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The Programmer's Guide to the Software Copyright

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June 1996



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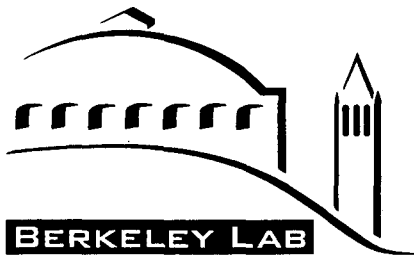
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The Programmer's Guide to the Software Copyright

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June 1996



ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY

~The Programmer's Guide ~
~To The~
~Software Copyright~

John E. Wehrli*



The Programmer's Guide to the Software Copyright
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This document is intended to be a general guide to the computer programmer at the Berkeley Lab regarding the software copyright. It is not intended to be a definitive legal source nor a final authority regarding copyrights at the Berkeley Lab. Computer law is both complex and continuously developing. Any specific questions should be addressed to the Patent Department at x7058. Any questions on licensing software should be addressed to the Technology Transfer Department (x6467).

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Introduction

This booklet was written specifically for anyone who writes computer programs at the Lawrence Berkeley National Laboratory. It is intended to provide basic information on how the law of copyright applies to computer software. It is not intended to be a legal reference for copyright attorneys, but an accessible reference for the people whose creative efforts result in software others want to use. Whether you are a chemist who writes software to help you with your work or a professional Berkeley Lab programmer you should benefit from this booklet.

The information in this booklet is written in an informal conversational style, not a legal style. It is simply a direct response to a need for information that I have observed. Since I have written it from a programmer's viewpoint and for a programmer's use, it does not cover copyright law in general and focuses only on those areas of copyright law specific to computer software. Moreover, it does not attempt to address other areas of law that may be applicable to computer software. It is certainly not intended to replace the timely legal advice of Berkeley Lab's Patent Department.

However, just as it is helpful to read the computer manual before calling tech support, it will also be helpful to read this booklet before calling the Patent Department, not so much to answer any and all questions, but to give you the vocabulary to better understand and digest the information provided by the Department.

Why Should You Read This Booklet?

Did you know that as an employee of the The University of California, any software that you write within the scope of your employment belongs to The Regents of The University of California as the copyright holder? Did you also know that if Berkeley Lab, acting for the University decides to license any software you write here, you may be entitled to a percentage of net license fees?

Many programmers do not consider the concept of software copyright when they write computer code. In most cases they don't need to, because the code they are writing is for their own use. However, if you are writing software that may be used by others you should definitely be thinking about copyright and the property rights granted by copyright law.

Just what does copyright mean anyway? How do you get it? How do you benefit from it? Why is the concept of copyright important to the actual programmer, even if he or she is not the legal owner of the software she or he writes? These and many other questions are addressed in this booklet. Many of them are based on actual questions I have received from programmers at the Berkeley Lab. Others are based on my own previous experiences writing software and interacting with other programmers.

This booklet is laid out much like a computer manual. First it introduces the basic language and concepts. Then it addresses areas relevant to programmers in general and in particular, to those at the Berkeley Lab. I have provided examples where they prove helpful to illustrate certain concepts and also have tried to repeat concepts often. You will also find appendices containing forms of the Berkeley Lab.

The computer programs that you write are the result of considerable creative effort on your part and represent an important work product for you and an asset for the Berkeley Lab. By becoming educated in the basics of the software copyright, you increase your ability to protect the fruits of your effort.

A Note on Footnotes

Realizing that a typical programmer is curious by nature, infinitely detail-oriented, and has an affinity for obscure languages, I have included footnotes. Some footnotes refer you to statutes or cases for further study and are written in traditional legal citation form, which can be as difficult to comprehend to a non-lawyer as hexadecimal addressing is to a non-programmer. Other footnotes provide further elaboration of certain points. In no case, however, are the citations and footnotes provided intended to meet the rigorous criteria of a law journal. They are intended as reference only, not as authority, and can obviously be skipped altogether.

Acknowledgments

I was inspired to write this booklet by a number of programmers here at the Berkeley Lab. In particular, questions from Deane Merrill and Harvard Holmes from ICSD motivated me to finally sit down and prepare this document.

I would also like to thank several attorneys and professionals in the Patent and Technology Transfer departments at the Berkeley Lab who reviewed drafts and provided very helpful comments: Martha Luehrmann, Paul Martin, Pepi Ross, Greg Silberman, Kristin Weissman, and Viviana Wolinsky. Thanks especially to Paul Martin, Manager of the Patent Department, and Viviana Wolinsky, Manager of Contracts & Licensing, for giving me the time to write this booklet.

Big Notice: The majority of principles outlined in this booklet are geared towards programs written after 1989. For computer programs written prior to 1989 there are several important differences in the law. Since most useful programs are replaced after 5 years, and for the sake of brevity, discussion of pre-1989 copyright law is not included in this booklet. If you have a question about software copyright prior to 1989 please contact the Patent Department.

1. What is a Copyright?

Copyright is a form of protection and a "bundle of rights" provided by the laws of the United States to the authors of "original works of authorship" including literary (software is considered a literary work), dramatic, musical, artistic, and certain other intellectual works. These rights include the legal right to exclude others, for a designated time, from copying, selling, performing, displaying, or making derivative versions of a work of authorship.¹

1.1 How Long Does It Last?

Generally, a copyright will last 50 years beyond the death of the author. For works made for hire, discussed later, the copyright expires 75 years after publication, or 100 years after creation, whichever comes first.²

2. What Is a Software Copyright?

Computer programs are considered "literary works" for the purpose of copyright law. The 1980 amendments to the Copyright Act define a computer program as a "set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."³ Any computer program, whether described as software, an application, a tool, or a system program, *may* be protected under copyright law.

3. What Does It Take to Get Copyright Protection?

The Copyright Act states that copyright protection exists "in original works of authorship fixed in any tangible medium of expression . . . from which they can be perceived . . . either directly or with the aid of a machine or device."⁴ The key terms here are "original" and "fixed."

3.1 It Must Be Original

Though the term "original" has been subject to interpretation by the U.S. Copyright Office and by the courts, it generally means that the work must be **original to the author** and more than a trivial variation of a preceding work.⁵ It is not required that the material be different from every previous work. It need only embody a minimum level of creativity and be developed originally by the author claiming copyright. For instance, if two novelists, each working in complete isolation and unaware of each other's work, authored identical novels, both would fulfill the originality requirement of copyright.⁶

¹17 U.S.C. § 101 *et. Seq.* This is the codification of the Copyright Act of 1909 and its 1976 amendments.

²17 U.S.C. § 302(c).

³17 U.S.C. §§ 101, 117 codify the 1980 Computer Software Copyright Act.

⁴17 U.S.C. § 102(a).

⁵*Alfred Bell & Co. v. Catalda Fine Arts, Inc.*, 191 F.2d 99, 102-03 (2d Cir. 1951).

⁶*Feist Publications, Inc. v. rural Telephone Service Company, Inc.*, 111 S.Ct. 1282, 1287-1288 (1991).

3.2 It Must Be Fixed

Fixation requires that a work be embodied in a tangible medium of expression, which is sufficiently permanent to permit it to be perceived for more than a transitory period.⁷

In the case of computer programs, a tangible medium can include paper, hard drives, disks, tapes and ROM chips. Therefore, in order for the computer program to be protected, it must be fixed to a tangible medium that can be perceived either directly by human eyes or by aid of a machine.⁸

No matter how many different material objects embody the work, there is only one copyright. The "work of authorship" is the program itself, not the material objects that embody it.⁹ These are, not surprisingly, called "copies." The program that is perceived from each embodiment represents the same work of authorship in all embodiments.

4. When Is a Computer Program Protected by Copyright Law?

A computer program has copyright protection the instant it is fixed. This means that the author has the bundle of rights described above once the fixation requirement is met. The author owns the source and object code and has the right to determine how, when, and by whom it is used.

This protection is automatic. The author does not have to file any formal documentation with local, state, or the federal government in order to obtain a copyright for her original and fixed literary work. It is granted to her by federal law. She has the right to place a copyright notice on her work and inform the world that she is exercising her copyright.

Example

Hunter Hacker is an unemployed computer programmer who likes to write sophisticated UNIX "Trojan horse" software. Cliff Cybercop is a Berkeley Lab employee who was hired to write computer anti-hacker software for UNIX.

Hunter begins writing a program based on his own idea on his 486 home computer via a UNIX emulator. He produces about 500 lines of C code for the first module and attempts to compile it. The compiler returns many warnings, several errors and one disaster. He gets frustrated, saves his program to disk and begins surfing Tymenet.

Meanwhile, Cliff decides to write a statistical program to help measure the performance of his software. He writes it in FORTRAN on an old HP-1000 supermini-computer. He writes the basic operation algorithms first, such as a t-test, ANOVA and chi-squared, etc., and then compiles, links and runs those routines for testing. After pseudocode walk-throughs, extensive acceptance testing, and stress testing he compiles the whole program without errors, links it, and then runs it to produce output. He then prints out the source code, puts his name on it and shows it to his boss.

⁷ 17 U.S.C. § 102(a).

⁸ See H. Rep. 94-1476, at 82.

⁹ H. Rep. 94-1476, at 53.

Who has produced a copyrightable computer program, Hunter or Cliff?

Answer: They both have. As soon as either programmer fixed his program to a tangible medium, it became a copyrightable work.

In Hunter's case he fixed a useless program to disk. This embodiment is sufficiently permanent. It was fixed to a tangible medium and, with the aid of a "machine," it can be perceived. It may not run, but he can print out the source code and read it. For purposes of copyright protection, it does not matter that the program will not compile. As long as it is fixed and can be perceived it meets the requirements. Whether or not the program is useful is not an issue in obtaining copyright.

In Cliff's case he has fixed the work to disk and paper. It may only be perceivable via an old HP-1000, but it is copyrightable nonetheless. Remember, even though he fixed the work to two different "tangible mediums" or copies, there is only one copyright in the work.

5. What Is Not Protected Under Copyright Law?

The Copyright Act states that "In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery . . ." ¹⁰ This includes algorithms, program logic, and layouts.

Things like systems and processes may be protected under patent law, but not copyright law. Therefore, if a computer program provides a novel method for parsing digitized analog signals, only the actual program that embodies the method and incorporates the program logic and algorithms is subject to copyright protection, not the method itself. Remember, the program logic and algorithms by themselves cannot be copyrighted.

This may appear counterintuitive to a programmer. After all, the tough part of software development involves the conceptualization of program logic and algorithms. However, program logic and algorithms represent an idea for the purpose of copyright. Though the actual coding of the method is typically only a mechanical exercise to a skilled programmer, it does require creativity to express a concept, method, or idea with sufficient detail to create a platform sensitive, error free, and rigorous program. It is only this mechanical, but creative, expression that is subject to copyright protection.

5.1 An Idea Alone Is Not Protected

It is important to note that an idea is not subject to copyright protection. It is only the manifestation of an idea that is protected, in a particular tangible form and affixed in a specific manner. In other words, the expression of the idea must be clearly distinguishable from the idea itself. ¹¹

¹⁰ 17 U.S.C. § 102(b).

¹¹ A classic case that explains this concept is *Baker v. Selden*, 101 U.S. 99 (1879).

This is not as illogical as it may sound. If an idea were copyrightable, programmers, mathematicians and many other professionals the world over would have to "reinvent the wheel" constantly. The following example represents a situation commonly faced by programmers.

Example

Let's say that our Berkeley Lab programmer Cliff decides to work on a non-hacker project for chemists. He reads about a better way to calculate the area under a curve than that provided by traditional integral calculus. He uses the mathematical equation from the research article as the basis for a computer program to calculate the area under chromatographic elution curves.

Though the particular research article is subject to copyright protection, the mathematical equation alone is not subject to protection.

First, the author of the article had an idea for a method. This idea is not subject to copyright protection. Second, the author expressed that idea by a mathematical equation. This equation is also not subject to copyright protection. A mathematical equation is considered a "work of nature" and belongs in the public domain. Third, the author incorporated the equation into a research article that describes the method. It is only this particular manner in which the method and equation is described that is subject to copyright protection.

Therefore, Cliff has not violated any copyright by using the equation from the article, in his program. The resulting computer program that incorporates the equation is subject to copyright ownership that vests with the author of the program. Only the computer program that is fixed and written in a specific language and, in this case, is designed for chromatography, that can be copyrighted.

If a third programmer uses the equation for another purpose, and writes a different program in another language, the resultant work *may* be altogether distinct from the first and merit its own copyright.

Even if someone uses the same equation to write a program in the same language to perform the same function as Cliff did, Cliff's copyright may not have been violated. As long as the second expression is otherwise distinct from the first, a separate copyright may be established. This expression is based on the programmer's own style of coding, which represents his own unique expression of an otherwise mechanical process. Remember, the method represents an idea and cannot be copyright-protected.

Of course, courts generally decide whether one abstraction is sufficiently different from another for the two to be considered distinct expressions of the same idea. If the first programmer proves that the second program is identical or substantially similar to the first, then the courts may find copyright infringement.

Therefore, if an idea can be separated from its expression, such as an entire computer program, then its expression may be subject to copyright protection as long as it meets the requirements of originality and fixation.¹² If an idea cannot be separated from its

¹²For a more philosophical restatement of this concept see Appendix 1.

expression, such as a mathematical equation or computer algorithm, then it is not subject to copyright protection.¹³

Bottom line: what US copyright law wants to protect is the "literary expression," not the concept, not the idea, but the original, fixed, and unique expression.¹⁴

6. Source Code vs. Object Code

Under a strict interpretation of the Constitution, one might think that only source code can be protected, since only it can be considered a writing. Object code on the other hand is machine-written and not a direct expression of the author's work. However, a precedent-setting court case in 1983 established that object code is protected under copyright law.¹⁵

Generally, the owner of the source code is also considered the owner of the object code for purposes of copyright protection. This means that in cases where only the object code is made available for public use, the author still retains a copyright over that object code.

7. Applications vs. System Programs

One of the things that underlies copyright law is that the copyrightable work must be perceivable by human senses. Several courts in early software cases argued that system programs and background programs, by their very nature, were not perceptible to human senses and, therefore, were not copyrightable.¹⁶

However, a programmer can print out the source code of any program, whether it has a user interface or not, and perceive it. It is this embodiment of the program that qualifies for copyright protection, not any user output or display. More recent court cases have established that the distinction between applications and system programs is illusory for the purposes of copyright and that system programs are also protected by copyright law.

Microcode, which in this context is a series of transistor activation instructions to a microprocessor based upon directions from a macroinstruction set, is also copyrightable under this rationale.¹⁷

8. Can the Look and Feel of a Computer Program Be Copyrighted?

¹³I anticipate some resistance here; refer to Appendix 2 for yet another philosophical explanation.

¹⁴If these arguments are still somewhat unpersuasive, and you have read both Appendix 1 and 2, you may want to realize several points. 1) one purpose of copyright law is to encourage innovation. If individuals are allowed to copyright the laws of nature and their mathematical expressions, innovation would come to a halt, and 2) also remember that adapting copyright law to computer programs is sort of like putting a square peg in a round hole. Courts and the legislature have had to fashion computer law at times at the expense of logic. That a computer program is considered a literary work is itself purely arbitrary.

¹⁵*Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (3d Cir. 1983).

¹⁶An oft cited case is *Whelan Assocs., Inc. v. Jaslow Dental Lab.*, 609 F. Supp. 1307, 225 U.S.P.Q. 156 (E.D. Pa. 1985).

¹⁷*NEC Corp. v. Intel Corp.*, 10 U.S.P.Q.2d 1177 (N.D. Cal. 1989).

No one really knows. The Copyright Office has stated that a registered copyright in a computer program extends to screen displays resulting from the computer program.¹⁸ This statement may appear somewhat contradictory to what has already been stated about what can and cannot be protected. One can argue that the "look and feel" of a computer program is a manifestation of the goal and purpose of an idea, not of the means of expressing that idea. In other words, two programmers may have the same idea which can manifest itself via identical screen displays. However, each programmer may use a completely different means, such as a different language with different routines on a VMS box rather than on a UNIX box, of expressing that manifestation. Thus each programmer should be able to assert his or her own copyright on the computer program without having a right to copyright the "look and feel" of the program.

A logical analysis would ask a seemingly simple question. If there is only one way to express the "look and feel" of a given program, then it is an idea and hence not copyrightable. If there are many ways to express the "look and feel" then each different way can be copyright protected. In either case, this logic suggests that the "look and feel" itself cannot be copyright protected.

However, courts do not necessarily restrict themselves to comparing the means of an expression, the source code. Sometimes they compare the ends, the "look and feel." To put it bluntly, courts have been all over the place on this issue.¹⁹ One court may hold that if one screen looks substantially similar to the other, then there is copyright infringement, thereby holding that the "look and feel" can be copyright protected.²⁰ Another court may look only at the source code and hold that no infringement exists and that the "look and feel" cannot be protected. Other courts may find no infringement and still hold that the "look and feel" can be protected. Some courts will evaluate both the source code and "look and feel" as separate infringement cases.²¹ In other words, there is still no definitive answer to this question.

One reason for this apparent inconsistency and contradiction is that most judges lack the technical knowledge in computer science to explore in detail the workings of a computer program. It is both easier and faster to simply compare screen displays or program outputs when deciding infringement cases than to do a line by line source code comparison. Another reason is that much of computer law falls in a wide expanse of uncertainty that has been difficult for courts to adapt into existing case law. Improvement will only take time.

The take-home message for you as a programmer is this: Never assume that you can protect the "look and feel" of your program from copyright infringement and never assume that you can't. If you want to do your best to protect your screen displays, then you may want to federally register your program and screen displays as one unit with the U.S. Copyright Office. Refer to §11 for details on federal registration.

¹⁸53 Fed. Reg. 21817-21820 (June 10, 1988). This means that you can obtain a federal copyright registration (see §11 of this booklet) for your screen display. It does not necessarily mean that you would win in a court case for somebody infringing on the "look and feel" of the program or on an infringement of the program itself.

¹⁹Take your pick from the following cases: *Autoskill, Inc. v. National Educ. Support Sys., Inc.*, 793 F. Supp. 1557, 24 U.S.P.Q.2d 1107, 1115 (D.N.M. 1992); *Whelan Assocs., Inc. v. Jaslow Dental Lab.*, 609 F. Supp. 1307, 115 U.S.P.Q. 156 (E.D. Pa. 1985); *Plains Cotton Coop. Assn v. Good Pasture Computer Servs.*, 807 F.2d 1256 (5th Cir.); *Synercom Technology, Inc. v. University Computing Co.*, 462 F. Supp. 1003, 1014 (N.D. Tex, 1978); *Digital Communications Assocs., Inc. v. Softklone Distrib. Corp.*, 659 F. Supp. 449 (N.D. Ga. 1987).

²⁰The greatest likelihood of such a result would occur in a case where the screen displays were federally registered with the Copyright Office along with the program. However, this result can also occur in the absence of federal protection.

²¹Again, this is particularly true if the source code and screen displays were registered with the Copyright Office as one unit (§11 will discuss federal registration). Note: "look and feel" can also encompass more than just screen displays.

9. Translations, Adaptations and Revisions Are Derivative Works

A derivative work is defined as a work based upon one or more preexisting works.²² In computer science this includes a translation of a computer program into another language or an adaptation of an original program onto a new platform. The derivative work is separately copyrightable. However, this protection applies only to the new material added and the compilation of the new and old elements.²³

A revision of a computer program is also a derivative work. It is based upon the earlier version. If the program is registered with the U.S. Copyright Office, discussed later, then a new revision must be registered as a new copyright.

The original work remains protected by its original copyright and belongs to the original author. Since the original author retains the right to produce derivative works based on the original program, the second programmer must obtain permission from the original author to use the program in a new derivative work. To repeat, since the right to prepare derivative works is part of the bundle of rights retained by the author of an original work, a computer programmer who is not the original author must obtain permission from the original author in order to create a derivative work based on the original work. Don't panic yet; read on.

9.1 *There Is a Limited Exception for Adaptations*

Courts have fashioned an exception to an adaptation as a derivative work. Since many computer programs are at least partially platform-dependent, a legal purchaser of a computer program may have to "tweak" the source code or object code in order to adapt it to a new platform. As such, many courts permit this limited adaptation and do not consider it infringement.

9.2 *Aren't Most Computer Programs Derivative Works?*

It is rare that a programmer will write a computer program completely from scratch. Most computer programs today represent an assemblage of routines, modules and algorithms obtained from many sources. Many times the programmer borrows routines from his or her previous completed programs or simply from previous uncompleted code. Why reinvent the wheel? Other times the code is taken from programs written by colleagues or from code in the public domain. Some code is even provided in libraries that come with the programming tools used to write the source code. Often, a programmer cannot even remember where he got a particular routine.

Usually the programmer has to make a serious effort to connect the routines together, modify them and "adapt" them to his program logic. This adaptation usually goes far beyond mere tweaking. It is this creative effort to assemble a working computer program that gives the programmer the right to copyright it as a derivative work. Based on the definitions above, if such programs should be considered derivative works, then most programs should.

²²17 U.S.C. A. § 101. Another good definition is a work that would be considered an infringing work if the code taken from a prior work had been used without the consent of the author of that prior work.

²³See *Apple Computer, Inc. v. Microsoft*, 18 U.S.P.Q.2d (N.D. Cal. 1991).

Does this mean that the programmer has to find the authors of all routines in what may be tens of thousands of lines of source code and get permission to use the material? The idea that a programmer has to seek permission from another programmer before he can use the original programmer's routines to make a derivative work may surprise, anger and even terrify many programmers. What about programs written by teams of individuals?

With that in mind, it is clear that the concept of derivative works is critical to the computer programmer. Where are the lines drawn? What are the programmer's rights and responsibilities here? As the typical programmer working a tech support desk would say to a frantic caller with a crashed system, "Stay calm; let's walk through this step by step. First, do you know how to convert binary to octal?"

9.2.1 How Much of Someone Else's Code Can I Use Without Permission?

Generally if your program uses a small amount of code that was previously published (defined later) then it will probably be considered an original work and not a derivative work.²⁴ If your program uses a substantial portion of previous material or if the portion that you use represents a critical element, then it will probably be considered a derivative work. Who defines what "substantial" is? In the case of a federally registered work, the US Copyright Office may make an initial determination, but that decision is ultimately determined by a court of law.

An Example

Julie, having access to Cliff's code, translates the code from Fortran into C. This translation, requiring a significant amount of work and input on her part, constitutes a derivative work. However, it is also an infringement of copyright in the original work if it was done without the original copyright holder's permission.

On the other hand, had Julie ended up using only 100 mechanical lines out of 10,000 lines of the original code as part of another program that she wrote, then in all likelihood, she can claim an original copyright in the new program; however, that copyright would not include copyright of the "borrowed" portion of the program. We are assuming here that the borrowed code is too insubstantial a portion of the original to render the new work a derivative work.²⁵

9.2.2 What if I Use Public Domain Source Code As Part of My Code?

By definition, you don't have to ask anyone for permission to use public domain source code. It belongs to the public. However, you cannot claim a copyright to **that portion** of your program that contains the public domain source code. You

²⁴Hawes, *Copyright Registration Practice*, §19.02(2) (1994).

²⁵Caution, this is not an absolute. It is quite possible that a court could find use of 500 lines of code from a third person to be acceptable without permission and also find that use of 10 lines of code constitutes an infringement without permission.

can only protect your particular enhancements.²⁶ Anyone can use the part of your code that is in the public domain in his or her code without your permission.²⁷

What is called "public domain" source code or software, however, is not always in the public domain. Some people use the terms public domain, freeware and shareware very strictly. Others use the terms interchangeably. However, these terms may connote different rights to copy or distribute.

In some cases an author may describe his or her work as being in the "public domain" or available for public use; and at the same time (contradictorily) including limitations or conditions upon that use. Technically this source code or software is not in the public domain; however, the conditions placed upon its use may be so easily or inexpensively complied with as to give the software the appearance of "public domain" code. One use limitation, of a substantial nature, could be a prohibition on the code being used commercially or incorporated into commercial software without permission or without payment of a fee. Another limitation, of a less substantial nature, might constitute a requirement that the author of the borrowed code be acknowledged in the documentation of the newly developed code.

Whether or not the code you intend to use is described as "public domain" code or not, it is always best to be cautious in your assumptions as to the ownership of borrowed code. A piece of code you thought was in the public domain may have been subject to some copyright that was not abandoned.

Courts will generally consider 1) how much effort the previous programmer made to protect her property interest in the portion of the public domain source code she wrote (for instance did she place a copyright notice on her code); 2) whether it constitutes a substantial portion of the public domain code and 3) how diligent you as a programmer were in determining prior ownership.

Here is the take-home message. Nothing in computer law is black and white. If you use someone else's code, do your best to determine if any limits were placed on its use by the original author. A copyright notice is a clear indication that you should find the author and ask permission. If you use public domain source code and want to establish a copyright on the new code, make sure your enhancements or additions are substantial, not trivial.

10. Databases Are Compilations

A compilation is a work made from the collection and organization of preexisting materials or data that are chosen, collected, and arranged in such a manner that the resulting work constitutes an original work of authorship.²⁸ Therefore, the database program may be subject to one copyright and the database itself may be subject to another.

In other words, a database application program such as FoxPro is subject to copyright protection and the database that is contained in the application may be subject to another separate copyright. In this context, the database is the particular organization of a set of data

²⁶See *Feist Publications, Inc. v. Rural Tel. Serv. Co.*, 111 S. Ct. 1282, 1289 (1991).

²⁷See 17 U.S.C. §103(b); see *Applied Innovations, Inc. v. Regents of the Univ. of Minn.*, 876 F.2d 626, 636 (8th Cir. 1989).

²⁸17 U.S.C. § 101.

or information. If you collect the names of all the original Berkeley UNIX programmers and place them in a database, that particular arrangement of names may be subject to copyright protection.

However, the template or layout you used within the database to organize the information is not subject to protection. It constitutes a Data Structure, which is not protected by copyright law. Note also that the information itself, which is based on preexisting materials, is also not protected. Only the particular arrangement can be copyright-protected.

11. So What Is Federal Copyright Protection?

As described above, an author establishes copyright protection once his original work is fixed. People frequently ask, "if I can establish a copyright by simply fixing my work, what is the advantage of registering my work with the U.S. Copyright Office?"

While an author may establish a copyright at fixation, he does not necessarily establish the right to sue for infringement of that copyright. Generally, in order for the author to sue for copyright infringement, the copyright must be registered with the U.S. Copyright Office.²⁹

If the copyright is registered within 3 months of publication (described below) then the author may be able to recover statutory damages or attorney's fees, in addition to other relief, for infringement that began before registration.³⁰

In addition, registration of a copyright within 5 years of publication will compel the court to give the registered owner the benefit of the doubt as to the validity of the registered party's ownership in a court case, unless the other party can prove otherwise.³¹ The other party will have the burden of proving that the registered owner does not have a valid copyright.³²

Finally, the combination of registration and proper notice will remove the defense known as "innocent infringement" from a defendant and the court will assume that the world had been put on notice that the work was copyright-protected.³³

Therefore, if a computer program is going to be commercially marketed or otherwise distributed to the public, it is usually a good idea to pursue federal registration.

11.1 Publication

Usually, a work is registered with the U.S. Copyright Office after it has been published. Publication, for the purpose of federal registration, is defined as the year copies of the work are distributed to the public by sale or other transfer of ownership, or by rental, lease, or lending; or the year the work is first offered to a group of persons

²⁹ 17 U.S.C. § 411(a).

³⁰ 17 U.S.C. § 412.

³¹ 17 U.S.C. § 410(c).

³² *Harper House, Inc. v. Thomas Nelson, Inc.*, 1988 C.L.D. 26203 (C.D. Cal. 1987).

³³ It is possible that a defendant could lose the defense of innocent infringer even in the absence of a copyright notice for works published after 1989. See *Steven Greenberg Photography v. Matt Garrett's of Brockton*, 1993 C.L.D. ¶ 27,046 (Mass. 1992).

for purposes of further distribution.³⁴ It is this "year of first publication" that is used with the copyright notice.

If a programmer distributes a computer program to a limited class for a limited purpose, such as other programmers in his department for testing or only to members of the Physics Division for beta testing or to outside testers as part of a confidentiality agreement, it may not be considered publication.³⁵

However, if multiple copies of the computer program are available for distribution to the general public, the sale or lending of a single copy may constitute publication.³⁶

An Example

Let's say our friend Cliff Cybercop enters into negotiations with several companies to license his Antihacker program. He sends the companies a copy of the source code along with a non-disclosure agreement for evaluation. This would not be considered publication. Furthermore, if he also sends a copy of the source code to friends at other national labs or universities for beta testing, this may also not constitute publication.

Now let's say that Cliff decides his program is perfect and license offers fail to impress him. He places a notice on the internet that the Antihacker program is for sale, even though he has only 2 copies. He gets one order and sends off a copy to the requester. This may constitute publication. This is so even if he gave the copy away, so long as he had more than one copy and made them available to the general public.

It is important for the programmer to accurately determine the date of first publication once approval to register a copyright has been granted. Though an incorrect date may not invalidate the copyright, it can increase the legal cost and effort required to enforce it.

11.2 Unpublished Computer Programs

A computer program that has been fixed but not published can still be registered as an "unpublished work." However, once published a new registration application must be submitted.

12. Who Is The Author?

Only the author has the right to assert the copyright. Generally, the author is the individual who reduced the idea, method, or process into a computer program.³⁷ This author of the

³⁴ 17 U.S.C. § 101.

³⁵ See *Academy of Motion Picture Arts and Sciences v. Creative House Promotions, Inc.*, 19 U.S.P.Q.2d 1491 (9th Cir. 1991).

³⁶ Hawes, *Copyright Registration Practice*, § 7.03[1] [2](1995).

³⁷ See *Community for Creative Non-Violence v. Reid*, 490 U.S. 730, 10 U.S.P.Q.2d 1985 (1989).

source code will normally claim and be entitled to title to the object code, the computer-generated work and, where appropriate, the expert system.³⁸

Say that a friend of a programmer comes up with a great program and writes it out in a flow chart or pseudocode format for the programmer. The friend holds the copyright to the flow chart or pseudocode. However, the programmer alone will hold the copyright for the particular computer program that embodies the idea expressed by the flow chart or pseudocode of the friend.

12.1 Employees Are Not Authors

Under the "Work Made for Hire Doctrine" an employer or other person for whom the work was prepared is considered the author for purposes of copyright law.³⁹

A Work Made for Hire is (1) a work prepared by an employee within the scope of his or her employment; or (2) a work specially ordered or commissioned if (a) it is used in one of certain types of work, and (b) if the parties expressly agree in a written instrument signed by them that the work is a work made for hire.⁴⁰

Therefore, if a Berkeley Lab (University of California) employee writes a computer program "within the scope of his or her employment" that program does not belong to the employee, but to his or her employer. In this case the employer is The Regents of The University of California. However, under Contract 98, the U.S. Government holds title to any software developed by the Berkeley Lab as a Government contractor, making DOE the technical employer of the programmer for the purposes of copyright protection.⁴¹

What this means is that the programmer does not have the bundle of rights described above. The programmer cannot market or even place a copyright notice on the program without permission of The University of California. The University of California under Contract 98, however, must obtain permission to assert copyright from DOE.⁴² Because DOE is the contractual owner of the program, it has the full legal right to determine how the program is used, whether it is marketed, and who may copy and use it. Contract 98 does give the Berkeley Lab the right to copy and use the computer program for "private" (i.e. non-commercial) purposes, subject to other provisions of the contract.⁴³

As discussed in § 16 of this Guide, when permission is granted to Berkeley Lab by DOE to "assert" a copyright, the copyright and therefore title to the program passes to The Regents of the University of California, and The Regents become the legal author of the computer program. That is, at that point The Regents, through Berkeley Lab, own the computer program and control the copyright to it.

³⁸ See Hawes, *Copyright Registration Practice*, § 19.02 (1995).

³⁹ 17 U.S.C. § 201(b).

⁴⁰ 17 U.S.C. § 101.

⁴¹ See Article XII, CL. 7 (b) (1) (i), DE-AC03-76SF00098 Modification No. M145 to its Supplemental Agreement.

⁴² Yes you cannot even place a copyright notice on the program without DOE permission. See DE-AC03-76SF00098 Article XII, CL. 7 (c) (1) & (e)(1) Modification No. M145 to its Supplemental Agreement.

⁴³ See Article XII, CL. 7 (b) (2) (ii), DE-AC03-76SF00098 Modification No. M145 to its Supplemental Agreement.

However, in special circumstances the University of California can transfer ownership of the program to the programmer. This must be negotiated between the University of California and the programmer and a formal agreement executed.

12.2 An Independent Contractor Is Not an Employee

If the University of California, as operator of the Berkeley Lab (i.e., a group within the Berkeley Lab has Procurement hire an independent contractor to write a computer program or component of one) by law that contractor will have the right to petition DOE for the right to assert copyright in the work.⁴⁴

If the University of California wants to retain the copyright to the computer program, the process also involves petitioning DOE for the right to assert copyright. (As of the writing of this report, July 1996, Berkeley Lab is revising its policy regarding copyright in software produced by independent contractors. Contact the Patent Department for current information.)⁴⁵

Under Contract 98, DOE requires that the University of California, or any agent of the University of California negotiating a subcontract with a third party, require that the party assign copyright and ownership rights to the Government as is required of the University.⁴⁶ If the subcontractor refuses then DOE must be notified and a written authorization must be obtained from DOE before the subcontract can be executed.⁴⁷

12.3 Works by Employees of the U.S. Government Are in the Public Domain

Any work created by an employee of the U.S. Government is in the public domain provided that it is created in that person's official capacity.⁴⁸

Since the Berkeley Lab is operated by the University of California on behalf of the Department of Energy, the University is considered an independent contractor of the Government. As employees at the lab are employees of the University of California, computer programs written by these employees are considered works made for hire with copyright belonging to the University and not the un-copyrightable works of Government employees.⁴⁹

⁴⁴ See *BPI Systems Inc., v. Leith*, 532 F.Supp. 208, 210 (W.D. Tex. 1981). I also add a general note of caution here. Courts have used a number of factors to determine whether a party is actually an independent contractor or not. In many cases parties who were called contractors were held to be employees and parties who were called employees were held to be contractors. See *Dumas v. Gommerman*, 790 U.S. 739, 739 (1989) (holding 13 factors as determinative of this issue).

⁴⁵ See 17 U.S.C. § 204 [a]; see also *Evans Newton, Inc. v. Chicago Sys. Software*, 793 F.2d 889 (7th Cir.).

⁴⁶ See Article XII, CL. 7 (f) (1) (2), DE-AC03-76SF00098 Modification No. M145 to its Supplemental Agreement.

⁴⁷ *Id.* at (f)(2)(i)(ii).

⁴⁸ 17 U.S.C. § 105. The pertinent section reads "Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise." See also 17 U.S.C. § 101.

⁴⁹ For an excellent discussion on Government rights to copyrights see Nimmer *Nimmer on Copyrights* § 5.06 (1994). It includes a discussion on contractors of the United States Government. See also *Schnapper v. Foley*, 667 F.2d (D.C. Cir. 1981).

12.4 Joint Authorship

Many times a program is written by more than one individual. As such, the contributors are considered joint authors.⁵⁰ The key here is that each author has rights to the entire work.⁵¹ That is, each author may market the work without approval of the other authors. However, that author must account to the other authors for any profits obtained.⁵²

13. Proper Copyright Notice

As mentioned above, copyright notice informs the public that the author is asserting rights under copyright law. Notice is not required for an author to have a copyright in works published after 1989.⁵³

However, as mentioned in § 11, proper notice coupled with federal registration will greatly increase one's chances of prevailing in a lawsuit. Omission of proper copyright notice may enable a defendant in a lawsuit to claim the defense known as "innocent infringement." That is, a defendant may successfully claim that she was unaware that she violated a copyright. This could sometimes result in the defendant prevailing or, at the very least, limiting the amount of damages available.⁵⁴ This defense would likely not be available if proper notice was used.⁵⁵

Therefore, if a computer program is to be marketed or distributed to multiple parties, it is highly recommended that it include proper notice. At the Berkeley Lab of course, DOE must first grant permission to the University of California to assert a copyright before any notice can be used.

Proper notice will contain the copyright symbol, or acceptable substitute; the year of first publication, described above; and the name of the author.⁵⁶ If the program was published by a Berkeley Lab employee in 1996 the preferred notice would be:

© 1996 The Regents of the University of California
or
Copyright 1996 The Regents of the University of California
or
Copyright © 1996 The Regents of the University of California

Also acceptable as a subordinate choice is

⁵⁰ 17 U.S.C. § 101 *see Ashton-Tate Corp. v. Ross*, 916 F.2d 516, 521 (9th Cir. 1990). To be considered a joint author one must make "an independently copyrightable contribution" to the program.

⁵¹ *S.O.S., Inc. v. Payday, Inc.*, 886 F.2d 1081, 1086 (9th Cir. 1989).

⁵² H. Rep. 94-1476, at 121.

⁵³ For any program published on or after March 1, 1989, notice is not required for a copyright to hold. This was a result of the Berne Convention Implementation Act of 1988, Pub. L. 100-568 (Oct. 31, 1988). Before the Berne Convention, the Copyright Act of 1978 permitted correction, within certain limitations, of an omission of notice. 17 U.S.C § 405(a). Before 1978, the Copyright Act of 1909 conditioned the copyright owner's rights on the presence of proper notice. Without proper notice there was no copyright.

⁵⁴ *See also Steven Greenberg Photography v. Matt Garrett's of Brockton, Inc.*, 1993 C.L.D. ¶ 27, 046 (Mass. 1992) (holding that the defense of innocent infringement was invalid in a case where defendant claimed plaintiff had not placed notice of copyright on photographs. The court stated that notice was no longer required after 1989.)

⁵⁵ Article XII CL7 (c)(1) DE-AC03-76SF00098, Modification No. M145 to its Supplemental Agreement.

⁵⁶ 17 U.S.C. § 401(b).

(c) 1996 The Regents of the University of California
or better yet
Copyright (c) 1996 The Regents of the University of California

If the program is a revision of a previous work it might have two dates, one for the original work and one for the revision,

Copyright © 1994, 1996 The Regents of the University of California
or it could have a range for several revisions.

Copyright © 1991-1996 The Regents of the University of California

Typically, the copyright notice will appear along with the title such as:

Hacker Tracer Program Copyright © 1990 Cliff Cybercop

If the work is unpublished, notice might look like this.

Hacker Proof OS. Unpublished Copyright © 1996 Cliff Cybercop

13.1 Where Should Notice Appear in a Computer Program?

Generally, the copyright notice on a computer program should appear in several places. First, it should appear on or near the first page of the source code. This is usually the "commented out" section at the beginning of the program that also includes the title, revision information and introductory remarks. Second, on application programs, it should be either briefly displayed at program startup, at sign-on, or continuously displayed on program screens. Third, it should appear on the labels affixed to disks or tapes that contain either the source code or the executable code.⁵⁷

Finally, copyright notice should also appear on or near the first page of any manuals that accompany the computer program.

13.2 DOE Also Requires a Separate Notice

Under the University of California's contract with DOE, the U.S. Government is granted a paid-up, non-exclusive, irrevocable worldwide license for 5 years after permission is granted by DOE to the University of California to assert the copyright. This license is renewable for two more 5 year periods.⁵⁸

A notice reflecting this requirement must appear in the software and accompanying manuals for computer programs federally registered by the University of California. The wording of this notice will be provided by the Patent Department and should be in a prominent place in the source code and accompanying manuals.⁵⁹

⁵⁷ 37 C.F.R. § 201.20(g) (1990). See also Scott Scott on Computer Law 2d Vol. 1 § 3.38[C] (1992).

⁵⁸ Article XII, CL. 7 (e)(iii)(C) DE-AC03-76SF00098 Modification No. M145 Supplemental Agreement.

⁵⁹ Refer to Appendix 3 for an example of the notice required. See Article XII, CL. 7 (e)(iii)(E) DE-AC03-76SF00098 Modification No. M145 Supplemental Agreement.

The University of California's contract with DOE also requires a "Restricted Rights Notice."⁶⁰ This notice covers Restricted Computer Software, which is defined as : "... computer software developed at private expense and that is a trade secret; is commercial or financial and is confidential or privileged; or is published copyrighted computer software; including minor modifications of such computer software."⁶¹

This notice essentially dictates the conditions under which the U.S. Government has rights to the software. See the example in Appendix 3.

14. Computer Manuals Are Also Protected

Any manual distributed along with the computer program can be separately copyrighted. Generally, however, the manuals may be registered as part of a unit that includes the computer program.

15. Computer Programs Are Not Sold, They Are Licensed

In an effort to minimize the danger of unauthorized copying of software, authors of computer programs do not sell them, they license them. A license grants permission to the licensee to do something with a copy of the computer program subject to certain conditions. These conditions generally include that the copy of the software cannot be sub-licensed or rented to a third party and that only one copy can be made for backup or minor adaptation by the licensee only.

16. What You Should Know If You Write Software As an LBNL Employee

As previously discussed, under the contract between the University of California and the Department of Energy, the University of California must ask for permission from DOE if it wants to assert a copyright for a computer program, that is, register a copyright with the U.S. Copyright Office. Therefore, if a program written by a Berkeley Lab employee is to be distributed to others or marketed in any way, that employee or his/her superiors must contact the Patent Department to request consideration for registration of the computer program with the Copyright Office.

Once DOE grants approval, the programmer will be asked to submit paper copies of the source code, tape or disk copies of the object code, and appropriate manuals.⁶² At that time the programmer will also be asked to ensure that proper notice appears in the program and manuals.

Any computer program license must be negotiated and drafted by the Technology Transfer Department. Under no circumstances may a programmer pursue licensing opportunities

⁶⁰ Article XII CL 7 (h)(a) DE-AC03-76SF00098 Modification No. M145 to Supplemental Agreement. An example of the notice can be found in Appendix 3.

⁶¹ Article XII CL 7 (a)(5) DE-AC03-76SF00098 Modification No. M145 to Supplemental Agreement.

⁶² Article XII, CL. 7 (e)(iii)(A) DE-AC03-76SF00098 Modification No. M145 to Supplemental Agreement.

without first contacting the Patent and Technology Transfer Departments and obtaining approval.

17. LBNL Programmers Are Entitled to a Percentage of Net Royalties

If the Patent and Technology Transfer Departments determine that a computer program should be federally registered and licensed to third parties, and if DOE provides approval, the original programmer of a University of California owned and copyrighted computer program may be able to "profit" from his or her program.

The Berkeley Lab policy grants to the original Berkeley Lab programmer a percentage of net income received from licensees on licensed software, just as it does to inventors of licensed inventions.⁶³

Currently, subject to certain restrictions, the Berkeley Lab grants the original programmer of a computer program developed at the Berkeley Lab as a "work for hire," 50% of the first \$100,000 of cumulative net income received, 35% of the next \$400,000 and 20% of all additional net income.⁶⁴

In addition, the programmer's research group will be allocated at least 50% of the University's portion of the net licensing income, and the programmer's division will receive the remainder. Those funds are used for R&D within the mission of the Berkeley Lab. (Note that at the time of preparation of this Guide (7/96), the University of California is considering changes to the University's Patent Policy. While these changes likely will not greatly affect Berkeley Lab distributions to inventors and programmers (and their research groups and divisions), you may refer to Section 5.05 of the LBNL Regulations and Procedures Manual (RPM) for the latest policy.)

Therefore, while a University of California employee does not hold a copyright to any computer program she or he writes within the scope of employment and cannot independently market it or take it with him or her when he or she leaves, that employee, and his or her research group and division, may nonetheless receive some financial benefits from his or her programming effort as a University of California employee at Berkeley Lab.

18. Some Computer Programs Can Be Patented

Under some circumstances, computer programs can be patented. The requirements are very strict and much more difficult to meet than those for copyright protection. However, in some circumstances patent protection may be more advantageous than copyright protection (see section 19 of this guide).⁶⁵

⁶³ See § II C. University of California Patent Policy.

⁶⁴ *Id.*

⁶⁵ Five recent cases have significantly changed both judicial and federal opinion regarding software patents. See *In re Schrader*, 22 F.3d 290 (Fed. Cir. 1994); *In re Alappat*, 33 F.3d 1526 (fed. Cir. 1994), *In re Warmerdam*, 33 F.3d 1354 (Fed. Cir. 1994); *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994); *In re Trovato*, 42 F.3d 1376 (Fed. Cir. 1994).

On October 3, 1995, the Patent and Trademark Office issued a legal analysis to support new guidelines for the examination of patent applications for computer programs and related inventions.⁶⁶ Though there had been a number of successful patent applications for computer programs prior to this date, the new guidelines have made it significantly easier to patent computer programs. Since this is a guide to software copyrights, we will not go into further detail. The Patent Department can help determine if a patent should be sought for a computer program.

19. Patent or Copyright, Which Is the Best Way to Protect a Computer Program?

As a programmer, you are probably wondering which form of protection is appropriate for your particular software. This being a copyright guide, you might guess that copyright protection should be sought. In the majority of cases you would be right. There are a number of distinct differences between patent and copyright protection. One thing to remember is that the two are not mutually exclusive.

The most basic difference is the term of protection. As discussed earlier copyright protection can exist for 50 or more years. Patent protection, however, lasts for only 20 years from the date of filing.

This does not imply that patent protection is inferior. For one thing, patent protection can apply to the method or process. Remember that copyright protection does not protect the method, but the expression of the method. Patent law, however, can protect the method as well. Additionally, patent law has international implications that may afford a program greater protection.⁶⁷

However, while copyright protection is available the instant a work is fixed, patent protection applies only after the application is approved, which can take 18 months. Furthermore, statutory damages and criminal sanctions may not be available under patent law. A final consideration is cost. A copyright registration application is very inexpensive and simple while a patent application for software can be extremely costly in terms of both time and money.

There are finer distinctions which may make one or the other more advantageous to pursue. These are beyond the scope of this guide. In some cases a patent should be filed while in many others copyright protection suffices. Once again, the Patent Department will determine which method of intellectual property protection is best for a particular program.

⁶⁶ Patent & Trademark Office, *Legal Analysis to Support Proposed Examination Guidelines for Computer-Implemented Inventions*, 50 Pat. Trademark & Copyright J. (BNA) 629 (October 5, 1995).

⁶⁷ For some third party analysis of the implications of the new patent guidelines, See Stephen G. Kunin, *Patentability of Computer Related Inventions in the United States Patent and Trademark Office*, 833 J. Pat. & Trademark Off. Soc'y (Nov. 1995); Roc. Laurenson, *Computer Software "Article of Manufacture" Patents*, 811 J. Pat. & Trademark Off. Soc'y (Oct 1995).

Appendix 1

Why an Idea Cannot Be Copyrighted.

This concept is worth repeating in greater detail and somewhat more philosophically. One can argue that an idea is intangible. It exists in the mind via non-static electrical brain impulses. Two people clear across the world can independently come up with the same idea. Neither can claim ownership to the idea unless each expresses it in a unique way by unique means.

In order for the goal or purpose of an idea to be perceivable by others, it must be expressed in some tangible manner. The result of this expression represents a tangible embodiment of the idea. Many times, the purpose or goal of a given idea can be accomplished by various means. Where there are various means of achieving the goal or purpose of a given idea, particular means are not necessary to embody that particular idea. Thus, the idea is clearly separable from the expression of the idea. The expression is unique to each person who embodies the same independently conceived idea. Each unique expression may be copyright-protected.

On the other hand, if the purpose or goal of a given idea can only be accomplished by one means, that is, by one expression, granting a copyright to the person who authors the expression would simultaneously grant her a monopoly right to an idea that could be independently conceived by almost anyone.

Therefore, if you can accomplish the goal of your idea by various means, then you can copyright your particular and original expression of that idea. If your idea can only be expressed one way, then the expression is inseparable from the idea itself and you cannot obtain copyright protection for it. Remember that we are talking only about copyright protection here; other areas of law, such as antitrust, patents, trade secret, contract, and tort may provide other types of protection.

Appendix 2

Why Mathematical Formulas and Computer Algorithms Cannot Be Copyrighted.

By way of example here is yet another somewhat philosophical explanation. The great Hellenic Greek mathematician Archimedes had an idea which almost resulted in the development of Calculus almost two millennia before Newton's achievements. At the time of Newton, the German mathematician Leibniz also had an idea which led to Calculus. Although Newton and Leibniz argued about which one of them came up with Calculus, neither of them could successfully argue that the idea belonged to one or the other. There can be no copyright ownership of ideas.

The mathematical expressions of the ideas of Archimedes, Newton, and Leibniz are examples of ideas that are inseparable from their expression. To express these ideas one must use the language of mathematics. As mentioned in the boxed example on page 6, mathematical equations are considered works of nature. They represent abstract truths. When a scientist characterizes an observation via a mathematical equation, she is expressing an abstract truth of nature. Her idea to express the truth is inseparable from the truth itself. Likewise, the means of expressing the idea, or abstract truth, are inseparable from the truth itself.

The key for an equation is "abstract." Recall that if the equation is incorporated into an article that describes a method, then the whole article is subject to copyright protection. The equation, however, cannot be copyrighted. One may theoretically use it to solve an entirely different problem expressed in an entirely different manner.

Likewise, a computer algorithm by itself cannot be copyright-protected. A mathematical algorithm is a "procedure for solving a given type of mathematical problem."⁶⁸ It is basically a particular way to write an abstract mathematical truth. This algorithm is inseparable from the mathematical truth it represents.

The mathematical philosophers among you may argue that an equation and hence an algorithm should be subject to copyright protection under the rules given in this booklet. After all, the requirements are originality and fixation. Under fixation falls the unique tangible expression.

For example, a Riemann Sum expresses the same idea and mathematical truth and accomplishes the same goal and purpose as an Integral. However, the Integral is more elegant and efficient and less cumbersome. An algorithm expressing a Riemann Sum would be much longer than one expressing an Integral. Therefore, it is a unique tangible expression of the same idea. It is original to the author.

However, each expression nonetheless embodies a mathematical truth. Each expression represents an idea that could have occurred to anyone, albeit to someone of high mathematical ability. The expression cannot be separated from the idea. The idea here is abstract. Its purpose or goal is only to express an abstract truth. It is only when the idea and hence the equation is used to solve a particular problem and is fixed by particular expression to embody that method of solution, that copyright protection can arise.

⁶⁸ *Gotschalk v. Benson*, 409 U.S. 63, 75 (1972).

Appendix 3

DOE Required Notices: The following notices should appear, as appropriate, on the first page of the source code and accompanying manuals.

NOTICE: The Government is granted for itself and others acting on its behalf a paid-up, nonexclusive irrevocable worldwide license in this data to reproduce, prepare derivative works, and perform publicly and display publicly. Beginning five (5) years after (date permission to assert copyright was granted), subject to two possible five year renewals, the Government is granted for itself and others acting on its behalf a paid-up, non-exclusive, irrevocable worldwide license in this data to reproduce, prepare derivative works, distribute copies to the public, perform publicly and display publicly, and to permit others to do so. NEITHER THE UNITED STATES NOR THE UNITED STATES DEPARTMENT OF ENERGY, NOR ANY OF THEIR EMPLOYEES, MAKES ANY WARRANTY, EXPRESS OR IMPLIED, OR ASSUMES ANY LEGAL LIABILITY OR RESPONSIBILITY FOR THE ACCURACY, COMPLETENESS, OR USEFULNESS OF ANY INFORMATION, APPARATUS, PRODUCT, OR PROCESS DISCLOSED, OR REPRESENTS THAT ITS USE WOULD NOT INFRINGE PRIVATELY OWNED RIGHTS.

Restricted Rights Notice

(a) This computer software is submitted with restricted rights under Government Contract No. DE-AC03-76SF00098 (and subcontract _____ if appropriate). It may not be used, reproduced, or disclosed by the Government except as provided in paragraph (b) of this notice.

(b) This computer software may be:

- (1) Used, or copied for use, in or with the computer or computers for which it was acquired, including use at any Government installation to which such computer or computers may be transferred;
- (2) Used, copied for use, in a backup or replacement computer if any computer for which it was acquired is inoperative or is replaced;
- (3) Reproduced for safekeeping (archives) or backup purposes;
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