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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

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1. See generally J. SOMA, THE COMPUTER INDUSTRY 28-30 (1976) (review of industry's change in emphasis from hardware to software development); *Software Rentals: Piracy is the Hot New Issue*, BUS. WK. Aug. 1, 1983, at 90, 91 (discussing economic value of software and financial threat of illegal copying through rentals).

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 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.² Programs, to borrow a phrase from Arthur Koestler, are

2. *Synercom Tech., Inc. v. University Computing Co.*, 462 F. Supp. 1003, 1005 (N.D. Tex. 1978); see 1 D. BENDER, *COMPUTER LAW* § 2.06 (1984); J. SOMA, *COMPUTER TECHNOLOGY AND THE LAW* § 1.06 (1983); Note, *Copyright Protection of Computer Program Object Code*, 96 HARV. L. REV. 1723, 1724 (1983).

the "ghost in the machine."³ 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.⁴ In legal terminology, such systems programs might be described as "procedural." Their "substantive" counterparts are applications programs,⁵ 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.⁶ The following discussion pertains to both of these major software categories.

A computer program typically is written in several steps.⁷ First, the programmer studies the function to be performed and outlines the general structure of the program.⁸ 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.⁹ 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.¹⁰ 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

3. A. KOESTLER, *THE GHOST IN THE MACHINE* (1967).

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.

6. 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[3]; J. SOMA, *supra* note 2, §2.01, at 23-24.

7. See 1 D. BENDER, *supra* note 2, § 2.06[3]; Davidson, *Protecting Computer Software: A Comprehensive Analysis*, 23 JURIMETRICS J. 337, 341-42 (1983).

8. See 1 D. BENDER, *supra* note 2, §2.06[3][a].

9. See *id.*

10. For a general discussion of writing code, see *id.* § 2.06[3][d] and authorities cited therein; Davidson, *supra* note 7, at 341.

are step-by-step logical procedures for solving programming problems.¹¹ 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.¹² 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."¹³ Source code usually is written in a "high-level" computer language, meaning one that is similar to English.¹⁴ Source code can be understood readily by other programmers 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.¹⁵ This version

11. *Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358, 1367 (D. Del. 1983). C. SIPPLE & R. SIPPLE, *COMPUTER DICTIONARY AND HANDBOOK* (2d ed. 1972), defines the term "algorithm" more comprehensively as:

(1) A fixed step-by-step procedure for accomplishing a given result; usually a simplified procedure for solving a complex problem, also a full statement of a finite number of steps.

(2) A defined process or set of rules that leads [sic] and assures development of a desired output from a given input. A sequence of formulas and/or algebraic/logical steps to calculate or determine a given task; processing rules.

Id. at 23, quoted in *Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358, 1367 (D. Del. 1983). For varying interpretations of the term, see *Diamond v. Diehr*, 450 U.S. 175, 186 n.9 (1981); *In re Pardo*, 684 F.2d 912, 915-16 (C.C.P.A. 1982); *In re Phillips*, 608 F.2d 879, 882-83 (C.C.P.A. 1979).

12. See generally NAT'L COMM'N ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT 18-23 (1978) (distinguishing function from expression in programs) [hereinafter cited as CONTU REPORT]. Cf. *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1253 (3d Cir. 1983) (discussing extent of originality in operating systems), cert. dismissed, 104 S. Ct. 690 (1984).

13. See *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1243 (3d Cir. 1983), cert. dismissed, 104 S. Ct. 690 (1984).

14. *Id.*; see 1 D. BENDER, *supra* note 2, § 2.06[3][c]; J. SOMA, *supra* note 2, glossary at 419; Davidson, *supra* note 7, at 341.

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 process-

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.¹⁶ 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.¹⁷ Since object code is sufficient and generally necessary to execute the program, it almost always is distributed to users.¹⁸ If the user wants to distribute the source code, he can negotiate the matter with the proprietor.¹⁹

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 distinguish it from the initial writing of code, many programmers view the two activities merely as related facets of a single creative process.²⁰ Early versions of the program created during the debugging

ing 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).

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

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.²¹

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.²² 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.²³ 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.²⁴

Some computer scientists believe that every level of the programming process yields valuable intellectual property on which the

21. See *Synercom Tech., Inc. v. University Computing Co.*, 462 F. Supp. 1003, 1013 n.5 (N.D. Tex. 1978); Davidson, *supra* note 7, at 379-80. Formerly, documentation often included actual source code.

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).

23. See generally A. MILLER & M. DAVIS, *INTELLECTUAL PROPERTY: PATENTS, TRADEMARKS, AND COPYRIGHT 1-2* (1983) (reviewing types of intellectual property).

24. See 17 U.S.C. § 109(a) (1982).

programmer has a proprietary claim.²⁵ In the initial, organizational phase of software production, the 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 pre-existing 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

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.

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.

28. See CONTU REPORT, *supra* note 12, at 9-10, 20-21.

29. See *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1249-54 (3d Cir. 1983) (discussing originality of expression in computer programs), *cert. dismissed*, 104 S. Ct. 690 (1984); *infra* notes 194-246 and accompanying text.

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 select and combine elements to fit his data and programming needs.³² 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.³³

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

30. See *Synercom Tech., Inc. v. University Computing Co.*, 462 F. Supp. 1003, 1013 n.5 (N.D. Tex. 1978); 1 D. BENDER, *supra* note 2, § 2.06[3][f].

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).

32. Similarly, with videogames, the display derives from interaction between the game program and the user who constantly chooses among available options. Several courts have concluded that the user's contribution does not undermine the copyright status of the game programs. E.g., *Midway Mfg. Co. v. Artic Int'l, Inc.*, 704 F.2d 1009, 1011-12 (7th Cir. 1983); *Stern Elecs., Inc. v. Kaufman*, 669 F.2d 852, 855-56 (2d Cir. 1982). See generally Jones, *Video Game Litigation and the 1976 Copyright Act: The Ideas of Games, The Expression of Aliens and the Underlying Computer Software*, 1 J. COPYRIGHT, ENTER. & SPORTS L. 17 (1982) (comprehensive review of videogame case law).

33. See Jones, *supra* note 32, at 18.

thereof."³⁴ The patentee holds the exclusive right to use, manufacture, and sell the patented invention.³⁵ 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.³⁶ Thus, competitors are free to “invent around” the patent by devising a dissimilar device that performs the same function in a different way.³⁷ Design patents, which cover such things as ornamental structures, have a life of fourteen years,³⁸ utility patents, which cover machines and other products and the processes used to develop them, last seventeen years.³⁹

In the 1972 case of *Gottschalk v. Benson*⁴⁰ the Supreme Court held unpatentable 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.⁴¹ In subsequent decisions the Supreme Court held not patentable two other processes that used computer programs, but did not foreclose

34. 5 U.S.C. § 101 (1982); see J. SOMA, *supra* note 2, § 2.03, at 26-27.

35. See 35 U.S.C. §§ 154, 271(a) (1982).

36. See *Diamond v. Diehr*, 450 U.S. 175, 182-84, 191-92 (1981). For a more general discussion of patent coverage, see J. SOMA, *supra* note 2, §§ 2.03-.04, at 26-35; Davidson, *supra* note 7, at 348-59. For a discussion of the economic factors involved in giving patent protection to software, see Note, *The Policy Implications of Granting Patent Protection to Computer Software: An Economic Analysis*, 37 VAND. L. REV. 147 (1984).

37. See R. CHOATE & W. FRANCIS, *PATENT LAW* 634-35 (2d ed. 1981).

38. 35 U.S.C. § 173 (1982); see J. SOMA, *supra* note 2, § 2.02, at 25.

39. 35 U.S.C. § 154 (1982); see J. SOMA, *supra* note 2, § 2.02, at 25.

40. 409 U.S. 63 (1972). The Court sought to resolve conflicting decisions from the Patent and Trademark Office and the Court of Customs and Patent Appeals. In 1968, the Patent Office took the 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 reh'g*, 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.

41. *Gottschalk*, 409 U.S. at 67, 71-73; see J. SOMA, *supra* note 2, § 2.03, at 30.

entirely the patenting of programs.⁴² Most recently, in *Diamond v. Diehr*,⁴³ 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.⁴⁴ There is post-*Diehr* case support for both positions.⁴⁵ Second, *Diehr* appears to suggest that otherwise patentable processes will not be denied protection simply because they use computer hardware and software.⁴⁶ Similarly, software more likely will be patentable if the claimed invention is described as a process in which the software is applied.⁴⁷ Last, these decisions do not undermine the patentability of

42. *Parker v. Flook*, 437 U.S. 584, 594 (1978); *Dann v. Johnston*, 425 U.S. 219, 229-30 (1976).

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.

45. Compare *Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358, 1368-69 (D. Del. 1983) (data processing methodology for cash management account held patentable subject matter in declaratory judgment action) (appeal pending) and *In re Pardo*, 684 F.2d 912, 916-917 (C.C.P.A. 1982) (reversing Patent and Trademark Office's rejection of patent application for invention that converted computer from sequential processor to processor that could receive program steps in any orders) and *In re Abele*, 684 F.2d 902, 907-09 (C.C.P.A. 1982) (patent application claims directed to improvement in computer tomography patentable subject matter) and *In re Taner*, 681 F.2d 787 (C.C.P.A. 1982) (claims relating to method of seismic exploration were patentable subject matter) with *In re Meyer*, 688 F.2d 789 (C.C.P.A. 1982) (claimed method of replacing thinking processes of neurologist with computer not statutory subject matter). 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).

46. *Diehr*, 450 U.S. at 187.

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 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

computer 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

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.

49. 17 U.S.C. § 102 (1982).

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 41; *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.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."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."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.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.⁵⁷ Moreover, copyright protects only expression, not the ideas being expressed.⁵⁸ Drawing the line between idea and expression has proved to be perhaps the most vexatious problem in the long history of copyright law.⁵⁹

53. Copyright protection for user languages is discussed *infra* notes 289-324 and accompanying text.

54. 17 U.S.C. § 106(1), (2) (1982).

55. *Id.* § 101.

56. See *Meredith Corp. v. Harper & Row, Publishers, Inc.*, 378 F. Supp. 686, 689-90 (S.D.N.Y.) (paraphrase of textbook), *aff'd per curiam*, 500 F.2d 1221 (2d Cir. 1974); *Donald v. Zack Meyer's T.V. Sales & Serv.*, 426 F.2d 1027, 1030 (5th Cir. 1970) ("paraphrasing is equivalent to outright copying"); *Consolidated Music Publishers, Inc. v. Hanson Publications, Inc.*, 339 F. Supp. 1161, 1165 (S.D.N.Y. 1972) (paraphrasing of text of guitar instruction book).

57. See *Warner Bros., Inc. v. American Broadcasting Cos.*, 530 F. Supp. 1187, 1192-93 (S.D.N.Y. 1982) (discussing "total concept and feel" of competing works); *Synercom Tech., Inc. v. University Computing Co.*, 462 F. Supp. 1003, 1012-13 (N.D. Tex. 1978) (recognizing longstanding doctrine that similarity in form, arrangement, and combination of literary elements may constitute infringement).

58. See *Baker v. Selden*, 101 U.S. 99, 101-05 (1879); 17 U.S.C. § 102(b) (1982).

59. 3 M. NIMMER, NIMMER ON COPYRIGHT § 13.03[A][1] (1984).

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,⁶⁰ that right would prohibit virtually any borrowing from the original in creating a subsequent work.⁶¹ Although this expansive interpretation of derivative work may squarely conflict with the statutory prohibition against extending copyright protection to ideas,⁶² the courts have given little guidance on whether the definition of derivative work is to be applied literally.⁶³

The Copyright Act authorizes broad relief. The Act⁶⁴ and associated Supreme Court rules⁶⁵ 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."⁶⁶ The Act also authorizes actual damages and disgorgement of an infringer's profits,⁶⁷ as well as statutory damages up to \$50,000 for willful violations⁶⁸ and reasonable attorneys' fees.⁶⁹

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.

60. See 17 U.S.C. §§ 101, 106(2) (1982).

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) (appropriation of "Maltese Falcon" characters and theme), *cert. denied*, 348 U.S. 971 (1955). 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).

62. See *Baker v. Selden*, 101 U.S. 99, 101-05 (1879); 17 U.S.C. § 102(b) (1982).

63. Cf. *Midway Mfg. Co. v. Artic Int'l, Inc.*, 704 F.2d 1009, 1013-14 (7th Cir. 1983) (exclusive right to prepare derivative works extended to "speeded up" versions of copyrighted videogames).

64. 17 U.S.C. § 503(a) (1982).

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.

66. 17 U.S.C. § 502(a) (1982).

67. *Id.* § 504(a)(1), (b).

68. *Id.* § 504(a)(2), (c).

69. *Id.* § 505.

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.⁷⁰

The same comment states that "[t]he subject matter of a trade secret must be secret."⁷¹ 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."⁷² The Restatement suggests examining 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 safe-keeping of confidential documents;⁷⁷ limiting access by outsiders and all

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.*

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).

75. See, e.g., *Cataphote Corp. v. Hudson*, 444 F.2d 1313, 1315 (5th Cir. 1971); *Sarkes Tarzian, Inc. v. Audio Devices, Inc.*, 166 F. Supp. 250, 257-59 (S.D. Cal. 1958), *aff'd*, 283 F.2d 695 (9th Cir. 1960), *cert. denied*, 365 U.S. 869 (1961).

76. See *Lowndes Prod., Inc. v. Brower*, 259 S.C. 322, 329-30, 191 S.E.2d 761, 765-66 (1972); 12 MILGRIM, *supra* note 70, § 3.01.

77. See 12 MILGRIM, *supra* note 70, § 2.04; 12A MILGRIM, *supra* note 70, § 7.07[1][a].

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 discovered 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 express⁸⁷ 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

78. See 12 MILGRIM, *supra* note 70, § 2.04.

79. See *id.*

80. See *id.*

81. See *Cybertek Computer Prods., Inc. v. Whitfield*, 203 U.S.P.Q. (BNA) 1020, 1022 (Cal. Super. Ct. 1977); Keplinger, *Computer Software—Its Nature and Its Protection*, 30 EMORY L.J. 483, 492 (1981) (citing 12 MILGRIM, *supra* note 70, §§ 2.06, 2.09[A]; Duncan, *supra* note 7, at 395-400).

82. See *supra* notes 2-20 and accompanying text.

83. RESTATEMENT OF TORTS § 757, comment b (1939).

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.

89. See *K & G Oil Tool & Serv. Co. v. G & G Fishing Tool Serv.*, 158 Tex. 594, 602-03,

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 outcome of his own case.⁹⁴ 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.⁹⁵ Even when a court issues such an injunction, the length

314 S.W.2d 782, 787-88 (citing *Smith v. Dravo Corp.*, 203 F.2d 369, 374 (7th Cir. 1953)), *cert. denied*, 358 U.S. 898 (1958).

90. See *J & K Computer Sys., Inc. v. Parrish*, 642 P.2d 732, 735 (Utah 1982) (citing *Grace v. Orkin Exterminating Co.*, 255 S.W.2d 279 (Tex. Civ. App. 1953)); cf. *Videotronics, Inc. v. Bend Elecs.*, [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,579 (D. Nev. Apr. 26, 1984) (distinguishing *J & K* and finding no trade secret because of unrestricted distribution).

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].

93. See, e.g., *Bridge C.A.T. Scan Assocs. v. Technicare Corp.*, 710 F.2d 940, 946 (2d Cir. 1983); *K & G Oil Tool & Serv. Co. v. G & G Fishing Tool Serv.*, 158 Tex. 594, 606, 314 S.W.2d 782, 790 (1958).

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).

95. Courts in trade secret and patent cases sometimes refuse injunctions that would harm disproportionately the infringer. P. GOLDSTEIN, *COPYRIGHT, PATENT, TRADEMARK AND RELATED STATE DOCTRINES—CASES AND MATERIALS ON THE LAW OF INTELLECTUAL PROPERTY* 159 (1981); see e.g., *Forest Labs, Inc. v. Formulations, Inc.*, 299 F. Supp. 202 (E.D. Wis. 1969) (damages sufficient to compensate plaintiff when trade secret process had been

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.⁹⁶ These difficulties are exacerbated when the trade secret has been made public by legitimate means after the alleged misappropriation but before trial,⁹⁷ or when the defendant can demonstrate that the product sought to be enjoined uses both the misappropriated trade secret and his original contributions.⁹⁸

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.⁹⁹

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"¹⁰⁰ Section 301(b)(3) also excludes from preemption "activities violating legal or equitable rights that are not equivalent to any of the exclusive rights within the general scope of copyright as specified by section 106."¹⁰¹ Although the courts have not yet construed section 301 definitively,¹⁰² the language and legislative history of the section suggest that it was intended to abrogate only the

made public by declarations in plaintiff's patent), *rev'd in part sub nom.* *Forest Labs, Inc. v. Pillsbury Co.*, 452 F.2d 621 (7th Cir. 1971).

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).

97. See *Forest Labs., Inc. v. Formulations, Inc.*, 299 F. Supp. 202, 211 (E.D. Wis. 1969), *rev'd in part sub nom.* *Forest Labs, Inc. v. Pillsbury Co.*, 452 F.2d 621 (7th Cir. 1971).

98. See *Head Ski Co. v. Kam Ski Co.*, 158 F. Supp. 919, 923-24 (D. Md. 1958).

99. 17 U.S.C. § 301(a) (1982).

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 exclusive power to grant protection in the nature of copyright. In *Goldstein v. California*, 412 U.S. 546 (1973), the Court held that a California statute designed to prohibit record piracy did not violate the Supremacy Clause by conflicting with federal copyright law. *Id.* at 561-70. For a general discussion of the preemptive effect of the 1976 Copyright Act on the common law of trade secrets, see

common law of copyright.¹⁰³ Accordingly, common-law protection should remain available for ideas and concepts, which are excluded specifically from federal copyright protection.¹⁰⁴

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.¹⁰⁵ 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."¹⁰⁶

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 copyright¹⁰⁷ and, if not the copyright's original owner, have recorded the instrument of transfer vesting the copyright in the plaintiff.¹⁰⁸ The

Videotronics, Inc. v. Bend Elecs., [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,579 (D. Nev. Apr. 26, 1984); Davidson, *supra* note 7, at 407-11.

103. See H.R. REP. NO. 1476, 94th Cong., 2d Sess. 129-33, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS 5659, 5745-49.

104. See Davidson, *supra* note 7, at 407-09.

105. See *Kewanee Oil Co. v. Bicon Corp.*, 416 U.S. 470, 484 (1974); *Compco Corp. v. Day-Brite Lighting, Inc.*, 376 U.S. 234, 238 (1964); *Sears, Roebuck & Co. v. Stiffel Co.*, 376 U.S. 225, 230-33 (1964).

106. *Kewanee Oil Co. v. Bicon Corp.*, 416 U.S. 470, 484 (1974).

107. See 17 U.S.C. § 411(e) (1982).

108. See *Burns v. Rockwood Distrib. Co.*, 481 F. Supp. 841, 846-47 (N.D. Ill. 1979); 17 U.S.C. § 205(d) (1982); 3 M. NIMMER, *supra* note 59, § 12.08.

plaintiff must have standing¹⁰⁹ and must have brought the action within the appropriate statute of limitations.¹¹⁰ Finally, the court must have jurisdiction over both the subject matter¹¹¹ and the defendant.¹¹²

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,¹¹³ or at least attempted to register and been refused.¹¹⁴ Registration requires submission of an application, a small fee, and a "deposit" of two complete copies of the "best edition" of the work.¹¹⁵ 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.¹¹⁶ In either case, "special relief" may be available to protect the confidentiality of trade secret materials.¹¹⁷

Registration is only a prerequisite to initiating the action, not the existence or validity of the copyright.¹¹⁸ 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.¹¹⁹ If the

109. See 3 M. NIMMER, *supra* note 59, § 12.02.

110. See 17 U.S.C. § 507 (1982).

111. See 28 U.S.C. § 1338(a) (1982); 3 M. NIMMER, *supra* note 59, § 12.01[A]-[B].

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

113. 17 U.S.C. § 411(a) (1982).

114. *Id.* A plaintiff has made a sufficient attempt to register if he has delivered the deposit, application, and fee in proper form to the Copyright Office, which has refused registration. See *id.*

115. See *id.* § 408.

116. The Copyright Office states that its examiners cannot determine whether copyrightable authorship exists by reviewing object code. See Copyright Office Literary Section Code Letter 70; Copyright Circular Rbl. Since the Copyright Act specifically extends protection to works of authorship that can be perceived "either directly or with the aid of a machine or device," 17 U.S.C. § 102(a) (1982), this position may be an unwarranted administrative narrowing of the scope of copyright protection. See also *id.* § 410(a)-(b) (Copyright Office either must issue or refuse registration.).

When a computer program has been published in the United States in machine-readable form only, the Office will accept a deposit of "identifying portions" in lieu of the complete work. 37 C.F.R. § 202.20(c)(2)(vii) (1984). Such materials must be in a "form visually perceptible without the aid of a machine," and usually must include the first and last 25 pages of the program equivalent material. *Id.*; see also *id.* § 202.19(5) (no Library of Congress deposit required for programs published in machine-readable form only).

117. See 37 C.F.R. § 202.20(d) (1984). If source code is deposited under the "identifying materials" provision, the materials deposited should be able to be organized to exclude trade secrets.

118. 17 U.S.C. §§ 102(a), 201(a) (1982) provide that copyright vests in the author of the work when the work is fixed in any tangible medium of expression.

119. See 3 M. NIMMER, *supra* note 59, § 12.08.

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.¹²⁰

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.¹²¹ A nonexclusive licensee does not have standing to sue and must rely on his licensor to initiate the action.¹²²

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.¹²³ 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.¹²⁴ Since the claim does not accrue until the infringement actually occurs, the plaintiff must identify specifically the act or acts that constitute infringement.¹²⁵ 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.¹²⁶

Any equitable ground recognized under federal law, such as estop-

120. See 17 U.S.C. § 205(d) (1982). The statutory language appears to require that only the most immediate instrument of transfer be recorded and not other instruments in the chain of title to the author. See 3 M. NIMMER, *supra* note 59, § 12.08.

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.

122. See *Hoffman v. Santly-Joy, Inc.*, 51 F. Supp. 779, 781 (S.D.N.Y. 1943); 3 M. NIMMER, *supra* note 59, § 12.02.

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.

126. See *Mount v. Book-of-the-Month Club, Inc.*, 555 F.2d 1108, 1111 (2d Cir. 1977); *Rosette v. Rainbo Record Mfg. Corp.*, 354 F. Supp. 1183, 1194 (S.D.N.Y. 1973).

pel¹²⁷ or fraudulent concealment, may toll the limitation period.¹²⁸ A state tolling statute in the jurisdiction of the action, however, is not sufficient to toll the statute.¹²⁹

4. Jurisdiction

The federal district courts have exclusive original subject matter jurisdiction over actions for the infringement of a statutory copyright.¹³⁰ 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.¹³¹ State courts also have jurisdiction 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

127. See *Herald Square Music Co. v. Living Music, Inc.*, 205 U.S.P.Q. (BNA) 1241 (S.D.N.Y. 1978); M. NIMMER, *supra* note 59, § 12.05.

128. See *Mount v. Book-of-the-Month Club, Inc.*, 555 F.2d 1108, 1112 (2d Cir. 1977).

129. See *Prather v. Neva Paperbacks, Inc.*, 446 F.2d 338, 339-40 (5th Cir. 1971).

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, *supra* note 59, § 12.01[A]. Cf. *Cresci v. Music Publishers Holding Corp.*, 210 F. Supp. 253 (S.D.N.Y. 1962) (federal court does not have jurisdiction over action to determine ownership of copyright).

132. See *Simon & Flynn, Inc. v. Time, Inc.*, 513 F.2d 832, 834 (2d Cir. 1975); *Hearst Corp. v. Shopping Center Network, Inc.*, 307 F. Supp. 551, 557 (S.D.N.Y. 1969). Common-law copyrights, by definition, do not arise under the Copyright Act. Since no common-law copyright can arise for any work created after January 1, 1978, it is unlikely that common-law copyright will be an issue in future computer program cases.

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

134. See *id.* § 13.01.

135. 17 U.S.C. §§ 102-105 (1982); see 3 M. NIMMER, *supra* note 59, § 13.01[A].

136. 17 U.S.C. §§ 102-103 (1982); see 3 M. NIMMER, *supra* note 59, § 13.01[A].

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 between the original and allegedly infringing works.¹⁴³ 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.¹⁴⁴ In some cases, the court may presume access if the plaintiff's work is readily available on the market.¹⁴⁵ 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.

137. 17 U.S.C. § 410(c) (1982).

138. *See id.*

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

140. *See, e.g.,* Apple Computer, Inc. v. Formula Int'l Inc., 725 F.2d 521 (9th Cir. 1984); Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984).

141. *See* Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1249-54 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984); Midway Mfg. Co. v. Artic Int'l, Inc., 704 F.2d 1009, 1011-12 (7th Cir. 1983); Stern Elecs., Inc. v. Kaufman, 669 F.2d 852, 855-57 (2d Cir. 1982).

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.

143. *See* Atari, Inc. v. North American Philips Consumer Elecs. Corp., 672 F.2d 607, 614 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1983); Warner Bros., Inc. v. American Broadcasting Cos., 654 F.2d 204, 207 (2d Cir. 1981).

144. *See* Atari, Inc. v. North American Philips Consumer Elecs. Corp. 672 F.2d. 607, 614 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1983).

145. *See* Midway Mfg. Co. v. Bandai-America, Inc., 546 F. Supp. 125, 146 (D.N.J. 1982); *cf. Selle v. Gibb*, No. 83-2482 (7th Cir. July 23, 1984) (striking similarity may be circumstantial evidence of access).

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."¹⁴⁶ 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."¹⁴⁷

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.¹⁴⁸ Other courts, particularly the United States Courts of Appeals for the Third and Ninth Circuits, have applied the following two-pronged inquiry:¹⁴⁹ 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?¹⁵⁰ Under this approach, dissection is permitted in answering the first question but the second is answered from the perspective of the ordinary lay observer.¹⁵¹ 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 lit-

146. *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d 607, 614 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1983).

147. *Original Appalachian Artworks, Inc. v. Toy Loft, Inc.*, 684 F.2d 821, 829 (11th Cir. 1982).

148. *See Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d 607, 614 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1983).

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).

150. *Midway Mfg. Co. v. Bandai-America*, 546 F. Supp. 125, 138 (D.N.J. 1982).

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).

erary 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

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.

155. *E.g.*, *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1245 (3d Cir. 1983) (copying admitted), *cert. dismissed*, 104 S. Ct. 690 (1984).

156. *See Synercom Tech., Inc. v. University Computing Co.*, 462 F. Supp. 1003, 1013 n.5 (N.D. Tex. 1978).

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.

The United States International Trade Commission also relied on expert testimony on the significance of source code similarity in *Certain Personal Computers and Components*, [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,651 (ITC Mar. 9, 1984). The Commission

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.¹⁵⁹ In perhaps the most widely publicized computer copyright case, *Apple Computer, Inc. v. Franklin Computer Corp.*,¹⁶⁰ copying was admitted, and in the frequently cited case of *Synercom Technology, Inc. v. University Computing Co.*,¹⁶¹ 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."¹⁶² The defendant's work need only "have captured the 'total concept and feel' " of the plaintiff's work.¹⁶³

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

heard expert testimony on 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.

Other software infringement cases in which expert testimony was permitted on various issues include *Williams Elecs., Inc. v. Artic Int'l, Inc.*, 685 F.2d 870, 876 n.6 (3d Cir. 1982) (evidence of copyright notice buried in object code, object code identity, and presence of identical errors in competing programs); *Midway Mfg. Co. v. Strohon*, 564 F. Supp. 741, 752-53 (N.D. Ill. 1983) (evidence of object code identity); and *Hubco Data Prods. Corp. v. Management Assistance Inc.*, [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,529 (D. Idaho Feb. 3, 1983) (evidence of defendant's creation of infringing copy as step in the operation of its product).

159. *See supra* note 158; *cf.* *Midway Mfg. Co. v. Strohon*, 564 F. Supp. 741, 752-53 (N.D. Ill. 1983) (evidence showed 89% identity at object code level; court found similarity to be substantial). 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).

160. 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984).

161. 462 F. Supp. 1003 (N.D. Tex. 1978).

162. *Universal Pictures Co. v. Harold Lloyd Corp.*, 162 F.2d 354, 360 (2d Cir. 1947); *see also* *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d 607, 618 (7th Cir. 1982) ("exact reproduction"), *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).

We have often decided that a play may be pirated without using the dialogue. . . . The play is the sequence of the confluents 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.¹⁶⁴

Thus, one who borrows only the content and sequence of the scenes in the play, thereby replicating its "dramatic meaning," may infringe the copyright in the play.

*Meredith Corp. v. Harper & Row Publishers, Inc.*¹⁶⁵ 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.¹⁶⁶ Defendant's employees then scrutinized plaintiff's book and outlined it in detail.¹⁶⁷ This outline was given to a second group of employees who did not have access to plaintiff's work.¹⁶⁸ 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."¹⁶⁹ 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."¹⁷⁰

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."¹⁷¹ 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."¹⁷² The rationale for the rule, Judge Hand

164. *Sheldon v. Metro-Goldwyn Pictures Corp.*, 81 F.2d 49, 55-56 (2d Cir.), *cert. denied*, 298 U.S. 669 (1936).

165. 378 F. Supp. 686 (S.D.N.Y.) (preliminary injunction granted), *aff'd*, 500 F.2d 1221 (2d Cir. 1974), *permanent injunction granted*, 413 F. Supp. 385 (S.D.N.Y. 1975).

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).

172. *Sheldon v. Metro-Goldwyn Pictures Corp.*, 81 F.2d. 49, 56 (2d Cir.), *cert. denied*, 298 U.S. 669 (1936).

noted elsewhere, is that otherwise "a plagiarist would escape by immaterial variations."¹⁷³

No quantitative or other precise standards govern the determination of substantial similarity. Courts have made determinations for such diverse works as dolls,¹⁷⁴ fabrics,¹⁷⁵ textbooks,¹⁷⁶ and plays and movies.¹⁷⁷ 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 comprehensive 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

173. *Nichols v. Universal Pictures Corp.*, 45 F.2d 119, 121 (2d Cir. 1930), *cert. denied*, 282 U.S. 902 (1931).

174. *Original Appalachian Artworks, Inc. v. Toy Loft, Inc.*, 684 F.2d 821 (11th Cir. 1982).

175. *Peter Pan Fabrics, Inc. v. Martin Weiner Corp.*, 274 F.2d 487 (2d Cir. 1960).

176. *Meredith Corp. v. Harper & Row Publishers, Inc.*, 378 F. Supp. 686 (S.D.N.Y.) (preliminary injunction granted), *aff'd*, 500 F.2d 1221 (2d Cir. 1974), *permanent injunction granted*, 413 F. Supp. 385 (S.D.N.Y. 1975).

177. *Sheldon v. Metro-Goldwyn Pictures Corp.*, 81 F.2d 49 (2d Cir.), *cert. denied*, 298 U.S. 669 (1936).

178. *Cf. Midway Mfg. Co. v. Bandai-America, Inc.*, 546 F. Supp. 125, 147 n.22 (D.N.J. 1982) (court rejected claim of independent creation of videogames).

179. *Meredith Corp.*, 413 F. Supp. at 387.

180. *Midway Mfg. Co. v. Bandai-American, Inc.*, 546 F. Supp. 125, 147 n.72 (D.N.J. 1982).

181. *Id.*

his own hand across the page."¹⁸²

Last, substantiality also has a qualitative aspect. As a federal judge experienced 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 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 excuplated by having included original expression

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 infringement.") (quoting *West Publishing Co. v. Edward Thompson Co.*, 169 F. 833, 854 (E.D.N.Y. 1909)).

186. *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).

187. E.g., *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d 607 (7th Cir. 1982) (videogames), *cert. denied*, 459 U.S. 880 (1983); *Sid & Marty Krofft Television Prods., Inc. v. McDonald's Corp.*, 562 F.2d 1157 (9th Cir. 1977) (cartoon characters).

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

188. Compare, for example, the district and appellate court opinions in *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 217 U.S.P.Q. (BNA) 1265 (M.D. Ill. 1981), *rev'd*, 672 F.2d 607 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1983), in which the courts compared two videogames. Much of what the court of appeals found to be borrowing of expression had been found to be borrowing of ideas by the district court. *See generally* Jones, *supra* note 33 (discussing difficulty of distinguishing idea from expression in videogames).

189. *See supra* notes 158-60 and accompanying text.

190. *See, e.g.*, *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d 607, 618-19 n.12 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1983).

191. In *S & H Computer Sys. v. SAS Inst., Inc.*, 568 F. Supp. 416 (M.D. Tenn. 1983), the court retained a statistical computing expert from Vanderbilt University who was nominated and paid jointly by the parties. He attended the pretrial hearings, conferences, and trial. Prior to trial, the experts for the two sides submitted written reports to him.

192. In a literary case, the trier of fact can examine generally the competing works, with or without the aid of experts, and make a largely subjective judgment whether any observed similarity is "substantial." If the very act of observing the competing works is meaningless to the trier of fact, the court may have to delegate to the experts not only observing the works and identifying similarities, but also the ultimate determination of whether such similarities are "substantial."

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.¹⁹³ 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 infringement of sim-

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).

194. *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d 607, 616 (7th Cir. 1982) (quoting *Sid & Marty Krofft Television Productions, Inc. v. McDonald's Corp.*, 562 F.2d 1157, 1168 (9th Cir. 1977)), *cert. denied*, 459 U.S. 880 (1983).

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, though entitled to the benefit of copyright, lays no foundation for an exclusive claim to the art itself.

Id. at 104-05.

ple designs,¹⁹⁸ written game rules,¹⁹⁹ and pictorial representations on game boards.²⁰⁰ Many defendants in videogame cases have contended, 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.²⁰¹ Section 102(b) of the Copyright Act now codifies the defense.²⁰²

The sparse software copyright case law suggests the potential for this defense. In *Apple Computer, Inc. v. Franklin Computer Corp.*,²⁰³ 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.²⁰⁴ In Franklin's view,

198. *Herbert Rosenthal Jewelry Corp. v. Kalpakian*, 446 F.2d 738, 742 (9th Cir. 1971) (bee-shaped pin).

199. *Durham Indus. Inc. v. Tomy Corp.*, 630 F.2d 905, 914-15 (2d Cir. 1980); *Affiliated Hosp. Prods., Inc. v. Merdel Game Mfg. Co.*, 513 F.2d 1183, 1188-89 (2d Cir. 1975).

200. *Atari, Inc. v. Amusement World, Inc.*, 547 F. Supp. 222, 228-30 (D. Md. 1981).

201. *Id.*; see also *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d 607, 616-17 (7th Cir. 1982) (discussion of "idea expression unity"), *cert. denied*, 459 U.S. 880 (1983); cf. *Midway Mfg. Co. v. Bandai-America, Inc.*, 546 F. Supp. 125, 148 (D.N.J. 1982) (rejection of contention that "idea of . . . game actually includes the physical characteristics of the characters").

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(h):

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.

H.R. REP. NO. 1476, 94th Cong., 2d Sess. 56-57 (1976), *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS 5659, 5670.

203. 714 F.2d 1240 (3d Cir. 1983), *rev'g* 545 F. Supp. 812 (E.D. Pa. 1982), *cert. dismissed*, 104 S. Ct. 690 (1984).

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

the pertinent idea apparently was "to enable a computer to run the vast body of Apple-compatible software."²⁰⁵ Apple's 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.²⁰⁶

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."²⁰⁷ Because of an inadequate factual record, the court remanded this issue for further consideration.²⁰⁸

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.²⁰⁹ 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."²¹⁰ 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

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 "compatible" when programs written for one will run on the other. For a discussion of IBM's competitors' efforts to achieve compatibility with the IBM Personal Computer, see Davis, *IBM PC Software and Hardware Compatibility*, *COMPUTER LAW*, July, 1984, at 11.

206. *Apple Computer*, 714 F.2d at 1253.

207. *Id.*

208. *Id.*

209. *Id.* at 1250-51; cf. 35 U.S.C. §§ 100(b), 101 (1982) (patentability of processes).

210. *Apple Computer*, 714 F.2d at 1252 (citing 17 U.S.C. § 101 (1982)).

copyrightability.'"²¹¹ 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."²¹² 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.²¹³ 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."²¹⁴ 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."²¹⁵

The idea-expression defense may be abused if a defendant per-

211. *Id.* at 1252 (quoting CONTU REPORT, *supra* note 12, at 21). The court treated the CONTU REPORT as legislative history of the 1980 computer-related amendments to §§ 101 and 117 of the 1976 Copyright Act, "since Congress wrote into the law the [CONTU] majority's recommendation almost verbatim." *Id.*; see Pub. L. No. 96-517, §10, 94 Stat. 3015 (1980) (amendments incorporated the definition of "computer program" into the Copyright Act). The district court drew a different conclusion from the legislative history, focusing on a then inconclusive congressional debate over copyright protection for design patterns imprinted on computer chips. *Apple Computer, Inc. v. Franklin Computer Corp.*, 545 F. Supp 812, 819 n.9 (E.D. Pa. 1982); cf. Semiconductor Chip Protection Act of Nov. 8, 1984, Pub. L. No. 98-620, tit. III, § 303, 98 Stat. 3356 (adding new ch. 9 to 17 U.S.C.) (creating new forms of protection for semiconductor "mask work").

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.

Id. See Davidson, *Protecting Computer Software: A Comprehensive Analysis*, 1983 ARIZ. ST. L. J. 611, 671 (final report of an American Bar Association committee on software protection).

214. *Apple Computer*, 714 F.2d at 1253.

215. *Id.*

suades 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."²¹⁶ "Such a ploy," the same court observed, "cannot be allowed."²¹⁷

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 object code of the plaintiff's program while writing his own.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.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.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?²²¹ Would the resulting

216. *Midway Mfg. Co. v. Bandai-America, Inc.*, 546 F. Supp. 125, 128 (D.N.J. 1982).

217. *Id.*

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). See *supra* note 158.

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.

220. See *Wall St. J.*, Feb. 3, 1984, at 25, cols. 1-2.

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.").

precedent permit even the admitted plagiarist to escape through rationalization and special pleading?

Although the court in *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 *Synercom Technology, Inc. v. University Computing Co.*²²²

In *Synercom* the input formats used in a structural engineering analysis program were at issue.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.²²⁴ Although the forms themselves resembled 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

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. *Synercom Tech., Inc. v. University Computing Co.*, 474 F. Supp. 37, 38 (N.D. Tex. 1979); see *infra* notes 318-22 and accompanying text.

223. *Synercom*, 462 F. Supp. at 1007-09. Synercom also argued that defendants had copied substantial portions of its printed manuals. *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. *Id.* at 1014-15.

224. *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. *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.

225. *Id.* at 1007.

226. *Id.*

227. *Id.* at 1008, 1012.

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 reinstruction 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 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 ex-

228. *Id.* at 1009, 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.*

pressed 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.²³⁵

In an important 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.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.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."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

235. *Id.* at 1012.

236. *Id.* at 1013 n.5.

237. *Id.*

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.*

239. *Id.* at 1014.

second program 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

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.

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 in creating their own.²⁴⁵ As noted above, given the nature of programming, courts probably should focus on conduct rather than attempt to apply the substantial similarity test.²⁴⁶ 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.²⁴⁷ 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."²⁴⁸ 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.²⁴⁹ In another recent case the author of a novel sought to enjoin the broadcast of a television movie

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.

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).

allegedly based on the novel.²⁵⁰ 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.²⁵¹ 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."²⁵² 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."²⁵³ In another case,²⁵⁴ 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 Act²⁵⁶ 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

250. *Fuld v. National Broadcasting Co.*, 390 F. Supp. 877, 882 n.4 (S.D.N.Y. 1975).

251. *Tennessee Fabricating Co. v. Moultrie Mfg. Co.*, 421 F.2d 279 (5th Cir.), *cert. denied*, 398 U.S. 928 (1970).

252. *Id.* at 284.

253. *Id.*

254. *Davis v. E.I. DuPont deNemours & Co.*, 240 F. Supp. 612, 614 (S.D.N.Y. 1965).

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.

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 works," including recastings, transformations, or adaptations of the original.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.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.²⁶³ There is no *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 "unDavinging" example,²⁶⁴ is not defendants'

258. The defendant will argue, of course, that the superficial dissimilarities are evidence that he originally appropriated only the plaintiff's ideas.

259. *Davis v. E.I. DuPont deNemours & Co.*, 240 F. Supp. 612, 620-21 (S.D.N.Y. 1965).

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.

261. 17 U.S.C. § 101 (1982).

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. 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).

263. See *supra* notes 142-47 and accompanying text.

264. *Davis v. E.I. DuPont deNemours & Co.*, 240 F. Supp. 612, 620-21 (S.D.N.Y. 1965).

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?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.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 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

265. Cf. *Meredith Corp v. Harper & Row, Publishers, Inc.*, 413 F. Supp. 385, 388 (S.D.N.Y. 1975) ("alterations [in textbook] to conceal obvious plagiarism" held to be evidence of copyright infringement).

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. See Davidson, *supra* note 7, at 376-78.

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 to mask the initial borrowing of expression. Since the second programmer may have made those changes more or less

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.*

270. *But cf.* *Meredith Corp. v. Harper & Row, Publishers, Inc.*, 413 F. Supp. 385, 387 (S.D.N.Y. 1975) (defense rejected in literary context).

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.).

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,²⁷² the new Act's definition of derivative work²⁷³ 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"²⁷⁴ 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.²⁷⁵ This section was added in 1980 to clarify the protection of computer programs.²⁷⁶ It provides that the "owner" of a copy of a copyrighted program does not

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

273. 17 U.S.C. §§ 101, 106(2) (1982); see *supra* notes 260-62 and accompanying text.

274. *Tennessee Fabricating Co. v Moultrie Mfg. Co.*, 421 F.2d 279, 284 (5th Cir.), *cert. denied*, 398 U.S. 928 (1970).

275. 17 U.S.C. § 117 (1982) provides:

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.

276. Pub. L. No. 96-517, § 10(b), 94 Stat. 3028 (1980). The present § 117 was added as part of a lengthy bill amending many provisions of the Patent Act. It is clear from the House Report and Congressional Record, however, that Congress saw the 1980 copyright amendments as a codification of the CONTU REPORT recommendations. See H.R. REP. NO. 1307, 96th Cong. 2d Sess. 19, reprinted in 1980 U.S. CODE CONG. & AD. NEWS 6460, 6482; 18 CONG. REC. H 10,767 (daily ed. Nov. 17, 1980) (remarks of Rep. Kastenmaier); 18 CONG. REC. S14,761 (daily ed. Nov. 20, 1980) (remarks of Sen. Bayh). CONTU recommended, however, that § 117 rights be extended to "rightful possessors," yet Congress' version applies only to an "owner of a copy of a program." See *supra* note 50; CONTU REPORT, *supra* note 12, at 30.

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. JS&A Group, Inc.*²⁷⁷ Defendant JS&A sold a device that duplicated certain Atari and Atari-compatible videogames. In response to a claim of contributory infringement,²⁷⁸ JS&A claimed that its product had a substantial noninfringing use—duplication of Atari games for archival purposes—as section 117 permits.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.'"²⁸⁰ The court reasoned that since the primary threat to videogame car-

277. [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,613 (N.D. Ill. Dec. 6, 1983). The court in *Idubco Data Prods. Corp. v. Management Assistance Inc.*, 219 U.S.P.Q. (BNA) 450, 456 (D. Idaho Sept. 18, 1983), similarly rejected a § 117 defense. The court granted a preliminary injunction against a computer program that enhanced the functioning of a copyrighted operating system, because the infringing product, during execution, created an unauthorized copy of the operating system. The court rejected the § 117 defense on the threshold basis that the alleged infringer was not an "owner" of the operating system. *Id.*

More recently, in *Apple Computer, Inc. v. Formula Int'l, Inc.*, 594 F. Supp. 617 (C.D. Cal. 1984), plaintiff Apple Computer previously had obtained a preliminary injunction prohibiting the defendant Formula from copying any of Apple's copyrighted programs and from selling computer components that contained copies of such programs. On Apple's motion for contempt, the court found that Formula was continuing to sell computers and computer kits that contained copyrighted Apple programs encoded on ROM chips. Formula contended that it had lawfully purchased copies of the Apple programs on "Wong diskettes," which had been produced with Apple's authorization. *Id.* at 620. Formula concluded that since it was "'the owner of a copy'" of the Apple programs, it could make and distribute the ROM copies as "'new copies . . . created as an essential step in the utilization of a computer program in conjunction with' a machine of its own." *Id.* (quoting 17 U.S.C. § 117 (1982)). The Court reviewed the CONTU REPORT and some of the sources considered by CONTU, characterized Formula's invocation of § 117 as a "pre-text," and held Formula in contempt. *Id.* at 622-23.

Finally, in *MicroSparc, Inc. v. Amtype Corp.*, 592 F. Supp. 33 (D. Mass. 1984), the court found infringement when a "typing service" copied programs from a computer magazine onto disks, duplicated the disks, and sold them to readers of the magazine. *Id.* at 34. The court rejected the argument that § 117 authorized such conduct. The court cited and followed the analysis of *JS&A*. *Id.* at 35.

278. [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,613, at 18,695. The theory of the contributory infringement claim was that JS&A contributed to the making of unlawful copies by the users of its product. The substantial noninfringing-use defense has its roots in patent law, but a recent Supreme Court decision made clear that the doctrine is relevant in copyright as well. See *Sony Corp. of Am. v. Universal City Studios, Inc.*, 104 S. Ct. 774, 789-90 (1984).

279. [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,613, at 18,695.

280. *Id.* at 18,696 (quoting CONTU REPORT, *supra* note 12, at 31).

tridges was physical rather than mechanical or electrical, defendant could not invoke the archival copy exception.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 report²⁸² 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."²⁸³ 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 possesses. Accordingly, courts should construe the section as not providing a defense 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 impermissibly. 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 suspect copy to an archival use.

Second, who should bear the burden of proof on the propriety of the defendant's activities? The court in *JS&A* treated section 117 as an exception to the general principle that the making of unauthorized cop-

281. [1984] COPYRIGHT L. DEC. (CCH) ¶ 25,613, at 18,696.

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.

ies constitutes infringement.²⁸⁴ 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."²⁸⁵ 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 defendant made an unauthorized copy,²⁸⁶ 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.²⁸⁷

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 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.²⁸⁸ *JS&A's* allocation of the burden is consistent with this interpretation of the purpose of section 117.

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.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.

284. [1984] COPYRIGHT L. DEC. ¶ 25,613, at 18,696.

285. *Id.*

286. In *S & H Computer Sys., Inc. v. SAS Inst. Inc.*, 568 F. Supp. 416, 422 (M.D. Tenn. 1983), 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.

288. 17 U.S.C. § 106(1) (1982); see *supra* notes 282-83 and accompanying text.

289. See *supra* notes 22, 30-32 and accompanying text.

The input displays seem analogous to the displays that videogame programs produce, which have been held subject to copyright protection as audio-visual displays.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.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.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.

Synercom Technology, Inc. v. University Computing Co.,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.²⁹⁴ If the input screens from a particular program can be analogized to the input formats in *Synercom*, the screens 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

290. *E.g.*, *Midway Mfg. Co. v. Artic Int'l, Inc.*, 704 F.2d 1009, 1012 (7th Cir. 1983); *Atari, Inc. v. North American Philips Consumer Elecs. Corp.*, 672 F.2d 607, 617 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1983); *Stern Elecs., Inc. v. Kaufman*, 669 F.2d 852, 856 (2d Cir. 1982).

291. *Stern Elecs., Inc. v. Kaufman*, 669 F.2d 852, 854-55 (2d Cir. 1982).

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).

293. 462 F. Supp 1003 (N.D. Tex. 1978).

294. *Id.* at 1012-14.

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.

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 manuals, should enjoy similar

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

297. *Cf.* *Harcourt, Brace & World, Inc. v. Graphic Controls Corp.*, 329 F. Supp. 517, 525-26 (S.D.N.Y. 1971) (test answer sheets subject to copyright protection). Even if, under this argument, copyright protects the input screens, it would not protect the logic and sequence of the input process, to which *Synercom*'s stick shift analogy would apply. *Synercom*, 462 F. Supp. at 1013.

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.

Copyright protection thus subsists in the portions of the compilation that the author contributed. The author may contribute by ordering items not themselves subject to copyright protection. *E.g.*, *Eckes v. Card Prices Update*, 736 F.2d 859, 862-63 (2d Cir. 1984) (infringement of copyright in baseball card catalogue); *Roy Export Co. v. Columbia Broadcasting Sys.*, 672 F.2d 1095, 1102 (2d Cir.) (copyright in compilation of Charlie Chaplin film clips), *cert. denied*, 459 U.S. 826 (1982); *Rand McNally & Co. v. Fleet Mtg. Sys. Inc.*, 591 F. Supp. 726, 731 (N.D. Ill. 1983) (copyright in mileage numbers on highway maps). The extent of copyright protection in a compilation of historical facts is controversial, and the Supreme Court recently has granted certiorari in a case involving President Ford's memoirs. *Harper & Row, Publishers, Inc. v. Nation Enters.*, 723 F.2d 195 (2d Cir. 1983), *cert. granted*, 52 U.S.L.W. 3860 (May 29, 1984) (No. 83-1632). See generally Denicola, *Copyright in Collections of Facts: A Theory for Protection of Nonfiction Literary Works*, 81 COLUM. L. REV. 576 (1981) (comprehensive review of compilation case law); Shipley & Hay, *Protecting Research: Copyright, Common-Law Alternatives, and Federal Preemption*, 63 N.C.L. REV. 125 (1984) (review of copyright and state-law protection for research in nonfiction works).

protection.²⁹⁹

Here too, however, *Synercom* intrudes with a cautionary note. Even if copyright protection subsists as described above, *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.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 *Hartfield v. Peterson*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.³⁰² Judge Learned Hand, writing for the court, rejected this argument, finding that plaintiff's act of compilation was itself original.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."³⁰⁴ Moreover, the court noted that the widespread use in business of some of the individual words and phrases did not affect its holding.³⁰⁵

Conversely, it has been held that copyright does not protect a system of taking shorthand.³⁰⁶ Nonetheless, *Hartfield* apparently represents the majority view; it is consistent with earlier cases involving codes and symbolic representations,³⁰⁷ it was followed as recently as

299. Such cards typically list the most commonly used lexical elements. *E.g.*, SAS 79.5 Reference Card (SAS Inst. 1981).

300. *Synercom*, 462 F. Supp. at 1013-14 (stick shift hypothetical).

301. 91 F.2d 998 (2d Cir. 1937).

302. *Id.* at 999.

303. *Id.*

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." *Id.* (citations omitted). See *infra* notes 313-14 and accompanying text.

305. *Hartfield*, 91 F.2d at 999.

306. *Brief English Systems, Inc. v. Owen*, 48 F.2d 555 (2d Cir.), *cert. denied*, 283 U.S. 853 (1931).

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

1971,³⁰⁸ and it was cited in *Synercom*.³⁰⁹

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;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.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.³¹²

(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." *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. *Id.* at 729.

308. *Harcourt, Brace & World, Inc. v. Graphic Controls Corp.*, 329 F. Supp. 517, 524 (S.D.N.Y. 1971).

309. *Synercom*, 462 F. Supp. at 1011.

310. *Hartfield*, 91 F.2d at 999.

311. 17 U.S.C. § 106 (1), (2) (1982).

312. See 17 U.S.C. § 102(b) (1982) (copyright protection does not extend to ideas); 37

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."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.³¹⁴ Moreover, it is plainly 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.³¹⁵ 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*³¹⁶ 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.³¹⁷ 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

C.F.R. § 202.1(a) (1984) (no registration of "[w]ords and short phrases"); 1 M. NIMMER, *supra* note 59, § 2.16.

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."

315. *Synercom*, 462 F. Supp. at 1013-14 & n.5.

316. *See supra* notes 223-29 and accompanying text.

317. *See supra* notes 296-97 and accompanying text.

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 law³¹⁸ and the statutory³¹⁹ and common law of unfair competition, however, may be the only means of protecting the language itself.³²⁰ A plaintiff asserting

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, § 2 (Michie/Law. Co-op. 1975); N.C. GEN. STAT. § 75-1.1 (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).

320. See, e.g., *United Van Lines, Inc. v. American Holiday Van Lines, Inc.*, 487 F. Supp. 235 (E.D. Tenn. 1979) (Tennessee common law of unfair competition); *Harrington Mfg. Co. v. Powell Mfg. Co.*, 38 N.C. App. 393, 248 S.E.2d 739 (1978), *cert. denied*, 296 N.C. 411, 251 S.E.2d 469 (1979).

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. *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.

International News Serv. expanded unfair competition to include the act of misappropriation and eliminated the element of ultimate confusion of consumers. With the decline of federal common law after *Erie R.R. v. Tompkins*, 304 U.S. 64 (1938), some federal courts have held that *International News Serv.* is no longer an independent source of a claim of unfair competition. See *Roy Export Co. v. Columbia Broadcasting Sys.*, 672 F.2d 1095, 1105 (2d Cir. 1982); *Schuchart & Assocs. v. Solo Serve Corp.*, 540 F. Supp. 928, 942 n.9 (W.D. Tex. 1982). Yet the Supreme Court has never overruled *International News Serv.*, and several federal courts have cited it in allowing a common-law unfair competition claim based on a misappropriation theory. See, e.g., *Miller v. Universal City Studios, Inc.*, 650 F.2d 1365, 1370 (5th Cir. 1981) (citing *International News Serv.* for misappropriation theory); *A & M Records, Inc. v. M.V.C. Dist. Corp.*, 574 F.2d 312, 314 (6th Cir. 1978) (holding plaintiff could obtain common-law relief); *Servo Corp. of America v. General Electric Co.*, 337 F.2d 716, 725 (4th Cir. 1964) (plaintiff entitled to recover under common law).

such claims generally 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.³²¹ The use of any of these theories, of course, may be preempted under section 301 of the Copyright Act.³²²

Some states have rejected the *International News Serv.* theory and limit unfair competition to misrepresentation; e.g., *Lady Esther, Ltd. v. Lady Esther Corset Shoppe, Inc.*, 317 Ill. App. 451, 46 N.E.2d 165 (1943) (stating that the test is whether consumer will be deceived); *Triangle Publications, Inc. v. New England Newspaper Publishing Co.*, 46 F. Supp. 198, 203 (D. Mass. 1942) (holding that Massachusetts courts would not follow *International News Serv.*); and others have cited *International News Service* in finding misappropriation. E.g., *Liberty/UA, Inc. v. Eastern Tape Corp.*, 11 N.C. App. 20, 22 (1971) (finding *International News Serv.* applicable).

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

322. 17 U.S.C. § 301 (1982). 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 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 *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. *Durham Indus.*, 630 F.2d at 918-19. In *Synercom* the court had 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).

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.³²³ 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.³²⁴ 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"³²⁵ on a computer with little creative effort, and

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

324. Cf. *Original Appalachian Artworks, Inc. v. Toy Loft, Inc.*, 684 F.2d 821, 830 (11th Cir. 1982) (court comments on defendant's "insatiable interest" in plaintiff's copyrighted dolls).

325. *Tennessee Fabricating Co. v. Moultrie Mfg. Co.*, 421 F.2d 279, 284 (5th Cir.), *cert. denied*, 398 U.S. 928 (1970).

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 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

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.

332. Act of Mar. 4, 1909, ch. 320, 35 Stat. 1075; see *supra* note 256.

333. 17 U.S.C. § 106(2) (1982).

334. *Id.* § 101.

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 . . . may be an infringement even though nothing is ever fixed in tangible form."³³⁵ 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."³³⁶

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*.³³⁷ 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."³³⁸ This holding,

335. H.R. REP. NO. 1476, 94th Cong., 2d Sess. 62 (1976), reprinted in 1976 U.S. CODE CONG. & AD. NEWS 5659, 5675.

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*.

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.³³⁹ 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.³⁴⁰ Other courts do not follow this view and thus should find limited precedential value in *Litchfield's* interpretation of section 106.³⁴¹

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 by the holder's "offensive" use of the right.³⁴² The United States Court of Appeals for the Seventh Circuit adopted a practical approach in *Midway Manufacturing Co. v. Artic International, Inc.*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.³⁴⁴ After first discussing the validity of plaintiff's copyrights in the games as audio-visual works,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 101.³⁴⁶ 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.³⁴⁷ The court rejected the analogy and, significantly, distinguished the speeded-up game from a speeded-up record on economic grounds:

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 Prods., 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.

342. The phrase "offensive derivative work theory" refers to the use of § 106(2) to impose liability independent of the substantial similarity test. This use contrasts with the older and more common "defensive" use of § 106(2) to determine the extent of copyright protection for a second work that draws on a preexisting work. See *supra* note 260.

343. 704 F.2d 1009 (7th Cir. 1983).

344. *Id.* at 1010-11.

345. The court found that the games were subject to protection, notwithstanding that the user contributed to the final pattern of images. *Id.* at 1011-12; see 17 U.S.C. §§ 101, 102(a)(6) (1982) (defining "motion pictures and other audiovisual works" and including them in coverage of Copyright Act).

346. *Midway*, 704 F.2d at 1013-14.

347. *Id.* at 1013.

[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 101.³⁴⁸

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.”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.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 substantially, the defendant has violated section 106; if the interference with the plaintiff’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 competing 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

348. *Id.* at 1014.

349. *Id.* at 1013.

350. 17 U.S.C. § 106(2) (1982).

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 copyright in the Pac-Man object code. *Id.* at 749-54.

many cases, and more importantly, 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 defendant's work to determine whether he engaged in unauthorized copying. The court first should determine whether the defendant engaged in unauthorized 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 benefit from doing so, and that economic benefit persists in the final product, 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 approach 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 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

352. 704 F.2d 1009 (7th Cir. 1983).

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?³⁵³ 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 McClure & 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.*,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.³⁵⁵ The program originally had been developed for defendant Jaslow, which therefore had access to the source code for the EDL version.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).³⁵⁷ The second version was virtually identical to the original in mode of operation and functions performed.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."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."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.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,³⁶² and that "prospective users and customers . . . found no substantial difference between the [two programs], and considered them to be the same."³⁶³

The procedural history of the second case, *SAS Institute, Inc. v. S&H Computer Systems, Inc.*,³⁶⁴ is outlined above.³⁶⁵ The court found

354. No. 83-4583 (E.D. Pa. Jan. 22, 1985).

355. Slip op. at 3-5, 7-8.

356. *Id.* at 15.

357. *Id.* at 15-16.

358. *Id.* at 33-35.

359. *Id.* at 29.

360. *Id.* at 30.

361. *Id.* at 31-35.

362. *Id.* at 18-19, 34-35.

363. *Id.* at 34.

364. Nos. 82-3669, 82-3670 (M.D. Tenn. Mar. 6, 1985).

the facts to be substantially as alleged by SAS Institute.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.³⁶⁷ The new product was to be fully compatible with SAS,³⁶⁸ 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.³⁶⁹ 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."³⁷⁰

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.³⁷¹ Second, the court found that both literal copying of source code and appropriation of organizational details constituted borrowing of expression.³⁷² 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 . . ."³⁷³ 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."³⁷⁴

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.³⁷⁵ 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."³⁷⁶ 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

365. See *supra* note 158.

366. Slip op. at 1-19.

367. *Id.* at 4-5.

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.

'based upon' SAS."³⁷⁷

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."³⁷⁸ 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 and the color of the siding."³⁷⁹

377. *Id.*

378. *Id.*

379. *Id.*