SOFTWARE COPYRIGHT

By Timothy B. McCormack, Seattle Copyright Attorney working in area of copyright litigation, procurement and development. This document encompasses all in the series of Software Copyright articles.

Overview of Copyright Law From Seattle Attorney

Generally speaking, copyrights protect original works of authorship fixed in a tangible medium of expression. A computer program is usually protected as a literary work or as an audiovisual work. There are six exclusive rights conferred by copyright law. For the most part, a computer programmer should be wary of reproduction, derivative works, and distribution.

The Idea/Expression Dichotomy is an important concept in copyright law. It helps to explain why a particular computer program is subject to copyright while the underlying idea of the program is not. The merger doctrine provides a possible defense to copyright infringement when the ways of expressing a particular idea are limited. Moreover, independent creation of a work (such as via a clean room) can avoid copyright infringement for the copied work because only the ideas are copied.

Proving copyright infringement during litigation can be very complex. An easy case might involve a "smoking gun" where direct proof of copying exists. A more complex case might involve a detailed three-part analysis, known as the abstraction-filtration-comparison test. When trying to figure out what can be copied and what cannot, it is best to err on the side of caution and ask an attorney.

Not all elements of a computer program are subject to copyright. This is because various defenses exist such as merger, fair use, and copyright expiration. All defenses should be considered when determining whether a particular work is protected by copyright and whether you may copy all or part of the work in question.

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THE TASK OF COMPUTER PROGRAMMING AND SOFTWARE DEVELOPMENT

In a practical sense, understanding how copyright law affects software development requires an understanding of how lawyers, judges, and juries understand the task of computer programming. These groups ultimately determine whether a particular copyright lawsuit has merit and, if so, what the liability or money damages will be.

For example, in an older (but instructive) case one court described the task of creating a computer program in the following manner:

> The creation of a computer program often takes place in several steps, moving from the general to the specific.
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> Because programs are intended to accomplish particular tasks, the first step in creating the program is identifying the problem that the computer programmer is trying to solve . . . . As the programmer learns more about the problem, she or he may begin to outline a solution. The outline can take the form of a flowchart, which breaks down the solution into a series of smaller units called "subroutines" or "modules," each of which deals with elements of the larger problem . . . .
>
> As the program structure is refined, the programmer must make decisions about what data is needed, where along the program's operations the data should be introduced, how the data should be inputted, and how it should be combined with other data . . . . Once again, there are numerous ways in which the programmer can solve the data-organization problems that she or he faces. Each solution may have particular characteristics -- efficiencies or inefficiencies, conveniences or quirks -- that differentiate it from other solutions and make the overall program more or less desirable . . . .
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> Once the detailed designs of the program are completed, the coding begins. Each of the steps identified in the design must be turned into a language that the computer can understand. This translation process in itself requires two steps. The programmer first writes in a "source code," which may be in one of several languages . . . . The choice of language depends upon which computers the programmer intends the program to be used by, for some computers can read only certain languages. Once the program is written in source code, it is translated into "object code," which is a binary code, simply a concatenation of "0"s and "1"s. In every program, it is the object code, not the source code, that directs the computer to perform functions. The object code is therefore the final instruction to the computer."[1]

Generally speaking, "programs written outside the software engineering environment tend to be small and tend to contain few inventive elements. As such, protection against verbatim copying [is] probably all the programmer [can] hope for. As software systems

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[1] *Whelan Assocs. v. Jaslow Dental Lab.*, 797 F.2d 1222 (3d Cir. 1986).

become more complex and come to contain more creative algorithms, the engineering phase becomes essential. As that happens, it becomes necessary to provide the software developer a means to protect those high-level, inventive elements which have nothing to do with their eventual literal expression in computer code."[2] While patents are often used to protect such inventive elements, the law of copyright also helps in offering protection.

COPYRIGHT BASICS: WHAT COPYRIGHT PROTECTS

One can obtain copyright protection for an original work of authorship fixed in a tangible medium of expression. The primary issues in determining whether a work may be protected by a copyright are (1) originality, (2) authorship and the type of work, and (3) fixation in a tangible medium, each of which is discussed separately below.

COPYRIGHT BASICS: The Originality Requirement under Copyright Law as it Applies to Software

To be "original," a work must be created independently but does not necessarily need to be new (*i.e.,* unique or different from existing works). As a result, as long as you do not copy your work from the pre-existing work, you can obtain copyright protection for a work that is very similar or even identical to the pre-existing work. The work must show also some creative expression, although the threshold for creativity is low and a lack of creative expression is rarely found.[3]

Daniel Remer, in his book *Legal Care For Your Software*, offers examples of computer code that is subject to copyright as well as code that is not.[4] According to Remer, the following is an example of code that is *not* a work of original authorship and thus not subject to copyright.

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[2] Joseph G. Arsenault, *Software Without Source Code: Can Software Produced By a Computer Aided Software Engineering Tool Be Protected?*, 5 ALB. L. REV. 131 (1994).

[3] The authorship and originality requirements of the Copyright Act are understood to require "creative expression" in order to gain copyright protection, and it is this limit that ensures the facts are not copyrightable. *Feist Publications, Inc. v. Rural Tel. Serv.*, 499 U.S. 340 (1991). In *Feist*, the court found that a local telephone directory that was alphabetically arranged and contained every possible known listing was "devoid of even the slightest traces of creativity." *Id.* at 362. The court emphasized, however, that the originality or creativity requirement is not a stringent one. "Presumably, the vast majority of compilations [of facts] will pass this test [and have some minimum level of creativity], but not all will." *Id.* at 349. The court also emphasized that the copyright in a factual compilation is "thin." That is to say, "[n]ot withstanding a valid copyright, a subsequent compiler remains free to use the facts contained in another's publication to aid in preparing a competing work, so long as the competing work does not feature the same selection and arrangement." *Id.*

[4] Daniel Remer et al., *Legal Care For Your Software* (1995);
(http://www.island.com/LegalCare/pages/LC_Ch03.htm)

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200 N = 1
210 PRINT N
220 N = N + 1
230 IF N < 10 THEN GOTO 210
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"This program, copied from the Applesoft Tutorial, is a demonstration of the IF statement from Applesoft Basic™. It is not copyrightable because it is not a work of original authorship. There is no originality whatsoever in the expression of the program."[5] More specifically, the Applesoft Basic™ code excerpted above lacks sufficient creativity because anyone using the same code would write it in the exact same way. Likewise, the fact that there are limited ways of expressing the program might invoke the Merger Doctrine, discussed below.

A fax machine's "handshake protocol" (the code permitting fax machines to interface with each other) provides another example of a work that has been precluded from copyright protection due to lack of originality.[6] For example, in *Secure Services,* the court held that a fax machine's handshake protocol was not protected by copyright because the code lacked even a "faint trace of originality." In *Secure Services*, the protocol in question was derivative of another protocol and varied from the earlier protocol only in the timing and content of various signals and therefore did not constitute an original work of authorship.[7]

On the other hand, the following is an example of code that is a work of original authorship subject to copyright. The code excerpted below is used in a billing program, to determine what date to print on an invoice.[8]

```
4290 REM Subroutine to determine CS for printing during prompt
4310 I = D5(W-1)\J = I + 2\X$ = STR$(D)
4380 IF D < = 9 THEN D$ = "O" + X$(2,2)ELSE D$ = X$(2,3)
4390 C$ = D5$(I,J) + G$ + M$ + "/" + D$ + "/" + Y$
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While not spectacular, the above code is likely sufficiently original to gain copyright protection. Although the underlying logic of the code is not original, the particular expression of the underlying logic is sufficiently original to warrant copyright protection, particularly given the options available for printing similar data.

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[5] Daniel Remer et al., *Legal Care For Your Software* 2-3 (1995); (http://www.island.com/LegalCare/pages/LC_Ch03.htm)

[6] *See Secure Servs. Tech., Inc. v. Time & Space Processing*, Inc., 722 F. Supp. 1354 (E.D. Va. 1989).

[7] *See also* Stephen B. Maebius, *The New Use of Fair Use: Accessing Copyrighted Programs Through Reverse Engineering*, J. PAT. & TRADEMARK SOC'Y (June 1993) (discussing *Secure Servs.*); 1 Michael D. Scott, SCOTT ON COMPUTER LAW § 3.47 [C][7] (1998) (discussing *Secure Servs.*).

[8] Daniel Remer et al., *Legal Care For Your Software* 2-3 (1995); (http://www.island.com/LegalCare/pages/LC_Ch03.htm) at 2-3.

COPYRIGHT BASICS: What Types of Work Are protected under Copyright Law? Authorship and Types of Works

In addition to being an original work, a work must be a "work of authorship." Typical works of authorship include:

(1) literary works (books, magazines, brochures, computer programs, and other written material);

(2) musical works (music sheets) and lyrics;

(3) dramatic works (plays, skits, and stage routines);

(4) pantomimes and choreographic works;

(5) pictorial, graphic, and sculptural works;

(6) motion pictures and other audio-visual works;

(7) sound recordings; and

(8) architectural works.[9]

A work may also be a work of authorship if it is (1) a compilation of information or (2) a derivative work that is merely a variation of an existing work. Many items conventionally used in business are works of authorship, including advertising copy, brochures, product packages, graphics, product shapes, and the products themselves.

Copyrights relating to computer programs are generally of two types: literary works or audiovisual works. Literary works are works, other than audiovisual works, "expressed in words, numbers, or other verbal or numerical symbols or indicia."[10] This is true regardless of the nature of the material objects in which the works are embodied, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks, or cards. Audiovisual works are works that consist of a series of related images intended to be shown by machines or devices such as projectors, viewers, or electronic equipment, together with accompanying sounds, if any.[11] Like literary works, the nature of the material objects in which the works are embodied, such as films or tapes, is irrelevant.

A computer program is a literary work since the term "computer program" is defined by copyright law to indicate a set of statements or instructions to be used directly or indirectly in a computer to generate a certain result.[12] A computer program may also be an audiovisual work inasmuch as it includes screen display images and sounds.

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[9] 17 U.S.C. § 102 (emphasis added to computer-related categories).

[10] 17 U.S.C. § 101 (defining literary work) (emphasis added).

[11] 17 U.S.C. § 101 (defining audiovisual works).

[12] 17 U.S.C. § 101 (defining computer program).

COPYRIGHT BASICS: Copyright Exists when you write it down: Fixation in a Tangible Medium

To fix your work in a tangible medium of expression, you must embody it in a copy that is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a sufficiently long period. For example, you can fix a work in print, film, computer disk, magnetic tapes, and many other mediums from which the work may be communicated. Even software copies in RAM have been found to be sufficiently fixed, presumably because it is possible for such copies to remain for long periods of time.[13] Conversely, it appears likely that transitory RAM copies, such as those made by an intermediary network node to propagate a transmitted message or file, may not be deemed fixed.

COPYRIGHT BASICS: What are the Copyright Formalities and are they needed?

The statutory formalities of (1) notice, (2) deposit, and (3) registration have become increasingly less important since 1989 when copyright law was simplified under international legal standards. Because the old copyright law is still applicable for some works, a basic understanding of the three copyright formalities can be important in evaluating copyright protection.

Notice

The use of a copyright notice is no longer required under United States law, although it is often beneficial. The notice requirement was eliminated when the United States adhered to the Berne Convention, effective March 1, 1989.[14] The use of the copyright notice is the responsibility of the copyright owner and does not require advance permission from, or registration with, the Copyright Office.[15] A typical copyright notice uses the well-known "©" symbol, the date a particular work was published, and the name of the copyright owner. For example, if computer code was sold or distributed in 1999, it should include the following notice:

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[13] *See generally* William O. Ferron Jr., Christopher J. Daley-Watson et al., *On-Line Copyright Issues, Recent Case Law and Legislative Changes Affecting Internet and Other On-Line Publishers,* J. PAT. & TRADEMARK SOC'Y 5 (1997); *MAI Sys. Corp. v. Peak Computer Inc.*, 991 F.2d 511 (9th Cir. 1993); *Triad Sys. V. Southeastern Express Co.*, 31 U.S.P.Q.2d 1239, 1243 (N.D.C. 1994) (stating that "*MAI* stands for the general proposition that a copy made in RAM is 'fixed' and qualifies as a copy under the Copyright Act.").

[14] Although works published without notice before that date could have entered the public domain in the United States, the Uruguay Round Agreements Act (URAA) restores copyright in certain foreign works originally published without notice. For further information about copyright amendments in the URAA, request Circular 38b. United States Copyright Office CIRCULAR NO. 1, COPYRIGHT BASICS, http://lcweb.loc.gov/copyright/circs/circ1.html.

[15] *Id.*

Even though notice is no longer technically required under United States law, most authors and publishers mark their works to give notice to the public and to potential copyright infringers. Such notice has many benefits, including the negation of the so-called "innocent infringement" defense.

Deposit

Authors are required to deposit copies of their works with the United States Copyright Office as part of the registration process.

COPYRIGHT BASICS: What Are the Benefits of Copyright Registration?

Under the current Copyright Act, registration is not required for an author to receive copyright protection.[16] Registration, however, provides several advantages and benefits, including:

(1) statutory damages and attorneys' fees will be available to the copyright owner in court actions if registration is made within three months after publication of the work or prior to an infringement of the work; otherwise, the copyright owner may only receive actual damages and lost profits;

(2) before an infringement suit may be filed in court, registration is necessary for works of United States origin and for foreign works not originating in a Berne Convention country;

(3) registration provides constructive notice of copyrights to others across the United States and may establish prima facie evidence in court of the validity of the copyright and of the facts stated in the certificate;

(4) registration allows the owner of the copyright to record the registration with the United States Customs Service for protection against the importation of infringing copies;

(5) registration will help limit the likelihood that a copyrighted work is "innocently" infringed by someone else. We thus recommend that you register all computer programs you develop.[17]

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[16] Under the Berne Convention, Article 5(2) "the enjoyment and the exercise of [copyright] shall not be subject to any formality." The United States harmonized its law in accordance with the Berne Convention on March 1, 1989. United States Copyright Office CIRCULAR NO. 1, COPYRIGHT BASICS, http://lcweb.loc.gov/copyright/circs/circ1.html.

COPYRIGHT BASICS: What Are "Copyrights"? Why is copyright Plural? The Six Exclusive Rights

The owner of a copyright enjoys six exclusive rights:

(1)   the right to reproduce the copyrighted work in copies or phonorecords;

(2)   the right to prepare derivative works based upon the copyrighted work;

(3)   the right to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending;

(4)   in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works, the right to perform the copyrighted work publicly;

(5)   in the case of literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work, the right to display the copyrighted work publicly; and

(6)   in the case of sound recordings, the right to perform the copyrighted work publicly by means of a digital audio transmission.[18]

Of the above six exclusive rights, three are particularly important in the realm of computer programming. The first is the right to reproduce (*i.e.,* copy) a copyrighted work. The second is the right to distribute copies (*e.g.,* over the Internet). The third is the right to prepare derivative works. These three rights are discussed in more detail below. To a lesser extent, the right to display and perform a copyrighted work publicly might be relevant in some cases for screen displays protected as audiovisual works.

COPYRIGHT INFRINGEMENT: Copying (Reproducing) Computer Programs

Copyright law protects against the copying of protectable expression, and the type of copying (whether electronic or manual) will not avoid copyright infringement. Thus, copying source code by hand does not avoid copyright infringement liability.[19] In fact, the protectable

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[17] Some other benefits to copyright registration are: (1) early registration will allow a copyright holder to troubleshoot any difficulties identified by the Copyright Office, such as statutory formalities; (2) registration allows a copyright holder to import a limited number of foreign-made copies of English language literary works; 2,000 copies can be imported; (3) registration is required to renew certain copyrighted works published before 1978 and still in their first term; (4) registration can lead to marketing opportunities from interested business people discovering work in the Copyright Office records. *See generally* United States Copyright Office CIRCULAR NO. 1, COPYRIGHT BASICS, http://lcweb.loc.gov/copyright/circs/circ1.html; Robert B. Chickering, et al., *HOW TO REGISTER A COPYRIGHT AND PROTECT YOUR CREATIVE WORK* 7-9.

[18] 17 U.S.C. § 106 (emphasis added).

[19] *See generally* 17 U.S.C. § 102(a) (making no distinction between machine-readable copyrighted works and other more directly communicative copyrighted works).

expression of a copyrighted work is not even limited to the exact expression of a particular author's work, but can also include insubstantial changes, since otherwise "a plagiarist would escape by immaterial variations."[20] Likewise, appropriating only a small amount of copyrighted material,[21] or making unauthorized copies for a short duration of time, or just making a "few" copies of a particular work is still copyright infringement.

The exclusive right to prevent others from reproducing a copyrighted work sometimes arises in the context of reverse engineering, discussed below. In short, copyright infringement claims can be based on intermediate copies made when reverse engineering a computer program, since making even a single unauthorized copy for a short duration of time can constitute copyright infringement.

COPYRIGHT INFRINGEMENT: Distributing Copies as copyright infringement

Distributing a copyrighted work without authorization can be copyright infringement. The first-sale doctrine defense allows anyone to sell or distribute copies of a copyrighted work if that work has already been purchased or is otherwise legally acquired. In other words, if someone buys a book, he or she is always free to give or sell the book to a friend or customer.

In the realm of software, normally if someone buys a program and installs it on his or her computer, he or she cannot turn around and sell the CD-ROM containing that program to a friend and avoid copyright infringement (because the program still resides on his or her own computer). However, if the program is erased or uninstalled from the first computer, then the first-sale doctrine would apply and the program could be sold, transferred, etc., thereafter.

COPYRIGHT INFRINGEMENT: Derivative Works infringement

A derivative work is a work based upon one or more pre-existing works, such as a translation, fictionalization, sound recording, abridgement, condensation, or any other form in which a work may be recast, transformed, or adapted. A work consisting of editorial revisions, annotations, elaborations, or other modifications which, as a whole, represents an original work of authorship, is a derivative work.[22]

Because the right to prepare derivative works is one of the six rights granted under copyright law, it is illegal to create a derivative work without authorization. In other

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[20] *Nichols v. Universal Pictures Co.*, 45 F.2d 119, 121 (2d Cir. 1930) (Opinion of Judge Learned Hand).

[21] *See SAS Inst., Inc. v. S&H Computer Sys., Inc.*, 605 F. Supp. 816 (M.D. Tenn. 1985) (finding copyright infringement when only 14 lines of source code were copied out of a total of 186,000 lines of code). *Cf.* fair use defense discussed later in this memorandum.

[22] 17 U.S.C. § 101 (defining derivative works).

words, it is illegal to use another person's copyrighted work to create a work which is substantially similar to the original work.

In the context of software development, creating derivative works arises often in the following situations.

Translating Computer Code From One Language Into Another (See Below)

Modifying Another Person's Existing Code (See Below)

Reorganizing a Program's Structure and Organization (See Below)

Altering Computer Graphics (See Below)

COPYRIGHT INFRINGEMENT: Derivative Works: Translating Computer Code From One Language Into Another

Since translating a novel or play from English to French creates an infringing derivative work, one court observed that "translating a program from FORTRAN to another [programming language] would likewise be infringement."[23] In each case, the substance of the work is the same between the original and the derivative work, with only the external manifestation of the expression changing.

In most cases, despite a detailed program specification, converting the specification into an unambiguous set of computer instructions requires substantial imagination, creativity, independent thought, and exercise of discretion. Therefore, any resulting program is rarely a copy or version of the program specified by the detailed specification. As such, the program and the specification are often so different, both in physical characteristics and in intended purpose, that they are really two different expressions of the same idea, rather than two different versions of the same expression.

COPYRIGHT INFRINGEMENT: Derivative Works: Modifying Another Person's Existing Code

Modifying another person's computer program can still constitute copyright infringement, even if the end result is a new and different program. Basically, copyright law prohibits one from taking another's work and transforming it into something new without paying the original author for the underlying work, unless the new work is substantially different. This idea is at the heart of the exclusive right to prepare derivative works.

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[23] *Synercom Tech. v. University Computing Co.,* 462 F. Supp. 1003 (N.D. Tex. 1978); *see also SAS Institute, Inc. v. S&H Comp. Sys.,* 605 F. Supp. 816 (M.D. Tenn. 1985).

COPYRIGHT INFRINGEMENT: Derivative Works: Reorganizing a Program's Structure and Organization

The extent of copyright protection available for a program's structure and organization varies and can be difficult to determine, as discussed below. In some cases, copyright infringement may arise when one copies the "structure and organization" expressed in another program to create a "new" work.

A two-part test can be used to evaluate whether reorganizing someone else's program creates a "derivative work." First, determine how much of a program's structure and organization is protected by copyright. Second, evaluate whether the program is "entirely new" or merely a derivative work.

COPYRIGHT INFRINGEMENT: Derivative Works: Altering Computer Graphics

Copying, but slightly altering, another's computer graphics can give rise to copyright liability. As one can imagine, there are a variety of ways that one might transform a digitally-based graphical work. Generally, if parts of the underlying work are readily recognizable, then legal problems could arise. In general, avoid using graphics created by others (without their permission).

COPYRIGHT PRIMER: Idea/Expression Dichotomy

The "idea/expression dichotomy" refers to a principle in copyright law that ideas are not protectable. Instead, copyright protects an author's creative expression of an idea.[24] However, applying the idea/expression dichotomy to computer software is problematic because of the difficulty in separating the ideas embodied in a computer program from the particular expression of the program. Courts have struggled with separating the protectable expression in a computer program from the unprotectable ideas.[25]

Another factor that affects copyright protection for computer software is that only *copying* is prohibited—independent creation of the same computer software by another party would not be a violation of copyright. Thus, for example, it is permissible to establish "clean

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[24] 17 U.S.C. § 102(b) (prohibiting copyright for "any idea, procedure, process, system, method of operation, concept, principle, or discovery"); *see generally Baker v. Selden,* 101 U.S. 99 (1879) ("Where the truths of a science or methods of an art are the common property of the whole world, any author has the right to express the one, or explain and use the other, in his own way."); 4 Melville B. Nimmer et al., NIMMER ON COPYRIGHT § 13.03[F][1] (noting that "[t]he familiar proposition that ideas are as 'free as air' has been recognized by computer copyright cases no less than in other types of copyright litigation"); s*ee, e.g., Q-Co Indus. v. Hoffman*, 625 F. Supp. 608, 615 (S.D.N.Y. 1985).

[25] *See generally Computer Assocs. Int'l, Inc. v. Altai, Inc*., 982 F.2d 693 (2d Cir. 1992) (articulating a test for determining copyright infringement in the realm of computer software, known as the abstraction-filtration-comparison test).

room" procedures in which only the basic ideas underlying a program (*e.g.*, desired inputs and outputs) are supplied to designated software developers who then independently implement the basic ideas. If those software developers are prevented from having access to the creative expression of another person's implementation (*e.g.*, the original program), then any similarities between the two implementations arise only from shared ideas rather than from copied expression.[26]

COPYRIGHT PRIMER: Merger Doctrine

Another copyright principle that limits the protection given to copyrighted works is the "merger doctrine." Basically, the merger doctrine prevents any one person from having a monopoly over an idea when there are only limited ways of expressing the idea. Under the merger doctrine, if only a limited number of ways exist to express an algorithm or other idea, the expression is said to merge with the idea and the particular expression will receive little or no copyright protection.[27] One example of where the merger doctrine might apply is in the following code excerpt:

```
200 N = 1
210 PRINT N
220 N = N + 1
230 IF N < 10 THEN GOTO 210
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As mentioned in the previous section of this memorandum addressing originality, the code excerpt above comes from the Applesoft Tutorial and demonstrates the IF statement from Applesoft Basic™. Because there are apparently a limited number of ways to express the above program, it can be said that the idea and the expression merge, thereby creating a monopoly in not only the expression but also the underlying idea. Such a "merger" prevents one from claiming copyright. Similarly, if one way of expressing an algorithm is particularly advantageous for functional reasons (*e.g.,* efficiency), the merger doctrine may prevent copyright protection from monopolizing that means of expression.

In addressing the merger doctrine in the context of computer programs, one well-known commentator suggests that:

> [a]lthough, theoretically, many ways may exist to implement a particular idea, efficiency concerns can make one or two choices so compelling as to virtually eliminate any other form of expression. . . . For example, compare two well-known sorting techniques, the bubble sort and the quicksort, each to be used to

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[26] *See NEC Corp. v. Intel Corp.*, 1989 Copyright L. Dec. (CCH) ¶ 26,379 (N.D. Cal. 1989); *see also* discussion of the merger doctrine, *infra.*

[27] There is a related and similar doctrine in copyright law known as "scénes à faire." The difference between scénes à faire and the merger doctrine are not important for the purposes of this memorandum, as the principles embodied in the merger doctrine generally also cover scénes à faire.

sort into alphabetical order a list of 1,000 randomly arranged names. The number of comparisons that the computer must make with a bubble sort is a function of the square of the number of names. In contrast, the number of comparisons required by a quicksort is a function of (N)ln(N), where N is the number of names, and "ln" is the natural log (base e) function. The bubble sort thus will require on the order of 1,000,000 comparisons while the quicksort will require only on the order of 7,000."[28]

Thus, in evaluating which elements of a computer program are not protected, functional elements, such as sorting routines, may not be protectable under copyright law, particularly if there are few ways of expressing the sorting algorithm in source code. Other functional aspects of a program's operation, and in some cases a program's architecture, may also lack copyright protection under the merger doctrine, as discussed above.

The quicksort/bubble sort example will be used again in the following section to help illustrate the abstraction-filtration-comparison test for copyright infringement.

COPYRIGHT INFRINGEMENT ACTIONS

Copyrights may be infringed when someone either violates one of the six exclusive rights listed above, or imports material into the United States that violates an exclusive right. To establish infringement of a copyright when someone copies a work, the copyright owner must prove that he or she owns the copyright and that the infringing work was copied without authorization.

Proving copyright infringement for computer programs may be very easy or extremely difficult: proving copyright infringement for literal copying is easy, while proving copyright infringement for the copying of a program's non-literal elements, such as its sequence, structure, and organization, is more difficult.

COPYRIGHT INFRINGEMENT: PROOF OF LITERAL COPYING

One may prove copying with direct evidence that establishes copying of the author's work. Direct copying, however, is often difficult to prove. Accordingly, one may also prove copying through circumstantial evidence showing that the author's work and the accused work are substantially similar and that the accused party had access to the author's work.

One author writing on the subject points out that, often,

stolen software is cosmetically changed in an effort to conceal it. This doctored software, however, often contains the same bugs or idiosyncrasies that were in the original software. It is very difficult for the defendant to explain this coincidence. This type of proof can be planned in advance by placing nonfunctioning code in

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[28] NIMMER ON COPYRIGHT § 13.03[F][1], citing S. Baase, COMPUTER ALGORITHMS 51-60 (1978).

the program. This code, it is hoped, will remain even if the rest of the program is changed cosmetically.[29]

Without evidence of direct infringement or copying of arbitrary or non-functional aspects, one must first prove that the accused infringer had access to the software allegedly copied. If the software was sold or otherwise publicly distributed, this proof is easy. Second, one must prove that the accused software is "substantially similar" to the software allegedly copied. Nevertheless, one need not compare the majority of two works for a court to conclude that they are substantially similar. "Because all steps of a computer program are not of equal importance, the relevant inquiry cannot therefore be a purely mechanical one of comparing whether most of a program's steps are similar" to another program's steps.[30]

Similarly, proving a copyright infringement for audiovisual works involves proving access to the copyrighted work and comparing the two works for "substantial similarity."[31] One case addressing the copyrights in an audiovisual work explains that an audiovisual copyright, as opposed to a copyright on an underlying computer program, extends greater protection to the sights and sounds generated by a computer video game than to the code which generates those sights and sounds (because the same audiovisual display could be generated by different programs and yet still be infringed).[32]

COPYRIGHT INFRINGEMENT: Proving Copyright Infringement for a Computer Program's Non-Literal Elements

Because a computer program often represents a complex mixture of protectable and unprotectable elements, a particular test known as the abstraction-filtration-comparison test has been developed to assist judges with copyright infringement for non-literal elements of a computer program such as the program's "structure, sequence and organization."[33] The abstraction-filtration-comparison test entails a three-step analysis.[34]

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[29] *See* Daniel Remer et al., *Legal Care For Your Software* 2-3 (1995) (http://www.island.com/LegalCare/pages/LC_Ch03.htm).

[30] *Whelan Assocs. v. Jaslow Dental Lab, Inc.*, 797 F.2d 1222 (3d Cir. 1986).

[31] *See Stern Elecs., Inc. v. Kaufman*, 669 F.2d 852, 855 (2d Cir. 1982).

[32] *Id.*

[33] Other tests may apply, but the abstraction-filtration-comparison test is most often used in litigation and best illustrates the type of reasoning courts use in copyright infringement actions involving computer programs.

[34] *See generally Computer Assocs. Int'l, Inc. v. Altai, Inc.*, 982 F.2d 693 (2d Cir. 1992); Paul I. Kravetz, *Copyright Protection of Computer Programs*, J. PAT. & TRADEMARK SOC'Y (Jan. 1998); 1 Michael D. Scott, SCOTT ON COMPUTER LAW § 3.47 [B][5] (1998).

First, break the allegedly infringing program into constituent structural parts at each level of abstraction. At a high level of abstraction, a computer program is only an idea for solving a particular problem or performing a particular function and thus receives little or no copyright protection. At a lower level of abstraction, a program's structure, sequence, and organization become increasingly more complex. At the lowest level, the program is a series of commands typically organized into groups or modules. These lower levels of abstraction represent aspects of authorship that are protected by copyright.

The second step of the test, filtration, attempts to divide the protectable elements of the expression from unprotectable elements and ideas. Under this step, the court examines the program's structure, sequence, and organization and tries to filter out any non-protectable elements. For example, elements that might be filtered out as non-copyrightable are elements dictated by efficiency or elements dictated by external factors or elements taken from the public domain. Specifically, the following program elements, for example, might not be copyrightable when dictated by external factors: (1) mechanical specifications of a computer; (2) manufacturer's design standard; (3) industry demand; (4) compatibility/interoperability of computer applications and user interface; and (5) industry standards.[35]

The quicksort and bubble sort example discussed previously in this memorandum (in conjunction with the merger doctrine) helps illustrate the application of the abstraction-filtration-comparison test. For example, suppose that two programs are being compared by a court because the plaintiff claims the defendant copied the plaintiff's program. As proof of copying, the plaintiff submits expert testimony comparing various similarities between the two programs.

After determining the appropriate level of abstraction from which to view the two programs, a court will attempt to "filter" any non-protected elements. The fact that both programs use a quicksort technique as part of their many subroutines is not a valid point of comparison because that element of the program's architecture or design is likely unprotected by copyright. The reason that the quicksort element of the program design or architecture is unprotected is because the author presumably chose the quicksort technique because of its computing efficiency; it therefore is not part of the author's original creative expression.

After a court filters the unprotectable elements, all that is left is the comparison of the two programs. The last part of the test compares what remains (the protectable elements) with the allegedly infringing program.

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[35] *Id.*

COPYRIGHT INFRINGEMENT: Direct Infringement

Anyone who violates any of the exclusive rights of the copyright owner (discussed above) is an infringer of the copyright.[36] Copying a computer program without permission onto a diskette or a hard drive is direct copyright infringement. Photocopying an instruction manual is also direct copyright infringement. Other activities that might constitute liability for direct copyright infringement include:

    (1)   downloading software;

    (2)   uploading software;

    (3)   making software available for download; and

    (4)   transmitting software files.[37]

COPYRIGHT INFRINGEMENT: Indirect Infringement

There are two types of "indirect infringement," *i.e.*, contributory infringement and vicarious liability.

i.   *Contributory Infringement*

Someone who knows or should have known that he or she is assisting, inducing, or materially contributing to another person's infringement of any of the exclusive copyright rights may be liable as a contributory infringer."[38] The Software Publishers Association[39] suggests that the following activities might constitute contributory copyright infringement:

    (1)   posting serial numbers of a program for others who copy and use the program;

    (2)   posting cracker utilities for disabling copy protection code;

    (3)   linking to FTP sites where software may be unlawfully obtained;

    (4)   informing others of FTP sites where software may be unlawfully obtained;

    (5)   aiding others in locating or using unauthorized software;

    (6)   supporting sites from which the above information may be obtained; and

    (7)   allowing sites where the above information may be downloaded to exist on a server.[40]

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[36] 17 U.S.C. § 501(a).

[37] http://www.spa.org/piracy/risk.htm (currently http:www.spa.org/piracy/programs/risk.htm).

[38] *Gershwin Publishing Corp. v. Columbia Artistry Management, Inc.*, 443 F.2d 1159, 1162 (2d Cir. 1971).

[39] Currently known as the Software Information Industry Association.

[40] http://www.spa.org/piracy/risk.htm (currently http:www.spa.org/piracy/programs/risk.htm).

ii.   *Vicarious Liability for Infringement by Another Person*

Where contributory infringement turns on the accused infringer's relationship with the direct infringement (*i.e.*, the act), vicarious liability turns on the accused infringer's relationship to the direct infringer (*i.e.*, the party). In general, vicarious copyright infringement requires: (1) the right and ability to supervise infringing activities by the direct infringer (but not necessarily knowledge of those activities), and (2) a direct financial interest in the direct infringement.[41] The Software Publishers Association[42] suggests that the following parties might be liable for vicarious copyright infringement:

(1)   Internet Service Providers (ISPs) who support unauthorized computer programs or pirating sites on their system;

(2)   ISPs who have pirates for customers; and

(3)   System administrators for news groups where pirate activity takes place.[43]

AVOIDING COPYRIGHT INFRINGEMENT IN THE REALM OF SOFTWARE DEVELOPMENT: DETERMINING WHAT CAN BE COPIED – PROTECTED ELEMENTS

The following are likely copyrighted and thus cannot be copied without first receiving authorization from the copyright owner.

b.   Computer Source Code and Object Code, Regardless of the Type of Program (*e.g.*, Application Programs or Operating Systems)[44]

Both a computer program's source code and object code are protected under copyright law. Thus, one should not copy code from one disk to another (*i.e.*, make unauthorized copies unless such copying is for authorized back-up use), or view a program's code and retype it into one's own program without authorization. Computer applications such as a word processing program are subject to copyright law. Likewise, computer operating systems such as WINDOWS® are also subject to copyright laws.[45]

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[41] *Shapiro, Bernstein & Co. v. H.L. DeGreen Co.*, 316 F.2d. 304 (2d Cir. 1963).

[42] Currently known as the Software Information Industry Association.

[43] http://www.spa.org/piracy/risk.htm (currently http:www.spa.org/piracy/programs/risk.htm).

[44] *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (3d Cir. 1983) ("a computer program, whether in object code or source code, is a 'literary work' and is protected from unauthorized copying").

[45] Arguments that a computer operating system is not the proper subject of copyright because it represents a functional process or system or method of operation have been rejected. *Apple Computer Inc. v. Franklin Computer Corp*, 714 F.2d 1240 (3d Cir. 1983) (upholding copyright in operating system and rejecting argument that an operating system is uncopyrightable because it is a functional process, or system, or method of operation).

c. **Schematics, Flow Charts, Structure Charts, Data Flow Diagrams, State Tables, and Other Diagrams Illustrating a Program's Structure, Sequence, and Arrangement**

Written charts and diagrams illustrating a program's functions and operations are also protected by copyright. A separate copyright action might be maintained for copying these documents in addition to the underlying computer program itself.

d. **Software Documentation, Such as User Manuals**

User manuals and the like are subject to copyright protection as books or written expressions.

e. **Structure Sequence and Organization of a Computer Program (Certain Non-Literal Elements)**[46]

The abstraction-filtration-comparison test can be used to help determine what aspects of a computer program's non-literal elements, such as the program's structure and organization, are protected by copyright. Because the test is difficult to administer, you should assume that a program's structure and organization are copyrighted, except at the very highest levels of abstraction (where one is only copying the "idea" or function of the program and not its "expression").

f. **Video Displays**

A computer program's video display and audio output may well be copyrightable as an audiovisual work. Use extreme caution when copying or employing other people's images. Even the creation of "derivative works" by modifying someone else's image can constitute copyright infringement.

g. **Program Design Documentation**

All program design documentation is presumably copyrighted. Design documentation includes a programmer's notes (including those accompanying the source code), outlines, etc., that relates to the design, operation, and programming of a particular program.

h. **HTML Code, Scripts or Other Web Page Programming**

For web pages, not only are computer displayed images and computer produced audio copyrightable, but underlying code used to create such images and sound is copyrightable. Additionally, all code, scripts, and other source code for web pages are copyrightable.

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[46] *Whelan Assocs. v. Jaslow Dental Lab, Inc.*, 797 F.2d 1222 (3d Cir. 1986).

i.   Freeware

The Microsoft Press Computer Dictionary, Second Edition, defines freeware as "A computer program given away free of charge." However, even free programs cannot be freely copied. License agreements distributed with freeware define the terms for copying or otherwise using freeware.

The Software Publishers Association[47] states that freeware software licenses may stipulate that: "(1) the software is covered by copyright, (2) copies of the software can be made for both archival and distribution purposes but that distribution cannot be for profit, (3) modifications to the software are allowed and encouraged, (4) decompiling (*i.e.*, reverse engineering) of the program code is allowed without the explicit permission of the copyright holder, and (5) development of new works built upon the package (derivative works) is allowed and encouraged with the condition that derivative works must also be designated as freeware. That means that you cannot take freeware, modify or extend it, and then sell it as commercial or shareware software."[48]

j.   Shareware

The Microsoft Press, Computer Dictionary, Second Edition, defines shareware as, "Copyrighted software that is distributed free of charge but is usually accompanied by a request for a small payment from satisfied users to cover costs and registration for documentation and program updates." Again, the license agreement distributed with the program controls copying and use of the program.

The Software Publishers Association[49] states that shareware software licenses may stipulate that: "(1) the software is covered by copyright, (2) although one archival copy of the software can be made, the backup copy cannot be used except when the original package fails or is destroyed, (3) modifications to the software are not allowed, (4) decompiling (*i.e.*, reverse engineering) of the program code is not allowed without the permission of the copyright holder, and (5) development of new works built upon the package (derivative works) is not allowed without the permission of the copyright holder."[50]

k.   Derivative Works

Creating a program that is substantially derived from another's copyrighted program may be copyright infringement. As noted above, the following actions can give rise to

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[47] Currently known as the Software Information Industry Association.

[48] http://www.spa.org/piracy/risk.htm (currently http:www.spa.org/piracy/programs/risk.htm).

[49] Currently known as the Software Information Industry Association.

[50] http://www.spa.org/piracy/risk.htm (currently http:www.spa.org/piracy/programs/risk.htm).

copyright infringement liability: (1) modifying another's existing code, (2) translating computer code from one language into another; (3) reorganizing a program's structure and organization; (4) altering computer graphics; and (5) altering other protectable elements.

AVOIDING COPYRIGHT INFRINGEMENT IN THE REALM OF SOFTWARE DEVELOPMENT: Determining What Can Be Copied - Unprotected Elements

The following computer programming elements are not likely to be copyrighted and thus can be copied without obtaining authorization.

Computer Languages

No court in the United States has ruled on whether high-level computer languages like C++ or Java can themselves be protected by copyright. The Copyright Office, however, refuses to register a work consisting solely of a computer language.[51]

Algorithms

An algorithm in the most general sense is an uncopyrightable idea. As used below, the term "algorithm" refers to a "finite sequence of instructions, each of which has a clear meaning and can be performed with a finite amount of effort in a finite length of time."[52] For example, an algorithm for Christmas shopping could be: (1) find appropriate gift, (2) purchase gift, (3) wrap gift, and (4) present gift to recipient. "When viewed from the highest level, algorithms represent the very essence of abstract ideas; as such, algorithms are ineligible for copyright or patent protection. . . . [and] always remain in the public domain."[53]

Other Non-Protected Elements

i. Command Structures of Menus in Computer Applications

The command structure of menus such as pull-down menus in computer applications are not protected under copyright law. (The analogy that courts have accepted in not recognizing copyrights for pull-down menus is based on their "button-like" nature). One court specifically compared pull-down menus to the buttons on a VCR.[54] An example of the type of pull down menu that is not protected under copyright law is shown below.

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[51] 1 Michael D. Scott, SCOTT ON COMPUTER LAW § 3.47 [C][11] (1998); U.S. Copyright Office, COPENDIUM OF COPYRIGHT OFFICE PRACTICES II, at 300-26 (1984).

[52] A. Aho, J. Hopcraft & D. Ullman, *Data Structures and Algorithms* 2 (1983).

[53] 4 Melville B. Nimmer et al., NIMMER ON COPYRIGHT § 13.03[f][1] (1998).

[54] *See Lotus Development Corp. v. Borland Int'l, Inc.,* 49 F.3d 807 (1st Cir. 1995), *aff'd by an equally divided Court*, 116 S. Ct. 804 (1996).

EDIT
Undo Typing
Repeat Typing
Cut
Copy
Paste

ii.   Overlapping Windows on a Computer Display

In *Apple Computer, Inc. v. Microsoft Corp*., 24 U.S.P.Q.2d 1081 (N.D. Cal. 1992), *aff'd,* 35 F.3d 1435 (1994), the court held that the look-and-feel of the Macintosh GUI (Graphical User Interface) was given only limited copyright protection because: (1) the desktop metaphor was found to be functional (rather than artistic); (2) the GUI was primarily designed to facilitate use of the computer; and (3) many of the GUI features (*e.g.*, overlapping windows, use of manipulatable icons, etc.) were found to be standardized across competing products for functional considerations and thus unprotectable ideas rather than protectable expression.[55]

Expired Copyrights and Works in the Public Domain

Copyrights that have expired or works that are otherwise in the public domain are not protected by copyright. A detailed discussion of when a work expires or otherwise enters the public domain appears below, under "Copyright Defenses."

AVOIDING COPYRIGHT INFRINGEMENT IN THE REALM OF SOFTWARE DEVELOPMENT: DETERMINING WHAT CAN BE COPIED - PROGRAMMING ELEMENTS THAT MAY BE COPYRIGHTED ("GRAY AREAS")

Essentially, a user interface includes all devices used by end-users to interact with a computer.

> Consequently, to the extent the competing programmer can demonstrate that aspects of the original interface are functionally optimal, and that there are few ways to devise alternative interface elements that will perform the function equally well, reproduction of those original interface elements by a competing program will not infringe. (It must be borne in mind that the copyright in the interface is distinct from the copyright in the program. A competitor who invokes

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[55] *See also Lotus Development Corp. v. Borland Int'l, Inc.,* 49 F.3d 807 (1st Cir. 1995), *aff'd by an equally divided Court*, 116 S. Ct. 804 (1996) (addressing interoperability concerns); *see also* 1 Michael D. Scott, SCOTT ON COMPUTER LAW § 3.47 [C][1] (1998).

this exception pertaining to the interface must still develop the program generating the interface in a legal manner.)[56]

Structure, Sequence, and Organization

As discussed above, aspects of computer program's "structure, sequence, and organization" may not be copyrightable. For a detailed discussion, see the above discussion regarding the abstraction-filtration-comparison test and proving copyright infringement for a computer program's non-literal elements.

External Constraints

When elements of a computer program's code or structure are dictated by any of the following, those elements may not be protected by copyright:

(1)   mechanical specifications of a Computer;

(2)   manufacturer's design standards;

(3)   industry demand;

(4)   compatibility/interoperability of computer applications and user interface; and

(5)   industry standards.[57]

AVOIDING COPYRIGHT INFRINGEMENT IN THE REALM OF SOFTWARE DEVELOPMENT: DETERMINING WHAT CAN BE COPIED - PROGRAMMING ELEMENTS THAT MAY BE COPYRIGHTED ("GRAY AREAS"): REVERSE ENGINEERING/DECOMPILATION

As noted, not all aspects of a computer program are protected under copyright law, including the ideas behind a particular program.[58] Sometimes the only way to access the ideas underlying a program is through reverse engineering.[59]

Reverse engineering can be accomplished in at least two ways.[60] First, one may reverse engineer a program through the program's design documentation. For example, one may

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[56] Center for the Study of Law, Science and Technology (LaST) at the Arizona State University College of Law, in February 1989, *Computer Software and Copyright Protection*: *The "Structure, Sequence and Organization," and "Look and Feel" Questions*.

[57] *See generally Computer Assocs. Int'l, Inc. v. Altai, Inc*., 982 F.2d 693 (2d Cir. 1992).

[58] A discussion of a program's non-literal elements and the abstraction-filtration-comparison test discussed previously in this memorandum provide some insight as to which elements of a computer program will be protected by copyright.

[59] *See generally Sega Enters. Ltd. v. Accolade, Inc*., 977 F.2d 1510 (9th Cir. 1992*); Atari Games Corp. v. Nintendo of America, Inc.*, 975 F.2d 832, 842-43 (Fed. Cir. 1992).

independently develop a competing program by having one team produce design documentation of desired inputs and outputs after lawfully analyzing the program from which the competing program is to be developed. Another team then writes codes for the competing program based on the created design documentation.

A second method of reverse engineering a program involves using decompiler or disassembler programs. With decompiler or disassembler programs, one can turn object code into a source code derivative that is in human-readable language, but lacks much of the information contained in the original source code such as programmer comments, abbreviations, etc. The resulting source code derivative is then analyzed to see how the original program works. This information can then be used to create a new program that will accomplish the same task.

Be careful when reverse engineering a computer program using a decompiler or disassembler. In the process of reverse engineering a computer program, the unauthorized loading of an "intermediate" copy of the protected program can constitute copyright infringement. An "intermediate copy" is not the final work product of the alleged infringer, but a copy made in the process of creating that product. An intermediate copy, made in the course of reverse engineering, however, is still a copy, fixed in a tangible form, and therefore may infringe the copyright rights.[61] Indeed, one court recently granted a preliminary injunction for copyright infringement based, at least in part, on the fact that an unauthorized intermediate copy of the protected software was made in the reverse engineering process. The court noted that, "when an entire software program is copied, there is no doubt that protected elements of the software were copied."[62]

The copyright statute provides an exception from liability even when a copy is undeniably made. The exception, called "fair use," is made by weighing the following factors:

    (1)   the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;

    (2)   the nature of the copyrighted work;

    (3)   the amount and substantially of the portion used in relation to the copyrighted work as a whole; and

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[60] 1 Michael D. Scott, SCOTT ON COMPUTER LAW § 3.47 [C][7] (1998).

[61] *Sega* at 1519. *See also MAI Sys. Corp. v. Peak Computer, Inc.*, 991 F.2d 511 (9th Cir. 1993) (holding that "copying" occurs when a computer program is transferred to a computer's RAM from another storage device; the RAM copy qualifies as "fixed" under the statute); *Sega Enters. Ltd. v. MAPHIA,* 857 F.Supp. 679, 686 (N.D. Cal. 1994) (games uploaded to a computer bulletin board by unknown users are unauthorized copies).

[62] *Sony Computer Entertainment, Inc. v. Connectix Corp.*, 1999 WL 304052, 50 U.S.P.Q.2d 1920 (N.D. Cal. 1999); *see also DSC Communications Corp. v. DGI Techs., Inc.,* 898 F. Supp. 1183 (N.D. Tex. 1995).

(4)   the effect of the use upon the potential market for or value of the copyrighted work.

Thus, copying a work for research purposes will not necessarily be considered copyright infringement.[63]   In one related case, the viability of the fair use defense ultimately hinged on the fact that traditional reverse engineering was the only available means to get at the unprotected ideas underlying the protected software.[64]

Once a program is safely "reverse engineered," one must determine which information in the original program is "protected expression" and what is not protected.   As previously mentioned, determining which non-literal aspects of a computer program can lawfully be used may be difficult.   Specifically, the extent of protection afforded a program's "structure, sequence, and organization" may require application of the abstraction-filtration-comparison test discussed previously in this memorandum.   Further, one should note that reverse engineering may violate a program's license agreement, sometimes called "shrink wrap" and "click wrap" licenses.

As a general rule, one should carefully read and obey any license agreements distributed with a computer program.   Using the program for purposes beyond the scope of the program's license agreement can create legal liability and possible copyright infringement.[65]   For example, reverse engineering aspects of a program where the program's license agreement strictly prohibits such an act may give rise to copyright liability issues.

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[63] Courts have applied the doctrine of fair use to protect the study of copyrighted software: even if the intermediate copy would be infringing, liability may be avoided if fair use applies. *See, e.g., Atari* at 843 ("When the nature of a work requires intermediate copying to understand the ideas and processes in a copyrighted work, that nature supports a fair use for intermediate copying. Thus, reverse engineering object code to discern the unprotectable ideas in a computer program is fair use. … Fair use to discern a work's ideas, however, does not justify extensive efforts to profit from replicating protected expression. … The fair use reproductions of a computer program must not exceed what is necessary to understand the unprotected elements of the work."); *Sega* at 1518 ("Although the question is fairly debatable, we conclude based on the policies underlying the Copyright Act that disassembly of copyrighted object code is, as a matter of law, a fair use if such disassembly provides the only means of access to those elements of the code that are not protected by copyright and the copier has a legitimate reason for seeking such access").

[64] *Sega Enters. Ltd. v. Accolade, Inc.,* 977 F.2d 1510, 1526 (9th Cir. 1992).

[65] *Cf. Lasercomb America, Inc. v. Reynolds*, 911 F.2d 970 (4th Cir. 1990) (holding that a license agreement preventing the development of a competing software program was abuse/misuse of copyright law).

AVOIDING COPYRIGHT INFRINGEMENT IN THE REALM OF SOFTWARE DEVELOPMENT: DETERMINING WHAT CAN BE COPIED - PROGRAMMING ELEMENTS THAT MAY BE COPYRIGHTED ("GRAY AREAS"): OTHER COPYRIGHTED MATERIAL

One should presume that all postings on the Internet are copyrighted unless specifically stated otherwise or unless the postings fall into one of the categories of uncopyrightable material discussed below. Postings that are presumably copyrighted include: (1) email, (2) Usenet and news group posting, (3) bulletin board system (BBS) posting, (4) mailing lists posting, (5) postings to Internet Service Providers (such as America Online and Microsoft Network), (6) interactive chat communications (IRC), (7) recordings of communications via Internet telephone and Internet video conferencing, (8) web page contents, (9) computer graphics, (10) sound, (11) video; and, of course, (12) photographs.

COPYRIGHT DEFENSES

Even if one establishes ownership in a copyrighted work and that an accused infringer copied the work, the accused infringer may escape liability under one of several defenses set forth in the Copyright Act. Note, however, that although a defense to copyright infringement may exist, one may still be prohibited from copying a work. Some defenses are absolute, and thus one can copy with impunity (assuming of course that the defense can be proven at trial). Other defenses can shield one from the legal consequences of copying another work, however, they are sometimes difficult to prove.

COPYRIGHT DEFENSES: GOVERNMENTAL WORKS

Works of authorship by the United States Government are not subject to copyright.[66] A "work of the United States Government" is defined as "a work prepared by an officer or employee of the United States Government as part of their official duties."[67]

COPYRIGHT DEFENSES: EXPIRED COPYRIGHTS AND PUBLIC DOMAIN (THE PUBLIC OWNS IT NOW)

Once the copyright in a work has expired or the copyright has been abandoned, the work is in the public domain and may be freely copied. The Copyright Act has been revised over the years, and thus determining which works are in the public domain can be difficult. A basic explanation of the two main copyright law revisions follows.

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[66] NIMMER ON COPYRIGHT § 5.06[B][2] (noting that "this same principle was recognized prior to the current [Copyright] Act.").

[67] 17 U.S.C. § 101 (defining governmental works).

iii.   The 1909 Copyright Act (The 1909 Act)

Under the 1909 Copyright Act (which is still applicable for many works), a copyright did not exist until registered and marked with a proper copyright notice.[68] The term of a copyright registered under the 1909 Act is for 28 years, subject to a renewal of an additional 28 years. Subsequent amendments to the current copyright act make renewal of some copyrights automatic. The relevant details of these amendments are reflected in a chart which is attached as part of the appendix.

iv.   The Current Copyright Act (The 1976 Act)

Under the current Copyright Act,[69] a work is automatically copyrighted when first fixed in a tangible medium. Copyright notice is optional for works created after March 1, 1989. Likewise, copyright registration is optional but recommended. A copyright lasts for the life of the author plus 70 years.[70] Copyrights created by corporations or other businesses last for 95 years from creation or 120 years from publication, whichever is sooner.[71] Generally, publication occurs when a work is divulged or made publicly available.[72]

COPYRIGHT DEFENSES: NO INFRINGEMENT DEFENSE (INDEPENDENT CREATION)

Two computer programs can be identical and yet there will be no copyright infringement if both were created independently of each other. One common way of doing this is by creating a "clean room."

One may independently develop a competing program by having a first team produce design documentation of inputs and desired outputs after lawfully analyzing a first program from which the competing program is to be developed. A second team then writes code for the competing program based on the created design documentation. The competing program, even if substantially similar to the first program will not likely infringe any copyrights because of its independent creation.

COPYRIGHT DEFENSES: AUTHORIZATION DEFENSE (CONSENT/LICENSE)

Generally, if someone has permission to use a particular copyrighted work, then no copyright infringement arises. Permission to use a work is often in the form of an express

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[68] Copyright notice is discussed in this memorandum in the section addressing copyright formalities.

[69] The current Copyright Act became effective on January 1, 1978.

[70] 17 U.S.C. § 302; 1998, Sonny Bono Copyright Term Extension Act, Public Law 105-298.

[71] *Id.*

[72] 1 Melville B. Nimmer, NIMMER ON COPYRIGHT § 401 (1998).

license agreement. A license is typically freely revocable, and the license controls all uses of the work.

A license can also be implied from the actions or non-actions of the copyright owner. If a copyright owner publishes a book of computer code entitled *Code-Ready-To-Go* and says nothing about use restrictions or copyrights, one can argue that the point of the book is to provide computer code ready to be copied into a program and thus there is an implied license to at least copy the code.

COPYRIGHT DEFENSES: ABANDONMENT OR FORFEITURE

A copyright can be abandoned, forfeited, or both, and a copyright owner can sometimes be prevented from asserting their rights. Abandoning a copyright requires some manifestation of an intent to abandon. Mere inaction will not constitute such a manifestation.[73]

Forfeiture is usually associated with the publication of a work without the proper notice (required under prior Copyright laws) or can occur when a copyright owner decides to dedicate a work to the public domain.

COPYRIGHT DEFENSES: FAIR USE (COPYING JUST A LITTLE BIT)

The most widely used defense is the "fair use" defense. The fair use defense involves the following factors: (1) the purpose and character of the use (*e.g.*, commercial versus nonprofit or educational purposes),[74] (2) the nature of the copyrighted work, (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole,[75] and (4) the effect of the use on the potential market for or value of the copyrighted work. Unfortunately, the

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[73] *See, e.g., Lottie Joplin Thomas Trust v. Crown Publishers, Inc.,* 456 F. Supp. 531 (S.D.N.Y.), *aff'd,* 592 F.2d 651 (2d Cir. 1978).

[74] Before *Cambell v. Acuff-Rose Music*, 510 U.S. 569 (1994) the general rule was that all "commercial use" was presumed to be unfair. *Sony Corp. of Am. v. Universal City Studios, Inc*., 464 U.S. 417, 449-51 (1984). In *Acuff-Rose Music* the court held that the commercial nature of a work is only one factor to be considered. 510 U.S. at 579; *see also* 1 Michael D. Scott, SCOTT ON COMPUTER LAW § 3.28 [B][3] n. 543.1 (1998).

[75] *See* 1 Michael D. Scott, SCOTT ON COMPUTER LAW § 3.28 [B][3] n.543.2 (1998) citing *Marcus v. Rowley*, 695 F.2d 1171, 1176 (9th Cir. 1983) ("wholesale copying of copyrighted material precludes application of the fair use doctrine"). As discussed earlier in this memorandum, appropriating only a small amount of copyrighted material or making unauthorized copies for a short duration of time or just making a "few" copies of a particular word does not necessarily alleviate one from liability for copyright infringement. *See SAS Inst., Inc. v. S&H Computer Sys., Inc.*, 605 F. Supp. 816 (M.D. Tenn. 1985) (finding copyright infringement when only 14 lines of source code were copied out of a total of 186,000 lines of code).

case law is scant on how courts will apply the four fair use factors mentioned above in the realm of software development.[76]

An example of the fair-use defense applied in a non-software context is *Harper & Row Publishers, Inc. v. Motion Nation Enterprises.*[77] In *Harper & Row*, the Supreme Court held that using 300 words excerpted from an unpublished manuscript written by President Gerald R. Ford as his autobiography was not a fair use. The Supreme Court found that all four fair use factors weighed against a finding of fair use. The court found that the purpose and character of the infringing use was commercial in nature. The "scooped" material from the President's autobiography, for example, was intended to sell magazines and conversely was not for a nonprofit or educational purpose.[78] The court also found that the nature of copyrighted manuscript (*i.e.*, that it was unpublished) weighed against finding fair use. Specifically, the court reasoned that the infringing use interfered with the author's interest in confidentiality and creative control of his own, yet unpublished, work.

Regarding the amount and substantiality of the copyrighted work used, although only 300 words were taken from an entire manuscript, the 300 words taken were among the "most interesting and moving parts of the manuscript." Lastly, the court found that use of the infringing excerpt would directly compete for a market share of the President's autobiography. The court noted that the last fair use factor is undoubtedly the single most important consideration when determining if a particular use is fair.

In a different case, the Supreme Court found that recording copyrighted television shows for home viewing on a video tape recorder was fair use.[79] The court reasoned that most people use their video recorders to record television programs for viewing at a later time (*i.e.*, "timeshifting"). Considering the fair use factors: (1) the timeshifting use is not commercial in nature; (2) the copyrighted television shows are broadcast free of charge; (3) the entire program is recorded, including the commercials; and (4) the timeshifting use increases the value of the copyrighted work because it actually increases the viewing audience.

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[76] One case applying the fair use factors to the question of video game copyrights held that making temporary alterations to certain characteristics of copyrighted Nintendo video games was a fair use. *Lewis Galoob v. Nintendo of America*, 780 F. Supp. 1283 (N.D. Cal. 1991). *See also* 1 Michael D. Scott, SCOTT ON COMPUTER LAW § 3.28 [B][3] (1998). In the realm of computer programs, the fair use defense has perhaps been addressed most widely in the context of reverse engineering.

[77] *Harper & Row Publishers, Inc. v. Nation Enters.,* 471 U.S. 539 (1985).

[78] The commercial nature of a work is not always dispositive but weighs in favor of finding a particular use was not fair. *Cf. Campbell v. Acuff-Rose Music, Inc.*, 510 U.S. 569 (1994) (commercial use can still be fair use).

[79] *Sony Corp. v. Universal City Studios, Inc.*, 464 U.S. 417 (1984).

Because the courts have decided issues of fair use on a case-by-case basis, and because the cases addressing fair use in the context of computer programs are few, specific questions regarding the use of the fair use defense should probably be addressed to a knowledgeable attorney.