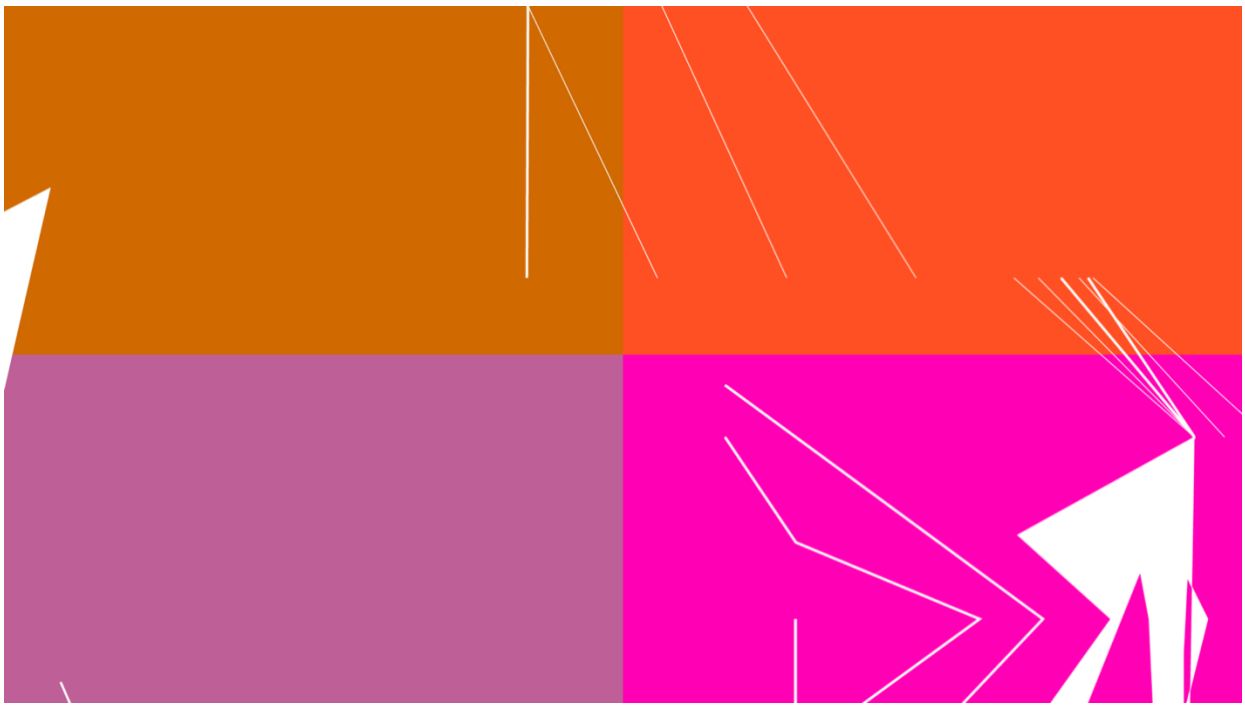


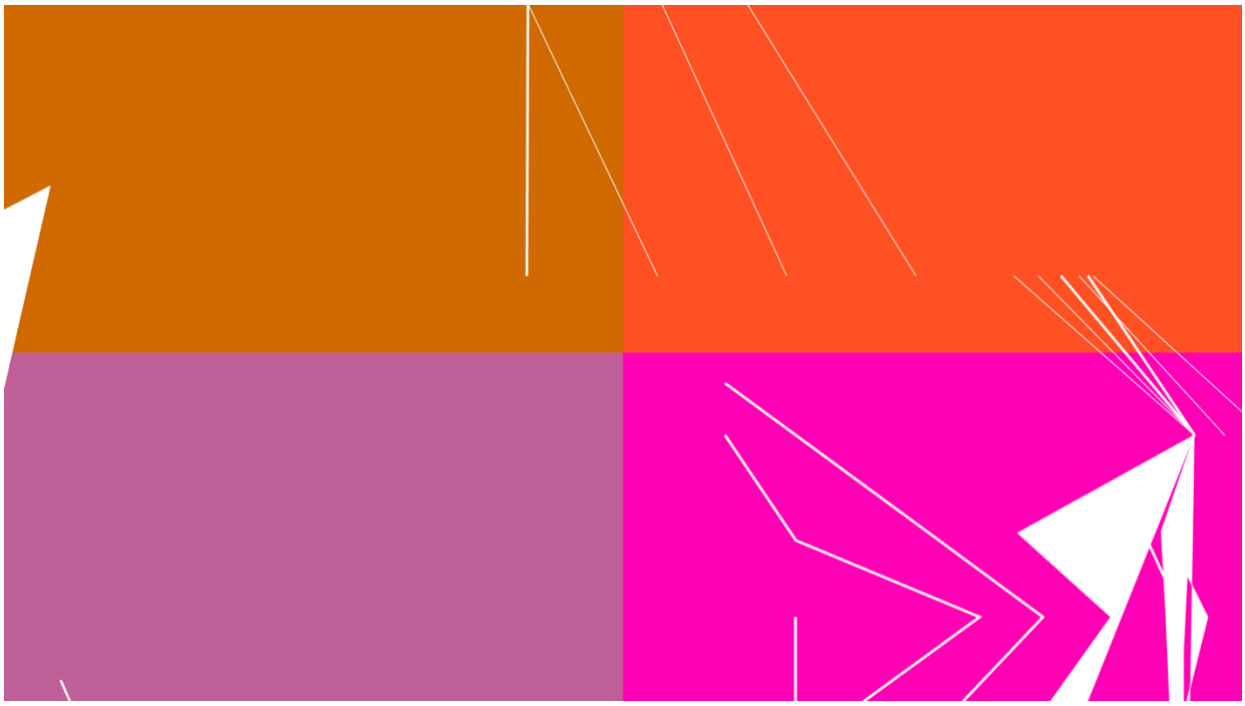


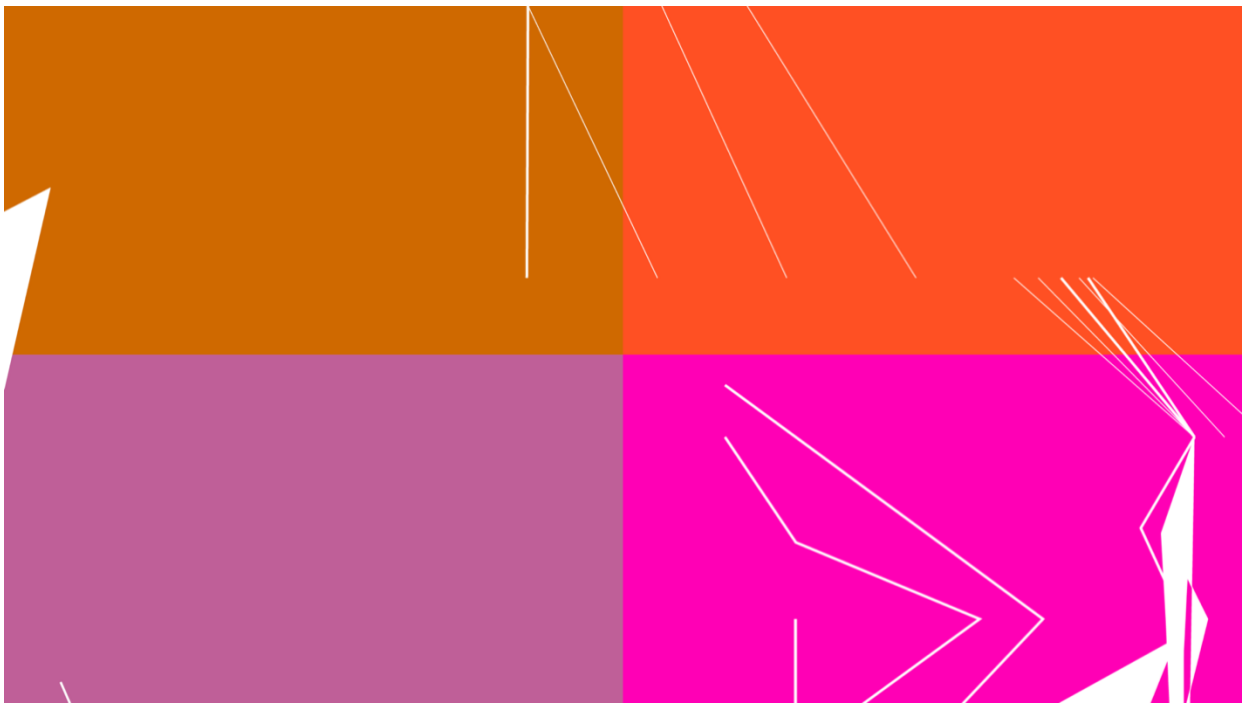


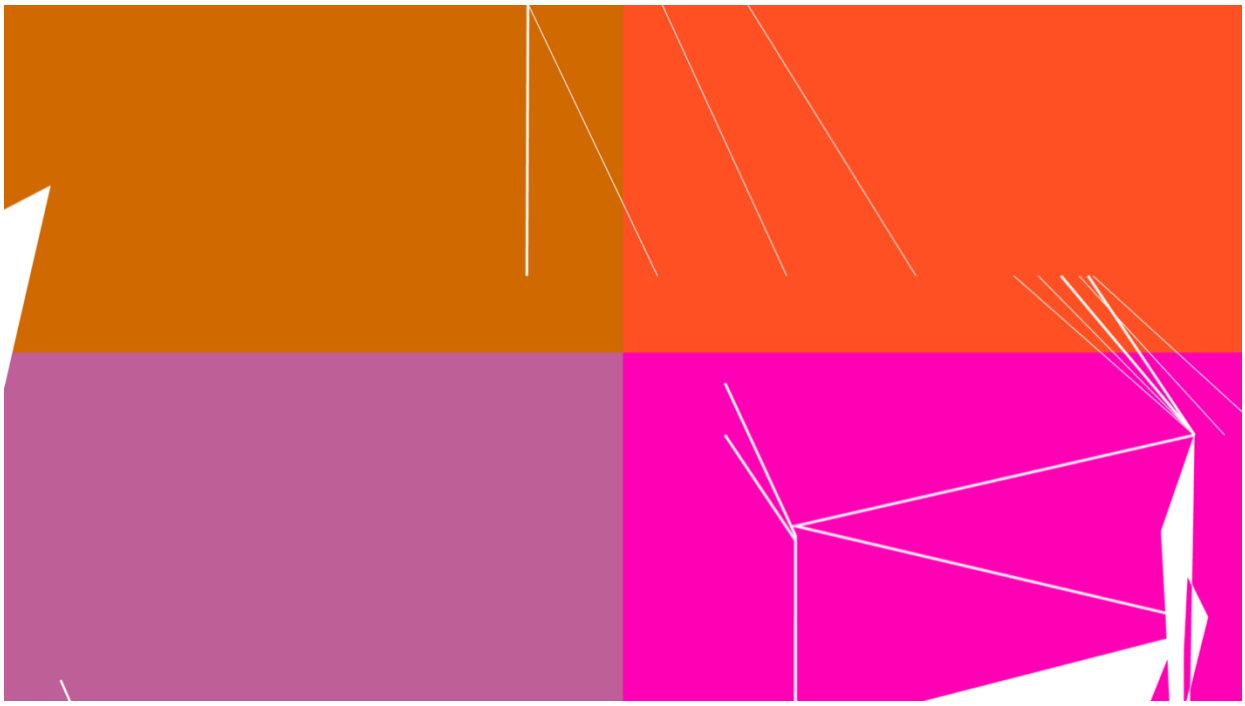


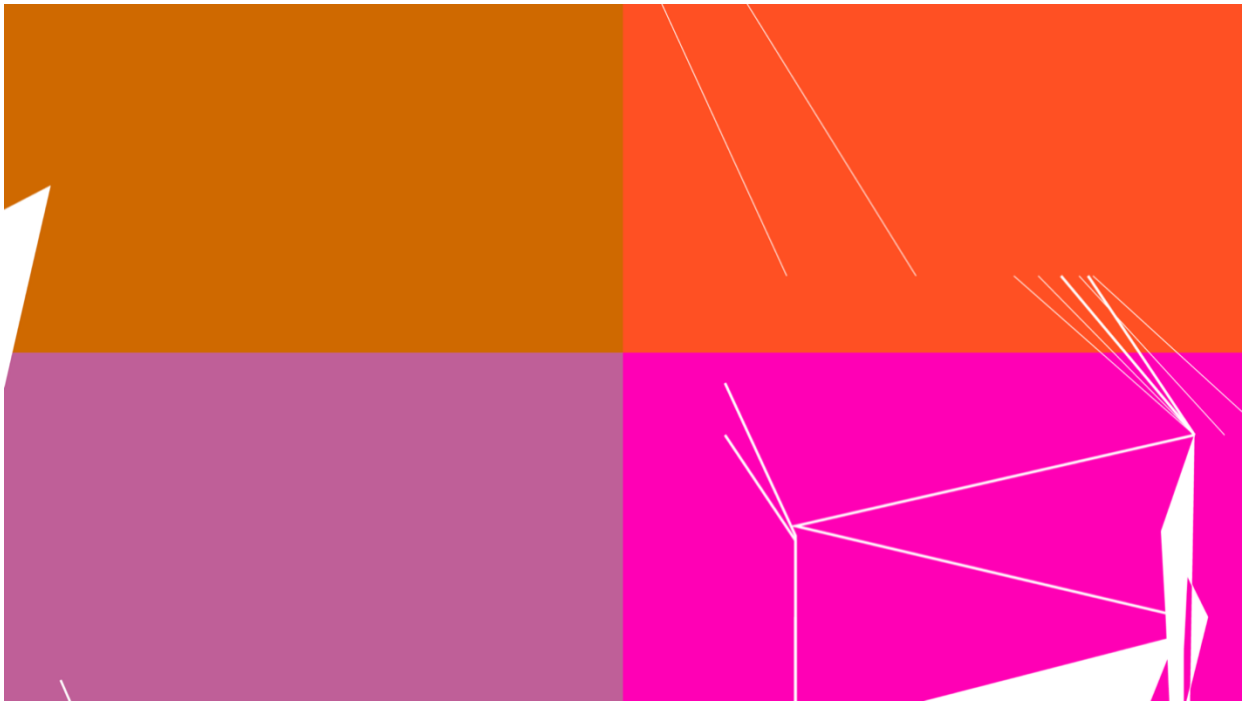


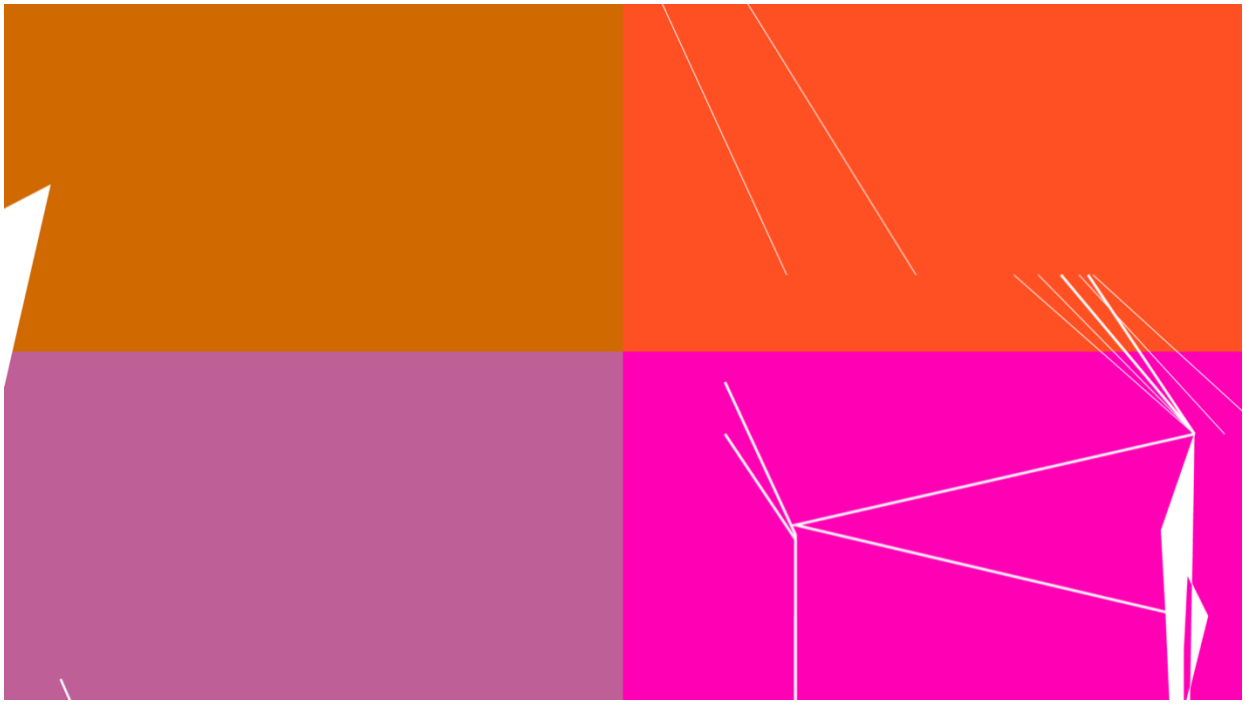


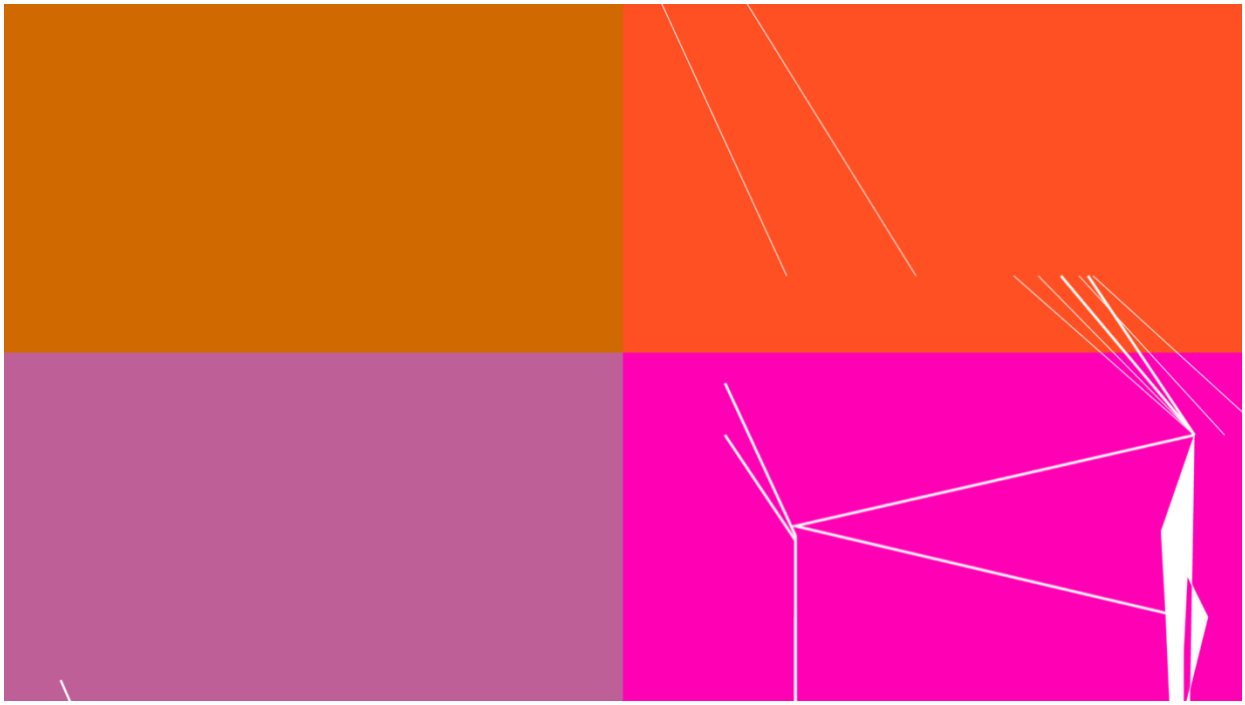


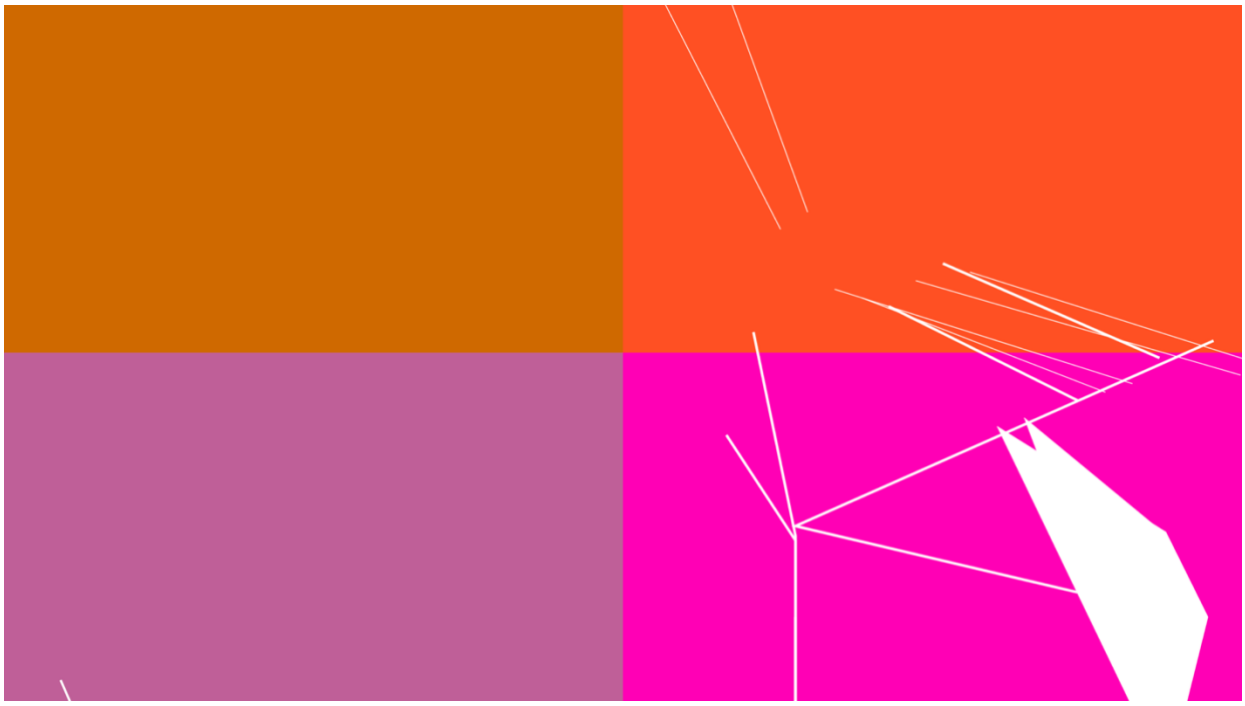


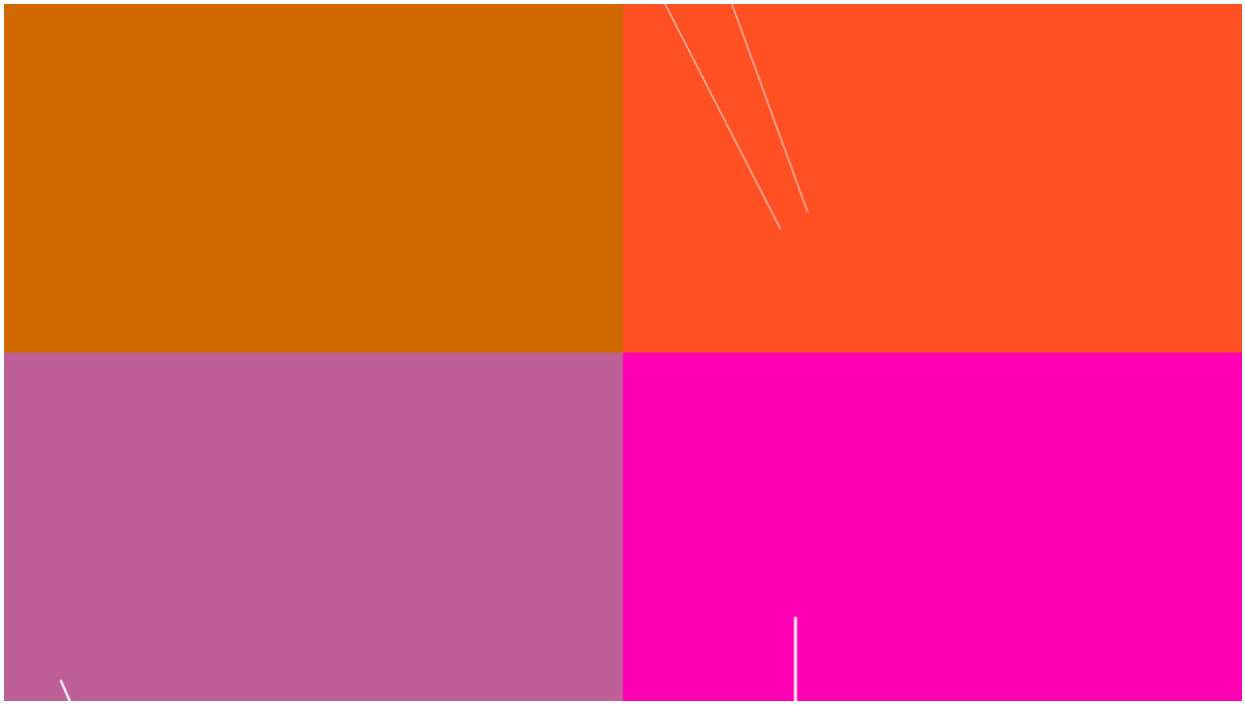


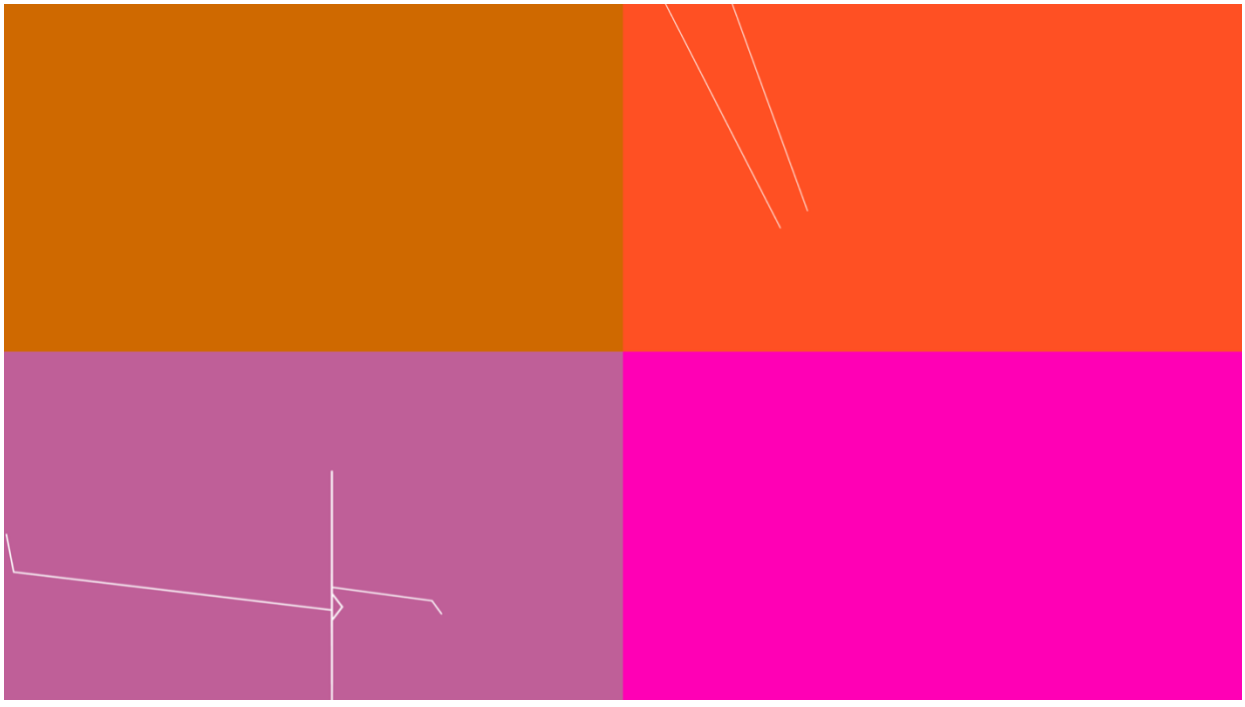


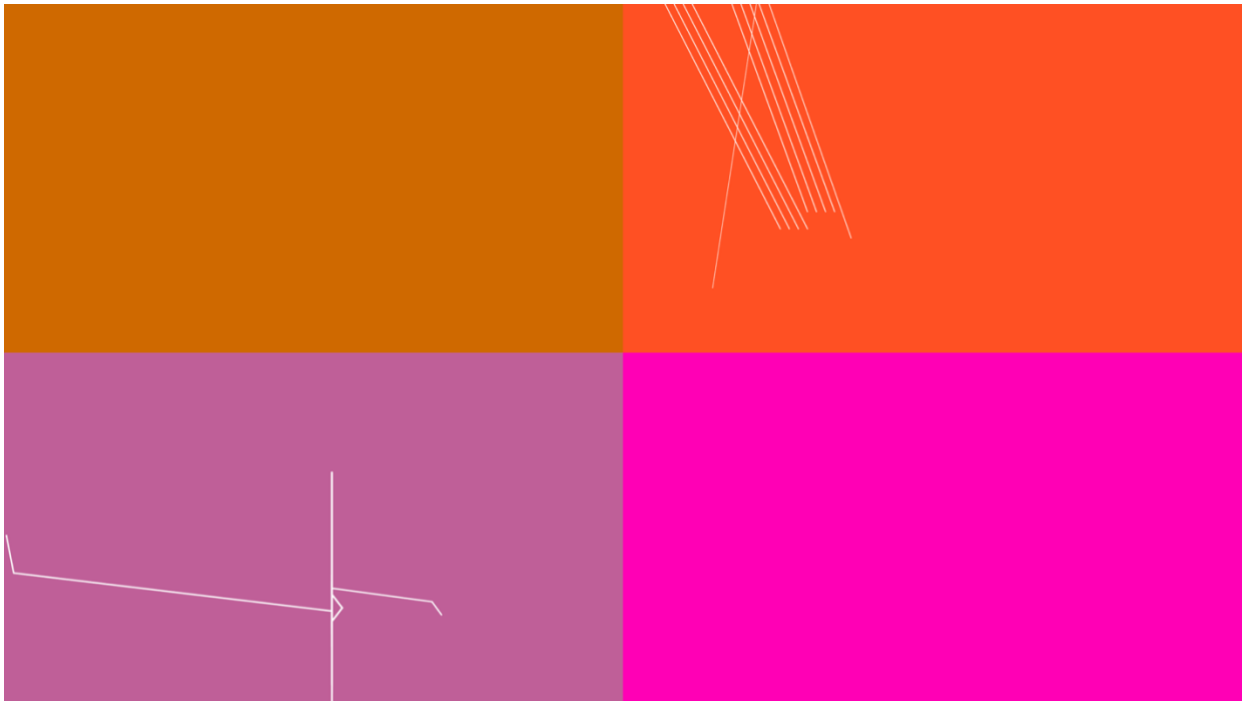


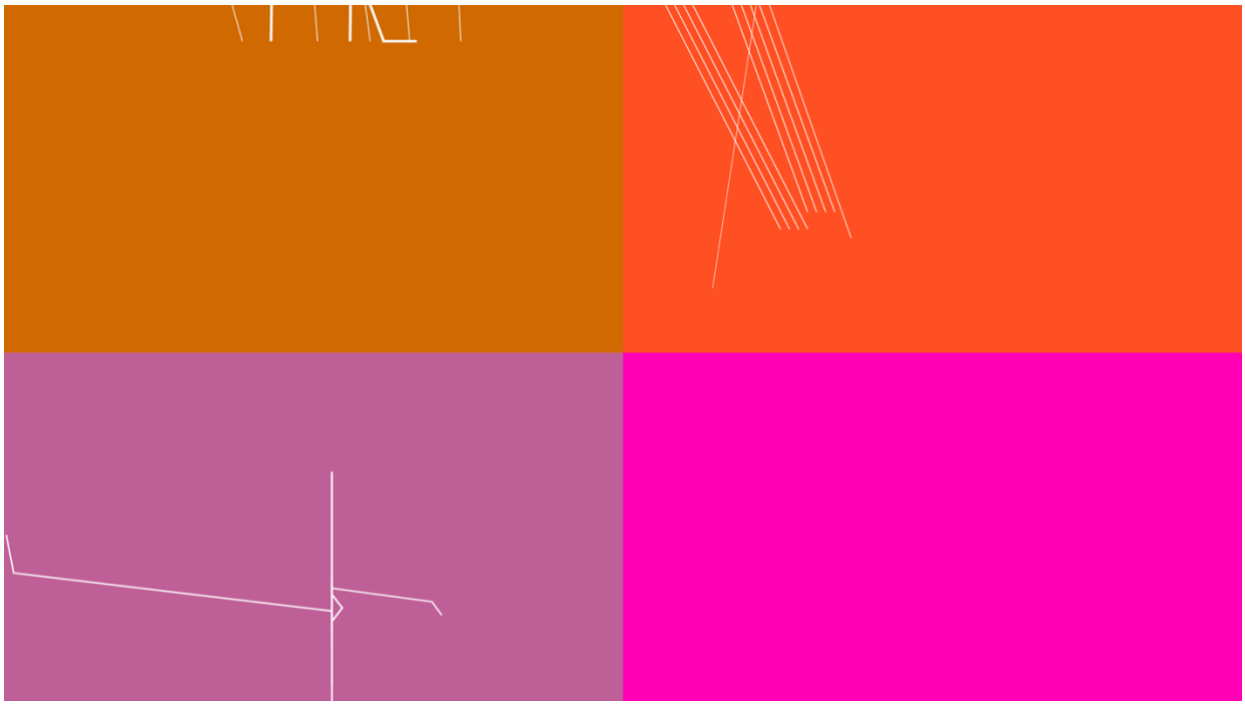


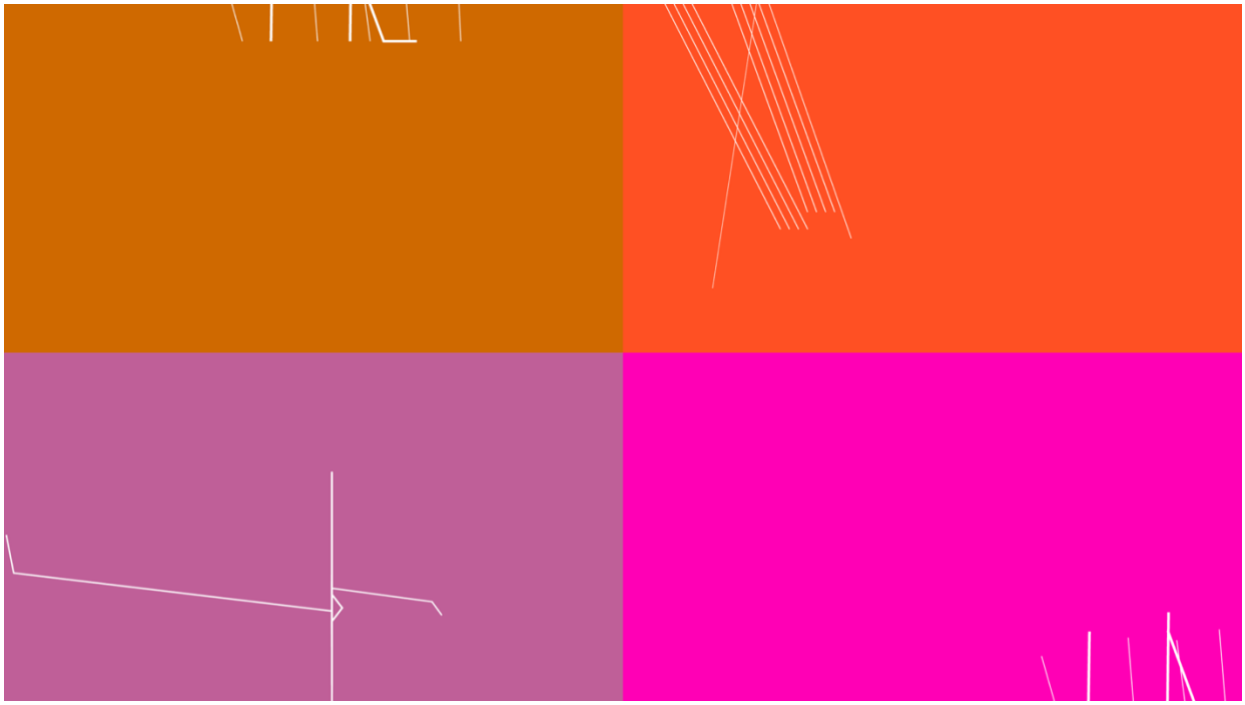


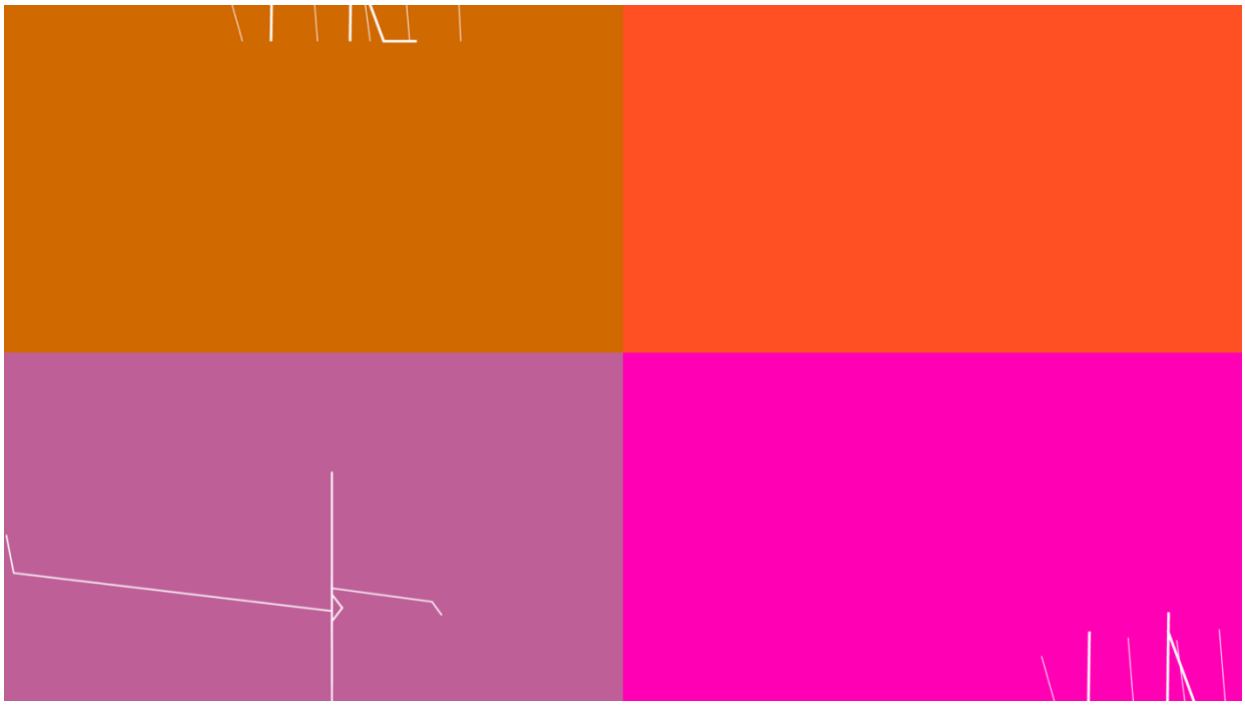


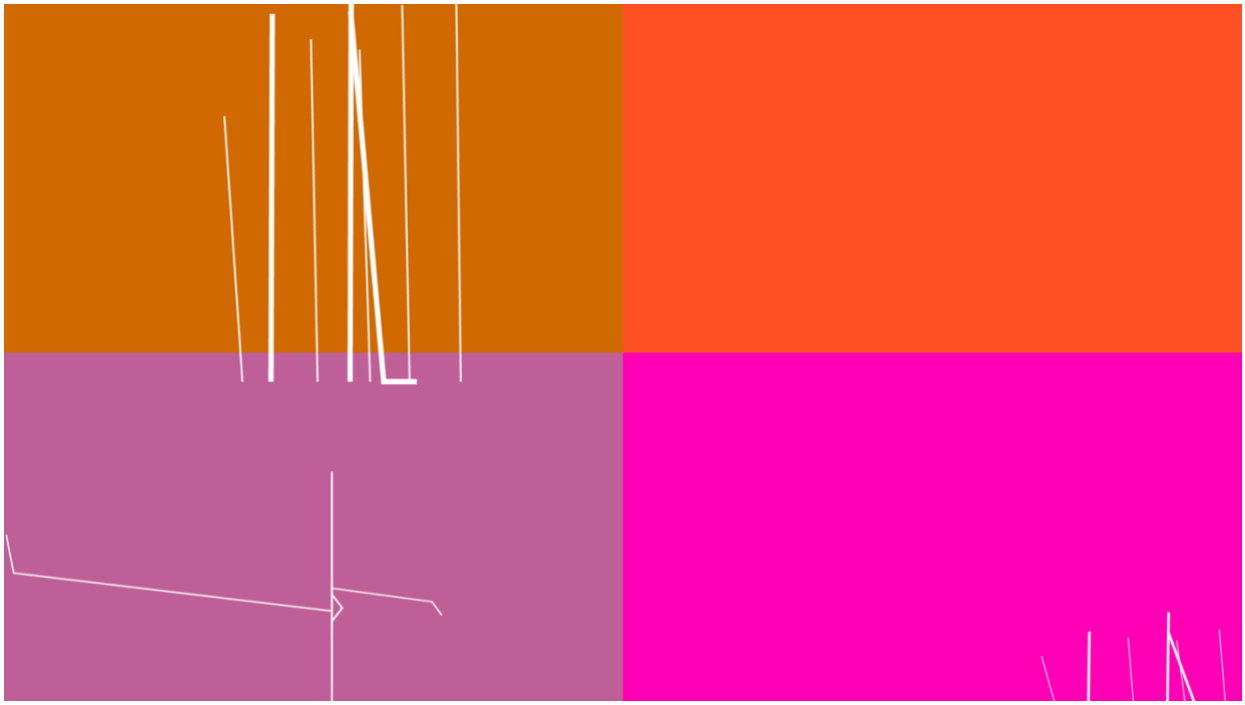


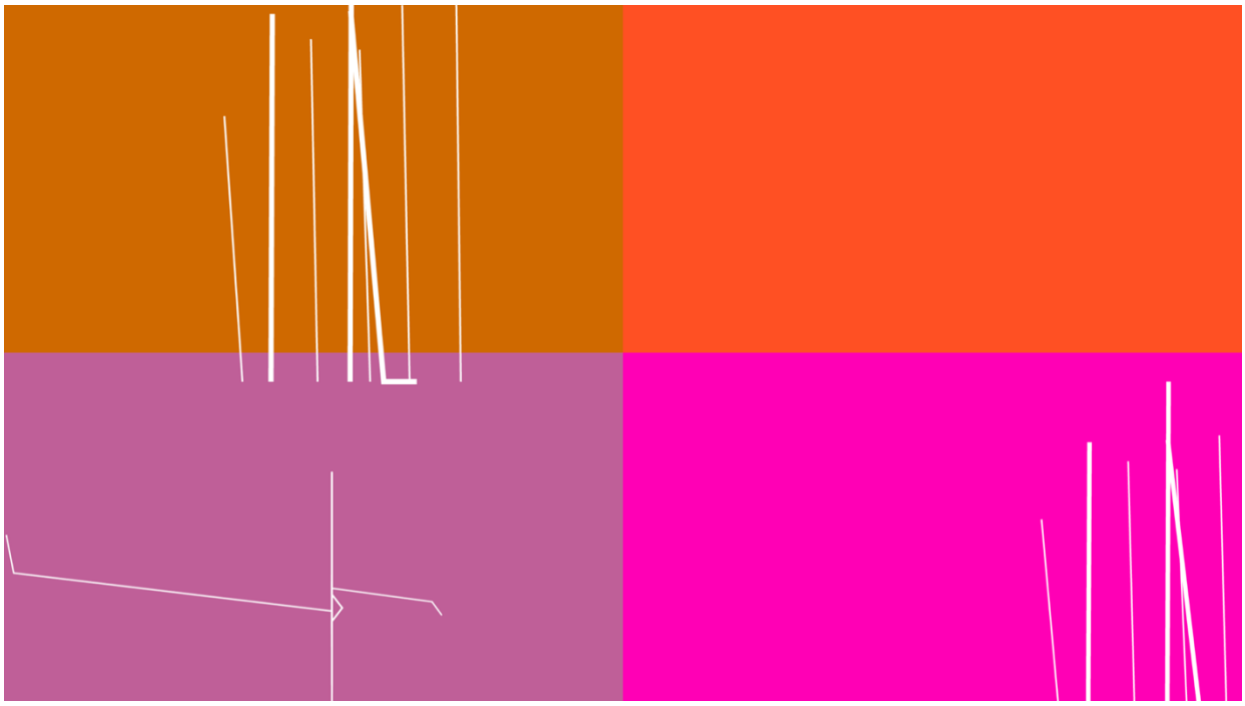


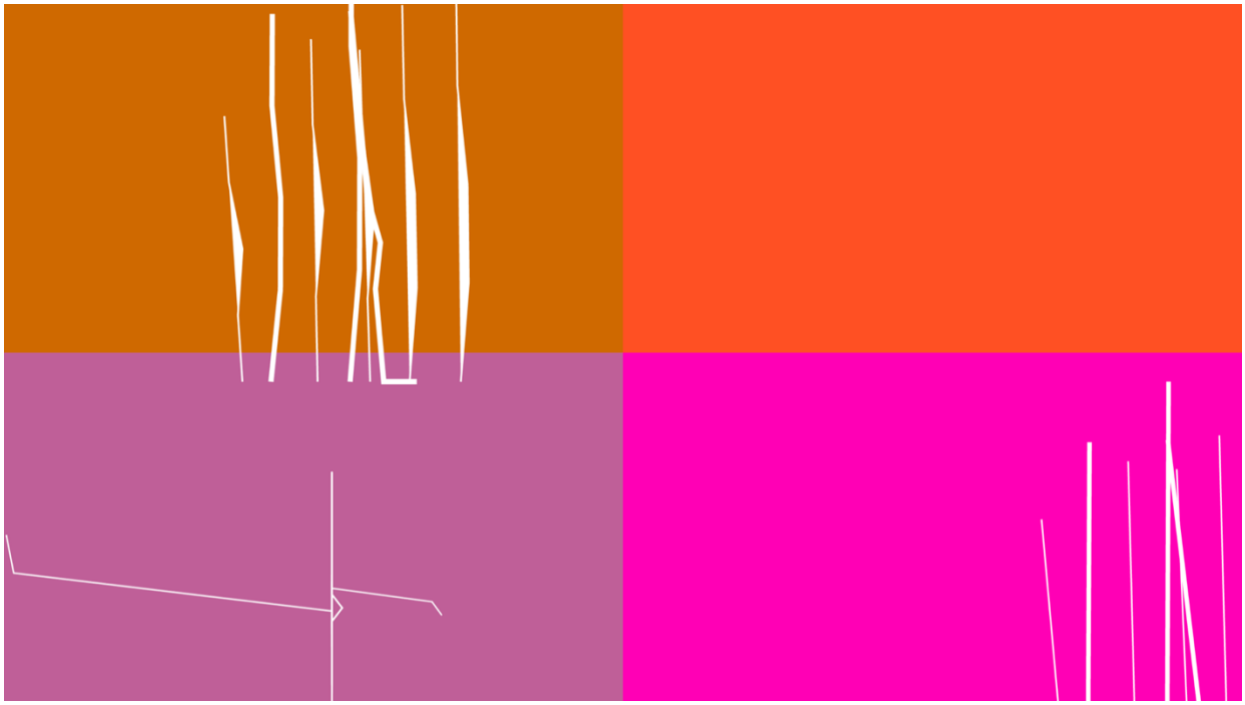


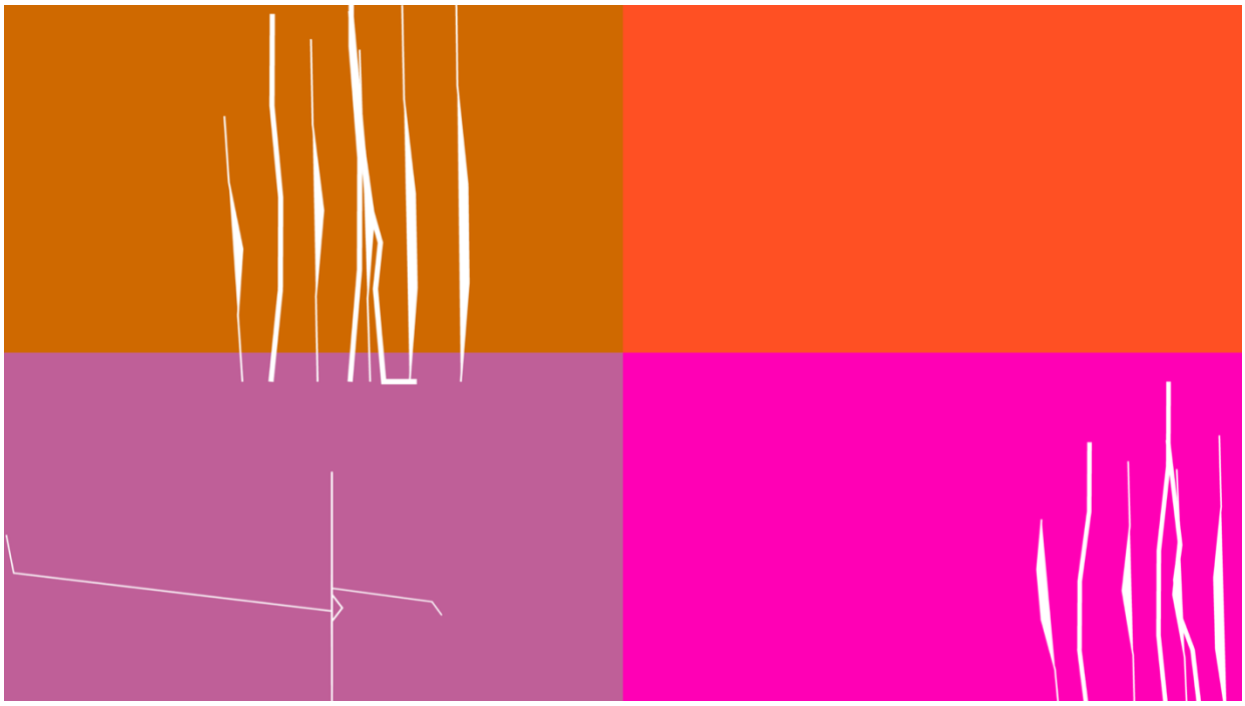


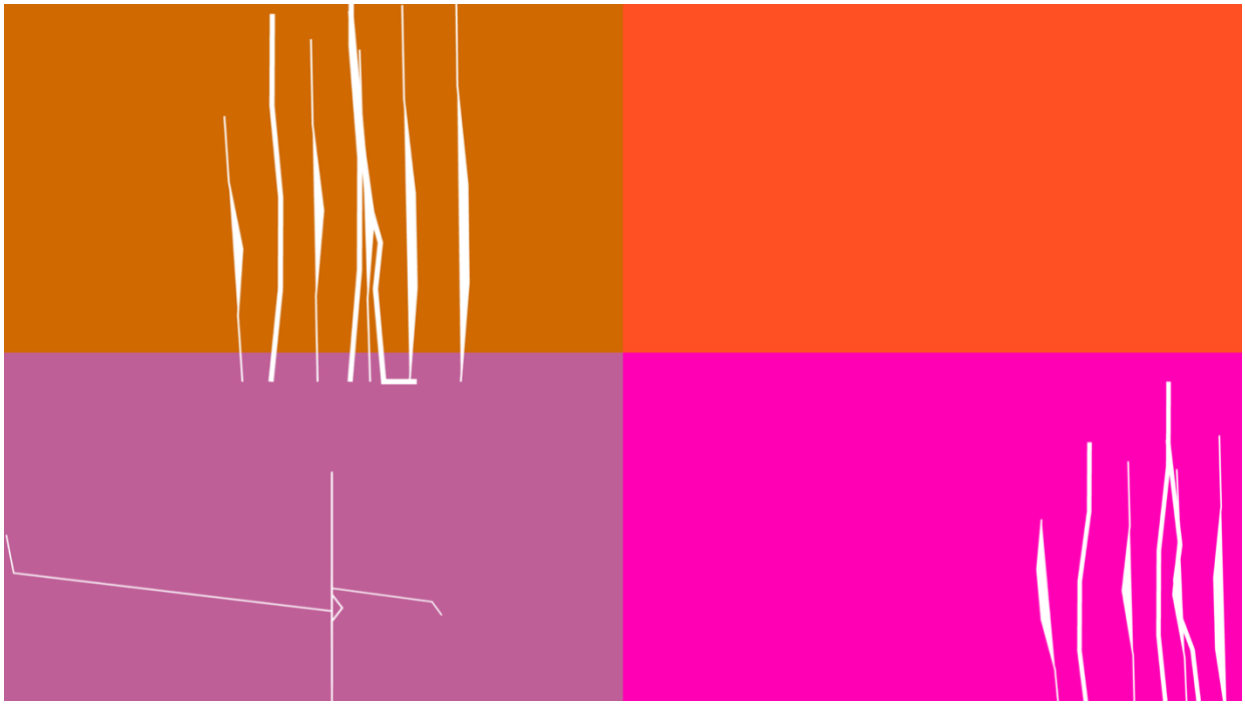


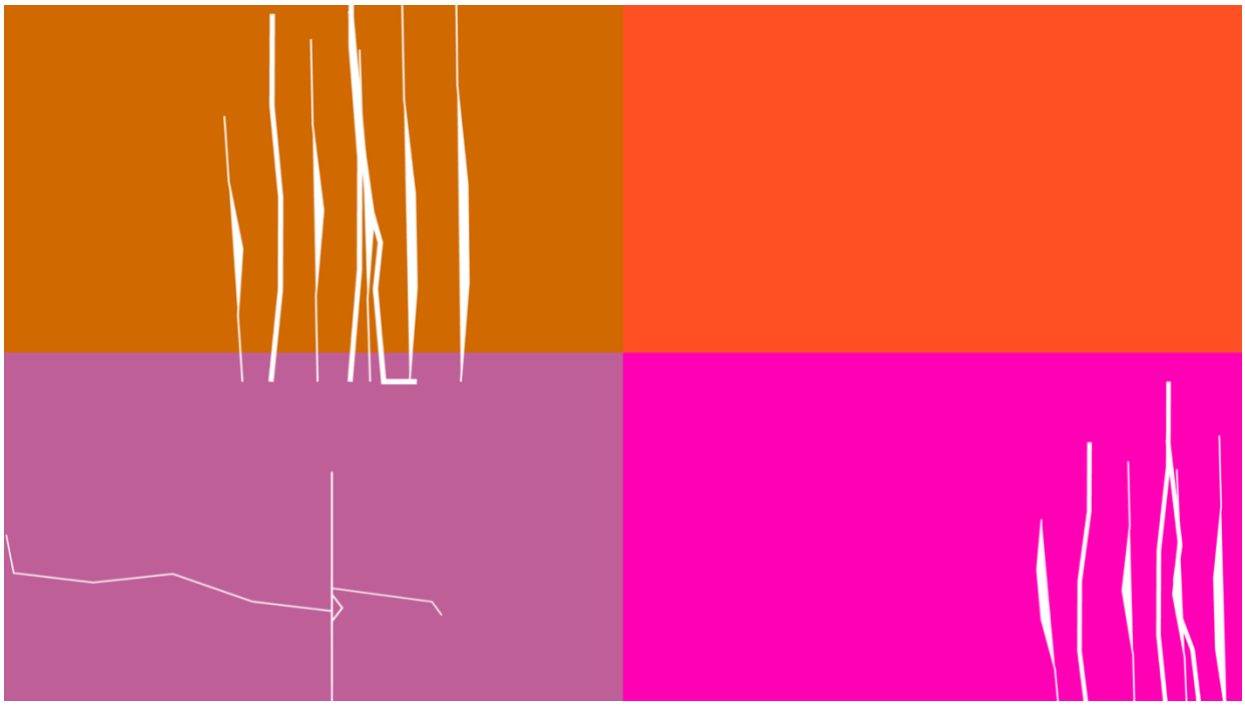


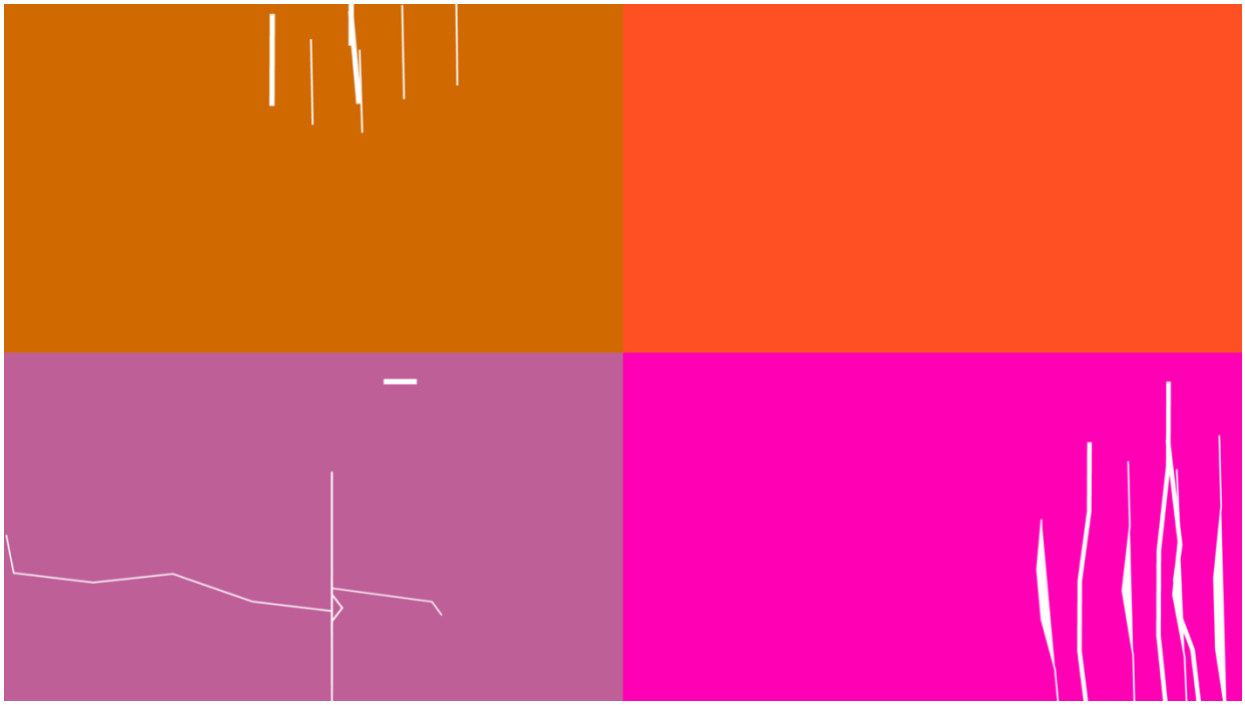


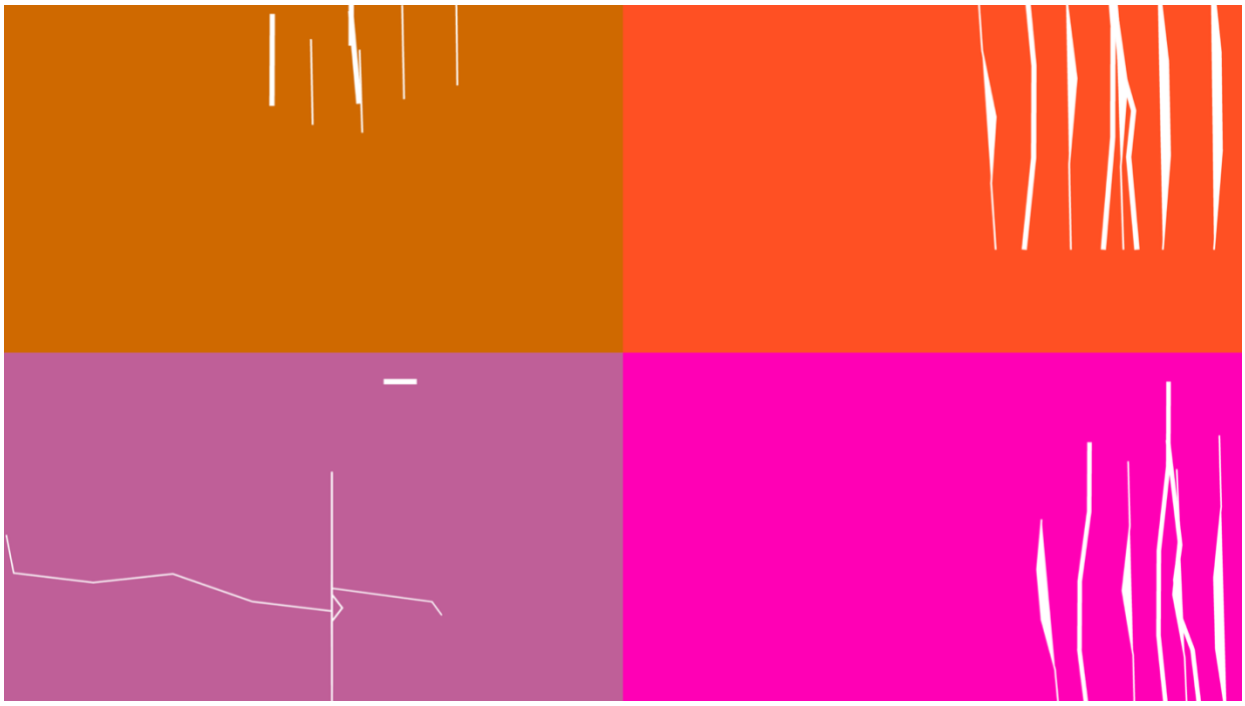


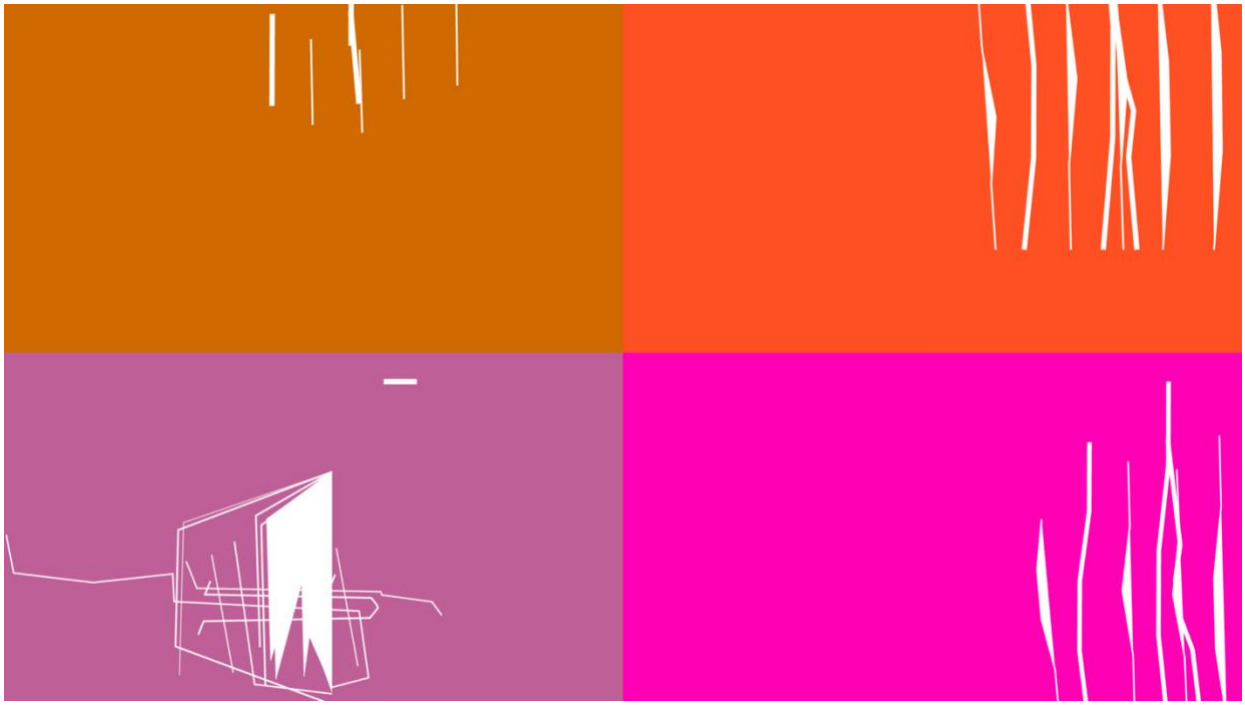


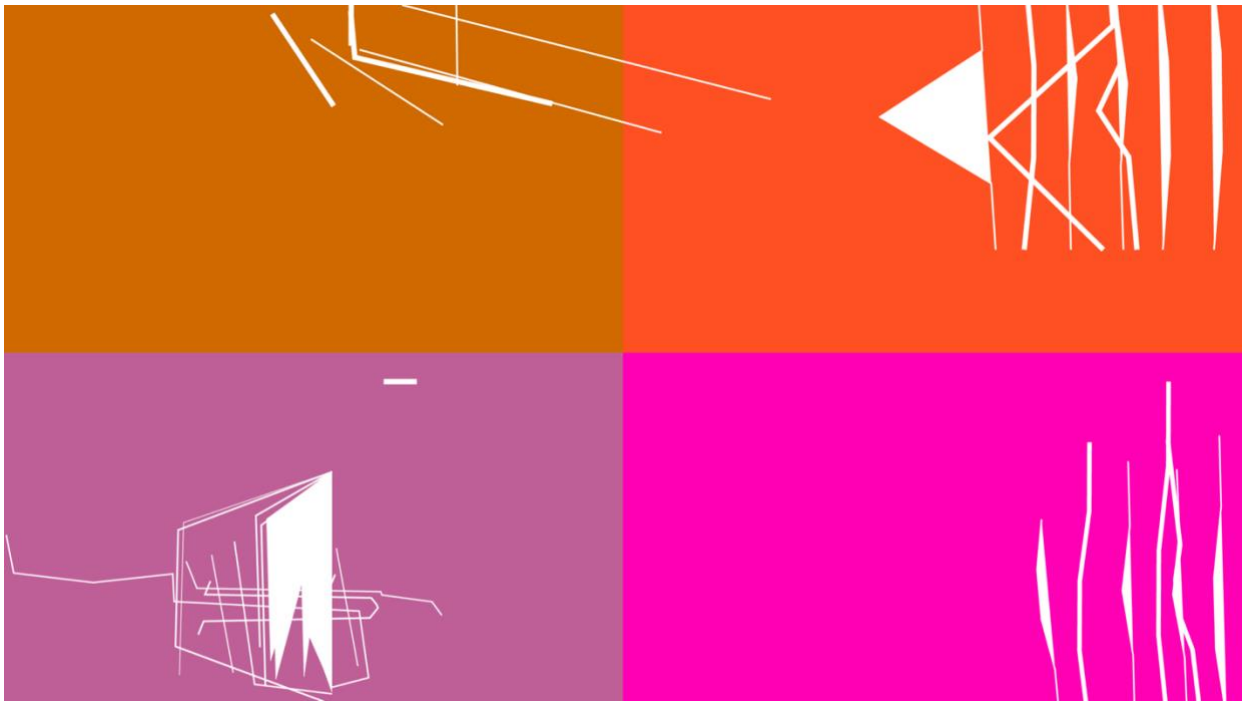


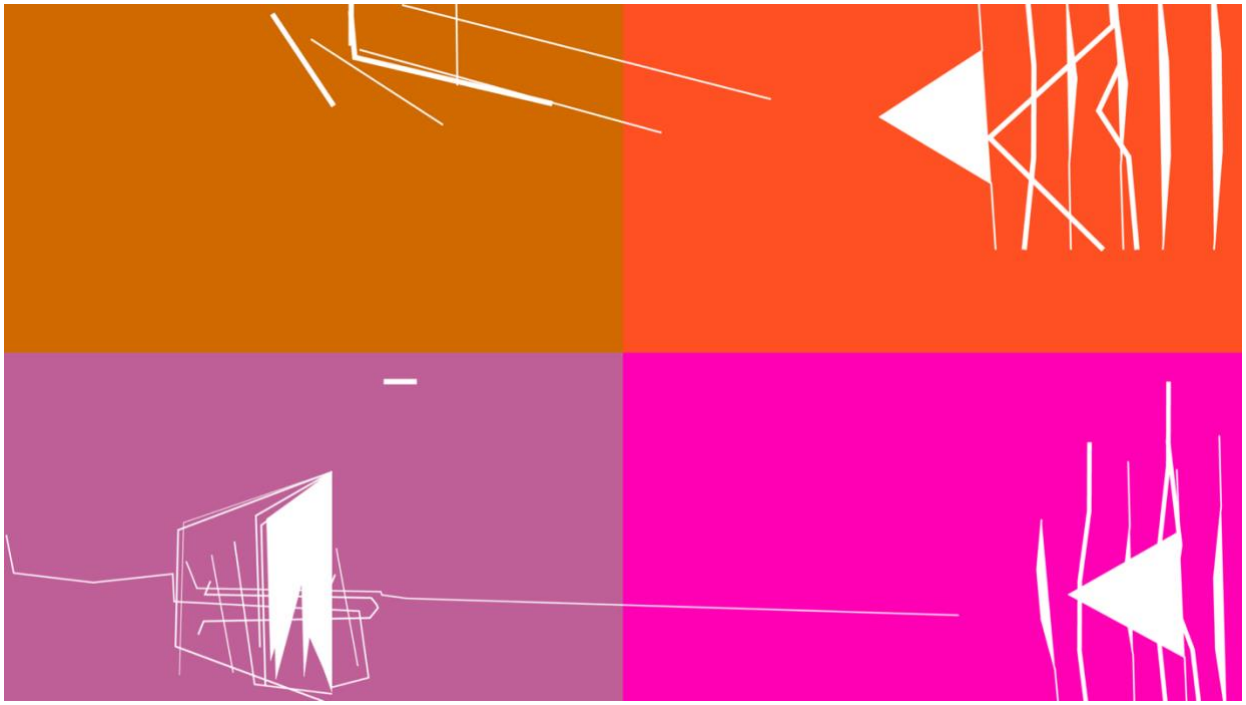


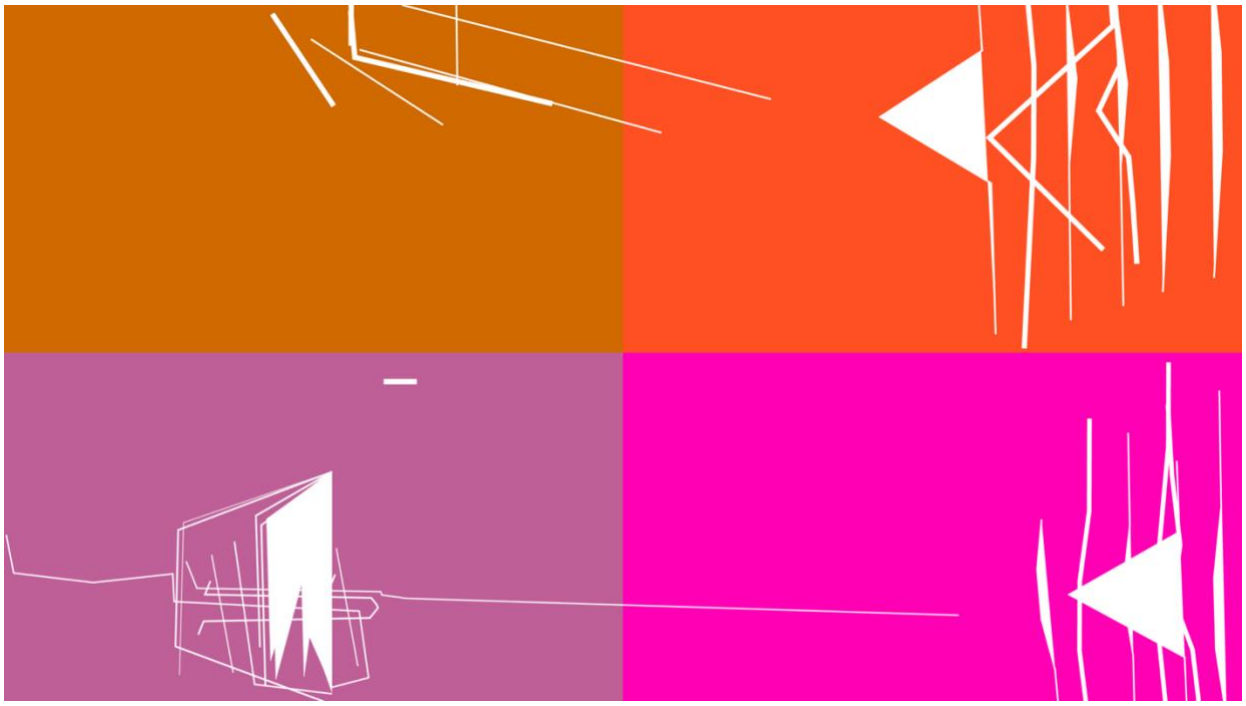


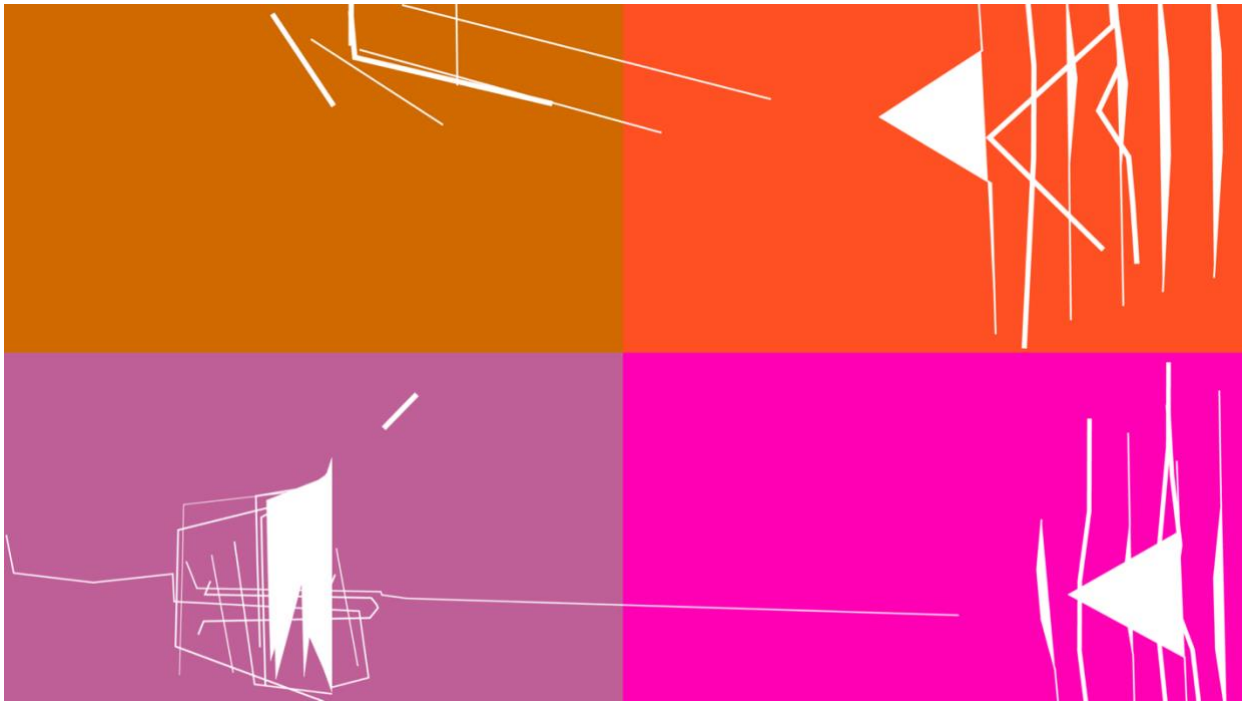


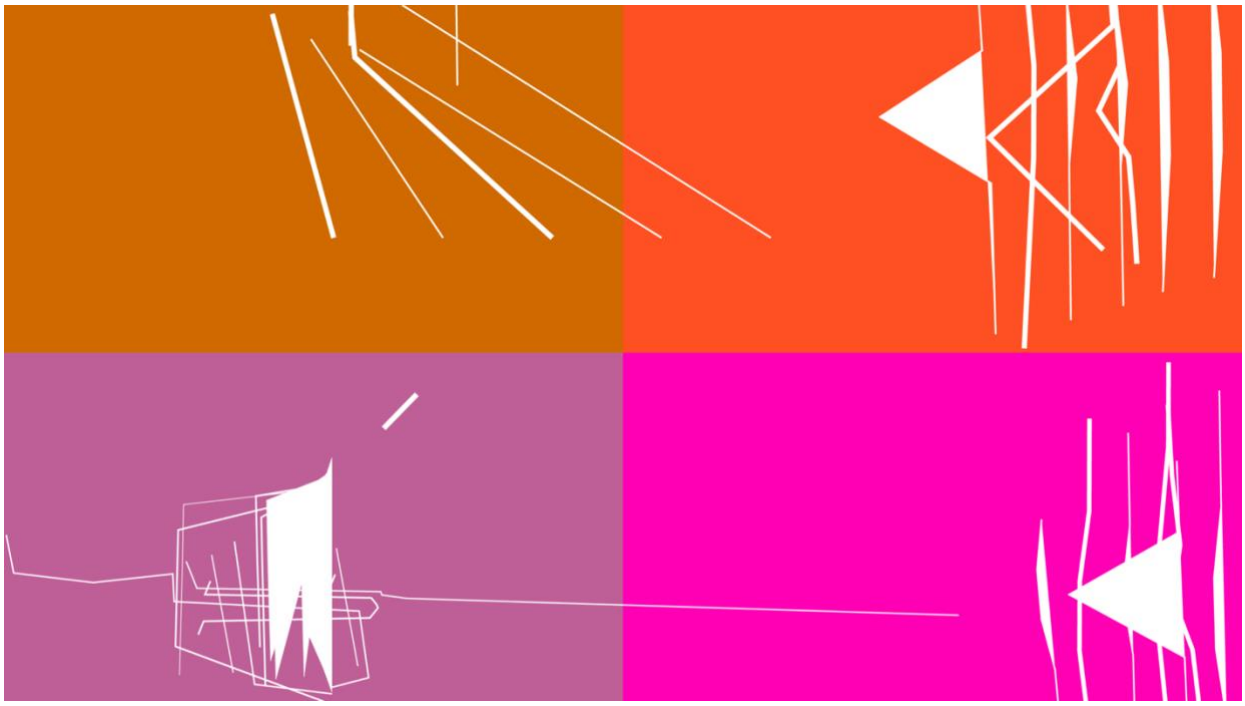


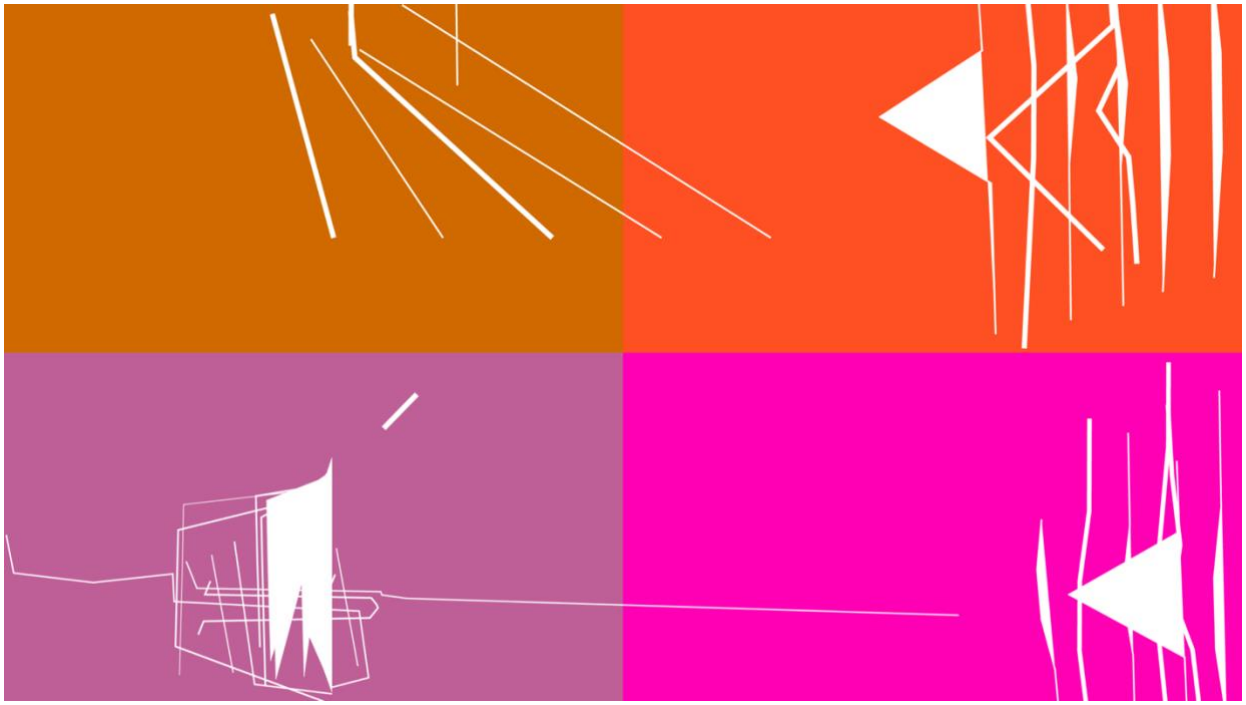


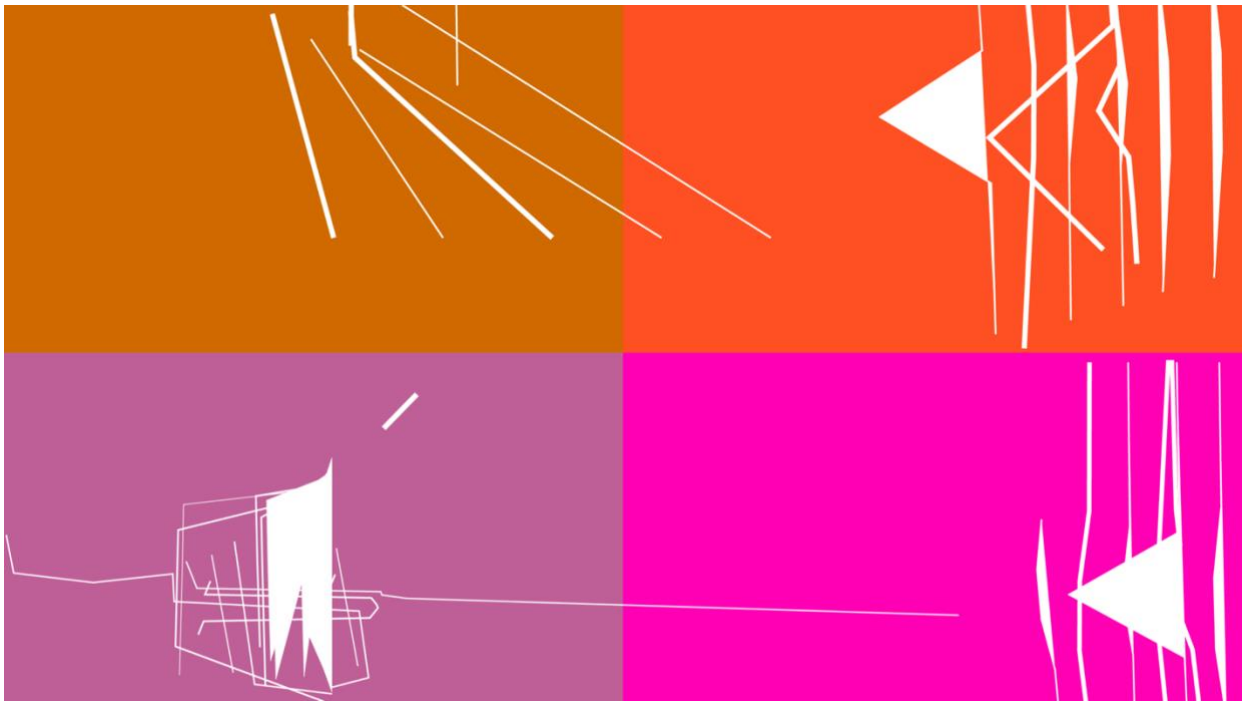


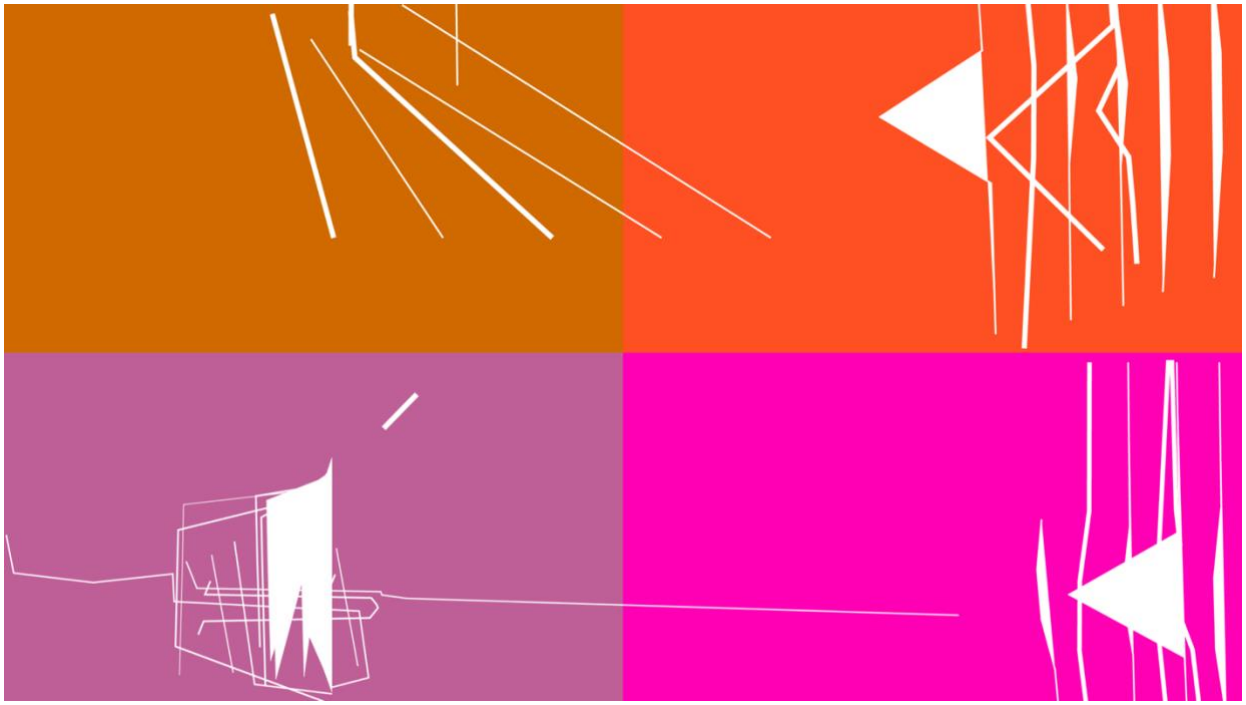


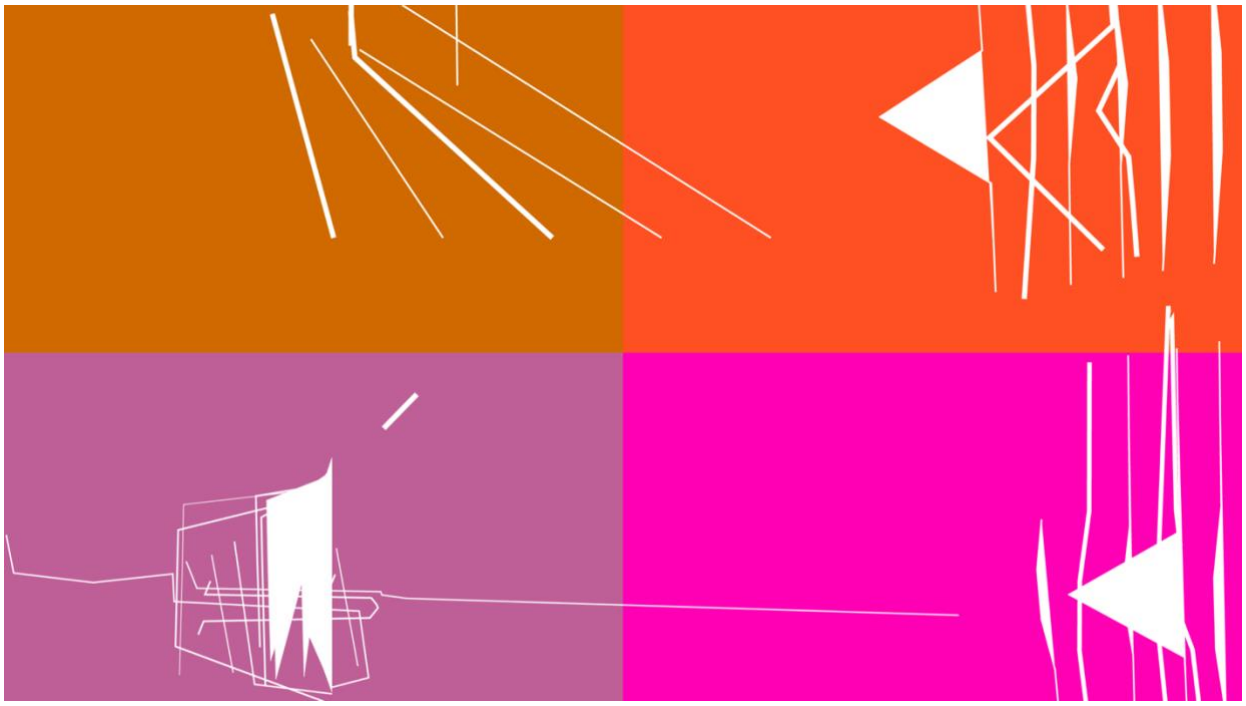


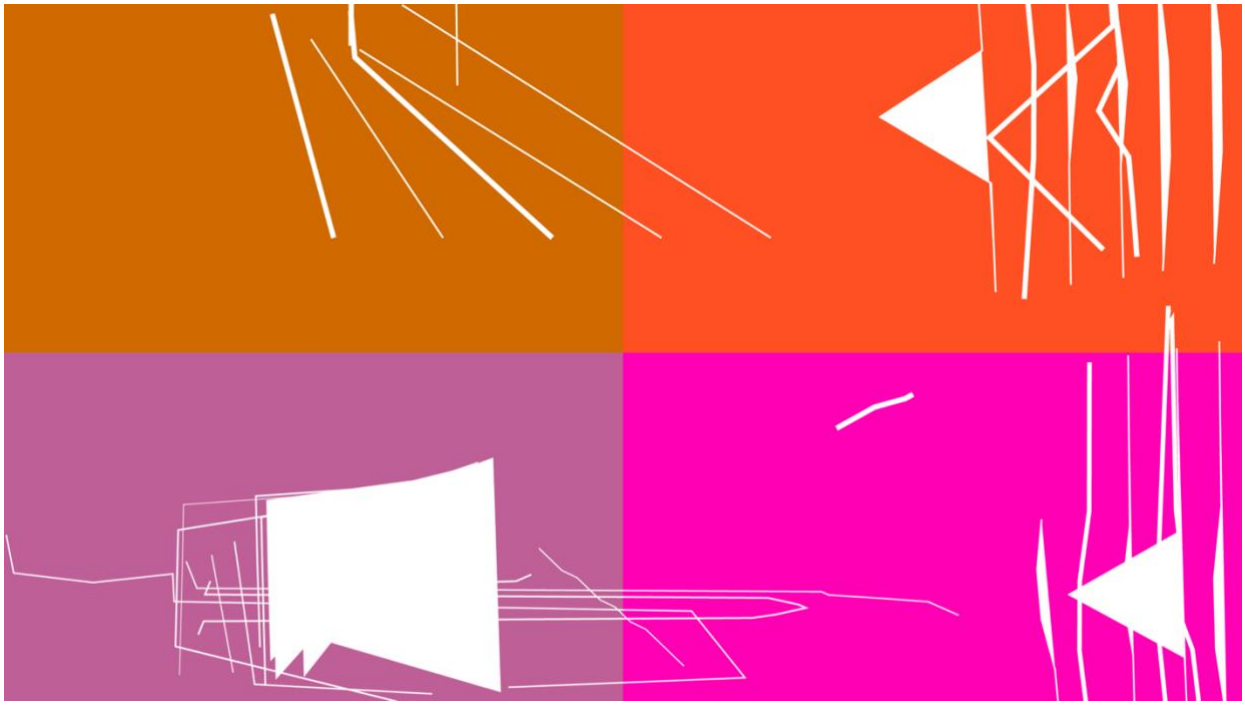


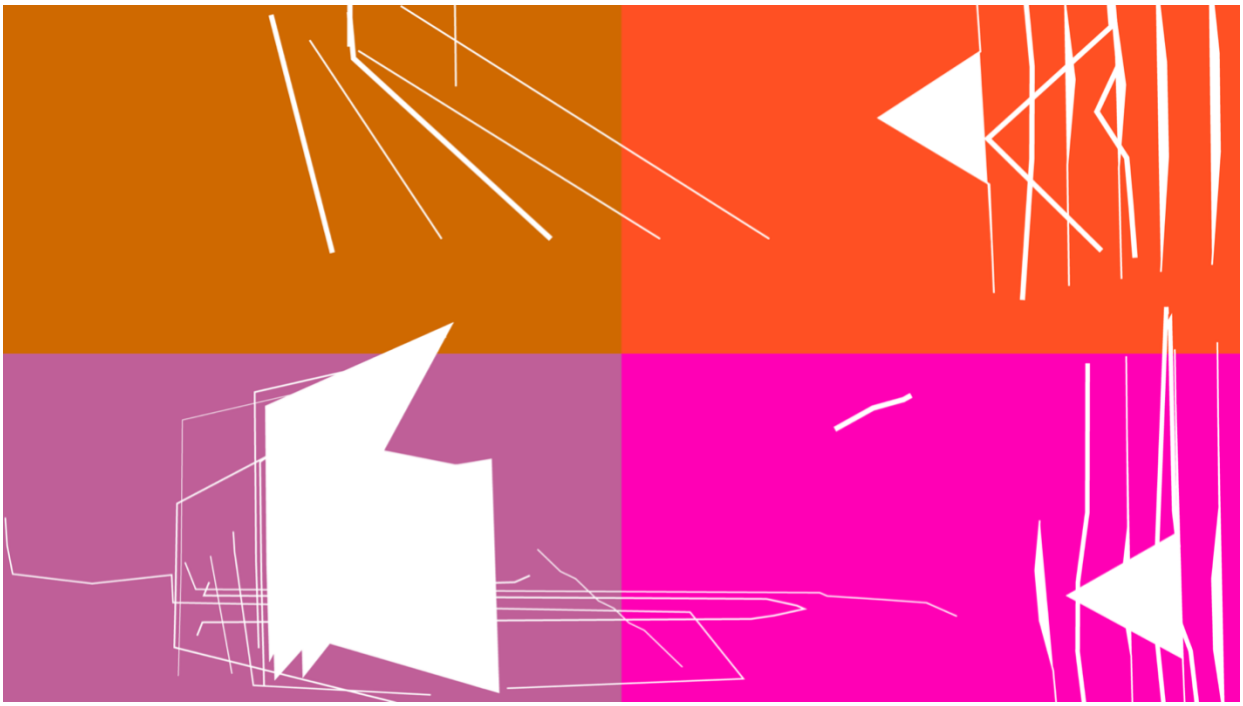


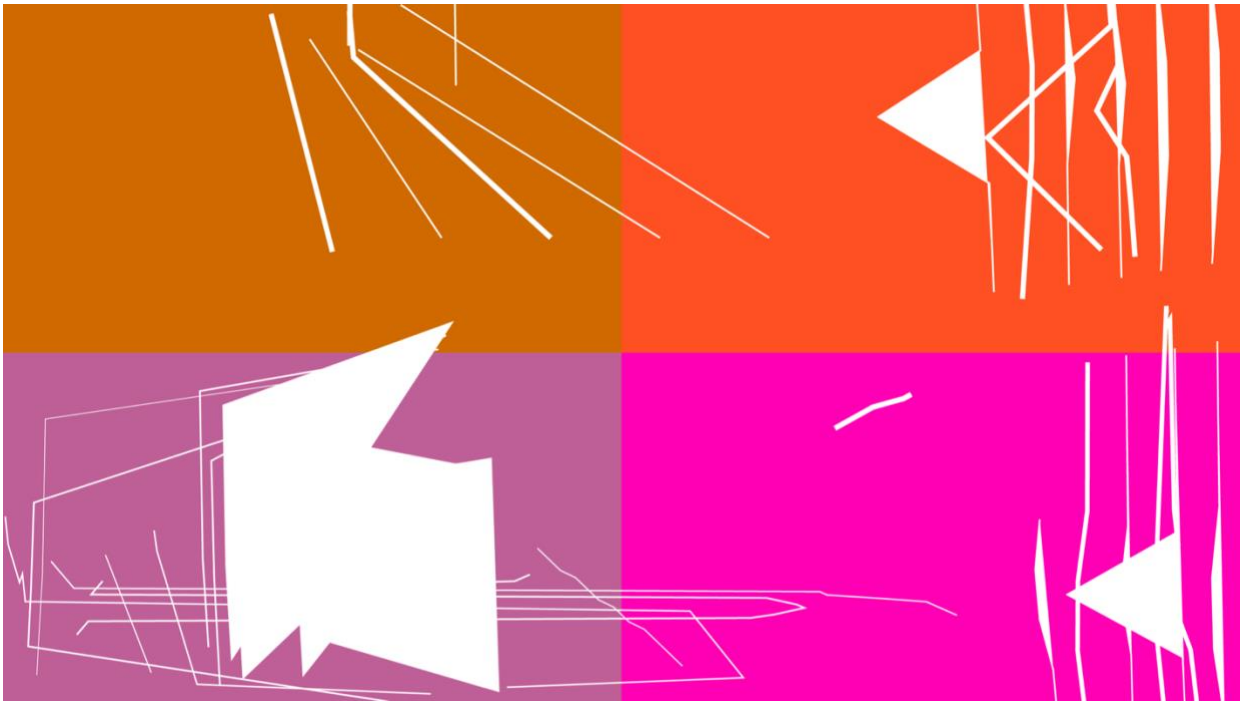


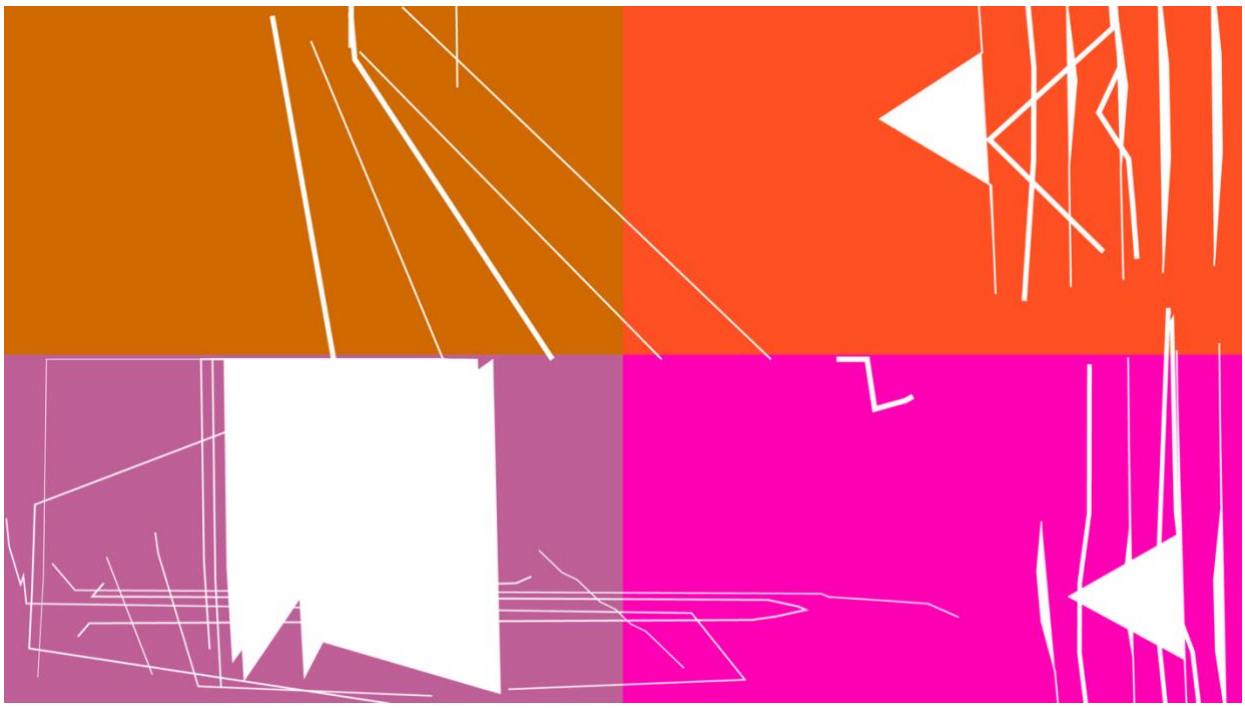


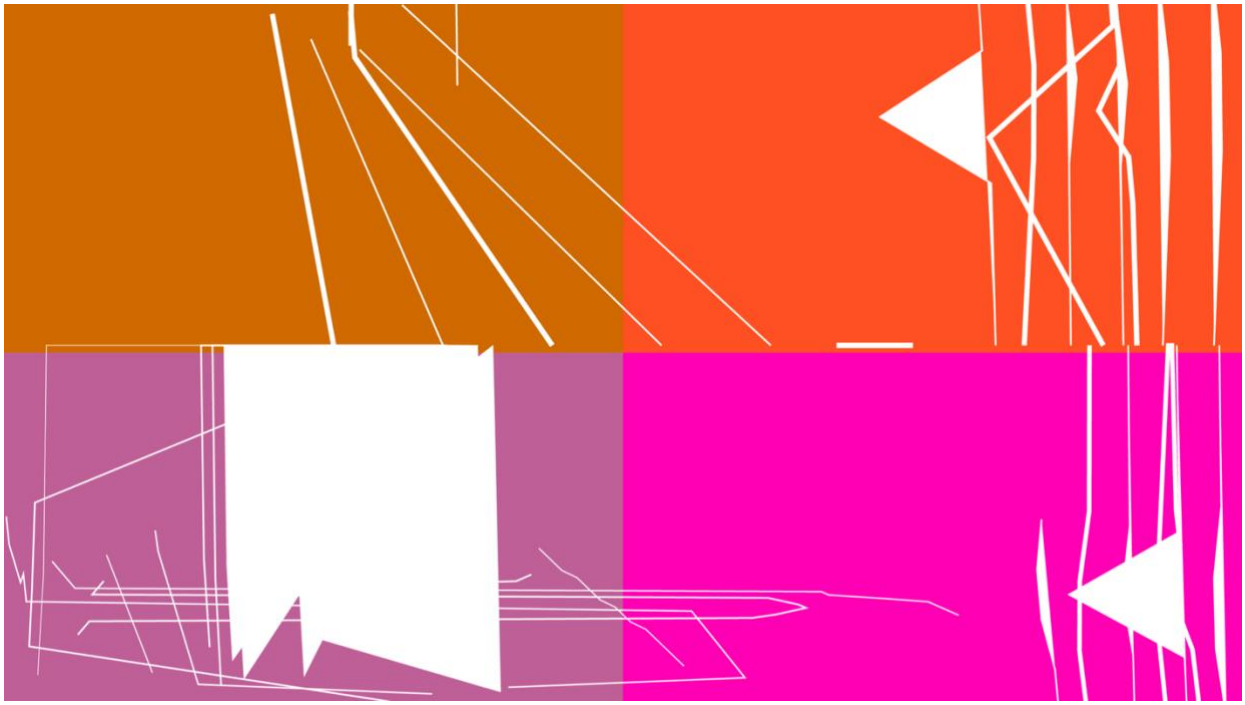


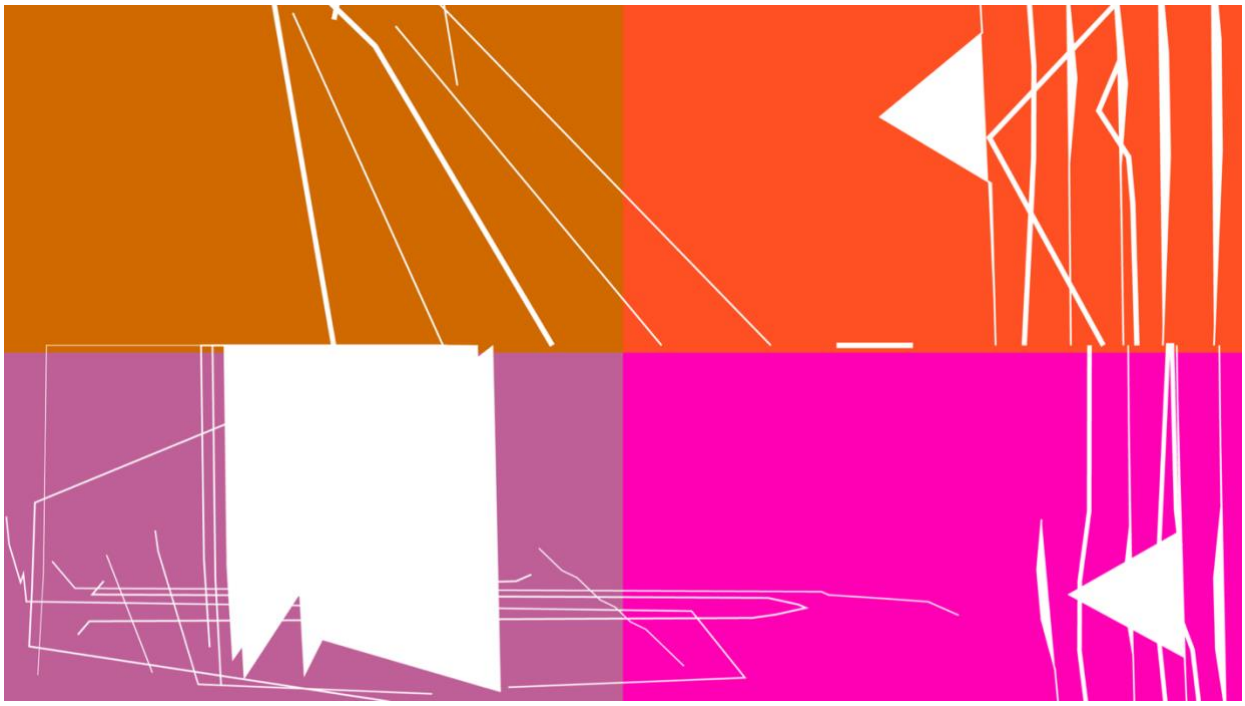


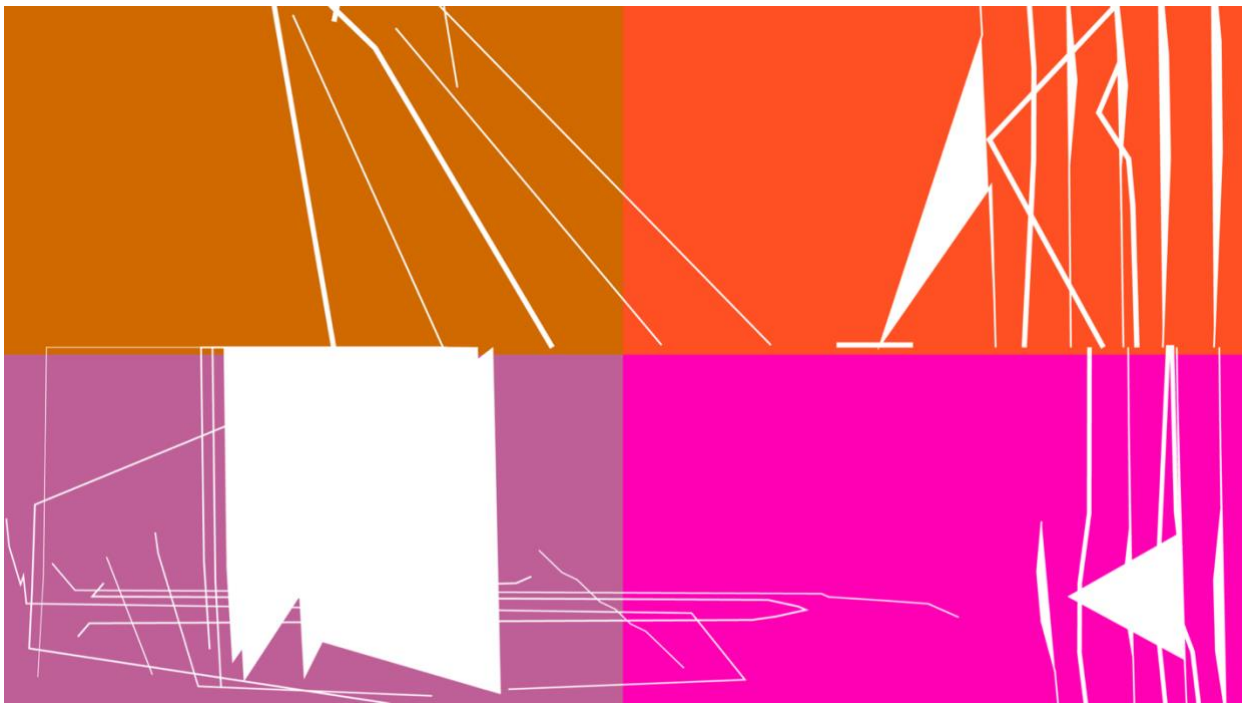


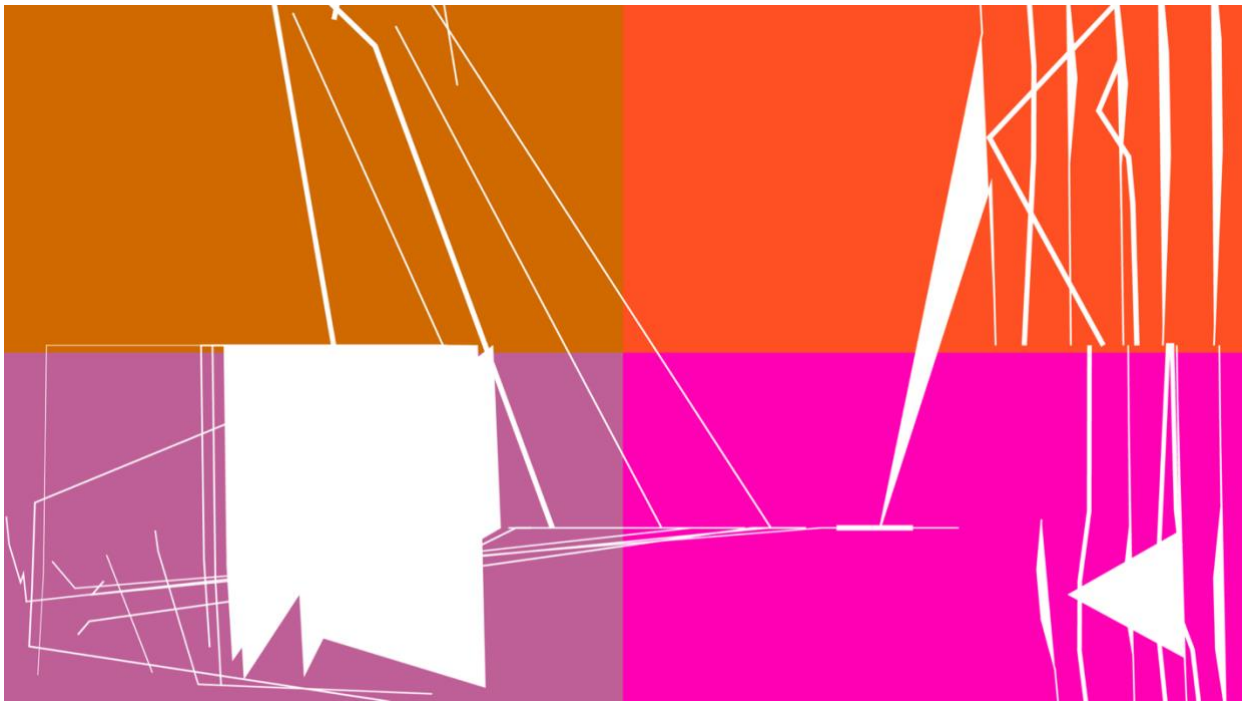


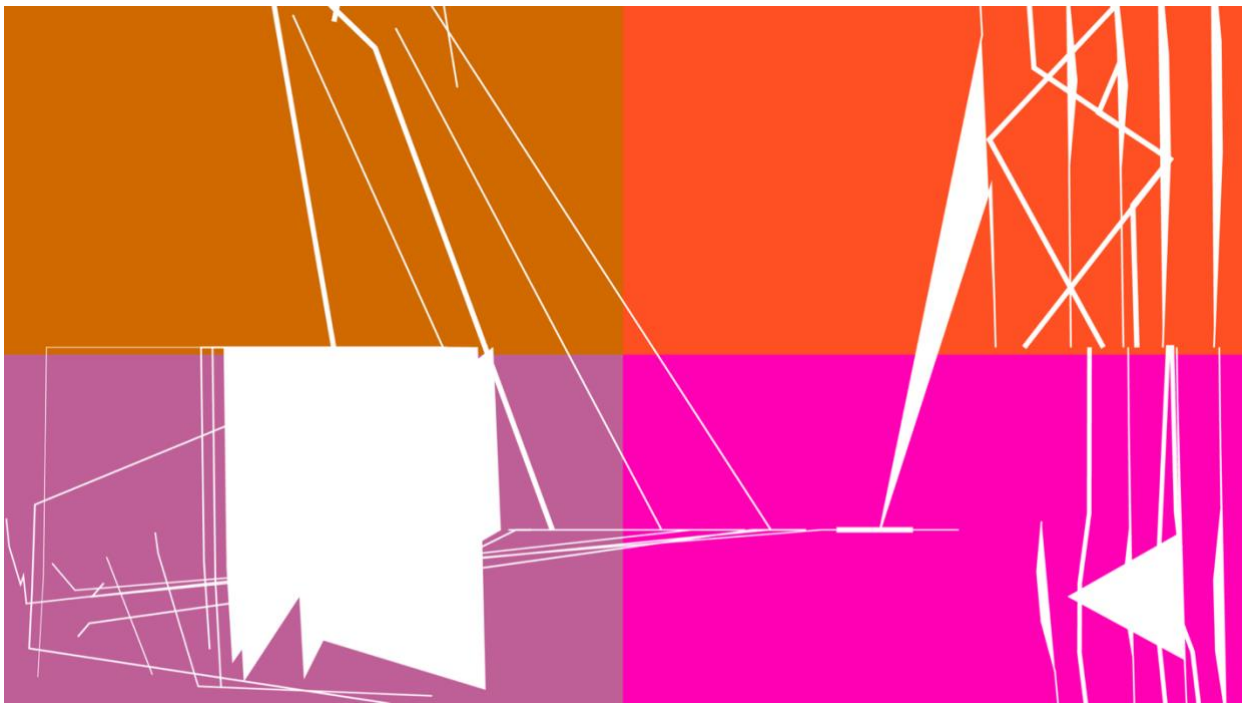


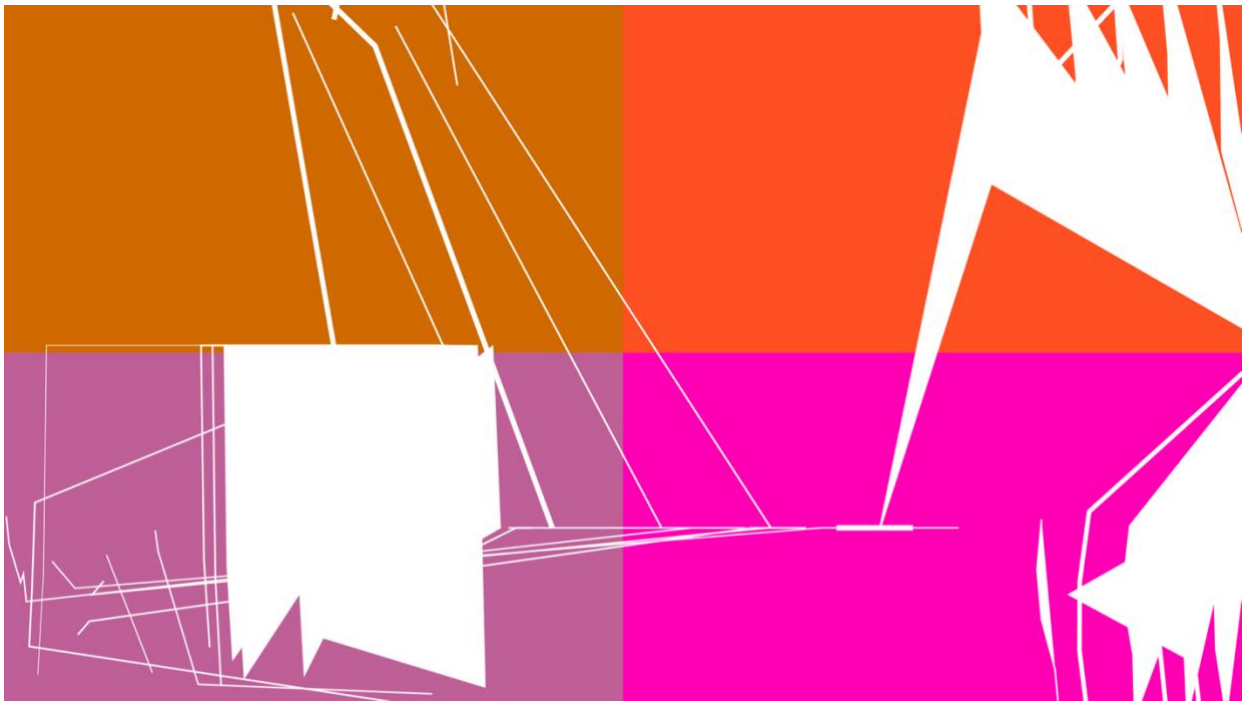


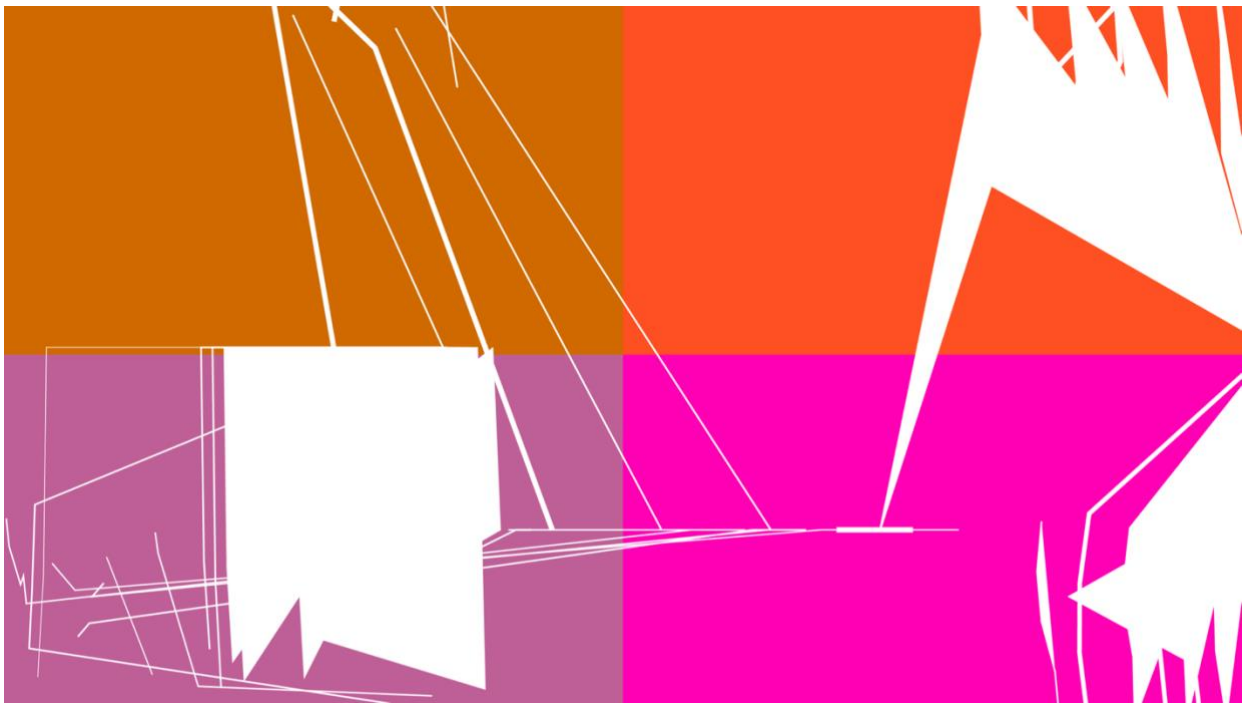


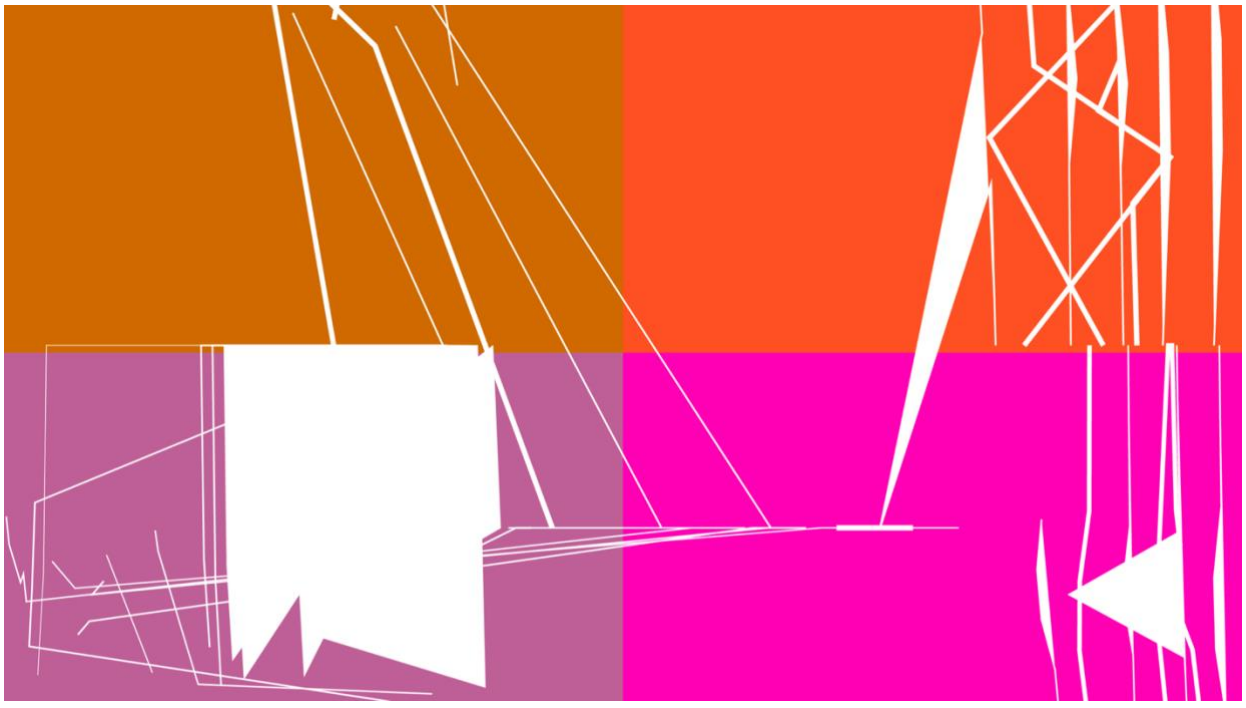


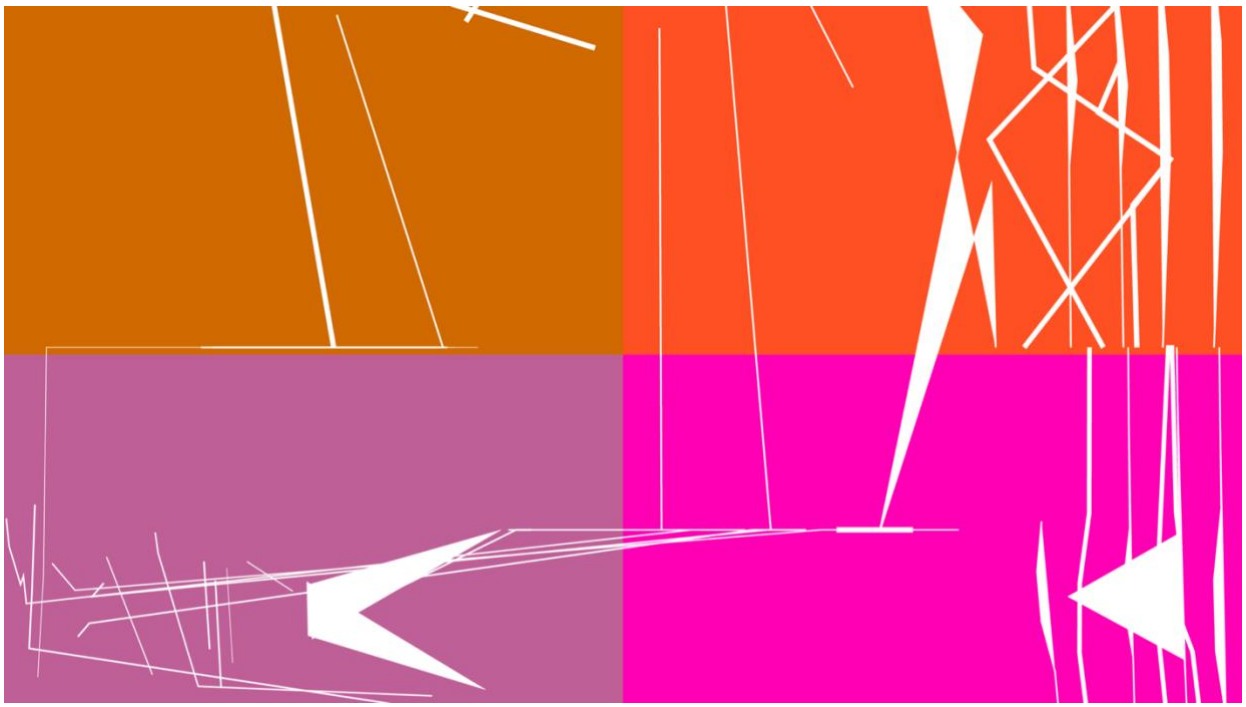


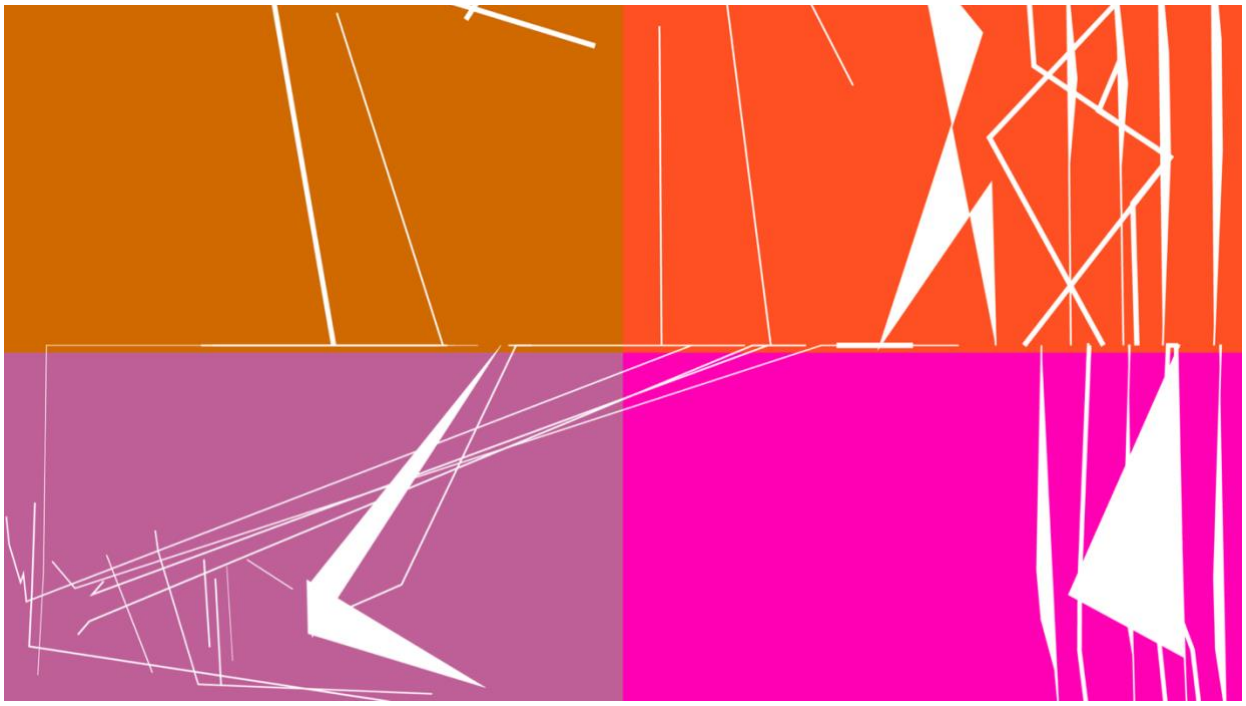


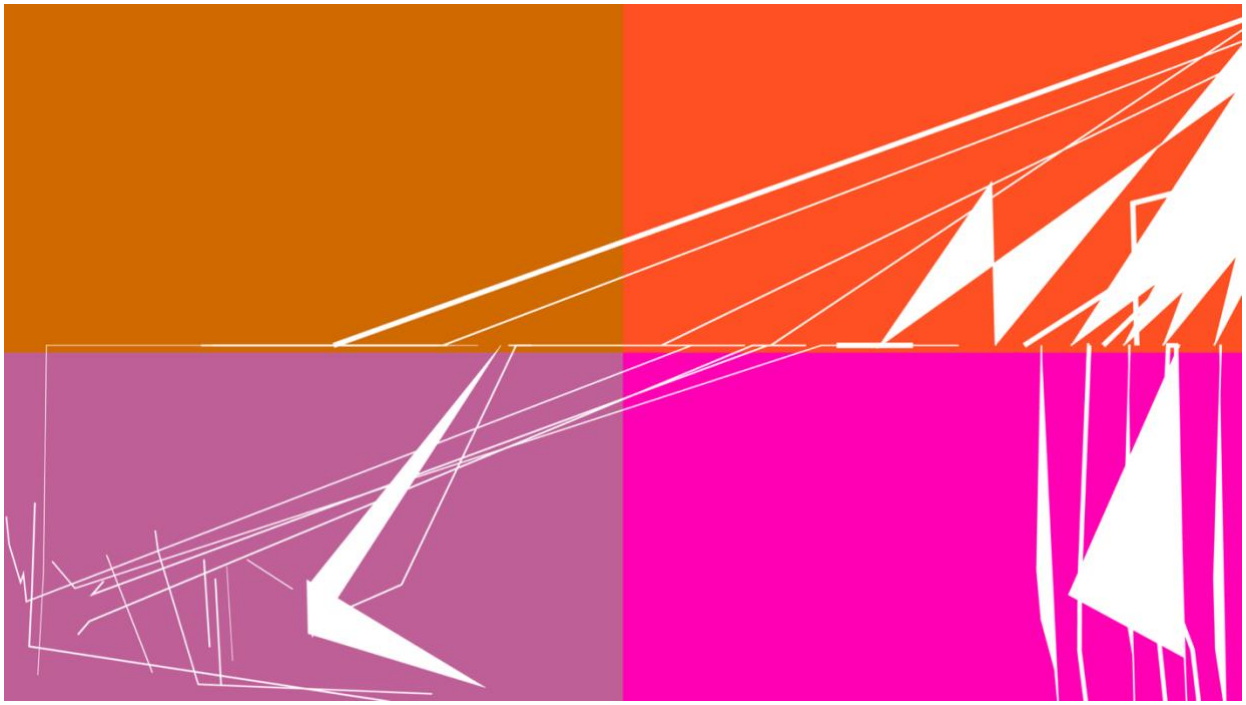


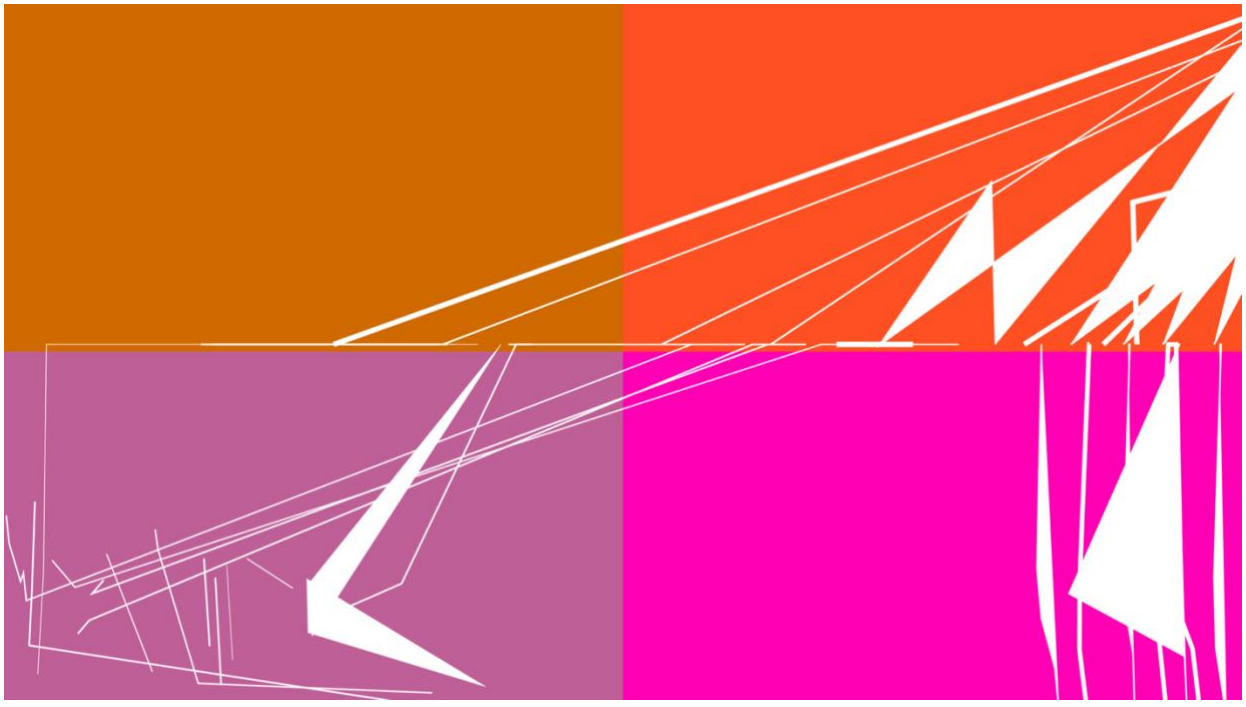


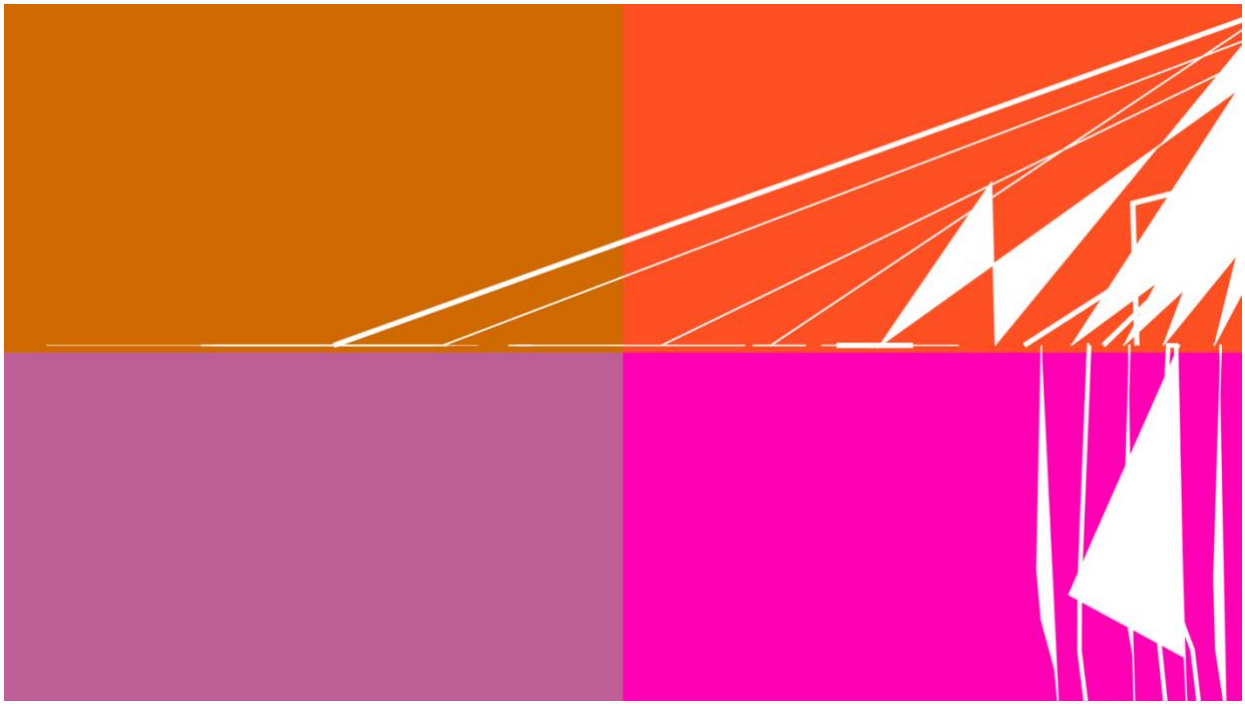


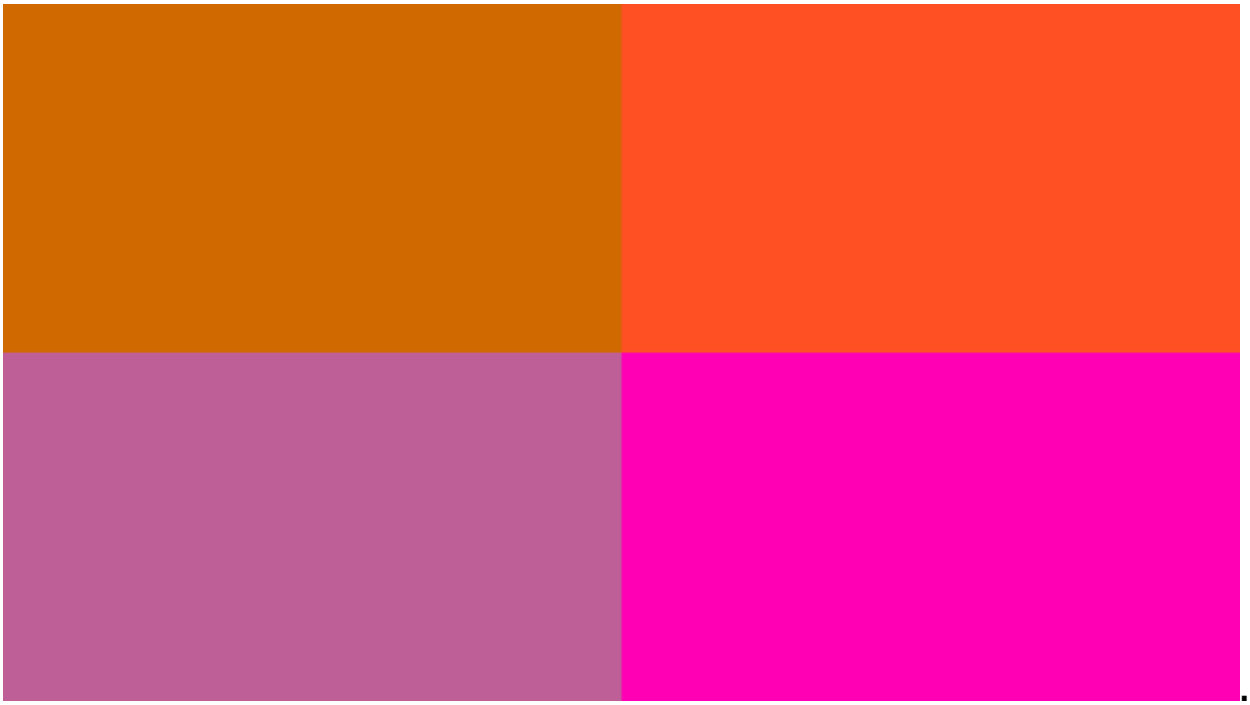






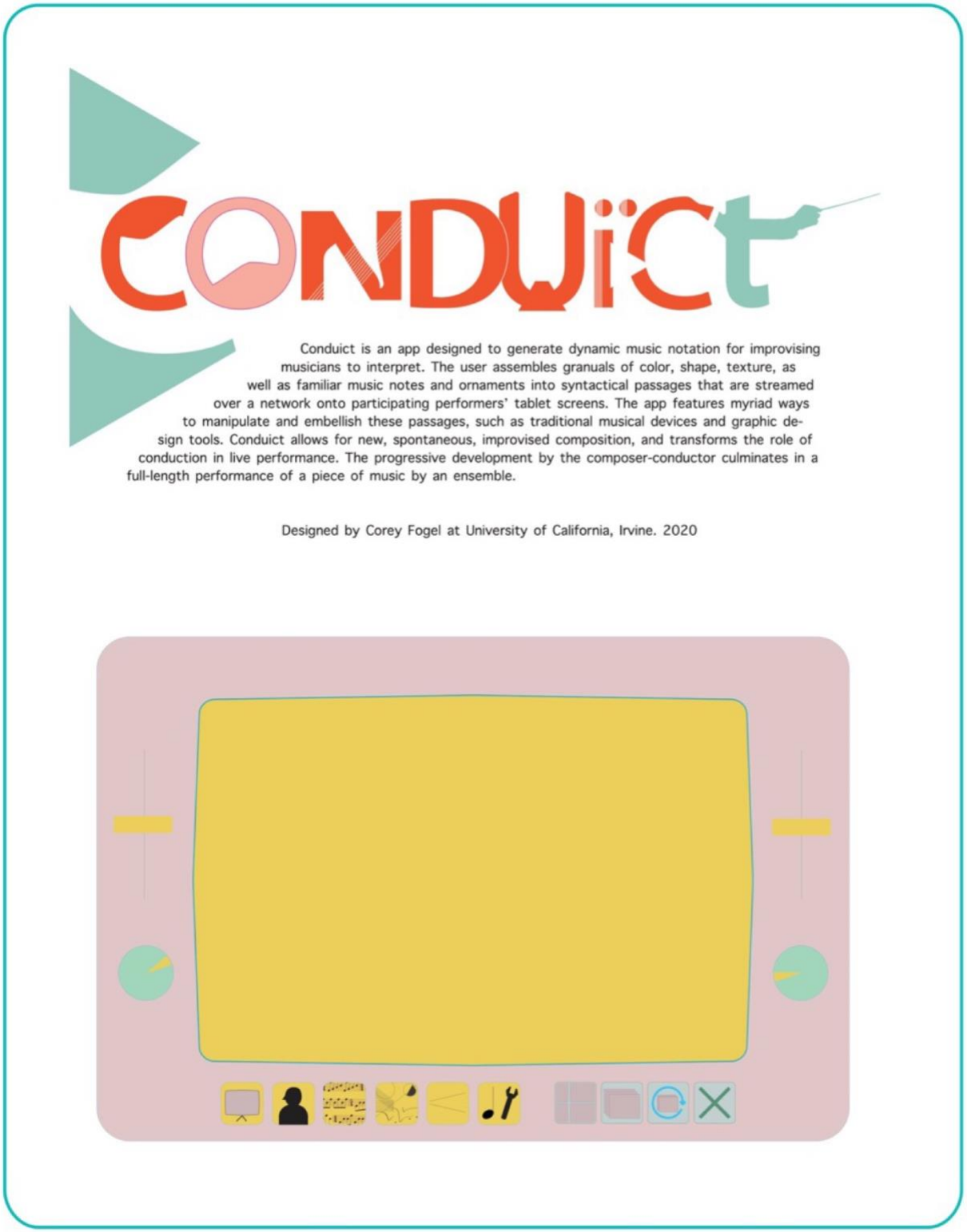






fin.

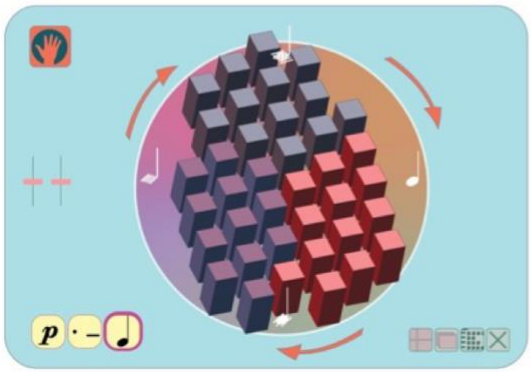
Appendix F: Original App Mockup

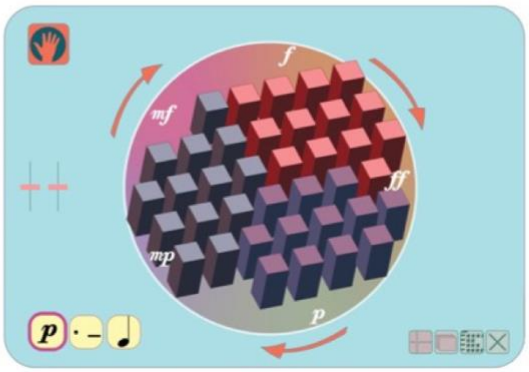


CONDUCT

Carousel Tool

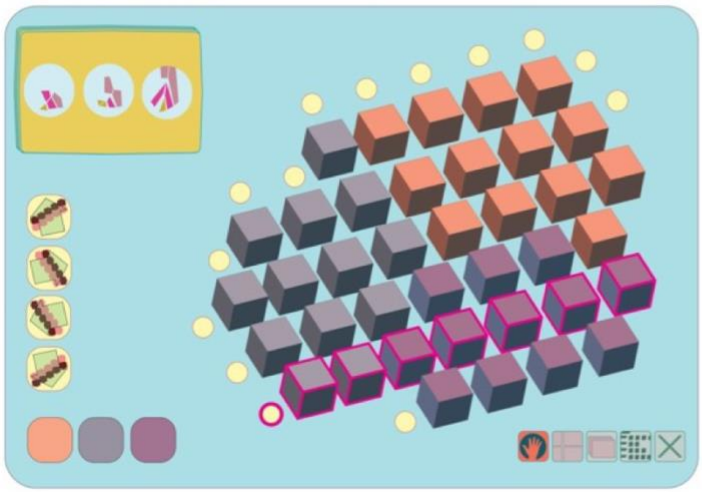
Create gradual shifts in dynamics, distortion of tone, tempo, or any other parameter by manually "rotating" the orchestra "through" them.





Map Operations (cont.)

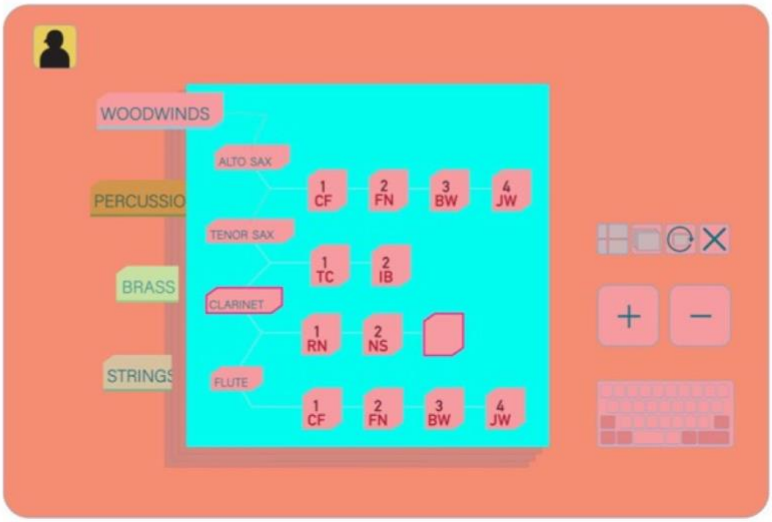
Distribute, "drop", shift musical passages around the orchestra by highlighting instrument families, rows, or columns.



CONDUCT

Outline View

Enter and edit personnel names and instruments according to instrument family.



Orchestra Floor View

Arial view of orchestra on the floor. Edit and enter personnel according to instrument families, rows, or columns.