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A UNIFYING THEORY FOR THE LITIGATION OF COMPUTER SOFTWARE COPYRIGHT CASES

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As the use of computers has increased dramatically, so has the illegal copying and adaptation of computer software. Because programs can be varied quickly and easily, however, copying of programs can be disguised more readily than copying of literary and other artistic works. Thus, factfinders, particularly those unfamiliar with computer software, may not be able to detect copying by comparing competing programs for "substantial similarity," as traditionally is done in copyright cases. Professor Conley and Mr. Bryan argue that courts should focus on whether the alleged infringer's actual conduct constitutes infringement. This approach is not only practical, but more consistent with language in the 1976 Copyright Act prohibiting conduct other than verbatim copying.

Companies and individuals engaged in high technology businesses are realizing increasingly that computer programs and the intellectual work product they embody are assets of great value.1 In some instances, computer software may be a business' only substantial asset. Thus, intellectual property protection is one of the most significant legal problems that high technology companies face regularly. This Article focuses on one important type of protection, copyright.

For reasons that will be developed more fully in sections I and II of the Article, copyright protection is likely to be central to any broader program of protection of the intellectual property embodied in computer programs. The federal courts are familiar at least with the general contours of copyright law, and the copyright statute provides ample authority for meaningful relief. Nonetheless, copyright law evolved in the preelectronic era, and the articulation of modern technology and copyright principles derived from art, literature, and music is less than precise. Accordingly, a computer copyright case presents novel legal challenges on both the theoretical and practical levels.

The purpose of this Article is to identify, analyze, and offer solutions to

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several important problems endemic to computer copyright litigation. In sections IA and IB, the Article reviews the process of writing a computer program to identify the various species of intellectual property that a typical program may embody. In section IC, the legal protections available for these various categories of intellectual property are discussed. In section II the Article reviews the procedural aspects of copyright litigation; section III presents an analysis of the traditional elements of copyright protection and the evidence necessary to prove infringement, discusses a number of special problems of proof common to computer cases, and suggests several strategies to overcome such difficulties. The principal thesis that the Article sets forth in sections IV and V is that the evidentiary standard relied on in the vast majority of literary copyright cases—the substantial similarity test—is likely to be of limited utility in a software case. Instead, courts should examine other types of direct and circumstantial evidence of the defendant's conduct that often may be available in software cases. The controlling determination should be whether the defendant has derived a substantial and lasting economic advantage by borrowing from the plaintiff's program information that fairly can be characterized as expression.

I. COMPUTER PROGRAMMING AND INTELLECTUAL PROPERTY LAW

A. The Process of Writing a Computer Program

Computer programs, often known as software, instruct in code the machinery of a computer system, the hardware, to run and to perform various tasks. Programs, to borrow a phrase from Arthur Koestler, are the "ghost in the machine." Computer programs can perform an almost infinite variety of functions. Systems programs control the basic functioning of the hardware and make it generally available for specific uses to which it may be put. In legal terminology, such systems programs might be described as "procedural." Their "substantive" counterparts are applications programs, which cause a computer to perform such specific tasks as printing a document, computing an average, or doing a word search within a body of case law. The following discussion pertains to both of these major software categories.

A computer program typically is written in several steps. First, the

4. See Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1243 (3d Cir. 1983), cert. dismissed, 104 S. Ct. 690 (1984); 1 D. Bender, supra note 2, § 2.06[2]; J. Soma, supra note 2, §2.01, at 23.
5. For a discussion of the distinction between systems and applications programs, see Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1243 (3d Cir. 1983), cert. dismissed, 104 S. Ct. 690 (1984); 1 D. Bender, supra note 2, § 1.05[1]; J. Soma, supra note 2, § 1.06.
programmer studies the function to be performed and outlines the general structure of the program. In writing a program to perform statistical calculations, for example, the programmer first might outline a number of procedures. One procedure might calculate means, one might perform correlation analysis, and another might execute regression analysis. Having thus determined the program's general structure, the programmer then might break it down into sections, or modules, each of which would be designed to perform one or more tasks. Within the regression procedure, a single module might accept and organize input data, several other modules might do portions of the necessary calculations, and a final module might organize the output data. The organization of the program at various levels is a largely discretionary process, and the decisions made at the organizational stage may affect the program's efficiency and utility.

Only after the programmer thus conceives and organizes the program is he ready to begin writing the computer code. At this level, programming is done in blocks, each of which implements a specific function. A block of code may embody one or more algorithms, which are step-by-step logical procedures for solving programming problems. The algorithm chosen to accomplish a particular functional objective may determine in part the contents of a segment of code. Nonetheless, writing the code is often a highly creative process, and programmers could choose various coding techniques to achieve the same functional objective. Once again, the programmer's choices will influence the program's accuracy, efficiency, and flexibility.

The code that the programmer writes is called the "source code." Source code usually is written in a "high-level" computer language, meaning one that is similar to English. Source code can be understood readily by other programmers.
mers and thus would be helpful in copying the program or appropriating the programming concepts and methods that the program embodies.

The computer does not use the source code directly to execute the program or otherwise perform work. First, another program, called a compiler, through a complex process reads and translates source code into a language that the computer can read and execute. This version of the program is called "object code." Object code is loaded onto the computer on a storage medium such as a tape, disk, or semiconductor chip. Few computer programmers are willing and able to read object code; its distribution therefore poses less of a security risk than the distribution of source code. Since object code is sufficient and generally necessary to execute the program, it almost always is distributed to users. If the user wants to distribute the source code, he can negotiate the matter with the proprietor.

A distinguishing characteristic of the programming process is its iterative nature. As soon as the programmer has written enough code to produce a rough working version of the program, he typically loads the code onto a computer for repeated execution and analysis. This process is grossly analogous to an author editing a literary work, although the programmer is more concerned with the program's functional efficiency than the code's intellectual and aesthetic appeal, and he is aided by the computer in identifying and correcting errors. The process of testing, analysis, and refinement usually continues until and after commercial distribution; purchasers or licensees of commercial software often receive updates, enhancements, and sequentially numbered versions of the program. Although the editing process sometimes is called "debugging," to distin-

15. Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1243 (3d Cir. 1983), cert. dismissed, 104 S. Ct. 690 (1984); 1 D. BENDER, supra note 2, § 2.06[3][c]; Davidson, supra note 7, at 341, 382-83. The central processing unit of a computer is capable of performing only a very small number of highly specific tasks. A typical mainframe computer may have slightly over 100 "operations" or "machine instructions" in its repertoire, each of which is identified by a numerical "operation code." An operation code can be combined with additional information, such as a reference to a specific location in memory, to constitute a machine instruction word. A sequence of such machine instruction words, stored in the computer's memory and executed sequentially by the central processing unit, makes up a "machine language" program. Machine language is the only type of programming language that the computer understands. 1 D. BENDER, supra note 2, § 2.06[3][c]. Thus, if a program is coded in any other language it must be converted into machine language before the computer can use it. Id.

16. Data Cash Sys., Inc. v. JS&A Group, Inc., 628 F.2d. 1038, 1040 (7th Cir. 1980); Note, supra note 2, at 1725.

17. The development of technology for "decompiling" object code, or translating it back to source code, is making object code distribution an increasing security threat. See Davidson, supra note 7, at 411; Grogan, Decompilation and Disassembly: Undoing Software Protection, COMPUTER LAW., Feb. 1984, at 1, 2; Laurie & Everett, Protection of Trade Secrets in Object Form Software: The Case for Reverse Engineering, COMPUTER LAW., July 1984, at 1.

18. See Grogan, supra note 17, at 1-2.

19. Proprietors, of course, desire maximum copyright and trade secret protection for their intellectual property. Users, however, may be concerned about access to the source code for maintenance purposes if the proprietor goes out of business or otherwise fails to meet its maintenance obligations. A method used increasingly to accommodate these competing concerns is to place source code in escrow pending specified events of default; if the proprietor goes bankrupt, however, the enforceability of such an escrow is uncertain. See Conley & Bryan, Software Escrow and "Cram-Down" License Assignments under the New Bankruptcy Code, in PRACTICING LAW INSTITUTE, COMPUTER LAW INSTITUTE 565 (D. Brooks ed. 1983).
guish it from the initial writing of code, many programmers view the two activities merely as related facets of a single creative process. Early versions of the program created during the debugging process often are preserved or "archived" on paper or a computer memory device, providing an historical record of a program’s development.

The package that the user ultimately receives also may contain several items not strictly part of the program but nonetheless essential to its use. The documentation that accompanies most commercially distributed programs may vary, depending on the program and the intended users, from simple instructions to a detailed guide for modifying the program for special needs. Although the documentation rarely reproduces source code, detailed documentation may reveal much about program structure and programming methods.

Finally, many programs offer what is loosely termed a "language" to enable the user to interact with the software. This Article previously has used "language" to mean the computer language in which source code is written. In the present context, "language" means a system of specified commands, statements, and symbols with which a software user organizes and enters his own data and directs the operation of the program. Although the user language is not part of the program in the sense of being a segment of the source or object code, user language instructions cause the program to function and thus are essential to the use of the program. Moreover, since the user sees and deals with the user language, it may be the component of the program that the consumer most identifies with the product.

B. The Species of Intellectual Property Embodied in Computer Programs

In its broadest sense, the term "intellectual property" includes, on one level, ideas, concepts, know-how, and other creative abstractions, and on a second level, the literary, artistic, or mechanical expressions that embody such abstractions. Intellectual property is distinct from tangible or physical property, even though a single object may embody both. A book is tangible property that contains expression that is intellectual property; the selling of the physical property does not affect the author's right to control reproduction of his expression.

Some computer scientists believe that every level of the programming process yields valuable intellectual property on which the programmer has a proprietary claim. In the initial, organizational phase of software production, the

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20. See 1 D. BENDER, supra note 2, § 2.06[3][e].
22. For descriptions of user languages used with two well-known statistical programs, see BMDP STATISTICAL SOFTWARE 25 (W.J. Dixon ed. 1983); M. Norusis, SPSS INTRODUCTORY STATISTICS GUIDE 175 (1983).
25. A leading, recently-published text therefore recommends that software be subject to a "matrix" of copyright, patent, and trade secret protection. J. SOMA, supra note 2, § 2.18, at 67-70.
programmer's creative contribution is in the form of concepts and ideas. Although most choices that the programmer makes in this phase are discretionary to some extent, he often must choose among options on which he can assert no claim, such as established programming languages or well-documented methods for breaking a task down into modules. At other times, however, the programmer makes an identifiable creative contribution at this level, such as organizing a novel programming task or devising a new modular structure that improves on established means for achieving a particular functional end.

The intellectual property generated by the actual writing of source code comprises both ideas and expression. At the level of ideas, the programmer must choose how to organize individual lines and groups of lines, and what programming strategies to employ in particular situations.26 He may have to develop algorithms or choose among available algorithms.27 Some of the concepts and ideas employed at the code-writing level may be original, whereas others simply will reflect borrowing or adaptation of the creative efforts of others.

A programmer writing code also must synthesize the words and symbols that constitute actual programming statements. A line of code, like a line of literary prose, is the programmer's expression of all the ideas and concepts that the line embodies.28 At this final stage of programming, unless the programmer is copying or closely following a preexisting work, his contributions probably will be sufficiently original to give rise to a proprietary claim.29

Software documentation is analytically indistinguishable from any other nonfiction literary work. The documentation includes many concepts and ideas, some borrowed and some original, which the author then expresses in a manner he creates or borrows from another source.30

It is particularly difficult to identify the intellectual property embodied in a user language. The language typically will comprise words and symbols, some original, others with counterparts in English, a programming language, or the symbolism of mathematics and logic.31 The language's syntax, or rules for arranging these elements, likewise may combine the author's original contributions with rules derived from English, a programming language, or mathematics. When the language is used to cause the computer system to perform a task, the ultimate form of expression rests with the user, since he will

26. See supra notes 7-12 and accompanying text. In statistical programming, calculations often may be done in a number of sequences: Although the choice of sequence may not affect the accuracy of the calculations, it sometimes may affect computing efficiency. The cumulative effect of many such choices therefore may influence the marketability of a software product.
27. See supra notes 10-12 and accompanying text. The choice of algorithm may have an effect similar to that discussed supra note 26.
31. The language in the SAS statistical package is a good illustration of such a combination of elements. See, e.g., SAS Reference Guide 79.5 (SAS Institute, Inc. 1981); cf. 1 D. BENDER, supra note 2, § 2.06[3][c] (discussing composition of high-level programming languages).
select and combine elements to fit his data and programming needs. Thus, although the author initially may contribute ideas and concepts, they may be difficult to identify and segregate; at the level of expression, he may have little or no claim of originality or even contribution. Nonetheless, regardless of the source of the elements, the author legitimately may claim that synthesizing the entire system required substantial creativity and ingenuity. Moreover, the user language often is the user's primary or even sole contact with the author's work.

C. Legal Theories Available to Protect Different Categories of Intellectual Property

One or more legal theories are available to protect each category of intellectual property discussed above. The choice of the theory or theories appropriate to each category depends on both the nature of the intellectual property to be protected and the method of distributing the software product.

1. Patent Protection

Patents protect "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." The patentee holds the exclusive right to use, manufacture, and sell the patented invention. A patent protects the specific invention itself—the patented machine, process, or matter—rather than the scientific discoveries, mathematical principles, or laws of nature underlying the invention. Thus, competitors are free to "invent around" the patent by devising a dissimilar device that performs the same function in a different way. Design patents, which cover such things as ornamental structures, have a life of fourteen years; utility patents, which cover machines and other products and the processes used to develop them, last seventeen years.

In the 1972 case of Gottschalk v. Benson the Supreme Court held unpat...
entable a computerized process for converting binary-coded decimal numerals into pure binary numerals. The Court reasoned that such a patent would grant a monopoly on a mathematical algorithm, which was equivalent to a traditionally unpatentable abstract intellectual concept. In subsequent decisions the Supreme Court held not patentable two other processes that used computer programs, but did not foreclose entirely the patenting of programs. Most recently, in Diamond v. Diehr, the Court held that an otherwise patentable industrial process which employed a computer system to perform essential calculations was not thereby rendered unpatentable.

These decisions suggest several observations about the patentability of computer software. First, the Supreme Court seems to have left open whether computer software standing alone, not tied in the patent application to a patentable machine or process, constitutes patentable subject matter. There is post-Diehr case support for both positions. Second, Diehr appears to suggest that otherwise patentable processes will not be denied protection simply because they use computer hardware and software. Similarly, software more likely will be patentable if the claimed invention is described as a process in which the software is applied. Last, these decisions do not undermine the patentability of computer

position that a computer program, whether claimed as a process or as part of an apparatus, was unpatentable. See Diamond v. Diehr, 450 U.S. 175, 197-98 (1981). In that same year, however, the Court of Customs and Patent Appeals issued two opinions that repudiated the longstanding legal doctrines on which the Patent Office based its position. See In re Tarczy-Hornoch, 397 F.2d 856, 857 (C.C.P.A. 1968) (rejecting doctrine that process which amounted to nothing more than a description of the function of a machine was unpatentable); In re Prater, 415 F.2d 1378, 1379 (C.C.P.A. 1968) (rejecting doctrine that processes which could be performed mentally were unpatentable), modified on rehearing, 415 F.2d 1393 (C.C.P.A. 1969). Then, in In re Bernhart, 417 F.2d 1395, 1400-01 (C.C.P.A. 1969), the court reaffirmed Prater and also announced that apparatus patents could be obtained for existing computers programmed in new and unobvious ways. Finally, in In re Musgrave, 431 F.2d 882, 892-93 (C.C.P.A. 1970), the court again emphasized Prater's rejection of the so-called "mental steps" doctrine and held that a computerized seismic interpretation process was patentable. A sequence of operational steps was a patentable process, the court held, as long as the process fell within the technological arts, regardless of whether it replicated a mental process. See J. Soma, supra note 2, § 2.03 at 29-30.


43. 450 U.S. 175, 187-88, 191-93 (1981); see J. Soma, supra note 2, § 2.04, at 33-35. The Diehr Court stated that "a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer. Diehr, 450 U.S. at 187.

44. See Gottschalk, 409 U.S. at 71-72; J. Soma, supra note 2, § 2.03, at 30-31.


46. For an analysis of the cases, see Milde, Life after Diamond v. Diehr: The CCPA Speaks Out on The Patentability of Computer-Related Subject Matter, 64 J. PAT. OFF. SOC'Y 434 (1982).

47. In Diehr the Supreme Court allowed patent application claims for a method of operating a rubber-molding press. The method included constant measurement of the temperature data and
hardware as machines. Thus, an invention described as a computer containing certain software is more likely to be found patentable than the same software standing alone.48

2. Copyright Protection

In contrast to their uncertain status under patent law, copyright law clearly protects computer programs embodied in source or object code. Under the Copyright Act of 1976, copyright "subsists" in works of authorship and takes effect on creation of the work.49 Copyright historically has applied to literary works, works of art, music, and artistic performances. The definition of a "copy" has been amended, however, to include works of authorship fixed in any tangible medium, even those that cannot be perceived without the aid of a machine.50 This amendment appears to confirm that copyright may protect both human-readable source code and machine-language object code; the United States Court of Appeals for the Third Circuit so held in Apple Computer, Inc. v. Franklin Computer Corp.51 Both systems and applications programs have been held subject to copyright protection.52

repeated calculation by a computer of a well-known mathematical formula incorporating the data. Id. at 179-80 n.5.

In Parker v. Flook, 437 U.S. 584 (1978), the Court rejected a claim for a method of calculating a temperature "alarm limit" at which a catalytic conversion process would be shut down. Id. at 585-86. A computer was to perform the calculations that would be used in an industrial process, but the patent claim itself merely recited and explained the formula. Id. at 596-98. The Court determined that the only point of novelty was "a new and presumably better method for calculating alarm limit values," id. at 594-95, and analogized the claim to an attempt to patent the formula used in calculating the circumference of a wheel. Id. at 595. In the Court's view, such a patent would grant a monopoly on an uninventive application of a "phenomenon of nature or mathematical formula." Id. at 594.

In Diehr the only novel aspect also was the improvement in the speed of calculating a well-known equation in a standard industrial process. Diehr, 450 U.S. at 179. Arguably, the only distinction between the cases is that Diehr's claim described an improved industrial process that involved computerized computations, whereas Flook's described only the computerized computations themselves. See Milde, supra note 45, at 435-39.

48. See Note, supra note 2, at 1733-35.
50. See id. In 1978, the National Commission on New Technological Uses of Copyrighted Works (CONTU), a commission created by Congress in Act of Dec. 31, 1974, Pub. L. No. 93-573, 88 Stat. 1373, recommended that copyright law be amended "to make it explicit that computer programs, to the extent that they embody an author's original creation, are proper subject matter of copyright." CONTU REPORT, supra note 12, at 2. Congress adopted many of CONTU's recommendations in amending the Copyright Act in 1980, in an attempt to clarify the copyright status of computer software. Act of Dec. 12, 1980, Pub. L. No. 96-517, § 10, 94 Stat. 3028; see H.R. REP. No. 1307, 96th Cong., 2d Sess. 23, reprinted in 1980 U.S. CODE CONG. & AD. NEWS 6460, 6482. The 1980 amendments added a definition of "computer program" to § 101, repealed existing § 117, which had made computer programs subject to legal principles developed under the 1909 Copyright Act, and enacted a new § 117 to give "owners" of copies of computer programs limited authority to use, adapt, or reproduce those copies for certain purposes. (CONTU had recommended that this authority be extended to "rightful possessors" of copies; see CONTU REPORT, supra note 12, at 30). See J. SOMA, supra note 2, § 2.07, at 44; infra notes 276-88 and accompanying text.
51. 714 F.2d 1240, 1249 (3d Cir. 1983), cert. dismissed, 104 S. Ct. 690 (1984). The Apple Computer decision appears to have resolved with compelling logic a split of authority on the copyright status of object code. See id. at 1247-49.
52. Id. at 1253-54; see also Apple Computer, Inc. v. Formula Int'l, Inc., 725 F.2d 521, 523 (9th Cir. 1984) (operating system subject to copyright protection).
Although documentation distributed with a program is subject to the same copyright protection as other literary works, the protection of user languages is wholly uncertain. On the one hand, it is clear that a document listing the elements of a language or describing the rules for its use is a copyrighted literary work. On the other hand, if one merely uses the language, or even writes a program that accepts an identical system of user commands, it is difficult to say that the copyright in an identifiable "work of authorship" has been infringed, even if the result is the appropriation of something that the programmer views as proprietary to him.\footnote{53}

The copyright holder has the exclusive right to "reproduce the copyrighted work in copies" and "to prepare derivative works based upon the copyrighted work."\footnote{54} "Derivative work" is defined broadly to include subsequent works "based upon one or more preexisting works, such as a translation . . . or any other form in which a work may be recast, transformed, or adapted."\footnote{55}

The application of this apparently straightforward Copyright Act language has been far from simple. For example, under the 1909 Copyright Act, which did not reserve to the author the right to create derivative works, the word "copies" was construed to include paraphrases and works bearing a close structural similarity to the copyrighted work, even though not using the original's actual language.\footnote{56} Although arguably obviated by the inclusion of the derivative work concept, this broad interpretation of copying has persisted in cases under the current Act.\footnote{57} Moreover, copyright protects only expression, not the ideas being expressed.\footnote{58} Drawing the line between idea and expression has proved to be perhaps the most vexatious problem in the long history of copyright law.\footnote{59}

Taken literally, the current Copyright Act's definition of "derivative work" appears to provide expansive protection. If the copyright holder has the exclusive right to prepare works "based upon" or representing recastings, transformations, or adaptations of the original,\footnote{60} that right would prohibit virtually any borrowing from the original in creating a subsequent work.\footnote{61} Although this

\footnote{53} Copyright protection for user languages is discussed \textit{infra} notes 289-324 and accompanying text.

\footnote{54} 17 U.S.C. § 106(1), (2) (1982).

\footnote{55} \textit{Id.} § 101.


\footnote{59} 3 M. NIMMER, NIMMER ON COPYRIGHT § 13.03[A][I] (1984).


\footnote{61} For example, a work borrowing its characters and its theme from an existing work plausibly could be characterized as "based upon" the original. Borrowing at this level, however, usually has been characterized as a permissible appropriation of ideas rather than expression. See, e.g., Warner Bros. Pictures, Inc. v. Columbia Broadcasting Sys., 216 F.2d 945, 951-52 (9th Cir. 1954) (appropria-
expansive interpretation of derivative work may squarely conflict with the statutory prohibition against extending copyright protection to ideas, the courts have given little guidance on whether the definition of derivative work is to be applied literally. The Copyright Act authorizes broad relief. The Act and associated Supreme Court rules provide for impounding infringing works before, during, or after trial. The Act itself authorizes equitable relief "on such terms as [the court] may deem reasonable to prevent or restrain infringement of a copyright." The Act also authorizes actual damages and disgorgement of an infringer's profits, as well as statutory damages up to $50,000 for willful violations and reasonable attorneys' fees.

3. Trade Secret Protection

Neither patent nor copyright law protects pure knowledge or abstract concepts. Both protect, in varying degrees, the expression, manifestation, and use of ideas. Protection of knowledge and concepts is left largely to state trade secret law.

The most widely cited definition of trade secret is articulated in comment b to section 757 of the Restatement of Torts:

A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. The same comment states that "[t]he subject matter of a trade secret must be secret." The secrecy, however, need not be absolute; "a substantial element of secrecy must exist, so that, except by the use of improper means, there would be difficulty in acquiring the information." The Restatement suggests examining the related "scenes a faire" doctrine provides that if certain elements of plot and character development can be expressed in only a limited number of ways, substantial similarity of expression is not necessarily infringement. See Reyher v. Children's Television Workshop, Inc., 533 F.2d 87, 91 (2d Cir. 1976).

65. Rules Adopted by the Supreme Court of the United States for Practice and Procedure under Section 25 of an Act to Amend and Consolidate the Acts Respecting Copyright, approved March 4, 1909, reprinted in 4 M. NIMMER, supra note 59, app. at 12.
67. Id. § 504(a)(1), (b).
68. Id. § 504(a)(2), (c).
69. Id. § 505.
70. RESTATEMENT OF TORTS § 757, comment b (1939). This section and other sections dealing with business torts were not included in the Second Restatement. See also UNIFORM TRADE SECRETS ACT, ABA SECTION OF PATENT, TRADEMARK, AND COPYRIGHT LAW, 1973 COMMITTEE REPORTS 179-82, reprinted in 12A BUSINESS ORGANIZATIONS, MILGRIM ON TRADE SECRETS app. A (1983) [hereinafter cited as MILGRIM].
71. RESTATEMENT OF TORTS § 757, comment b (1939).
72. Id.
six factors to determine whether particular information is a trade secret:

1. The extent to which the information is known outside of his [the proprietor's] business; (2) the extent to which it is known by employees and others involved in his business; (3) the extent of measures taken by him to guard the secrecy of the information; (4) the value of the information to him and to his competitors; (5) the amount of effort or money expended by him in developing the information; (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.73

Many courts have adopted these suggested factors.74 A few courts also have required the purported trade secret to have an element of novelty.75

The following practices are among those employed to ensure the requisite "substantial element of secrecy": requiring employees to sign employment agreements acknowledging the confidentiality of certain information and prohibiting use of such information during employment and for a period of time after termination of employment;76 safekeeping of confidential documents;77 limiting access by outsiders and all but necessary employees to confidential documents and sensitive plant areas;78 disclosing sensitive information to third parties only pursuant to written confidentiality agreements;79 and monitoring security breaches.80

Given the process by which it is created, a complex computer program appears eligible for trade secret protection.81 At every level of abstraction, the programmer must make decisions that affect the ultimate success or failure of the program.82 To the extent that such decisions are maintained in substantial secrecy, they appear to constitute a "formula, pattern . . . or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it."83 Thus, to the extent that copyright law may not protect the ideas and concepts that the program embodies, trade secret law may.

Pursuant to section 757 of the Restatement, any person who uses or discloses the trade secret of another is liable for misappropriation if "(a) he discov-

73. Id. § 757.
74. See 12 MILGRIM, supra note 70, § 2.01, at 2 n.2. For an application of the Restatement test to alleged trade secrets in a computer program, see Cybertek Computer Prods., Inc. v. Whitfield, 203 U.S.P.Q. (BNA) 1020, 1023 (Cal. Super. Ct. 1977).
77. See 12 MILGRIM, supra note 70, § 2.04; 12A MILGRIM, supra note 70, § 7.07[l][a].
78. See 12 MILGRIM, supra note 70, § 2.04.
79. See id.
80. See id.
82. See supra notes 2-20 and accompanying text.
83. RESTATEMENT OF TORTS § 757, comment b (1939).
ered the secret by improper means, or (b) the disclosure or use constitutes a breach of confidence reposed in him by the other in disclosing the secret to him. 84 Acquisition by improper means usually occurs through industrial espionage or breach of a confidential relationship. 85 Disclosure in breach of a confidential relationship may occur when a partner uses the trade secret of a partnership for personal advantage, 86 or when an employee or other party to whom a trade secret has been disclosed for business reasons uses the secret in violation of an express 87 or implied confidentiality agreement. 88 Significantly, it is not a defense that a competitor might have learned the protected information from lawfully acquired sources; the relevant inquiry is what the defendant did, not what someone else might have done. 89

When trade secret protection is sought for computer programs that are widely distributed to users, there is an inherent tension between the requirement of secrecy and the fact of distribution. Wide distribution of software does not foreclose trade secret protection, as long as each recipient is party to an agreement that creates a confidential relationship and substantially limits disclosure of those aspects of the software deemed proprietary. 90 Thus, software generally is distributed only pursuant to license agreements. 91 Software license agreements typically define broadly the trade secrets that the program embodies, require the licensee to acknowledge the existence and protected status of those trade secrets, prohibit use or disclosure of the software beyond what is necessary to carry out the product’s intended purpose, and prohibit copying of the software or any accompanying documentation except for legitimate backup purposes. 92

Courts formulating remedies in trade secret cases tend to follow general principles of equity. 93 In part because the products often are complex, the cases are difficult to reconcile and offer little help to a lawyer attempting to predict the

84. Id. § 757.
85. See, e.g., E.I. DuPont deNemours & Co. v. Christopher, 431 F.2d 1012 (5th Cir. 1970) (aerial photography of unfinished plant); Forest Labs., Inc. v. Formulations, Inc., 299 F. Supp. 202 (E.D. Wis. 1969) (use of trade secrets that were disclosed in confidence), rev’d in part sub nom. Forest Labs., Inc. v. Pillsbury Co., 452 F.2d 621 (7th Cir. 1971).
86. See 12 MILGRIM, supra note 70, § 5.03[7].
87. See id. § 3.05[1].
88. See id. § 3.03.
91. In J & K Computer Sys. v. Parrish, 642 P.2d 732 (Utah 1982), plaintiff informed its employees and customers that its accounts receivable program was secret and noted on each copy of the program that it could be used only when authorized by license. Because of these measures, the court found the program protectible even though its contents were revealed to certain customers. Id. at 735.
92. See 1 D. BENDER, supra note 2, § 4A.07[1].
outcome of his own case. 4 It is particularly difficult to predict when one who has misappropriated a trade secret will be enjoined from distributing a product that allegedly embodies it. 5 Even when a court issues such an injunction, the length of time it is to remain in effect and the scope of its coverage are difficult problems that are resolved on a case-by-case basis. 6 These difficulties are exacerbated when the trade secret has been made public by legitimate means after the alleged misappropriation but before trial, 7 or when the defendant can demonstrate that the product sought to be enjoined uses both the misappropriated trade secret and his original contributions. 8

Finally, possible preemption of trade secret protection for software must be considered. Section 301(a) of the Copyright Act of 1976 provides:

[A]ll legal or equitable rights that are equivalent to any of the exclusive rights within the general scope of copyright as specified by section 106 in works of authorship that are fixed in a tangible medium of expression and come within the subject matter of copyright as specified by sections 102 and 103 . . . are governed exclusively by this title . . . . No person is entitled to any such right or equivalent right in any such work under the common law or statutes of any State. 9

Section 301(b)(1) further provides that "[n]othing in this title annuls or limits any rights or remedies under the common law or statutes of any State with respect to . . . subject matter that does not come within the subject matter of copyright . . . ." 10

Although the courts have not yet construed section 301 definitively, 102 the lan-

94. Compare Shellmar Prods. Co. v. Allen-Qualley Co., 87 F.2d 104 (7th Cir. 1936) (wrongdoer may be enjoined permanently from use or disclosure even though a subsequently issued patent makes the information public) with Schreyer v. Caseo Prods. Corp., 190 F.2d 921 (2d Cir. 1951) (disclosure in patent precludes liability for use of information after patent issued) and Conmar Prods. Corp. v. Universal Slide Fastener Co., 172 F.2d 150 (2d Cir. 1949) (injunction can remain in effect only as long as trade secret remains secret).


96. See supra note 95; see also Head Ski Co. v. Kam Ski Co., 158 F. Supp. 919 (D. Md. 1958) (broad injunction necessary when entire operation was built on plaintiff's techniques, methods, materials, and design).


100. Id. § 301(b)(1).

101. Id. § 301(b)(3).

102. The United States Court of Appeals for the Second Circuit has construed 17 U.S.C. § 301 (1982) in dictum to preempt previous law and "replace the labyrinth of statutory and common law authority with a single, generally applicable federal statute." Roth v. Pritikin, 710 F.2d 934, 938 (2d Cir.), cert. denied, 104 S. Ct. 393 (1983). Prior to the 1976 Act, the Supreme Court had held that the Copyright Clause in the United States Constitution did not vest in the federal government the exclu-
guage and legislative history of the section suggest that it was intended to abrogate only the common law of copyright. Accordingly, common-law protection should remain available for ideas and concepts, which are excluded specifically from federal copyright protection.

A series of Supreme Court decisions on the interaction of federal patent law and state trade secret and unfair competition law supports this interpretation. Between 1964 and 1974 the Court expressed and then retreated from the view that state law could not protect unpatentable inventions because they were in the public domain. In the most recent of these decisions, the Court concluded that "the patent policy of encouraging invention is not disturbed by the existence of another form of incentive to invention. In this respect the two systems [patent and trade secret law] are not and never would be in conflict."

4. Summary

Every computer program includes source and/or object code in which a copyright subsists. There is no persuasive reason not to take the procedural steps necessary to take full advantage of Copyright Act protection. Since a software developer will also likely claim proprietary rights in intellectual contributions other than writing code, he should complement copyright with licensing and other forms of trade secret protection. Nonetheless, in cases involving alleged misappropriation of a program, copyright infringement is likely to be a major issue. The remainder of this Article discusses some of the specific problems likely to be encountered in computer copyright litigation.

II. PROCEDURAL PREREQUISITES TO COPYRIGHT LITIGATION

A plaintiff attempting to prove copyright infringement must meet certain procedural prerequisites and then prove the required substantive elements. Procedurally, the plaintiff must have registered the copyright and, if not the copyright's original owner, have recorded the instrument of transfer vesting the copyright in the plaintiff. The plaintiff must have standing and must have
brought the action within the appropriate statute of limitations. Finally, the court must have jurisdiction over both the subject matter and the defendant.

A. Specific Requirements

1. Registration and Recordation

The plaintiff may not initiate an action for copyright infringement until he has registered the work in the Copyright Office, or at least attempted to register and been refused. Registration requires submission of an application, a small fee, and a “deposit” of two complete copies of the “best edition” of the work. The Copyright Office prefers the deposit of a computer program’s source code, but will accept object code under the so-called rule of doubt. In either case, “special relief” may be available to protect the confidentiality of trade secret materials.

Registration is only a prerequisite to initiating the action, not the existence or validity of the copyright. Thus, once the plaintiff has registered or attempted to register the copyright, he may sue for infringements that occurred both prior to and after registration. If the plaintiff is not the author of the work, he also must record in the copyright office the instrument of transfer under which he asserts ownership of the right allegedly infringed.

2. Standing to Sue

The owner of the copyright and any assignee or exclusive licensee of any...
right arising out of the copyright all have standing to sue to the extent of their respective interests at the time of infringement. A nonexclusive licensee does not have standing to sue and must rely on his licensor to initiate the action.

Under the current Copyright Act, the owner of a copyright may assign or grant an exclusive license in some, but not all, of the rights arising out of the copyright, and thus, multiple parties may have protected rights in a single work that was infringed only once. A plaintiff should identify specifically the right infringed and the date of infringement to demonstrate that he is the appropriate party to bring the suit.

3. Statute of Limitations

The plaintiff must initiate any action for copyright infringement within three years of the date on which the claim accrued. Since the claim does not accrue until the infringement actually occurs, the plaintiff must identify specifically the act or acts that constitute infringement. If an act of infringement occurred within the prior three years, a suit for damages arising out of that act will not be barred, even if the statute of limitations does bar a suit for other, earlier infringements of the same work by the same party.

Any equitable ground recognized under federal law, such as estoppel or fraudulent concealment, may toll the limitation period. A state tolling statute in the jurisdiction of the action, however, is not sufficient to toll the statute.

4. Jurisdiction

The federal district courts have exclusive original subject matter jurisdiction over actions for the infringement of a statutory copyright. The state courts have jurisdiction over actions to enforce, invalidate, or rescind contracts, as well as actions for breach of warranty, even though the validity of a copyright or the existence of infringement may be an issue. State courts also have juris-

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121. See 3 M. Nimmer, supra note 59, § 12.02. 17 U.S.C. § 501(b) (1982) provides only that the "legal or beneficial owner of an exclusive right under a copyright" may sue. The section defines an "exclusive right" as including the rights of a copyright holder set out in § 106.
123. See 17 U.S.C. § 201(d)(2) (1982). This section is the first explicit statutory recognition of the principle of divisibility of copyright. Id., Historical and Revision Notes.
124. See id. § 507.
125. See Hoste v. Radio Corp. of Am., 654 F.2d 11 (6th Cir. 1981); 3 M. Nimmer, supra note 59, § 12.05.
130. 28 U.S.C. § 1338 (1982) provides that "[t]he district courts shall have original jurisdiction of any civil action arising under any Act of Congress relating to patents, plant variety protection, copyrights and trademarks. Such jurisdiction shall be exclusive of the courts of the states in patent, plant variety protection, and copyright cases."
131. See Condon v. Associated Hosp. Serv., 287 N.Y. 411, 40 N.E.2d 230 (1942); 3 M. Nimmer,
diction over any other claims for the infringement of common-law copyright.132 In determining whether it has personal jurisdiction over the defendant in an infringement action, a court will apply general principles of federal jurisdiction.133

III. SPECIAL PROBLEMS IN COMPUTER COPYRIGHT CASES

A. Infringement Generally

The two classic elements of a copyright infringement case are the validity of the copyright and the existence of copying.134 A copyright is valid if the work is appropriate copyright subject matter135 and an original work of authorship.136 Registration of the copyright and issuance of the registration certificate within five years after the work's first publication is prima facie evidence of the validity of the copyright and the facts stated in the certificate.137 The court may, but is not required to, give evidentiary weight to a certificate of registration first recorded more than five years after the work's first publication.138 Once the plaintiff establishes prima facie proof of the validity of the copyright, the burden shifts to the defendant.139

As noted earlier, a computer program in source- or object-code form, whether stored on a tape, disk, ROM, or other medium, is subject to copyright protection.140 Both systems and applications programming are protected, and the user's interaction with the program and contribution to the output should not affect the protection.141

Direct evidence of copying, by admission or eyewitness testimony, is often unavailable.142 Thus, courts have long allowed copying to be proved circumstantially by showing access to the infringed work and substantial similarity be-

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133. See 3 M. NIMMER, supra note 59, § 12.01[C].

134. See id. § 13.01.


138. See id.

139. 3 M. NIMMER, supra note 59, § 13.01[A].


142. Direct evidence of copying a computer program, however, may be more readily available. See Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1245 (3d Cir. 1983) (defendant admitted copying each work for which infringement alleged), cert. dismissed, 104 S. Ct. 690 (1984). See infra notes 324-50 and accompanying text; supra notes 19-21 and accompanying text.
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between the original and allegedly infringing works. It usually is not difficult to demonstrate access. The defendant may admit it, or may be shown to be a purchaser or licensee of the program. In some cases, the court may presume access if the plaintiff's work is readily available on the market. Defining substantial similarity, however, has proved to be one of the most difficult problems in cases dealing with literary works. The problem promises only to become exacerbated in the computer context.

B. Proving Substantial Similarity

Generally, the substantial similarity test "is whether the accused work is so similar to the plaintiff's work that an ordinary reasonable person would conclude that the defendant unlawfully appropriated the plaintiff's protectible expression by taking material of substance and value." As another court has put it, substantial similarity exists when "an average lay observer would recognize the alleged copy as having been appropriated from the copyrighted work."

1. The Standard for Evaluating Similarity

Most courts determining whether two works are substantially similar have evaluated them from the perspective of the hypothetical ordinary lay observer; "analytic dissection" and expert testimony generally are not favored for this purpose. Other courts, particularly the United States Courts of Appeals for the Third and Ninth Circuits, have applied the following two-pronged inquiry: First, is there enough similarity to infer that the defendant copied at all? Second, is the copying extensive enough to constitute a misappropriation of the plaintiff's work? Under this approach, dissection is permitted in answering the first question but the second is answered from the perspective of the


149. See Universal Athletic Sales Co. v. Salkeld, 511 F.2d 904, 907 (3d Cir.), cert. denied, 423 U.S. 863 (1975); Midway Mfg. Co. v. Bandai-America, Inc., 546 F. Supp. 125, 138 (D.N.J. 1982). The Ninth Circuit sometimes has varied this approach, requiring an "extrinsic" or "objective" showing that the two works are similar in idea, and then an "intrinsic" or "subjective" showing that they are similar in expression. See Litchfield v. Spielberg, 736 F.2d 1352, 1356-57 (9th Cir. 1984); Sid & Marty Krofft Television Prods., Inc. v. McDonald's Corp., 562 F.2d 1157, 1162-64 (9th Cir. 1977); cf. Atari, Inc. v. North American Philips Consumer Elecs. Corp., 672 F.2d 607, 614 (7th Cir. 1982) (in videogame case, court refers to two-part test, but focuses inquiry on reaction of ordinary lay observer), cert. denied, 459 U.S. 880 (1983).

With either approach, the courts permit expert testimony and dissection on the issue of whether the misappropriated portions of the plaintiff’s work are subject to copyright protection.152

The process of proof is relatively straightforward in the typical literary case. The competing works are put before the trier of fact who, assisted by descriptive testimony, determines such things as the extent of line-by-line copying and the overall similarity of the two works.153 Expert testimony may be introduced on such specific issues as whether the plaintiff’s work merely restates mathematical formulas, laws of nature, or other matters in the public domain.154

It is difficult, if not impossible, to apply these standard copyright principles to a computer case, primarily because an ordinary lay observer often is incapable of comparing line by line two sets of computer source or object code. In the rare case of verbatim copying the ordinary lay observer might be able to detect it simply by comparing the two sets of code side by side.155 Such relatively minor changes as the translation of the plaintiff’s code from one computer language to another or the reversal of the order in which a program carries out certain calculations, however, may render the two works materially dissimilar to the lay observer. Because either of these changes could be made mechanically and neither change necessarily would vitiate copyright liability,156 the ordinary-lay-observer standard may have limited utility in computer cases.157 In several cases, the trier of fact determining source code similarity therefore has relied on otherwise disfavored expert testimony and analytic dissection.158

151. Id.
152. Id.; see also Atari, Inc. v. North American Philips Consumer Elecs. Corp., 672 F.2d 607, 615 (7th Cir. 1982) (If the works are similar only in an abstract idea not subject to copyright protection, there is no substantial similarity or infringement.), cert. denied, 459 U.S. 880 (1983).
153. E.g., Sheldon v. Metro-Goldwyn Pictures Corp., 81 F.2d 49 (2d Cir.) (Judge Learned Hand discusses copyright protection of play), cert. denied, 298 U.S. 669 (1936).
154. See supra note 152 and accompanying text.
157. If such mechanical changes rendered the competing works superficially dissimilar, the lay observer would be unable to draw reasonable inferences about common origin.
158. The legal significance of alleged but disputed source-code similarity was litigated in SAS Institute, Inc. v. S & H Computer Sys., Nos. 82-3669 & 82-3670 (M.D. Tenn. filed July 30 & 31, 1982) (consolidation of separately filed cross-actions), which was tried by Professor Conley, one of the authors of this Article. SAS Institute alleged that a new S & H product infringed its copyright and that S & H had violated a license agreement in creating the product. S & H challenged the validity of SAS Institute’s copyright, denying both breach of the license and copying. The court summarized the facts in a partial summary judgment order of July 25, 1983, which dealt with the license issues and the copyright status of an earlier version of the product that allegedly was copied. S & H Computer Sys. v. SAS Institute, Inc., 568 F. Supp. 416 (M.D. Tenn. 1983). The copyright issues were tried to the court in September 1983, and a decision recently was handed down. See infra notes 364-79 and accompanying text. At trial, each side presented testimony from several experts, both in-house and independent, on whether certain similarities in the source codes of the two products supported an inference of copying.

2. How Much Similarity is Enough?

There are no reported decisions in which a court has judged the substantiality of alleged but contested similarities between two sets of computer source code. In perhaps the most widely publicized computer copyright case, *Apple Computer, Inc. v. Franklin Computer Corp.*, copying was admitted, and in the frequently cited case of *Synercom Technology, Inc. v. University Computing Co.*, the similarity at issue was between elements of input and output. Thus, to determine how much similarity is "substantial" in a software case, it is necessary to begin with principles developed in other contexts. First, "[a]n infringement is not confined to literal and exact repetition or reproduction; it includes also the various modes in which the matter of any work may be adopted, imitated, transferred, or reproduced, with more or less colorable alterations to disguise the piracy." The defendant's work need only "have captured the 'total concept and feel'" of the plaintiff's work.

Second, substantial similarity does not require literal, line-by-line identity; as Judge Learned Hand put it,

> We have often decided that a play may be pirated without using the dialogue. . . . The play is the sequence of the confluent[s] of all these means [all the elements of the story and performance], bound together in an inseparable unity; it may often be most effectively pirated by leaving out the speech, for which a substitute can be found, which keeps the whole dramatic meaning.

Thus, one who borrows only the content and sequence of the scenes in the play,

whether certain source code similarities constituted "substantial similarity," and ultimately issued an order banning the importation of several computer products. *Id.* at 18,931-32.


In a number of cases involving videogame programs, the courts have considered substantial similarity, but have focused on the similarity of the displays produced by the program rather than the programs themselves. *See, e.g.*, *Midway Mfg. Co. v. Artic Int'l*, 704 F.2d. 1009, (7th Cir. 1983) (audio and video images produced by videogame programs "virtually the same"), *cert. denied*, 104 S. Ct. 690 (1984); *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d. 607, 608 (7th Cir. 1982) (video images produced by videogame programs, "uniquely similar"), *cert. denied*, 459 U.S. 880 (1983).


163. *Sid & Marty Krofft Television Prods., Inc. v. McDonald's Corp.*, 562 F.2d 1157, 1167 (9th Cir. 1977) (quoting *Roth Greeting Cards v. United Card Co.*, 429 F.2d 1106, 1110 (9th Cir. 1970)); *see Universal Pictures Co. v. Harold Lloyd Corp.*, 162 F.2d 354, 361 (9th Cir. 1947).

thereby replicating its "dramatic meaning," may infringe the copyright in the play.

*Meredith Corp. v. Harper & Row Publishers, Inc.* illustrates the flexibility of the substantial similarity doctrine. Plaintiff published a leading psychology textbook. Defendant initially identified plaintiff's book as the leader in the field and decided to use it as a model. Defendant's employees then scrutinized plaintiff's book and outlined it in detail. This outline was given to a second group of employees who did not have access to plaintiff's work. This group wrote a book that directly plagiarized only eleven percent of plaintiff's book and contained "some independent ideas, . . . some independent research, some additional topics, and some differing structure." Notwithstanding the originality and the insulation of defendant's actual writers from plaintiff's book, the court found infringement in the form of "an extensive taking of the structure and topical sequence of the [plaintiff's] book in addition to the eleven percent of the [plaintiff's] book admittedly plagiarized."

Third, courts regularly have focused on the overall pattern of similarity; if the similarity is pervasive, differences in detail may be viewed as immaterial. The test most frequently cited is whether "the ordinary observer, unless he set out to detect the disparities, would be disposed to overlook them, and regard their aesthetic appeal as the same." In yet another of his sibylline dicta, Judge Learned Hand put it more succinctly: "[N]o plagiarist can excuse the wrong by showing how much of his work he did not pirate." The rationale for the rule, Judge Hand noted elsewhere, is that otherwise "a plagiarist would escape by immaterial variations."

No quantitative or other precise standards govern the determination of substantial similarity. Courts have made determinations for such diverse works as dolls, fabrics, textbooks, and plays and movies. These courts have been consistent in only one point: if it would be unmistakably clear to a lay observer that the defendant used the plaintiff's work as an explicit and compre-

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166. *Meredith Corp.*, 413 F. Supp. at 385.
167. *Id.*
168. *Id.*
169. *Id.* at 387.
170. *Id.* at 386.
171. Peter Pan Fabrics, Inc. v. Martin Weiner Corp., 274 F.2d 487, 489 (2d Cir. 1960); see Original Appalachian Artworks, Inc. v. Toy Loft, Inc., 684 F.2d 821 (11th Cir. 1982).
hensive model for the defendant's work, regardless of the details of comparison, the works are substantially similar.

The fourth point is a corollary of the third. Just as a plagiarist cannot excuse himself by showing how much he did not copy, neither can he excuse himself by demonstrating that he has made independent contributions to his otherwise infringing work. Substantial similarity is only circumstantial evidence of copying, which can be overcome by proving that the accused work was created independently and that the similarity is merely incidental.\(^{178}\) The similarity, however, must be incidental to the independent creation; minor independent creation incidental to comprehensive similarity will not exonerate the defendant. The Meredith Corp. court rejected a defense based on the inclusion of "some independent ideas, . . . research, . . . topics, . . . and . . . structure," finding that despite these contributions the overall similarity of the works was sufficient to support an inference of copying.\(^{179}\) Moreover, that the plagiarist has expended substantial time and effort is irrelevant. In a recent videogame case, the court rejected evidence offered by the defendants of "independent creation of the physical elements of their games."\(^{180}\) Such evidence, the court concluded, "depicts only creation, not independent creation."\(^{181}\) As the court noted somewhat tartly, "even the infringer who traces the outline of another's work must move his own hand across the page."\(^{182}\)

Last, substantiality also has a qualitative aspect. As a federal judge experimented in copyright matters recently pointed out to one of the authors, a finding of substantial similarity to the works of Shakespeare would seem unwarranted if the alleged plagiarist had copied only a single line from the vast Shakespearean corpus. If, however, that line happened to be "a rose by any other name would smell as sweet,"\(^{183}\) it would be reasonable to conclude that the plagiarist had appropriated something of real substance.

Although the focus in most cases is on quantitative comparison,\(^{184}\) some courts have recognized the significance of qualitative similarity. One district court stated that including some of Charlie Chaplin's "best scenes" in an infringing film would support a finding of substantial similarity even if the quantitative similarity was limited.\(^{185}\) As the trial judge in that case put it, "I would think

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181. Id.
182. Id.
183. Shakespeare, Romeo and Juliet, act II, scene ii.
184. See, e.g., Meredith Corp., 413 F. Supp. at 387 (11% of textbook); Certain Personal Computer and Components, [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,651 at 18,931-32 (ITC March 9, 1984) (line-by-line quantitative comparison of computer source code similarities); see also 3 M. Nimmer, supra note 59, § 13.03[A][2], at 13-36 to -37 (discussing difficulty of determining quantum of "fragmented literal similarity" allowable).
185. Roy Export Co. v. Columbia Broadcasting Sys., 503 F. Supp. 1137, 1145 (S.D.N.Y. 1980), aff'd, 672 F.2d 1095 (2d Cir.), cert. denied, 459 U.S. 826 (1982); see also Universal Pictures Co. v. Harold Lloyd Corp., 162 F.2d 354, 361 (9th Cir. 1947) ("[I]f . . . the labors of the original author are substantially, to an injurious extent, appropriated by another, that is enough to constitute in-
there would be a substantial taking of Gone with the Wind if somebody just took the burning of Atlanta." 186

These five considerations arguably are mere variations on the pervasive theme of idea versus expression. Most copyright cases in which some degree of similarity is found ultimately are resolved by determining whether the demonstrated resemblances lie in the realm of idea or expression. 187 Whether the works are similar enough to prove infringement, for example, is related to whether the similarities are sufficiently detailed to prove misappropriation of expression. Similarly, qualitative similarity is significant because a single line ("a rose by any other name would smell as sweet," "the quality of mercy is not strained," for example) indeed can capture the essence of an author's expression. The plagiarist should not be exculpated by having included original expression in his infringing work since the more pertinent question is whether he has appropriated another's expression.

Substantial similarity and its permutations, although perhaps analytically neat, have been imprecise at best in application. 188 Although there is little or no precedent, 189 this imprecision only will be compounded when courts consider computer programs rather than literary works.

Judges and jurors will be comparing works written in a language and idiom incomprehensible to most of them. Absent identity of the competing works, expert opinion inevitably will guide the determination of similarity. 190 Although courts can mitigate the problem by appointing their own experts, 191 in many instances they may have to rely uncritically on the application by partisan experts of a legal concept—substantial similarity—to the facts. 192 If judges and jurors cannot evaluate the overall similarity of computer programs, then they will have even more trouble determining whether a particular dissimilarity is
exculpatory, evaluating the importance of an alleged infringer's independent contributions, and assessing the qualitative significance of a portion of a program. Overall, the trier of fact is likely to have great difficulty determining where in the programming process the boundary between idea and expression lies.

It will be argued in section V of this Article that the Copyright Act above all is a statute proscribing certain behavior. Thus, if the ordinary-lay-observer test is obsolete in computer cases, the focus should shift from the appearance of the competing works to the alleged infringer's actual behavior. Given the iterative nature of the programming process and the record-keeping it often engenders, evidence of the defendant's behavior is likely to be more extensive and better preserved than in the typical literary case. Expert testimony can be used to prove whether the defendant engaged in any conduct prohibited by the Act rather than to evaluate substantial similarity. Before this argument is developed, the intervening sections will review several other general principles of copyright law that have assumed particular importance in computer cases.

C. The Identity of Idea and Expression

"Where idea and expression are indistinguishable, the copyright will protect against only identical copying . . . . 'The idea and the expression will coincide when the expression provides nothing new or additional over the idea.' "194 If the idea and its expression are intertwined so closely that the particular idea can be expressed in only one form, copyright protection is vitiated.195

The "idea-expression defense" originated in Baker v. Selden,196 a case in which the Supreme Court held that a copyright in a book describing a bookkeeping system did not preclude use of the system itself, even if that use required reproduction of charts and forms in the book. The Court reasoned that the idea of the system was inseparable from the expression of the idea in certain bookkeeping forms; to protect the forms therefore would preempt use of the system.197 Lower courts have recognized the defense in rejecting claims of

193. See supra notes 19-20 and accompanying text. Earlier versions of the defendant's program, for example, may repeat errors present in the plaintiff's program. See McClure & Sher, Evaluating Claims of Software Copying Through Data Analysis (Part I), 3 SOFTWARE PROTECTION 8, 10-11 (July 1984).


195. See 3 M. NIMMER, supra note 59, § 1303[A][1], at 13-32-33. To protect the expression in such cases would preempt the idea being expressed. E.g., Morrissey v. Procter & Gamble Co., 379 F.2d 675, 678-79 (1st Cir. 1967) (no copyright protection when idea capable of only "a limited number" of forms of expression).

196. 101 U.S. 99 (1879).

197. The copyright of a book on book-keeping cannot secure the exclusive right to make, sell, and use account-books prepared upon the plans set forth in such book . . . .

   . . . . In describing the art, the illustrations and diagrams employed happen to correspond more closely than usual with the actual work performed by the operator who uses the art . . . . But the principle is the same . . . . The description of the art in a book,
infringement of simple designs, written game rules, and pictorial representations on game boards. Many defendants in videogame cases have contend, generally without success, that the games are similar because of the limited number of ways to express the idea of frantic escape from a voracious insectile creature. Section 102(b) of the Copyright Act now codifies the defense.

The sparse software copyright case law suggests the potential for this defense. In Apple Computer, Inc. v. Franklin Computer Corp., Franklin, the admitted copyist, attacked the copyright of Apple's operating system on several grounds, including the alleged identity of the idea and the expression embodied in the system. In Franklin's view, the pertinent idea apparently was "to enable a computer to run the vast body of Apple-compatible software." Apple's though entitled to the benefit of copyright, lays no foundation for an exclusive claim to the art itself. Id. at 104-05.

202. 17 U.S.C. § 102(b) (1982) provides:
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, regardless of the form in which it is described, explained, illustrated, or embodied in such work.

The House Report makes clear the purpose of § 102(b):
Nature of Copyright. Copyright does not preclude others from using the ideas or information revealed by the author's work. It pertains to the literary, musical, graphic, or artistic form in which the author expressed intellectual concepts. Section 102(b) [subsec. (b) of this section] makes clear that copyright protection does not extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.

Some concern has been expressed lest copyright in computer programs should extend protection to the methodology or processes adopted by the programmer, rather than merely to the "writing" expressing his ideas. Section 102(b) [subsec. (b) of this section] is intended, among other things, to make clear that the expression adopted by the programmer is the copyrightable element in a computer program, and that the actual processes or methods embodied in the program are not within the scope of the copyright law.

Section 102(b) [subsec. (b) of this section] in no way enlarges or contracts the scope of copyright protection under the present law. Its purpose is to restate, in the context of the new single Federal system of copyright, that the basic dichotomy between expression and idea remains unchanged.

204. Id. at 1252-53. Franklin also challenged the copyright status of object code embedded on a ROM (read-only memory) chip, id. at 1249, and argued that an operating system was a "method of operation," and thus not subject to copyright protection. Id. at 1250-51. The court of appeals rejected both of these arguments. Id.
205. Id. at 1253. "Apple-compatible software" includes both programs created by Apple and those created by others that will run on Apple computers. Generally, two computer systems are
operating programs were not protected by copyright, Franklin contended, because they represented one of only a "limited number of ways to arrange operating systems" to achieve this end.  

In responding to this argument, the United States Court of Appeals for the Third Circuit identified the pertinent inquiry as "whether the idea is capable of various modes of expression . . . . [I]f other programs can be written or created which perform the same function as an Apple's operating system program, then that program is an expression of the idea and hence copyrightable." Because of an inadequate factual record, the court remanded this issue for further consideration.

The court of appeals' treatment of Franklin's idea-expression defense is noteworthy in several respects, although it leaves unresolved at least one major issue. First, the court rejected Franklin's argument that, for purposes of determining the separability of idea and expression, an operating system differs somehow from other works of authorship. Franklin suggested that because the operating system causes the machine to run and is purely utilitarian in purpose, the system is nothing more than an idea in operation, more closely akin to a patentable process than copyrightable expression. The court interpreted the statutory language strictly and characterized as "perhaps the most convincing item leading us to reject Franklin's argument" the fact that section 101 of the Copyright Act, which defines "computer program," "makes no distinction between application programs and operating programs." The court also relied on the conclusion of the National Commission on New Technological Uses of Copyrighted Works. "Programs should no more be considered machine parts than videotapes should be considered parts of projectors or phonorecords parts of sound reproduction equipment. . . . That the words of a program are used ultimately in the implementation of a process should in no way affect their copyrightability." It can be intuitively appealing, particularly to one unacquainted with programming, to view an operating system or other program as too mechanistic to be protected as a work of authorship. The court's conclusion,
however, that the plain language and legislative history of the statute require a different approach is persuasive.

Second, the court refused to allow Franklin to define itself out of the infringement. Franklin premised its claim of entitlement to the idea-expression defense on the assertion that "there are limited number of ways to arrange operating systems to enable a computer to run the vast body of Apple-compatible software." Franklin seemed to argue that complete Apple-compatibility (that is, the capability to use Apple programs on the Franklin machine) was Franklin's "idea," which it could achieve only by copying Apple's object code. The court of appeals, however, properly recognized that the relevant idea of each operating system program is the function that it was intended to perform—"for example, how to translate source code into object code." The dispositive issue then is whether there are alternative means of achieving these various functional ends. The larger goal of compatibility was characterized as "a commercial and competitive objective which does not enter into the somewhat metaphysical issue of whether particular ideas and expressions have merged." The idea-expression defense may be abused if a defendant persuades a court to define the "idea" so narrowly that the defendant's copy of the plaintiff's work is truly the only possible expression of that idea. As the court in a recent videogame case stated, "The 'idea' of any work could always be defined in such detail that the description of the expression would add nothing to the 'idea,' thus allowing a defendant to engage in all but verbatim copying." "Such a ploy," the same court observed, "cannot be allowed.

Although the argument apparently was neither well developed nor well received in Apple Computer, it might be more plausible in other circumstances. Consider a plaintiff whose applications programs have wide user acceptance. Hypothesize further a defendant attempting to develop a lower-cost program, functionally similar to the plaintiff's program, that accepts user input in the same way as the plaintiff's program and delivers identical output. Finally, assume that the source code of the defendant's program closely resembles that of the plaintiff's program, and that the defendant had access to the source and

212. Apple Computer, 714 F.2d at 1253.
213. Id. The district court described Franklin's argument somewhat more explicitly:

Franklin's goal was to create an operating system that would properly execute any program that would run on an Apple computer, and to ensure that a user who had used Apple programs on an Apple computer would notice no difference in using the Franklin. Whether complete compatibility of operating systems can be achieved by independent creation will depend largely on the complexity of the system being emulated and its manner of solving particular programming problems. Straightforward solutions often can be replicated independently; more convoluted solutions may have to be copied to achieve complete compatibility.

214. Apple Computer, 714 F.2d at 1253.
215. Id.
217. Id.
object code of the plaintiff's program while writing his own.\textsuperscript{218}

The defendant does not contest access, nor does he contest substantial similarity. Conversely, he stresses it. He identifies his "idea" as the achievement of one hundred percent user-level compatibility. The only question, he contends, is whether there is more than one way to achieve such compatibility, and he contends that there is not. He argues that the plaintiff is trying improperly to foreclose competition by extending a copyright monopoly into an area where idea and expression have merged.\textsuperscript{219}

How should the court respond? It is likely to be aware, or at least informed by the defendant, that achieving compatibility with the hardware and software of other manufacturers is an industry in itself, and that it has had the salutary effect of reducing consumer prices.\textsuperscript{220} Would the court be stifling a recognized form of competition by rejecting the idea-expression defense? Or would acceptance of the defense dilute necessary copyright protection?\textsuperscript{221} Would the resulting precedent permit even the admitted plagiarist to escape through rationalization and special pleading?

Although the court in \textit{Apple Computer} rejected defendant's theory that its "idea" was compatibility, it did so peremptorily and without detailed analysis. The United States District Court for the Northern District of Texas approached the problem somewhat differently in \textit{Synercom Technology, Inc. v. University Computing Co.}\textsuperscript{222}

In \textit{Synercom} the input formats used in a structural engineering analysis program were at issue.\textsuperscript{223} The formats specified the manner in which the user's data were to be entered into the computer. Synercom had provided the user with forms to facilitate entering data in the appropriate formats, and had registered a copyright in the forms.\textsuperscript{224} Although the forms themselves resembled

\textsuperscript{218} This hypothetical is drawn from an argument made in S & H Computer Sys., Inc. v. SAS Inst., Inc., 568 F. Supp 416 (M.D. Tenn. 1983). \textit{See supra} note 158.

\textsuperscript{219} The recent opinion in Digidyne Corp. v. Data General Corp., 734 F.2d 1336 (9th Cir. 1984), analyzed the antitrust implications of a copyright monopoly.


\textsuperscript{221} Midway Mfg. Co. v. Bandai-America, Inc., 546 F. Supp 125, 148 (D.N.J. 1982) ("The idea of any work could always be defined in such detail that the description of the expression would add nothing to the 'idea,' thus allowing a defendant to engage in all but verbatim copying.").

\textsuperscript{222} 462 F. Supp. 1003 (N.D. Tex. 1978). Plaintiff asserted several state-law claims, including unfair competition, a year later. The court declined to grant the relief sought, finding that federal copyright law preempted it. \textit{Synercom Tech., Inc. v. University Computing Co.}, 474 F. Supp. 37, 38 (N.D. Tex. 1979); \textit{see infra} notes 318-22 and accompanying text.

\textsuperscript{223} \textit{Synercom}, 462 F. Supp. at 1007-09. Synercom also argued that defendants had copied substantial portions of its printed manuals. \textit{Id.} The court upheld the copyright in the manuals, found copying, and ordered defendant to account for infringing materials already published and to desist from further infringement. \textit{Id.} at 1014-15.

\textsuperscript{224} \textit{Id.} at 1007-09. The opinion often uses "form" and "format" interchangeably. In particular, the court discusses the copyright status of both the "formats" and the "forms" without distinguishing between the two. \textit{Id.} at 1007, 1011. "Format" technically should refer, however, to the logic and sequence the user follows in entering data, whereas "form" should refer to the printed cards that guide the user to structure and enter the data correctly. An examination of the exhibits in the case reveals that the forms were cards with lines and spaces arranged in a particular fashion. The only words on the forms were column headings across the top. The dispute might have been framed more clearly if the forms had been treated as the expression of the idea of input sequencing—the expression of the formats.
blank business forms more than literary works, the court recognized that the formats embodied in the forms were the product of substantial intellectual effort: "Synercom conceived their logic and arranged their sequence."225 Using this logic and sequence, an engineer who formerly had needed three different programs to perform certain structural calculations now could perform the same calculations in a more sophisticated manner with only a single program.226

Plaintiffs alleged that defendants had infringed by furnishing the users of their competing system with instructions to enter data in a sequence identical to that called for by the Synercom forms.227 Although defendants did not actually copy and provide the Synercom forms, their instructions did include a "mirror image" of the Synercom forms.228 Defendants' instructions ensured complete compatibility with the Synercom program, since a user accustomed to the Synercom entry formats could use defendants' program without any reinstallation or rehabilitation.229

The court initially rejected defendants' contention that the input forms communicated no information and thus could not constitute the copyrighted expression of an idea.230 In an interesting logical exercise, the court emphasized that defendants' manual used a "mirror image" of the Synercom forms to instruct users how to format input data. Since the forms were instructive, the court reasoned, they must convey information and thus constitute expression.231

Having determined that the input forms constituted expression, the court next addressed the "closely related" arguments that defendants had borrowed only the ideas expressed in the forms, or to the extent that defendants had borrowed expression, it was inseparable from the underlying ideas.232 The court accepted both arguments.

The court analogized the ideas embodied in the forms to the figure-H pattern of an automobile stick shift.233 Although an automobile manufacturer's description of the stick shift would be subject to copyright protection, a second manufacturer would be free, at least for copyright purposes, to appropriate the idea. The second manufacturer also could write its own description of the stick shift, "however similar [it] may be to the first manufacturer's materials."234

225. Id. at 1007.
226. Id.
227. Id. at 1008, 1012.
228. Id. at 1000, 1012.
229. Id. at 1008-09, 1012.
230. Id. at 1011-12. The court contrasted the blank bookkeeping forms in Baker v. Selden, 101 U.S. 99 (1879), which conveyed no information and thus were not protected by copyright, with the test answer sheets in Hartfield v. Peterson, 91 F.2d 998 (2d Cir. 1937), that had been held to convey information. The court found the input forms more similar to the latter. Synercom, 462 F. Supp. at 1011-12.
231. Synercom, 462 F. Supp. at 1011-12. Later in the opinion, the court retreated somewhat from this conclusion. Id. at 1014.
232. Id. at 1012-14. The lack of distinction between "forms" and "formats" is particularly confusing in this part of the opinion. Defendants apparently argued that any expression embodied in the forms was inseparable from the idea of entering data in particular formats.
233. Id. at 1013.
234. Id.
Thus, substantial similarity of the two descriptions would be irrelevant for copyright purposes, as long as the second manufacturer had borrowed the unprotected idea and then independently developed its own expression of the idea.

The court concluded that defendants had not borrowed any of Synercom's protected expression. Rather, defendants had appropriated the ideas embodied in the input forms (the logic and sequence) and expressed these ideas in their instructions. That these instructions caused the user to enter data according to the Synercom format and that the defendants' instructions contained a mirror image of the Synercom form did not give rise to copyright liability because these were incidental, if inevitable, results of borrowing the unprotected ideas.\footnote{235}

In an important footnote,\footnote{236} the court compared defendants' actions to reading another programmer's manual, borrowing the manual's ideas to use in a second program, and then writing a manual about the second program. The court stated that such a process would not violate the copyright in the first manual, regardless of any ultimate similarity between the manuals. Translating a computer program into another language would be a violation, however, as would be converting a "detailed description of a particular problem solution, such as a flow chart or step-by-step set of prose instruction," into a computer program.\footnote{237} In Synercom defendants merely had borrowed an idea, and then, working independently, followed that idea to its logical conclusion; the result might have been different, the court intimated, if defendants had copied from Synercom's program.\footnote{238}

Finally, the court held in the alternative that even if defendants had copied expression, it was coextensive with the ideas being expressed and thus would not be protected. If the only expression on the Synercom forms was the order and sequence of inputs, that expression would not be subject to copyright protection because it was "not separable [from the underlying ideas], for the form, arrangement and combination is itself the intellectual conception involved."\footnote{239}

Given the facts that the court faced, the decision probably was correct. It is difficult to separate the idea of entering data in a certain sequence from the expression of that idea in a form that arranges the data appropriately. This factual context differs from the Apple Computer situation, in which the idea was the performance of particular functions by a computer and the expression was a complex set of instructions written by a programmer to cause the machine to carry out that function. The Synercom opinion, however, does have broader implications for the idea-expression defense when a defendant has attempted to achieve compatibility with a plaintiff's software.

First, Synercom states clearly that achieving compatibility is not itself a copyright violation. Copyright liability does not result from the second program

\footnote{235}{Id. at 1012.}\footnote{236}{Id. at 1013 n.5.}\footnote{237}{Id.}\footnote{238}{"Hence [defendants'] preparation of a FORTRAN preprocessor program from the descriptions contained in the manuals cannot constitute an infringing use provided this was done without copying of the plaintiff's FORTRAN program, as it was." Id.}\footnote{239}{Id. at 1014.}
duplicating the functions of the first or the users of the second program going through the same input and output procedures as the users of the first. In fact, according to *Synercom*, substantial similarity between the two user's manuals and, perhaps, the two source codes may not even give rise to liability. The pertinent questions are whether the alleged infringer achieved similarity by borrowing the ideas and the functionality of the first program and by independently writing his own program and supporting documentation or whether he worked from the plaintiff's code or a highly detailed description of the code.\(^{240}\)

Although *Synercom* states clearly that compatibility itself will not give rise to liability, it is less clear whether a defendant who asserts that his goal is compatibility but admits copying original expression will be exonerated. The court premised its holding on a finding that defendants had appropriated, at most, unprotected ideas; it indicated that the result would have been different if defendants had copied Synercom code or a detailed outline of the Synercom program. Although this proposition appears straightforward, the significance of the term "idea" is uncertain. The borrowed idea in *Synercom* may have been the concept of compatibility. Defendants' apparent goals—to duplicate the functions of the Synercom program and to permit users to enter and receive data in the same manner as with the Synercom program—support this interpretation.\(^{241}\)

If this interpretation is correct, the opinion may suggest that infringement occurs if a defendant borrows detailed programming expressions, even if pursuing compatibility.

The court, however, seems not to have viewed the borrowed idea as having such broad implications. Rather, it seemed to interpret the idea in functional terms, as did the court in *Apple Computer*.\(^{242}\) The *Synercom* court's mechanical analogy and its use of language such as "sequencing and ordering of data"\(^{243}\) suggest that the court read nothing more into the "idea" than the arrangement of data, and that it did not make the logical jump from the specifics of data arrangement to the general concept of compatibility.\(^{244}\) Thus, a more prudent interpretation of the case is that it leaves open whether pursuing compatibility is a complete defense to unambiguous acts of plagiarism.

The most significant point in *Synercom* may be that the court viewed the functional similarity between the two programs as not dispositive of the copyright issue, if not irrelevant to it. The court focused, rather, on defendants' *conduct*, in particular whether they had used any elements of Synercom's program.

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\(^{240}\) In footnote 5 the court commented that the preparation of a computer program in any language from a description of the problem to be solved (even if that description was written "in sufficient detail and with sufficient precision to enable it to be converted into an unambiguous set of computer instructions") would be an independent creative act and would not give rise to copyright liability for similarities at the code level. *Id.* at 1013 n.5. The court drew a less-than-lucid distinction between this process and preparing a program from a description that included "a flow chart or step-by-step set of prose instructions, written in human language." *Id.* The latter program "would probably be a violation" of the original program's copyright. *Id.*

\(^{241}\) *Id.* at 1008.

\(^{242}\) *Apple Computer*, 714 F.2d at 1253.

\(^{243}\) *Synercom*, 462 F. Supp. at 1013.

\(^{244}\) In other words, the court did not consider the broader question of whether the "idea" of compatibility excuses any copying of expression necessary to perform that idea.
in creating their own. As noted above, given the nature of programming, courts probably should focus on conduct rather than attempt to apply the substantial similarity test. Section V suggests that a similar focus on conduct may help resolve the compatibility dilemma.

D. Subsequent Alterations

If a particular version of the defendant’s program is found to be substantially similar to the plaintiff’s program, or even if the defendant admits copying some or all of a plaintiff’s program, the defendant may offer to alter his work prior to distributing it, or introduce evidence that he already has done so. The defendant will argue that since the version of his work that will be marketed is not substantially similar to the plaintiff’s work, the defendant should not be held liable for infringement, regardless of similarity in earlier versions or other contrary evidence.

This argument has had a mixed reception in the literary and artistic cases. Professor Nimmer’s treatise supports the argument, stating that “a defendant may legitimately avoid infringement by intentionally making sufficient changes in a work which would otherwise be regarded as substantially similar to that of the plaintiff’s.” The court in one recent case relied on Nimmer in finding that defendant’s doll did not infringe plaintiff’s doll, partly because of changes made by defendant to render the two dolls less similar. In another recent case the author of a novel sought to enjoin the broadcast of a television movie allegedly based on the novel. The court rejected plaintiff’s comparison of the novel to defendant’s screenplay, holding that the movie as broadcast was the only relevant evidence of infringement.

The United States Court of Appeals for the Fifth Circuit, on the other hand, rejected this argument in a case involving an alleged copy of an ornamental screen. In response to defendant’s claim that it had cured any infringement by changing the screen, the court pointed out that “the starting point for [defendant’s] ‘redesign’ was the plaintiff’s work.” The court determined that, given this essential fact, subsequent changes would not excuse the initial plagiarism; they merely were “colorable alterations made to disguise the piracy.”

245. See supra note 240 and accompanying text.
246. See supra notes 153-58 and accompanying text.
247. In S & H Computer Sys. v. SAS Inst., Inc., 568 F. Supp. 416 (M.D. Tenn. 1983), defendant offered evidence that recent versions of the allegedly infringing program were less similar. See supra note 158.
248. 3 M. NIMMER, supra note 59, § 13.03 [B], at 13-43.
249. Eden Toys, Inc. v. Marshall Field & Co., 675 F.2d 498, 501 (2d Cir. 1982); see also Warner Bros., Inc. v. American Broadcasting Cos., 654 F.2d 204, 210 (11th Cir. 1981) (citing M. NIMMER, supra note 59, for proposition that defendant may avoid liability by making changes sufficient to avoid finding of substantial similarity).
252. Id. at 284.
253. Id.
In another case, plaintiff named Davis, had written a dramatization of an Edith Wharton novel, and defendants had produced and sponsored a television play based on the same novel. Having found substantial similarity between plaintiff's novel and defendants' dramatizations of the novel, the court examined defendants' efforts to "unDavis" the television script prior to its broadcast. The court considered these efforts "too little, too late and too transparent," but, perhaps significantly, never stated that the attempt to "unDavis" the script was unavailing as a matter of law.\(^{255}\)

There is no apparent way to reconcile these conflicting authorities. The Nimmer view seems to follow logically from a somewhat mechanical reading of the 1909 Act\(^ {256} \) and the substantial similarity case law.\(^ {257} \) If the plaintiff is trying to enjoin the distribution of an infringing work, then the test should be (absent evidence of direct copying) whether the work sought to be enjoined is substantially similar to the plaintiff's work. The defendant should not be liable for his prior substantially similar work since the plaintiff does not seek to enjoin that prior work.

This argument has two shortcomings, one equitable and one statutory. First, there is something inherently inequitable about permitting a defendant to appropriate a plaintiff's creative effort, presumably saving himself a great deal of time and money, and then to escape liability by making cosmetic changes prior to distribution of the otherwise infringing work.\(^ {258} \) An unspoken appreciation of these equities may underlie those decisions that view subsequent alterations as "too little, too late and too transparent."\(^ {259} \)

Second, the argument favoring the defense seems to ignore that, under the present Act, one of the copyright holder's exclusive rights is to prepare derivative works.\(^ {260} \) A derivative work "is a work based upon one or more preexisting


\(^{255}\) Id. at 620-21.

\(^{256}\) Under § 1(a) of the 1909 Copyright Act, the exclusive rights of the copyright holder included the rights "[t]o print, reprint, publish, copy, and vend the copyrighted work." Act of March 4, 1909, ch. 320, 35 Stat. 1075. Compare this language with that of § 106(1)-(3) of the present Act, 17 U.S.C. §106 (1)-(3) (1982), which grants exclusive rights: "(1) to reproduce the copyrighted work in copies or phonorecords; (2) to prepare derivative works based upon the copyrighted work; [and] (3) to distribute copies." A semantic argument can be made that the new Act, by replacing such terms as "print" and "vend" with broader prohibitions against copying and preparing derivative works, focuses more on the conduct of the alleged infringer and less on the commercial exploitation of the allegedly infringing work. In the reported cases, the Nimmer view seems not to have been challenged on this basis.

\(^{257}\) See supra notes 141-57 and accompanying text.

\(^{258}\) The defendant will argue, of course, that the superficial dissimilarities are evidence that he originally appropriated only the plaintiff's ideas.


\(^{260}\) 17 U.S.C. § 102(2) (1982). This right has no counterpart in the 1909 Act. The cases had used the term "derivative work," but it referred to a second work that was sufficiently different from an earlier one to receive independent copyright status as a "derivative work." See, e.g., Original Appalachian Artworks, Inc. v. Toy Loft, Inc., 684 F.2d 821, 830 (11th Cir. 1982) (copyright status of successive generations of dolls); Grove Press, Inc. v. Greenleaf Publishing Co., 247 F. Supp. 518 (E.D.N.Y. 1965) (copyright status of original French work and subsequent translations). Interestingly, some of the cases taking the Nimmer view were decided after the January 1, 1978 effective date of the 1976 Act. See supra note 249.
works,” including recastings, transformations, or adaptations of the original.\textsuperscript{261} Although no cases are squarely on point, the definition should include a work copied from an existing work and then altered to disguise the similarities.\textsuperscript{262}

The fundamental flaw in the subsequent alteration defense, however, is that it treats substantial similarity as an end rather than a means. Substantial similarity, after all, is only circumstantial evidence of copying, to be used when no direct evidence is available.\textsuperscript{263} There is no \textit{a priori} basis for treating it as the sole determinant of liability when other forms of evidence are available. This approach is precisely what those courts that have permitted exculpation by subsequent alteration have done. To pursue the “unDavising” example,\textsuperscript{264} is not defendants' attempt to “unDavis” their original script circumstantial evidence that they copied plaintiff’s play? Similarly, is it not relevant that defendants considered an earlier version of their script even more similar to Davis’ play than the version actually broadcast?\textsuperscript{265}

To ignore prior versions of a work assumes that what the Copyright Act prohibits is the distribution of a substantially similar work. Although the language of the former Copyright Act may support such an interpretation, the present Act, particularly in its expansive definition of derivative work, focuses on the defendant’s behavior. Under this view, the relevant question is whether it can be inferred from all the available evidence that the defendant copied the plaintiff’s work or prepared a derivative work based on it.

The equitable considerations supporting this view are particularly compelling in a software copyright case. Once even a rudimentary version of the allegedly infringing program has been entered into a computer system that has text editing capabilities, a plagiarist can make massive changes in the appearance of the source code in a matter of seconds.\textsuperscript{266} Consider again the example of a program designed to perform statistical calculations. Assume that a plagiarist has copied this program verbatim. Using the text editing capabilities of most general purpose computer systems, the plagiarist can make nonfunctional changes in procedure and variable names, the order in which calculations are performed, the order in which variables appear within particular equations, and the manner in which particular categories of data are represented in the program. None of these changes is particularly significant from either a statistical or programming standpoint; all can be accomplished with minimal time and

\begin{itemize}
\item \textsuperscript{261} 17 U.S.C. § 101 (1982).
\item \textsuperscript{262} This logic is particularly compelling when at some stage in the derivation process the defendant “copied” the plaintiff’s work in the traditional sense. \textit{Cf.} Hubco Data Prods. Corp. v. Management Assistance Inc., 219 U.S.P.Q. (BNA) 450 (D. Idaho 1983) (citing exclusive right to make copies, court issues preliminary injunction against Hubco product that alters operation of MAI operating system, since at one stage Hubco product creates copy of MAI object code).
\item \textsuperscript{263} \textit{See supra} notes 142-47 and accompanying text.
\item \textsuperscript{266} One way to edit text is to use a word processing program to correct, reorder, and reformat. Specially designed programs can make other, more complex changes in the code, such as reordering a series of calculations. \textit{See} Davidson, \textit{supra} note 7, at 376-78.
\end{itemize}
creative effort by the plagiarist. Together, however, they may result in a source code that, at least from the perspective of the lay observer, has little similarity to the original work.

Many programmers believe that the most difficult part of programming is developing an initial, rough version of the code. This "working draft" version need not accomplish the desired task accurately or efficiently, as long as it embodies a method for accomplishing the task that a computer can execute. This version then can serve as a basis for elaboration, refinement, and, in some cases, wholesale substitution. Although this initial version may bear little superficial resemblance to the final one, many programmers find that once they have developed an initial version the remainder of the programming process moves far more quickly.267

The initial draft may be of much greater practical significance when writing a computer program than when writing a book. The initial draft of a book gets the ideas on paper. The author can posit and reject alternative ways of expressing those ideas using little time or money. Since the computer program is functional, however, the initial version not only gets the ideas on paper but is a true working model. To create that working model, the original programmer may have spent much time and money developing and testing alternatives.268 The computer plagiarist thus derives a tangible and substantial benefit from avoiding those lines of inquiry which yield results that simply do not work.

A defendant who can rely on the subsequent alteration defense can use another's copyrighted program as an initial version of a second program. Such a defendant need only refine the first program. Regardless of how extensive the process of refinement,269 if the first program "works" to some extent, the second programmer has been spared many blind alleys. In some cases, the second programmer only may have to make changes to avoid palpable similarities.

The defendant may argue that borrowing and changing is common in the literary world and is merely the borrowing of unprotected ideas.270 The defense only will apply, however, if the changes are extensive enough to preclude a finding of substantial similarity of the final versions. With a literary work, such changes likely will require so much creative effort that little will remain of the first work but the ideas it embodied.271 With a computer program, by contrast, it sometimes requires limited creative effort to make alterations sufficient to avoid readily apparent similarity. In that case, it is more accurate to find that the defendant initially copied both idea and expression, and then made changes

267. See generally 1 D. BENDER, supra note 2, § 2.06 [3][e] (discussion of "debugging"). There was expert testimony to this effect in S & H Computer Sys., Inc. v. SAS Institute, Inc., 568 F. Supp 416 (M.D. Tenn. 1983). See supra note 158.

268. See 1 D. BENDER, supra note 2, §2.06 [3][e].

269. The refinement process still may be difficult, but significantly less difficult than starting from the beginning without a working model. See id.


271. E.g., Davis v. United Artists, Inc., 547 F. Supp. 722, 724 n.9 (S.D.N.Y. 1982) (Defendants' movie Coming Home did not infringe copyright in plaintiff's novel, regardless of similarities between novel and earlier screen plays.).
to mask the initial borrowing of expression. Since the second programmer may have made those changes more or less mechanically, unlike his literary counterpart, he did not necessarily substitute his own expression for that in the original.

Although there is little or no relevant case law, the new Act’s definition of derivative work again is helpful. If plagiarism followed by disingenuous alteration is not the creation of an unauthorized derivative work, what is? The focus once again is on the defendant’s conduct; the relevant inquiry is whether he based his program on or adapted it from a preexisting program. If the plaintiff shows that the defendant initially appropriated both ideas and expression, derived substantial benefit from doing so, and then made “colorable alterations . . . to disguise the piracy” without contributing substantial original expression, it will be fully consistent with traditional copyright principles to find the defendant liable because of his behavior.

E. The Section 117 Defense

The current version of section 117 of the Copyright Act is another potential problem in software infringement litigation. This section was added in 1980 to clarify the protection of computer programs. It provides that the “owner” of a copy of a copyrighted program does not infringe by making “another copy or adaptation” as long as it is an essential step in using the program on a machine or is made for archival purposes only and destroyed when rightful possession of the original program ends.

Current section 117 first was subjected to close scrutiny in *Atari, Inc. v.*

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272. See infra notes 337-51 and accompanying text.


Limitations on exclusive rights: Computer programs

Notwithstanding the provisions of section 106, it is not an infringement for the owner of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program provided:

1. that such a new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner, or

2. that such new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.

Any exact copies prepared in accordance with the provisions of this section may be leased, sold, or otherwise transferred, along with the copy from which such copies were prepared, only as part of the lease, sale, or other transfer of all rights in the program. Adaptations so prepared may be transferred only with the authorization of the copyright owner.


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2. that such new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.

Any exact copies prepared in accordance with the provisions of this section may be leased, sold, or otherwise transferred, along with the copy from which such copies were prepared, only as part of the lease, sale, or other transfer of all rights in the program. Adaptations so prepared may be transferred only with the authorization of the copyright owner.

JS&A Group, Inc.\textsuperscript{277} Defendant JS&A sold a device that duplicated certain Atari and Atari-compatible videogames. In response to a claim of contributory infringement,\textsuperscript{278} JS&A claimed that its product had a substantial noninfringing use—duplication of Atari games for archival purposes—as section 117 permits.\textsuperscript{279} The court held section 117 inapplicable. It examined the CONTU Report and determined that the narrow purpose of the archival copy exception was to protect a user against "destruction or damage by mechanical or electrical failure."\textsuperscript{280} The court reasoned that since the primary threat to videogame cartridges was physical rather than mechanical or electrical, defendant could not invoke the archival copy exception.\textsuperscript{281} Thus, the court did not address whether the section ever could exculpate a defendant whose purpose was to infringe or promote infringement.

Consider the buyer of a single copy of a copyrighted program, who is thus the "owner" of that copy. Because he plans to develop a competing program, he makes a second copy of the copyrighted program to facilitate studying it. The copyright proprietor files suit, claims that the making of the second copy violated his copyright, and seeks ultimately to enjoin further work on the competing product. The user responds that, regardless of his intent, the second copy serves an archival purpose and thus is permissible under section 117.

The initial response must be that the presence of any nonarchival purpose,
however secondary, will foreclose the section 117 defense. Section 117 requires
that the copy be "created as an essential step in the utilization of the computer
program" and that it be "used in no other manner," or that the copy be created
"for archival purposes only." Two further questions, however, arise from this
response.

First, how should "purpose" be defined? Does it mean subjective purpose,
so that an unconsummated plan (as in the hypothetical) forecloses the defense,
or objective purpose referring only to actual nonarchival or nonessential use? Although there are no cases no point, the CONTU report clearly implies that
the sole purpose of section 117 is to provide to "[o]ne who rightfully possesses a
copy of program . . . a legal right to copy it to that extent which will permit its
use by that possessor." The report does not suggest any intent to increase the
burden borne by a copyright plaintiff by providing a technical defense to one
who intends to make other than lawful use of a program that he rightfully pos-
sesses. Accordingly, courts should construe the section as not providing a de-
fense for one who has made actual use of a copy other than the permitted
operational and archival uses or has made a copy that he plans to use impermis-
sibly. Section 117 should not exonerate a defendant who made a copy as part of
an impermissible, thwarted scheme merely because he could have put the sus-
pect copy to an archival use.

Second, who should bear the burden of proof on the propriety of the defen-
dant's activities? The court in JS&A treated section 117 as an exception to
the general principle that the making of unauthorized copies constitutes in-
fringement. Although the court did not state so explicitly, it seemed to view
section 117 as an affirmative defense to a prima facie case of infringement. The
court concluded that the alleged infringer bears the "burden of bringing itself
within the section 117 exception." Once the plaintiff has established a prima
facie case that an unauthorized copy has been made, the burden shifts to the
defendant to prove either that the copy was used exclusively for, and an essential
step in, the utilization of the program, or that the copy was for archival purposes
only. In the above hypothetical, the plaintiff would demonstrate that the de-
fendant made an unauthorized copy, and the defendant then would have to
persuade the court that he had only one purpose, permissible under section 117,
and that his conduct was consistent with that permissible purpose.

The legislative history and the CONTU report do not discuss the allocation
of burden. Nevertheless, it seems fair to infer from both the language of the
section and the tone of the legislative history that Congress intended not to add

282. JS&A is consistent with other cases in treating the CONTU Report as the legislative history
of the 1980 computer-related amendments. Id.; see supra note 211.
283. CONTU REPORT, supra note 12, at 13.
285. Id.
several briefs mentioned the § 117 defense. The defense clearly was inapplicable, however, since the
alleged infringer was a licensee rather than an owner.
287. In other words, he would have to demonstrate both subjective and objective compliance
with § 117.
to the burden borne by copyright holders, but simply to identify limited circumstances in which users might meet their technical needs without violating section 106’s blanket prohibition on unauthorized copying.\textsuperscript{288} JS&A’s allocation of the burden is consistent with this interpretation of the purpose of section 117.

\textbf{F. User-level Languages}

One of the most difficult issues that can arise in computer-related intellectual property disputes is how to treat a system through which the user interacts with the program, sometimes termed a user language.\textsuperscript{289} Such a language likely will include a lexicon of words and symbols, some of which may be novel and others of which may come from mathematics, logic, English, or an existing computer language. The user language also will include syntactical rules for combining these lexical elements, some of which again may be original and others of which may be drawn from the rules of existing computer languages. The components of the language system that arguably may be protected are the screen displays that control input, the manuals sections that list the lexical elements and the syntactic rules, and the language itself.

The input displays seem analogous to the displays that videogame programs produce, which have been held subject to copyright protection as audio-visual displays.\textsuperscript{290} Videogame programs produce both “attract mode” displays, which display typical game sequences when no one is playing, and “play mode” displays, in which the user interacts with the computer program to produce action sequences.\textsuperscript{291} It has been held that the user’s contribution, through his moves and choices, to the final audio-visual product of the play mode sequences does not affect copyright protection.\textsuperscript{292}

The input screens generated by an applications programs are logically indistinguishable from the displays generated by a videogame, particularly in the play mode. Both types of displays contain expression that the program generates and invite participation in a particular manner by the user, all of which may determine the contents of further displays.

\textit{Synercom Technology, Inc. v. University Computing Co.},\textsuperscript{293} however, may suggest a different analysis and conclusion. One of Synercom’s alternative holdings was that input formats were not subject to copyright protection, in part because they merged idea and expression.\textsuperscript{294} If the input screens from a particular program can be analogized to the input formats in Synercom, the screens

\textsuperscript{288} 17 U.S.C. § 106(1) (1982); see supra notes 282-83 and accompanying text.
\textsuperscript{289} See supra notes 22, 30-32 and accompanying text.
\textsuperscript{291} Id. at 855-56; see also Midway Mfg. Co. v. Artic Int’l, Inc., 704 F.2d 1009, 1011 (7th Cir. 1983) (player’s contribution to production of images on videogame screen does not render the images his work for copyright purposes).
\textsuperscript{292} Id. at 855-56; see also Midway Mfg. Co. v. Artic Int’l, Inc., 704 F.2d 1009, 1011 (7th Cir. 1983) (player’s contribution to production of images on videogame screen does not render the images his work for copyright purposes).
\textsuperscript{293} 462 F. Supp 1003 (N.D. Tex. 1978).
\textsuperscript{294} Id. at 1012-14.
should not be protected by copyright, regardless of any analogies to audio-visual displays, as long as there has been no copying of the program that generates the screens.295 Under Synercom the idea underlying the input screens is the arrangement of data in a particular format; the screen merely expresses one of a limited number of means of achieving that format.

The way to reconcile these conflicting views may be to focus on the input forms that Synercom used. These forms were nothing more than cards with blank spaces arranged in a particular sequence under column headings; the manual instructed the user how to fill in the spaces.296 Although the court found these forms to be expression (albeit indistinguishable from the underlying idea), they bore little or no resemblance to the literary or artistic works usually encountered in copyright cases. The court in Synercom perhaps was swayed by the lack of literary or symbolic content in the forms, notwithstanding its protestations about expression. Under this view, Synercom should be limited to its facts and not applied to screens that not only arrange data but contain recognizable literary output.297

The description and compilation of the user language in manuals clearly seems protected. Copyright should protect the manual as a book, including those portions listing the elements of the language or describing its use.298 Other compilations, such as the quick reference cards often used with software

295. See id. at 1013 n.5. A program used in preparing medical insurance claims would generate a series of screens calling for a variety of information about the claimant. The information entered in response to inquiries on one screen would determine the inquiries on subsequent screens.

296. Id. at 1007-08, 1011; see supra notes 223-29 and accompanying text.


298. 17 U.S.C. § 103 (1982) provides as follows:

Subject matter of copyright: Compilations and derivative works

(a) The subject matter of copyright as specified by section 102 includes compilations and derivative works, but protection for a work employing preexisting material in which copyright subsists does not extend to any part of the work in which such material has been used unlawfully.

(b) The copyright in a compilation or derivative work extends only to the material contributed by the author of such work, as distinguished from the preexisting material employed in the work, and does not imply any exclusive right in the preexisting material. The copyright in such work is independent of, and does not affect or enlarge the scope, duration, ownership, or subsistence of, any copyright protection in the preexisting material.

manuals, should enjoy similar protection.\textsuperscript{299}

Here too, however, \textit{Synercom} intrudes with a cautionary note. Even if copyright protection subsists as described above, \textit{Synercom} notes that infringement occurs only when a work subject to copyright protection, such as a screen or manual, has itself been copied. Another programmer who uses the same language in his program will not incur copyright liability by writing a manual for the use of his program, regardless of how similar his manual is to the one written by the original programmer.\textsuperscript{300}

This conclusion assumes, of course, that the language itself does not enjoy copyright protection. There are at least two ways to approach this issue. First, a series of early cases held that copyright protects compilations of code words. In \textit{Hartfield v. Peterson}\textsuperscript{301} plaintiff's work was a compilation of approximately 75,000 code words and phrases. Defendant attacked the work's copyright status, arguing that many, if not most, of plaintiff's words and phrases appeared in other codes that were in the public domain, which plaintiff virtually had admitted.\textsuperscript{302} Judge Learned Hand, writing for the court, rejected this argument, finding that plaintiff's act of compilation was itself original.\textsuperscript{303} Significantly, the court held that the copyright extended both to the compilation and to the individual coinages themselves to the extent that they were original: "Both the phrases, so far as they were his, and the arrangement were proper subjects of copyright."\textsuperscript{304} Moreover, the court noted that the widespread use in business of some of the individual words and phrases did not affect its holding.\textsuperscript{305}

Conversely, it has been held that copyright does not protect a system of taking shorthand.\textsuperscript{306} Nonetheless, \textit{Hartfield} apparently represents the majority view; it is consistent with earlier cases involving codes and symbolic representations,\textsuperscript{307} it was followed as recently as 1971,\textsuperscript{308} and it was cited in \textit{Synercom}.\textsuperscript{309}

\begin{itemize}
\item \textsuperscript{299} Such cards typically list the most commonly used lexical elements. \textit{E.g.}, SAS 79.5 Reference Card (SAS Inst. 1981).
\item \textsuperscript{300} \textit{Synercom}, 462 F. Supp. at 1013-14 (stick shift hypothetical).
\item \textsuperscript{301} 91 F.2d 998 (2d Cir. 1937).
\item \textsuperscript{302} Id. at 999.
\item \textsuperscript{303} Id.
\item \textsuperscript{304} Id. It is difficult to determine precisely what the court meant by this statement, particularly because the preceding sentence points out: "[T]he right protected by Hartfield's copyright was not to the use of the words found in the phrases, but to the many arrangements ... which the author selected to express his idea." \textit{Id.} (citations omitted). \textit{See infra} notes 313-14 and accompanying text.
\item \textsuperscript{305} \textit{Hartfield}, 91 F.2d at 999.
\item \textsuperscript{306} Brief English Systems, Inc. v. Owen, 48 F.2d 555 (2d Cir.), cert. denied, 283 U.S. 853 (1931).
\item \textsuperscript{307} The court had reached a similar conclusion in an earlier case involving another book of coined code words. Reiss v. National Quotation Bureau, 276 F.2d 717 (C.C.S.D.N.Y. 1921) (L. Hand, J.). The same court also had suggested in dictum in another case that a copyright might subsist in a geometric design "illustrating thought processes and formulating scientific information in regard to same." \textit{Korzybski v. Underwood & Underwood}, Inc., 36 F.2d 727, 728 (2d Cir. 1929) (A. Hand, J.). The court found in the latter case, however, that a photograph of the work did not infringe because plaintiff already had included drawings of the work in a patent application, thus placing the work in the public domain. \textit{Id.} at 729.
\item \textsuperscript{308} Harcourt, Brace & World, Inc. v. Graphic Controls Corp., 329 F. Supp. 517, 524 (S.D.N.Y. 1971).
\item \textsuperscript{309} \textit{Synercom}, 462 F. Supp. at 1011.
\end{itemize}
If Hartfield remains sound law, the analogies between a code and a user language initially are persuasive. Both are collections of words and symbols, borrowed and original, in which the symbolic system has meaning only if a set of conventions is followed. If indeed a user language is analogous to a code, Judge Hand’s conclusion that copyright protected Hartfield’s words and phrases would be significant;\(^\text{310}\) copyright then would protect the elements of the user language original to the programmer, regardless of past use by others.

Application of the codebook rationale to a user-level language, however, results in a major logical gap. Section 106 of the Copyright Act reserves several rights to the copyright holder, including the rights to make copies and to prepare derivative works.\(^\text{311}\) The offense in each instance is the unauthorized use of the copyrighted work. If a plaintiff premises an infringement action on unauthorized use of a user-level language in a competing work, how will he identify the infringed work?

If the defendant has copied a compilation or description of the language, the analysis is relatively straightforward (subject, of course, to the Synercom caveats discussed above). Since a copyright may subsist in a compilation, unauthorized copying of the compilation of a language in a manual or on a reference card should violate that copyright. Similarly, copying a description in a manual is indistinguishable from copying any other book. The analysis is more difficult, however, if the plaintiff alleges that the defendant developed a competing program that accepts a language identical to the plaintiff’s and wrote documentation describing that language. Following Hartfield, the plaintiff will argue that the copyright subsists in the elements of the language themselves, and that the defendant violated the copyright by including these elements in his program and documentation. The defendant will respond that the plaintiff cannot point to a “work” that has been misappropriated, but rather is seeking to protect either an idea or individual words, neither of which copyright protects.\(^\text{312}\)

The defendant’s argument is more persuasive. Abstractions do not enjoy copyright protection; an infringer must infringe a protected work. If the defendant merely writes a program that accepts the elements and syntactical rules of the plaintiff’s language, the defendant has not infringed a protected work.

Judge Hand, however, remarked in Hartfield that “the phrases . . . were proper subjects of copyright.”\(^\text{313}\) Although any statement by Learned Hand in a copyright decision is not to be dismissed lightly, it only can be inferred that the remark is aberrant dictum. The statement was unnecessary to the decision since defendant had copied portions of the compilation.\(^\text{314}\) Moreover, it is plainly

\(^{310}\) Hartfield, 91 F.2d at 999.


\(^{313}\) Hartfield, 91 F.2d at 999.

\(^{314}\) Id. The trial court found “a large number of substantially identical phrases that are in the two codes and certain sequences of phrases.”
inconsistent with that most venerable of copyright maxims: copyright protects only works of expression, not ideas and abstractions.

Second, *Synercom* also supports the theory that copyright cannot protect a user-level language. The court concluded that copyright did not bar one programmer from using input formats that another had developed, or independently producing descriptions of those formats. In one important sense, a user-level language is a set of "input formats." The language elements and syntax specify acceptable means for entering data, selecting options, and generating output—purposes similar to those served by the input formats in *Synercom*. *Synercom*, therefore, suggests that any expression embodied in a user-level language is indistinguishable from the underlying ideas of arranging and entering data and controlling the program's operation.

There are differences, however, between the largely blank forms used by *Synercom* and a complex user-level language. As suggested earlier, the differences between the forms and traditionally protected literary expression may have influenced the *Synercom* court. A user language may be the culmination of a long process of designing and manipulating elements of expression. The language must be intelligible to the user, must be comprehensive and internally consistent, and must direct the operation of the program.

Although this distinction may avoid the precedential effect of *Synercom*, it does not solve the fundamental problem—the absence of an identifiable protected work. This absence makes it unlikely that copyright protection will be extended to the elements and syntax of user-level languages, notwithstanding Judge Hand's dictum. Copyright may protect discrete manifestations of the language, including screen displays, compilations, and description. Passing off and misappropriation claims asserted under federal trademark law and the statutory and common law of unfair competition, however, may be the only means of protecting the language itself. A plaintiff asserting such claims generally

316. See supra notes 223-29 and accompanying text.
317. See supra notes 296-97 and accompanying text.
318. See Lanham Act § 43(a), 15 U.S.C. § 1125(a) (1982). Section 43(a) prohibits, "words or other symbols tending falsely to describe or represent" the origin of goods or services. In certain circumstances, misappropriation of another's user language arguably could confuse customers about the origin of a software product.
319. See, e.g., TENN. CODE ANN. § 47-18-104(b)(1)-(4) (1984). These provisions of the Tennessee Consumer Protection Act are similar to the Lanham Act in prohibiting practices that tend to create confusion about a product's source. Because one of the stated purposes of the Consumer Protection Act is to promote "good faith dealings between buyers and sellers at all levels of commerce," id. § 47-18-102(4), it presumably is available to persons other than retail consumers. See id. § 47-18-109(a) (private right of action available to "any person who suffers an ascertainable loss . . . as a result of the use of or by another person of an unfair or deceptive act or practice declared to be unlawful by this part"). Other states have more general prohibitions against unfair or deceptive acts or practices. See, e.g., MASS. ANN. LAWS ch. 93A, § 11 (Michie/Law Co-op. Supp. 1984). Some of these states have created a private right of action for any person injured by a prohibited practice, see, e.g., N.C. GEN. STAT. § 75-1.1 (1984), whereas others have provided for an express private action for injured business people, see, e.g., MASS. ANN. LAWS ch. 93A, § 2 (Michie/Law Co-op. 1975); N.C. GEN. STAT. § 75-16 (1984). Some of these states have created a private right of action for any person injured by a prohibited practice, see, e.g., N.C. GEN. STAT. § 75-16 (1984), whereas others have provided for an express private action for injured business people, see, e.g., MASS. ANN. LAWS ch. 93A, § 11 (Michie/Law Co-op. Supp. 1984).
would have to demonstrate one of the following: (1) the plaintiff’s language is so closely identified with his product that the defendant’s use of the language tends to create confusion about the source of the defendant’s product, or (2) the defendant is reaping unfairly the benefits of the plaintiff’s development and marketing.\textsuperscript{321} The use of any of these theories, of course, may be preempted under section 301 of the Copyright Act.\textsuperscript{322}

\textsuperscript{321} A full discussion of these theories and their elements is beyond the scope of this Article.

\textsuperscript{322} See supra notes 99-106 and accompanying text.

Section 301 of the Copyright Act preempts state statutory and common-law protection when:

(i) the nature of the work at issue is within the subject matter of copyright as defined in §§ 102 and 103 of the Copyright Act; and

(ii) the rights granted under state law are equivalent to any of the exclusive rights within the general scope of copyright as specified by § 106 of the Copyright Act.

Accordingly, an unfair competition claim under state common or statutory law must concern either (1) the plaintiff’s language is so closely identified with the product that the defendant’s use of the language tends to create confusion about the source of the defendant’s product, or (2) the defendant is reaping unfairly the benefits of the plaintiff’s development and marketing. The use of any of these theories, of course, may be preempted under section 301 of the Copyright Act.

\textsuperscript{321} In 1918 the Supreme Court recognized a cause of action for misappropriation under federal common law. International News Serv. v. Associated Press, 248 U.S. 215 (1918). The Court held that even though plaintiff news agency could not copyright the facts in its news releases, defendant could not review the early editions of plaintiff’s newspapers and pirate the news to use as its own. \textit{Id.} at 226. The Court reasoned that one who had worked to obtain a product should be able to benefit from it, rejecting defendant’s argument that published news articles belonged to the public, and considering instead the plaintiff’s and defendant’s relative rights as competitors.


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\end{enumerate}

Accordingly, an unfair competition claim under state common or statutory law must concern either intellectual property not protected by copyright or be based on state rights qualitatively different from the rights protected by the Copyright Act. Compare Rand McNally & Co. v. Fleet Mgt. Sys., 591 F. Supp. 726, 739 (N.D. Ill. 1983) (mileage figures on highway maps entitled to copyright protection as compilations; process of compilation may be entitled to state-law misappropriation protection) and Bromhall v. Rorvik, 478 F. Supp. 361, 367 (E.D. Pa. 1979) (ideas protected by state misappropriation law precisely because they are not protected by copyright) and Leonard Storch Enters. Inc. v. Mergenthaler Linotype Co., 202 U.S.P.Q. (BNA) 623 (E.D.N.Y. 1979) (printing fonts denied copyright protection but granted alternate state protection) with Durham Indus. Inc. v. Tomy Corp., 630 F.2d 905, 918-19 (2d Cir. 1980) (unfair competition claim preempted) and Synercom Tech., Inc. v. University Computing Co., 474 F. Supp. 37, 42-43 (N.D. Tex. 1979) (state misappropriation doctrine preempted). In \textit{Durham Indus.}, a manufacturer of Walt Disney character figurines sued for copyright infringement and unfair competition. The court, after rejecting the manufacturer’s copyright claims because of lack of originality, also dismissed the unfair competition claim. Citing § 301 of the Copyright Act, the court stated that a plaintiff cannot achieve with an unfair competition claim what he has failed to achieve with a copyright claim, and held that the unfair competition claim was preempted because it was based on a right equivalent to exclusive rights within the scope of copyright. \textit{Durham Indus.}, 630 F.2d at 918-19. In \textit{Synercom} the court had
Although it is unlikely that user-level languages will receive copyright protection, evidence of a defendant's appropriation of a language still may be relevant in a copyright infringement case. The difference between a literary work and a computer program dictates a parallel difference in the focus of an infringement case—rather than comparing page by page the competing works, the defendant's conduct must be analyzed. If this premise is accepted, the defendant's appropriation of the plaintiff's user language may be significant. Consider an admitted copyist who relies on the compatibility defense. The court must determine whether copying to achieve compatibility is more like computer industry practices that should be tolerated, if not encouraged, so as to promote competition, or more like traditional literary plagiarism. That the defendant has appropriated the plaintiff's language, a product of substantial creative effort, may have some practical impact on the court's determination. Similarly, if the defendant claims that any code-level similarities were incidental to his independent creation and the case turns on the relative credibility of the parties, evidence of the defendant's appropriation of a user language may be significant. Thus, although defendant may not be independently liable for appropriating a user language, such appropriation nevertheless may be relevant in evaluating other acts of alleged infringement.

IV. SUBSTANTIAL SIMILARITY REVISITED: A FOCUS ON CONDUCT

This Article suggests in several contexts that the defendant's conduct should be the critical inquiry in software copyright litigation. Liability should not depend on substantial similarity between the copyrighted work and a particular version of the allegedly infringing work; rather, it should depend on whether the defendant has engaged in conduct that infringes any of the plaintiff's exclusive statutory rights. This view draws support from four important sources.

First, applying the substantial similarity test to a pair of computer programs may be a meaningless exercise for a trier of fact not well versed in computer programming. Trivial distinctions may disguise, to the lay viewer, earlier line-by-line copying. Second, subsequent alterations may be much more significant in a computer case than a literary case. Since a plagiarist sometimes can make alterations sufficient to "disguise the piracy" on a computer with little creative effort, and since such alterations may not substantially divest him of the advantage he has gained from initially copying the plaintiff's program, there are compelling reasons for not limiting the inquiry to the appearance of the work granted copyright relief in an earlier decision, and it held that granting further relief under unfair competition for the same conduct would create an unacceptable conflict between state and federal law. Synercom, 474 F. Supp. at 43. See generally Denicola, supra note 298, at 517 n.7 (review of copyright preemption doctrine and its effect on state-law theories); Shipley & Hay, supra note 298, at 152-58 (same).

323. See supra notes 212-21 and accompanying text.


that the defendant ultimately plans to distribute.326

Third, several cases suggest indirectly that the appropriate focus in a copyright case is the defendant's conduct. In Hartfield v. Peterson,327 for example, defendant denied copying, even though many of his words and phrases were identical to those appearing in plaintiff's book. The court rejected defendant's denial, considering among other things, that defendant had purchased a copy of plaintiff's work well in advance of compiling his own.328 Similarly, in Original Appalachian Artworks, Inc. v. Toy Loft, Inc.,329 the original Cabbage Patch doll case, defendant denied that he had copied the dolls produced by the now famous Xavier Roberts. As part of its inquiry the court examined defendant's conduct, emphasizing defendant's "insatiable interest in the production techniques of [plaintiff's] dolls," and finding that this "provided ample grounds for the trial court's skeptical treatment" of defendant's claims of originality.330 Furthermore, the United States Courts of Appeals for the Third and Ninth Circuits have applied a two-part inquiry in infringement cases: they assess whether defendant has copied and then evaluate the significance of any copying that has been detected.331 Although these circuits and other courts ultimately have used the degree of similarity as the dispositive criterion, this two-step analysis nevertheless is consistent with the statutory focus on copying.

Last, courts should concentrate on the defendant's conduct because of the language of the 1976 Act. Under the 1909 Act the exclusive rights of the authors of literary works included the rights to print, reprint, publish, copy, vend, translate, or dramatize the copyrighted work.332 Section 106 of the 1976 Act includes among the exclusive rights of the copyright holder the right "to prepare derivative works based upon the copyrighted work."333 Section 101 defines a derivative work as "a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, . . . or any other form in which a work may be recast, transformed, or adapted."334

The language of section 106 suggests that preparing a derivative work includes more than just copying. If this language is taken literally, the defendant need not copy verbatim or even paraphrase the copyrighted work, as long as he uses it and his resulting work can be seen as "based upon" the copyrighted work. The legislative history, although not extensive, is consistent with this interpretation. The House Report notes that the exclusive right to prepare derivative works "overlaps the exclusive right of reproduction to some extent. It is broader than that right, however, in the sense that reproduction requires fixation in copies or phonorecords, whereas the preparation of a derivative work . . .

326. See supra notes 266-74 and accompanying text.
327. 91 F.2d 998 (2d Cir. 1937).
328. Id. at 999.
329. 684 F.2d 821 (11th Cir. 1982).
330. Id. at 830.
331. See supra notes 149-52 and accompanying text.
334. Id. § 101.
may be an infringement even though nothing is ever fixed in tangible form.”

The report also notes that, notwithstanding the breadth of the offense, “the infringing work must incorporate a portion of the copyrighted work in some form.”

The United States Court of Appeals for the Ninth Circuit squarely contradicted this interpretation of section 106 in the recent motion picture case of Litchfield v. Spielberg. The court rejected the proposition that a plaintiff “does not have to show substantial similarity to show that [the accused work] is a derivative work.” This holding, however, should not be considered controlling or even persuasive in computer software cases for two reasons. First, it is easier to disguise original similarity between computer programs than between movies. Second, the Litchfield holding is premised on the court of appeals’ view that substantial similarity is an element of the offense and not merely a form of circumstantial evidence of copying. Other courts do not follow this view and thus should find limited precedential value in Litchfield’s interpretation of section 106.

The literal scope of the copyright holder’s exclusive right to prepare derivative works must be limited, so that every borrower of an idea is not threatened.


336. Id.

337. 736 F.2d 1352 (9th Cir. 1984).

338. Id. at 1357. Plaintiff alleged that defendant’s movie, E.T.—The Extraterrestrial, infringed the copyright in a 1978 play plaintiff had written. The court rejected a traditional copyright claim because of the absence of substantial similarity, id. at 1356-57, and dismissed as “frivolous” plaintiff’s argument that an unlawful derivative work need not be substantially similar to the protected work. Id. at 1357. The court criticized the plaintiff for “cit[ing] no authority to support this novel proposition.” Id. The principal authority, however, that the court cited to support its own position, Harry Fox Agency, Inc. v. Mills Music, Inc., 543 F. Supp. 844, 849 (S.D.N.Y. 1982), rev’d on other grounds, 720 F.2d 733 (2d Cir. 1983), cert. granted, 104 S. Ct. 1676 (1984), appears not to be on point. In Harry Fox, the court determined the respective rights of a composer and a music publisher under a previously terminated license and copyright assignment. The page that the Spielberg court cited from the Harry Fox district court opinion states that “[a] work is a ‘derivative work’ if it is substantially derived from an underlying work.” Harry Fox, 543 F. Supp. at 849. It does not state or “suggest,” however, as the court of appeals contends, that “a work is not derivative unless it has been substantially copied from the prior work.” Litchfield, 736 F.2d at 1357 (emphasis added). The other case that the court cites, Reyher v. Children’s Television Workshop, 533 F.2d 87, 90 (2d Cir.), cert. denied, 429 U.S. 980 (1976), did use the “substantially copied” language, which it borrowed from Nimmer on Copyright. See M. Nimmer, supra note 59, § 3.01. Reyher was decided under the 1909 Copyright Act. Moreover, the issue discussed in Reyher on the page that the Spielberg court cited was whether a book written by the plaintiff was sufficiently distinct from a story in the public domain to be a derivative work subject to copyright protection. Litchfield, 736 F.2d at 1357 (citing Reyher, 533 F.2d at 90). Reyher did not address the offensive use of the right to produce derivative works proposed by plaintiff in Litchfield.

339. See supra notes 266-71 and accompanying text.

340. See Litchfield, 736 F.2d at 1355 (“To prove copyright infringement, the plaintiff must show (1) ownership of the copyright, (2) access . . . and (3) substantial similarity . . . .”); id. at 1356 (“To prove infringement, a plaintiff must show that the works are substantially similar in both ideas and expression.”) (both citing Sid & Marty Krofft Television Prosds., Inc. v. McDonald’s Corp., 562 F.2d 1157, 1162-64 (9th Cir. 1977)). The Ninth Circuit’s view of the significance of substantial similarity is discussed supra note 149.

341. See supra notes 142-52 and accompanying text. Litchfield’s use of precedent is also suspect. See supra note 338.
by the holder’s “offensive” use of the right.\textsuperscript{342} The United States Court of Appeals for the Seventh Circuit adopted a practical approach in \textit{Midway Manufacturing Co. v. Artic International, Inc.}\textsuperscript{343} Plaintiff was the licensor of the Pac-Man and Galaxian videogames. Defendant sold a printed circuit board that would speed up play when inserted into one of the plaintiff’s Galaxian game machines.\textsuperscript{344} After first discussing the validity of plaintiff’s copyrights in the games as audio-visual works,\textsuperscript{345} the court found that the entity the consumer created by using both plaintiff’s and defendant’s products—a speeded-up Galaxian game—constituted a derivative work as defined in section 101.\textsuperscript{346} Defendant analogized the effect of its product to speeding up a phonograph record—a trivial activity that clearly would not yield an infringing derivative work.\textsuperscript{347} The court rejected the analogy and, significantly, distinguished the speeded-up game from a speeded-up record on economic grounds:

\[ 	ext{T} \]he additional value to the copyright owner of having the right to market separately the speeded-up version of the recorded performance is too trivial to warrant legal protection for that right. A speeded-up videogame is a substantially different product from the original game. As noted, it is more exciting to play and it requires some creative effort to produce. For that reason, the owner of the copyright on the game should be entitled to monopolize it on the same theory that he is entitled to monopolize the derivative works specifically listed in Section 101.\textsuperscript{348}

The court determined that because the speeded-up game was a derivative work, the consumer “who lacks the plaintiff’s authorization to create a derivative work is a direct infringer [under section 106(2)] and the defendant is a contributory infringer through its sale of the speeded-up circuit board.”\textsuperscript{349}

Thus, the court treated sections 101 and 106(2) as meaning what they say: one who creates an unauthorized derivative work infringes, and derivative works are not only the enumerated examples—such as translations, dramatizations, and motion picture versions—but other works not named in the statute that are similarly “based upon” the original.\textsuperscript{350} Most significantly, the court defined the category of derivative works using economic considerations. The court held that if, because the defendant has based his work on the plaintiff’s work, the limited monopoly that the Copyright Act confers on the plaintiff is frustrated substan-
tially, the defendant has violated section 106; if the interference with the plain-
tiff's monopoly is economically trivial, the defendant has not violated the
plaintiff's exclusive rights, even though the allegedly infringing work in some
sense is "based upon" the original.351

V. CONCLUSION: A UNIFYING THEORY FOR SOFTWARE COPYRIGHT
LITIGATION

It often will be inappropriate in software cases simply to compare the com-
peting works to determine whether they are substantially similar. Rather, the
technology dictates a focus on the defendant's conduct and any advantage he
has gained from it. This approach is implicit in many cases, and more impor-
tantly, is consistent with the statutory language and the limited case authority
construing it.

Based on these practical and legal considerations, the following is proposed
as a unifying theory for software copyright litigation:

(1) The court should read the Copyright Act literally to prohibit
conduct inconsistent with the copyright holder's exclusive rights. The
court should not follow literary cases by concluding immediately that
no direct evidence will be available and that substantial similarity must
be the dispositive criterion. In a computer case, direct evidence not
only may exist, but it may be more useful than inferences drawn from
comparing the works.

(2) The court should look beyond the final version of the defend-
ant's work to determine whether he engaged in unauthorized copying.
The court first should determine whether the defendant engaged in un-
authorized copying while developing his work. Following indirectly
the United States Court of Appeals for the Seventh Circuit in Midway
Manufacturing Co. v. Artic International, Inc.,352 the court next should
evaluate the economic significance of any copying: if the defendant
copied while developing his work, received a substantial economic ben-
efit from doing so, and that economic benefit persists in the final prod-
uct, he should be held to have violated the plaintiff's copyright,
regardless of whether the defendant's final product appears to be a
copy of the original. Thus, if the defendant copied while developing
his work, his subsequent alterations should exonerate him only if they
eliminate the economic advantage he gained by copying. This ap-
proach will minimize the inequity of the subsequent alteration defense,
yet prevent a copyright holder from inhibiting competition because of
a literal but trivial copyright violation.

(3) Absent evidence of copying, the court should examine whether

351. Midway used a similar argument in a suit against the producer of a Pac-Man modification
kit. Midway Mfg. Co. v. Strohon, 564 F. Supp. 741 (N.D. Ill. 1983). In this case, however, the court
did not consider § 106(2) as an independent source of liability. It found that defendant's product did
not infringe Midway's audio-visual work copyright because the kit produced an audio-visual work
not substantially similar to Pac-Man. Id. at 747-78. The court enjoined Strohon's kit nonetheless,
partly on trademark grounds and partly because it contained ROMs that infringed Midway's copy-
right in the Pac-Man object code. Id. at 749-54.
352. 704 F.2d 1009 (7th Cir. 1983).
COMPUTER SOFTWARE LITIGATION

the defendant's work constitutes a derivative work, again focusing on the defendant's conduct. The court should determine whether the defendant developed his program by basing it on or deriving it from the plaintiff's program. There are three pertinent questions: First, did the defendant make substantial physical use of the plaintiff's work by, for example, dissecting a copy of the plaintiff's source code that the defendant had received under a license agreement or decompiling an ROM he had purchased? Second, did the defendant borrow from the plaintiff's program material detailed enough that it could be characterized as expression? The Copyright Act will apply only if the material appropriated was a detailed outline of the program, if not code itself, and not merely general programming ideas. For reasons discussed in the preceding recommendation, the plaintiff need only show that the defendant appropriated such material at some point in the development process, regardless of the ultimate similarity of the two works. Third, did the defendant derive a substantial economic advantage from using the plaintiff's work? This inquiry is designed to prevent copyright holders from inhibiting competition unreasonably. Again, the subsequent alteration defense should apply only if the alterations eliminated the advantage the defendant gained from his otherwise unlawful use of the plaintiff's program.

(4) Focusing on the defendant's conduct and any advantage he derived from it, the court should consider all relevant circumstantial evidence. The defendant's subsequent alterations may be evidence that he earlier engaged in significant copying or derivation. Similarly, the defendant's appropriation of a user-level language may be relevant to his credibility in determining whether similarities between his and the plaintiff's programs resulted from derivation or were incidental to the program's functional equivalency. Substantial similarity of the competing works is also circumstantial evidence. Although in many cases it will remain the most important circumstantial evidence, it should not be considered the sole relevant circumstantial evidence, nor should its preeminence be presumed conclusively.

Although this model requires the court to make many subjective judgments, so does the prevailing interpretation of the Copyright Act. In software litigation, however, traditional copyright doctrine requires judgments that are likely to be uninformed and thus conjectural. For example, how can a district court decide whether the facial similarity of two source codes is substantial? The proposed model instead requires judgments of human conduct and economic significance—matters with which courts and jurors deal daily. The proposed model, although imperfect, will balance more equitably the competing interests of free competition and reasonable proprietary expectations, and will do so in a manner consistent with the letter and spirit of the Copyright Act.

353. It recently has been suggested that the manner in which an allegedly infringing program organizes and processes data will provide important clues in determining whether another program was used in its creation. See McCure & Sher, Evaluating Claims of Software Copying Through Data Analysis (Part II), 3 SOFTWARE PROTECTION 6 (Aug. 1984).
ADDENDUM: NOTE ON RECENTLY DECIDED CASES

Since this Article went to press, two United States District Courts have issued opinions dealing with infringement of a copyright in computer software. The reasoning in both cases is consistent with some of the views expressed in this Article.

In the first case, Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.,\textsuperscript{354} plaintiff Whelan was the assignee of the copyright in a program written in a language called EDL and intended for use on IBM minicomputers.\textsuperscript{355} The program originally had been developed for defendant Jaslow, which therefore had access to the source code for the EDL version.\textsuperscript{356} Without authorization from Whelan, a programmer working under Jaslow’s direction prepared a BASIC language version of the program that would run on IBM Personal Computers (PCs).\textsuperscript{357} The second version was virtually identical to the original in mode of operation and functions performed.\textsuperscript{358}

After disposing of several preliminary issues, the court turned to the “more difficult factual determination . . . as to whether the IBM-PC program . . . constitutes copyright infringement.”\textsuperscript{359} The court stated that although the idea of a program for performing a particular function is not protected, “[t]he expression of the idea embodied in a computer program is protected by the copyright laws even though it must be altered and refined to be made adaptable to different types of computers that have different methods of responding to command controls and therefore require different source codes.”\textsuperscript{360} The court reasoned from this legal premise in finding that the PC version of the program infringed even though it was not a literal copy or translation of the original.\textsuperscript{361} Relying on the testimony of plaintiff’s expert, the court emphasized that defendant’s programmer had acquired thorough knowledge from his access to the original program,\textsuperscript{362} and that “prospective users and customers . . . found no substantial difference between the [two programs], and considered them to be the same.”\textsuperscript{363}

The procedural history of the second case, SAS Institute, Inc. v. S&H Computer Systems, Inc.,\textsuperscript{364} is outlined above.\textsuperscript{365} The court found the facts to be substantially as alleged by SAS Institute.\textsuperscript{366} Programmers affiliated with S&H set out to create a version of the Institute’s SAS program for computers other than the large IBM computers for which it originally had been written.\textsuperscript{367}

\textsuperscript{355} Slip op. at 3-5, 7-8.
\textsuperscript{356} Id. at 15.
\textsuperscript{357} Id. at 15-16.
\textsuperscript{358} Id. at 33-35.
\textsuperscript{359} Id. at 29.
\textsuperscript{360} Id. at 30.
\textsuperscript{361} Id. at 31-35.
\textsuperscript{362} Id. at 18-19, 34-35.
\textsuperscript{363} Id. at 34.
\textsuperscript{364} Nos. 82-3669, 82-3670 (M.D. Tenn. Mar. 6, 1985).
\textsuperscript{365} See supra note 158.
\textsuperscript{366} Slip op. at 1-19.
\textsuperscript{367} Id. at 4-5.
new product was to be fully compatible with SAS, so that SAS users would notice no functional differences between the two programs. In writing the new program, which was in a different computer language than SAS, the S&H programmers studied SAS source code, copied the SAS code literally in a number of instances, and appropriated extensively the structure and organizational details of SAS. After the dispute began, S&H made a concerted effort to edit the new program to minimize its similarity to SAS. The court characterized this an "an effort to mask and disguise evidence of copying."

In finding infringement, the court dealt directly with a number of the issues raised in this Article. First, the court eschewed the "ordinary lay observer" approach to substantial similarity, instead accepting the testimony of an expert witness on this point. Second, the court found that both literal copying of source code and appropriation of organizational details constituted borrowing of expression. In reaching this conclusion, the court observed that a computer program's function does not dictate its form to the extent suggested by S&H: "Even in the case of simple statistical calculations, there is room for variation . . . ." Third, the court recognized that the quality, as well as quantity, of observed similarities may be relevant to their substantiality: "[T]he piracy of even a quantitatively small fragment ('a rose by any other name would smell as sweet') may be qualitatively substantial."

Fourth, the court found that besides being an infringing copy in the sense of being substantially similar to SAS, the S&H product was an infringing derivative work. The court based its analysis on the premise that "The [copyright] statute deals with human conduct, the nature of the activity which resulted in the defendant's product." The court evaluated S&H's conduct in light of the statutory definition of derivative work and found that "the product was substantially and pervasively 'based upon' SAS."

Last, the court rejected a subsequent alteration defense. The court dismissed out of hand S&H's contention that it had not violated copyright law because the version of its product distributed had been edited to the point that it was no longer substantially similar to SAS. As the court put it, "S&H's argument that it can cure its infringement by simple excision is flatly inconsistent with the statute." The court analogized the argument to the contention that a plagiarist "can misappropriate every internal and external feature of a building, [and] can then cure any impropriety by changing the tint of the windows

368. Id. at 6. 369. Id. at 9-18. 370. Id. at 13. 371. Id. at 10. 372. Id. at 16-17, 25-26. 373. Id. at 17. 374. Id. at 25. 375. Id. at 26-27. 376. Id. at 27. 377. Id. 378. Id.
and the color of the siding."\textsuperscript{379}