

UIC John Marshall Journal of Information Technology & Privacy Law

Volume 5
Issue 3 *Computer/Law Journal - Winter 1985*

Article 7

Winter 1985

Copyright Protection of Computer Software, 5 Computer L.J. 413 (1984)

James Altman

Follow this and additional works at: <https://repository.law.uic.edu/jitpl>



Part of the [Computer Law Commons](#), [Intellectual Property Law Commons](#), [Internet Law Commons](#), [Privacy Law Commons](#), and the [Science and Technology Law Commons](#)

Recommended Citation

James Altman, Copyright Protection of Computer Software, 5 Computer L.J. 413 (1984)

<https://repository.law.uic.edu/jitpl/vol5/iss3/7>

This Comments is brought to you for free and open access by UIC Law Open Access Repository. It has been accepted for inclusion in UIC John Marshall Journal of Information Technology & Privacy Law by an authorized administrator of UIC Law Open Access Repository. For more information, please contact repository@jmls.edu.

COPYRIGHT PROTECTION OF COMPUTER SOFTWARE

The recent development of the small computer market has created a multibillion dollar industry nonexistent a decade ago. The controversies ensuing from this market have required the courts and legislatures to address new issues and apply old doctrines in novel ways.¹ Computer programmers remain unsure of the appropriate forms of legal protection for their creations. Congress has debated for more than twenty years over the extent to which patent, trade secret, and copyright law should protect the authors of computer programs and has been reluctant to act on the question.² Access to judicial remedies has been uncertain as the courts have grappled with unfamiliar subject matter.

This Note focuses on copyright law. It examines the problems of applying old doctrines in this new field and identifies loopholes where the copyright of a computer program can operate like a machine patent. Common law doctrines exist which, when applied properly, can prevent abuse. A model for analysis of computer programs is proposed using the common law doctrines presently applied in the treatment of video games.³ For those unfamiliar with the mysteries of computers, this Note also explains how computers work, what operating systems and application programs are, and the relationship between computers and copyright law in general.

I. COMPUTERS AND THEIR OPERATION

Computers perform many tasks more quickly and efficiently than humans. Repetitive and complex tasks can be accomplished without introducing careless human errors. Computers can be programmed to calculate space flight trajectories, balance checkbooks and edit typewritten

An earlier version of this note was entered in the Nathan Burkan Memorial Competition at the Georgia State University of Law sponsored by the American Society of Composers, Authors and Publishers.

1. NATIONAL COMM'N ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT 23-26 (1978) (hereinafter cited as CONTU REPORT).

2. *Id.* at 5-8.

3. Video games are computer generated audio-visual displays. They may be copyrighted as programs, but are also eligible for copyright protection as audio-visual works of art. It is the latter treatment that is used as a model for the analysis of program copyrights.

text. Computers, however, can do only what they have been programmed to do. A programmer must create a series of instructions, called "programs," for the machine to follow in order to produce the desired result.

The physical devices associated with a computer are known as the "hardware."⁴ Hardware includes the television monitor, storage devices, such as a tape recorder or disk drive, and the microcircuit chips. There are several different types of microcircuit chips. The Central Processing Unit (CPU) is the "brain" of the whole system and is usually on one chip. The other microcircuit chips contain memory, create the video display, and control the operation of disk storage.

Programs, often referred to as "software," must be in the microcircuit memory for use, and are usually stored on tape or disk when not in use.⁵ Programs are sequences of machine instructions which cause some operation to be performed on data. For example, a program could add a set of numbers. The program must contain instructions on where to find the numbers to be added and what to do with the answer once found. Such a program is an example of an "application program." Application programs are oriented to the user of the computer. They accept input from the user, such as the numbers to be added in the above example, and provide the user with an output, such as the sum.

A computer must also contain a program to handle its internal operation functions. These sets of operating instructions are known as "operating system programs." Operating systems handle a variety of tasks, such as creating the video display, checking the keyboard to see which keys are being struck, and storing programs on a cassette tape or disk.

These definitions are not meant to be technically precise; there are programs which do not fit into either of these categories. Some scientific and industrial applications programs monitor or control processes without active human users, but are considered applications programs because, broadly speaking, other equipment is a surrogate for the human user. For the purposes of this Note, however, operating systems will be considered as the narrow class of programs controlling the computer's internal functions. All other programs are relegated to the application program category.

Operating system and application programs are written in the same

4. Technical advances are occurring so rapidly that it is beyond the scope of this Note to differentiate among all of the existing forms of hardware.

5. A disk can be seen as a cross between a phonograph record and a tape recorder. A disk with a magnetic coating is inserted into a machine with tape recorder heads that move across the disk, like the needle of a record player. These devices have a large storage capacity and are inexpensive enough to be popular for home use. The current price for an Apple II disk drive, for example, is about \$300.

manner. The distinction between the two is purely functional. An applications program is written for a specific operating system. Thus, a manufacturer must consider software availability for a given operating system in deciding whether to introduce a compatible machine.

After a program is loaded into the machine, the memory of the computer contains two types of information: instructions and data. The instructions command the machine to perform some function upon the data. Each memory location is composed of a collection of binary digits, or "bits." Each bit is like an on/off switch. If it is "on," a voltage is present, and conversely if it is "off," there is no voltage present. This corresponds with binary mathematics where all numbers are expressed with only ones and zeros. The collection of bits in each memory location is called a "word." There are often eight bits per word in small computers, but the number varies according to the model of CPU chip used.

Each instruction's meaning is designed into the electrical device by the manufacturer and is not a matter of choice for the programmer. Once the instruction byte is in memory, the CPU can "read" the electrical status of the memory location by way of the complex set of interconnecting wires. The CPU can also "read" and manipulate the status of other devices to which it is wired. The electrical status of these other devices is ultimately under the control of the program's instructions. This is similar to the way a phonograph record alters and controls the electrical status of the amplifier and results in the reproduction of music. Just as the grooves of the record are separate from the stereo system, so is a program separate from the processes it effects within the computer.

The programmer is limited to arranging the limited number of instructions into various sequences. This limitation on the programmer's creativity, however, is no greater than a poet's limitation in having only twenty six letters in the alphabet.⁶

Programs can also be permanently written into the microcircuit chips by the manufacturer. Such programs are called "firmware," and the chips used in these programs are called Read Only Memory (ROM) chips. Memory chips which users can write on are known as Random Access Memory (RAM) chips and operate as a transient form of storage, designed for use during program operation.⁷

To be operable, a program must be placed in the computer's memory in binary form, called "object code." This is a difficult form to write

6. There are usually between 128 and 256 operation commands designed into a given CPU.

7. This categorization of hardware chips does not describe the full range of present technology. Further distinctions, however, are beyond the scope of this Note.

in, so most programmers prefer to write programs in a more human-readable "high level" language. Some familiar high level languages are FORTRAN, COBOL and BASIC. A program written in these languages is called "source code." Source code is then converted to object code through the use of a "compiler" program. The operation of the compiler is similar to human language translation in that, e.g., two people translating *Hamlet* to German might select different words when translating one English word. Each finished product is *Hamlet* despite minor differences in word choice.

All computers operate on these basic principles, but prior to the mid-1970's, users had no choice of operating systems and programs were custom written by programmers for specific applications. Thus, prior to the invention of the microcomputer, there was only a limited market for standardized programs and few controversies arose over ownership or sales of programs. Copyright law was not available in the settlement of these early disputes because the law required publication in human-readable form for protection prior to January 1, 1978. Moreover, few authors bothered to copyright their works even if they met the publication requirement.⁸

The appearance of the microcomputer initially brought computer prices as low as five hundred dollars⁹ and created a home market composed of computer professionals and amateur enthusiasts. Today there is a thriving software market for home and small business computer systems, the distribution and sales of programs for microcomputers has become a multibillion dollar industry.¹⁰ It is a simple task for unscrupulous dealers to make unauthorized duplicates of programs and sell them as originals. Authors need to be protected from such unauthorized sales, and copyright law is the best way to provide them with an effective remedy. The following section will provide a brief history and general background of copyright protection.

II. COPYRIGHT LAW

A. THE HISTORY OF COPYRIGHT

The Constitution provides for copyright protection by empowering Congress to "promote the Progress of Science and useful Arts, by secur-

8. See CONTU REPORT, *supra* note 1, at 38.

9. In late 1978, the basic Radio Shack TRS-80 unit cost \$499.

10. There are literally thousands of "basement" programmers selling their wares by mail. Dozens of periodicals aimed at the home and small business computer owner have appeared, some with hundreds of pages of advertisements offering software for sale. Sales of software and related services by American companies are expected to total \$33.8 billion by 1985. Pollack, *Computer Software Sales on the Rise*, N.Y. Times, Nov. 8, 1981, § 3, at 1, col. 2.

ing for limited times to Authors and Inventors the exclusive right to their respective Writings and Discoveries;"¹¹ Public benefit from free interchange of ideas is the philosophical justification for the private benefit conferred by copyright.¹² The extent of the copyright monopoly has been regulated by Congress in a series of acts beginning in 1790.¹³

Many media of expression were initially granted protection by the courts, with these decisions codified in the subsequently enacted statutes.¹⁴ This subsequent codification has been relied upon by the National Commission on New Technological Uses of Copyrighted Works (CONTU) to infer congressional intent to include new means of expression within the scope of protection.¹⁵

The Copyright Act of 1909 was quite different from the Act of 1976 presently in force.¹⁶ The 1909 Act required publication in order for a work to receive statutory protection,¹⁷ although authors of unpublished works were protected to some extent under state common law copyright. Expressions were also required to be directly readable by a person to qualify for protection; piano rolls and music box wheels were excluded.¹⁸ In 1965, the Copyright Office issued *Circular 31D* which provided for registration of computer programs if there was "presence of authorship and deposit of human readable copies."¹⁹

The human-readable form requirement was eliminated by the 1976 Act.²⁰ Until the passage of this Act, fewer than two thousand programs were registered under the 1909 Act, chiefly because of the latter's publication requirement.²¹ The 1976 statute also instituted a requirement that the work be registered before an infringement action could be

11. U.S. CONST. art. I, § 8, cl. 8.

12. See *United States v. Paramount Pictures, Inc.*, 334 U.S. 131, 158 (1948); CONTU REPORT, *supra* note 1, at 57, 58.

13. See CONTU REPORT, *supra* note 1, at 37; P. GOLDSTEIN, COPYRIGHT, PATENT, TRADEMARK AND RELATED STATE DOCTRINES 652 (2d ed. 1981).

14. CONTU REPORT, *supra* note 1, at 37.

15. *Id.*

16. The Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541 (codified as amended at 17 U.S.C. §§ 101-118, 201-209, 301-309, 401-412, 501-510, 601-603, 703-710, 801-810), effective January 1, 1978.

17. "Any person entitled thereto by this title may secure copyright for his work by publication thereof with the notice of copyright required by this title . . ." Copyright Act of 1909, ch. 320, 35 Stat. 1075, 17 U.S.C. §§ 1-215 (repealed 1978).

18. See *White-Smith Music Publishing Co. v. Apollo Co.*, 209 U.S. 1 (1908).

19. CONTU REPORT, *supra* note 1, at 15 (citing COPYRIGHT OFFICE, CIRCULAR 31D (Jan. 1965)).

20. See H.R. REP. NO. 1476, 94th Cong., 2d Sess. 52, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5659-65.

21. CONTU REPORT, *supra* note 1, at 38.

brought.²² Copyright Office registration and acceptance is an important factor in judicial determinations of copyright protection.²³

As soon as a work becomes fixed in a tangible medium of expression,²⁴ the 1976 Act is the exclusive means of copyright protection.²⁵ All means of communication, including machines now known or later developed, are expressly protectable under the Act.²⁶ Registration and deposit with the Copyright Office are required before an action can be commenced for infringement,²⁷ and notice of copyright is still required to be marked on all distributed copies.²⁸

The 1976 Act preempted state law, but common law copyright survives where works are not fixed in a tangible means of expression. Some examples of non-fixed expression are choreography which has not been filmed or recorded, extemporaneous speeches, and live dramatic improvisation.²⁹ It is possible that programs written on a computer, but stored only in transient RAM memory, might not be sufficiently fixed to satisfy the requirement of the Act. In such a case, however, common law tort causes of action, such as contributory infringement, remain available to provide protection.³⁰

B. BASIC PRINCIPLES OF COPYRIGHT

One of the most difficult concepts limiting the availability of copyright protection is the distinction between idea and expression. The copyright law protects only the tangible expression of an idea.³¹ Ideas, procedures, processes, systems, methods of operation, concepts, principles, or discoveries, regardless of their form, are precluded from protection by statute.³²

The difference between expression and idea may be analogized to the difference between copying a book and communicating the ideas contained in the book. An early case dealing with this distinction is

22. If registration is refused, a plaintiff may sue, but he must serve the Register of Copyrights, who *may* then join in the action. 17 U.S.C. § 411(a) (1982).

23. Acceptance of registration, if made within five years after first publication of the work, is prima facie evidence of valid copyright. 17 U.S.C. § 410(c) (1982); *Stern Elecs., Inc. v. Kaufman*, 523 F. Supp. 635, 638 (E.D.N.Y. 1981), *aff'd*, 669 F.2d 852 (2d Cir. 1982).

24. 17 U.S.C. § 301(a) (1982).

25. *Id.* § 102.

26. *See id.* §§ 101-103.

27. *Id.* § 205(d).

28. *Id.* §§ 401-412.

29. P. GOLDSTEIN, *supra* note 13, at 196.

30. *See, e.g., Sony Corp. of Am. v. Universal City Studios, Inc.*, 104 S. Ct. 774, (1984).

31. 17 U.S.C. § 102 (1982).

32. *Id.*

Baker v. Selden.³³ In *Baker*, the Court held that the use of the ideas in Baker's book on bookkeeping was not an infringement.³⁴ More recently, the Court stated: "Unlike a patent, a copyright gives no exclusive right to the art disclosed; protection is given only to the expression of the idea, not the idea itself."³⁵

When an idea becomes so closely tied to one expression that it becomes impossible to express the idea in any other way, "merger" occurs. In such a case, "copying the expression will not be barred, since protecting the 'expression' in such circumstances would confer a monopoly of the 'idea' upon the copyright holder free of the conditions and limitations imposed by patent law."³⁶

Three major common law principles serve to implement the policy separating idea from expression. First, the *Baker* "blank form" principle,³⁷ renders blank forms such as blank columnar sheets ineligible for protection since they do not express anything. *Synercom Technology v. University Computing Co.*³⁸ is an example of the recent application of this principle, holding that data input formats were not entitled to copyright protection.

Second, the "*scene a faire*" principle limits copyright protection of expressions essential to any treatment of an idea. An example of this principle can be seen in the treatment of historical events. Since one cannot copyright the use of historical facts, a claimant must prove outright copying of his treatment of a historical event to prove infringement. Infringement cannot be proven by merely proving substantial similarity.³⁹

Another example of this principle can be seen in board games such as Monopoly. The unique and distinctive aspects of the board used in the game are eligible for copyright, but the use of contiguous squares on

33. 101 U.S. 99 (1879).

34. The distinction between idea and expression can be demonstrated by reference to an instruction manual. The author is protected against the copying and selling by others of his manual, the expression, but has no right to prohibit people from doing what the instructions tell them to do, the idea.

This doctrine is codified at 17 U.S.C. § 102(b) (1982) which provides: "In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work."

35. *Mazer v. Stein*, 347 U.S. 201 (1954).

36. *Herbert Rosenthal Jewelry Corp. v. Kalpakian*, 446 F.2d 738, 742 (9th Cir. 1971); *Sid & Marty Kroft Television Prods., Inc. v. McDonalds Corp.*, 562 F.2d 1157 (9th Cir. 1977).

37. This principle was first enunciated in *Baker v. Selden*, 101 U.S. 99 (1879).

38. 462 F. Supp. 1003 (N.D. Tex. 1978).

39. See *Hoehling v. Universal City Studios, Inc.*, 618 F.2d 972, 979 (2d Cir. 1980), *cert. denied*, 449 U.S. 841 (1980).

the board in general is not. Since contiguous shapes are essential to many board games, a claimant would have to prove that another had exactly copied the original to show infringement.

The third principle, first announced in *Morrissey v. Proctor & Gamble*,⁴⁰ holds that copyright protection will not lie for expressions of ideas that can only be expressed in a limited number of ways. In *Morrissey*, the defendant copied the plaintiff's contest instruction which instructed the entrant to place his name, address and social security number on a piece of paper and mail it to a stated address. The court held that to protect the expression would be to protect the idea itself, an impermissible use of copyright, because any implementation of the idea would require a similar expression. The court further stated that in such a case, a "plaintiff can not complain even if his particular expression was deliberately adopted."⁴¹

C. STANDARDS OF PROOF

Normally, all that must be shown in an infringement action is notice of copyright within the work, registration of the copyright, and the copying of the registrant's work. Copying is sometimes inferred from a showing that the defendant had access to the plaintiff's work and that the two works are to some degree similar.⁴²

There are three standards of proof used in the prosecution of copyright infringement claims. Each standard permits a different degree of similarity between the copyrighted and the allegedly infringing work. The degree of similarity permitted will depend upon the nature of the expression as well as other factors.

The first standard, "substantial similarity," was best described by Judge Learned Hand who stated that such similarity would be found where "the ordinary observer, unless he set out to detect the disparities,

40. 379 F.2d 675 (1st Cir. 1967).

41. *Id.* at 679.

42. A strong showing by the plaintiff that the defendant had access to his work has raised an inference of the prohibited similarity in some courts, but the majority takes a contrary position. See *Morse v. Fields*, 127 F. Supp. 63, 66 (S.D.N.Y. 1954) (Court acknowledged the "inverse ratio" rule in an "action for infringement of copyright where access to work allegedly copied was established, a lesser degree of similarity between article copied and defendant's article was required to prove copying." "When access is established a lesser degree of similarity is required." But the court held this rule was inapplicable in this case because plaintiff only presented circumstantial evidence that defendant actually saw plaintiff's work. Plaintiff only proved availability of access.); *ARC Music Corp. v. Lee*, 296 F.2d 186, 187-88 (2d Cir. 1961) ("Of course access shown either directly or indirectly is an element of plaintiff's case. And it is not an unnatural step in inference of fact for ease of access to suggest a deduction of copying when similarity is found. But access will not supply its lack, and an undue stress upon that one feature can only confuse and even conceal this basic requirement.").

would be disposed to over look them, and regard their aesthetic appeal as the same."⁴³ The second standard is that of "outright copying" and requires that the two expressions be virtually identical. Finally, the third standard would permit the deliberate adoption of another's expression. In essence, this standard operates as a complete bar to recovery. Since there would be no proof competent to permit a finding of infringement under this category, it is not really a standard of proof at all.

In general, these standards of proof correspond to the three common law principles discussed in the previous section. In most cases, an allegedly infringing work must be at least "substantially similar" to the copyrighted work in order to establish an infringement. In order to prevent abuse of the limited monopoly granted by a copyright,⁴⁴ however, the doctrines described earlier operate to restrict access to remedies in certain situations.

Under the *scene a faire* doctrine, the plaintiff must show outright copying to be successful in an infringement claim.⁴⁵ Similarly, the *Morrissey* doctrine will generally operate as a complete bar to copyright relief in cases falling within its scope.⁴⁶ Finally, the *Baker* doctrine precludes certain expressions lacking content from copyright protection.⁴⁷

As discussed earlier,⁴⁸ these principles serve to implement the policy separating idea from expression. They have been applied successfully to limit copyright protection in the video game area, but have yet to be utilized in relation to computer programs. Commentators from the bench,⁴⁹ the bar,⁵⁰ and CONTU⁵¹ have expressed concern that protecting some computer programs violates the principle that copyright does not protect the idea disclosed by an expression. Some are concerned that allowing copyright of certain programs indispensable to the operation of computers would operate as a machine patent, preventing others from building a similar machine. This Note will examine a situa-

43. *Peter Pan Fabrics v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960). This definition has been widely used as the test for substantial similarity.

44. The monopoly is limited in the sense that the copyright holder has certain rights regarding copy, distribution, sale, preparation of derivative works, etc., but has no rights to the idea disclosed by the work. See CONTU REPORT, *supra* note 1, at 57-59.

45. See *supra* text accompanying note 39.

46. See *supra* text accompanying notes 40-41.

47. See *supra* text accompanying notes 37-38.

48. See *supra* text accompanying notes 31-41.

49. See *Data Cash Sys., Inc. v. JS & A Group, Inc.*, 480 F. Supp. 1063 (N.D. Ill. 1979), *aff'd on other grounds*, 628 F.2d 1038 (7th Cir. 1980).

50. See Stern, *Another Look at Copyright Protection of Software: Did the 1980 Act Do Anything For Object Code?*, 3 COMP. L.J. 1 (1981).

51. See CONTU REPORT, *supra* note 1, at 27, 28 (dissent of Commissioner Hersey).

tion in which copyright protection might act in this way and will explore ways to separate copyright protection for programs from patent protection afforded ideas and processes.

D. APPLICATION OF THE LAW 1978-1980

Section 117 of the 1976 Copyright Act referred explicitly to computer programs, stating that the copyright holder's rights were those existing at the time of the passage of the Act.⁵² The 1976 Act was intended to affirm the status quo pending the final report of CONTU. Since the scope of preexisting protection was unclear, however, litigation concerning program copyrights produced varying results.

In one case, *Data Cash Systems v. JS & A Group*,⁵³ the trial court held that the copying of plaintiff's object code program was not actionable because the ROM chip in which it was embedded was unreadable by humans.⁵⁴ The court of appeals affirmed the decision on the grounds that there was no notice of copyright within the work.⁵⁵ The trial court had interpreted section 117 of the 1976 Act to mean that the 1909 Act applied. This may or may not have been a correct statement of the law in 1979, but the repeal and replacement of section 117 in 1980 assures it is not the law today.⁵⁶

Synercom Technology v. University Computing Co.,⁵⁷ followed a more reasoned path and applied the existing general standards to computers as a novel medium of expression. Computer database management systems often require the user to input information by filling in a "blank form" on a video screen. Synercom brought an action against University Computing for copying its formats and user manuals. The *Synercom* court relied on *Baker*, holding that the input formats were not protected, although the user manuals with their depiction of the input formats were. "The litmus [test] seems to be whether the material

52. Copyright Act of 1976 Pub. L. No. 94-553, 90 Stat. 2541 (codified as amended at 17 U.S.C. § 117 (Amended 1980)).

53. 480 F. Supp. 1063 (N.D. Ill. 1979), *aff'd on other grounds*, 628 F.2d 1038 (7th Cir. 1980).

54. *See id.* at 1068.

55. *See* 628 F.2d at 1041.

56. The decision was probably legally incorrect when rendered. The confusion over human readability is understandable given the confusion over applicable law and lack of development of cases at that time. The Software Copyright Act of 1980, Pub. L. No. 96-517, § 10, 94 Stat. 3028 (codified at 17 U.S.C. §§ 101, 117) replaced the language of § 117 which referred to past law, leaving no doubt that the 1976 Act is the applicable law. Other courts have also refused to follow the *Data Cash* trial court. *See, e.g.*, *Apple Computer Corp. v. Formula Int'l*, 562 F. Supp. 775 (C.D. Cal. 1983), *aff'd*, 725 F.2d 521 (9th Cir. 1984); *Tandy Corp. v. Personal Micro Computers, Inc.*, 524 F. Supp. 171 (N.D. Cal. 1981).

57. 462 F. Supp. 1003 (N.D. Tex. 1978).

proffered for copyright undertakes to express."⁵⁸ Expressions should be protected "only to the extent [they] involve stylistic creativity *above* and *beyond* the bare expression of sequence and arrangement"⁵⁹ The fact that the input formats were not readable by humans was not determinative: "writings of an author need not be 'tangible to the human eye'. . . . Chief Justice Burger [has] noted that writings. . . 'may be interpreted to include any physical rendering of the fruits of creative intellectual or aesthetic labor'. . . ."⁶⁰

Even as late as 1980, the computer market was only beginning to develop. Although home computers such as the Radio Shack TRS-80 and the Apple II were available, the market remained largely restricted to expert hobbyists. Today there is a mass consumer market for business and home application programs to, e.g., maintain checkbooks, keep inventories, and calculate loan amortizations. This market development, coupled with the unauthorized copying of programs, has caused a greater number of disputes to arise. Consequently, there was a clear need for a predictable and comprehensive scheme to protect the interests of programmers in their creations.

III. THE STATE OF THE LAW

A. THE SOFTWARE COPYRIGHT ACT OF 1980⁶¹

Copyright protection for computer programs has been discussed in Congress since 1964, but the increase in disputes beginning in the mid-1970's over the protection available under the various intellectual property laws illustrated the need for a clarification of the law. In 1974, Congress created CONTU to examine the problem and make recommendations concerning the appropriate use of copyright law in the computer program context.⁶²

In July 1978, the *CONTU Report*⁶³ was delivered to Congress. The Report urged comprehensive protection for all computer programs in a

58. *Id.* at 1011.

59. *Id.* at 1014. This is a correct statement of the *Baker* doctrine. Theoretically, one could distinguish the elements of the input formats in *Synercom* as those which express beyond mere order and sequence and those which do not. This application would be consistent with current practice in the video game area, where some elements of a visual depiction are protected and others are not. See *infra* notes 74-80 and accompanying text. See also *John H. Harland Co. v. Clarke Checks, Inc.*, 711 F.2d 966, 971-72 (11th Cir. 1983).

60. 462 F. Supp. at 1013 (quoting *Goldstein v. California*, 412 U.S. 546, 561 (1973)).

61. Pub. L. No. 96-517, § 10(b), 94 Stat. 3028 (codified as amended at 17 U.S.C. § 117 (Amended 1980)).

62. Copyrights, Pub. L. No. 93-573, 88 Stat. 1873 (1974).

63. See *supra* note 1.

proposal that later developed into the Software Copyright Act of 1980.⁶⁴ The 1980 Act amended 17 U.S.C. § 101 to include a definition of "computer program"⁶⁵ and replaced 17 U.S.C. § 117 with a new section that permits making archival copies of programs and alteration of programs to suit an intended use.⁶⁶ The clear implication of the new section 117 is that the general rule is to grant the protection. By reading sections 101 and 117 together, courts have inferred the broad grant of protection recommended by CONTU.⁶⁷

The scope of protection afforded copyright holders under the 1980 Act is spelled out in detail beginning at 17 U.S.C. § 106. This protection includes the exclusive right of the copyright holder to do or authorize the following: to reproduce, or prepare derivative works from, the copyrighted work; to distribute copies by sale or other transfer or by rental, lease or lending; and to perform or publically display the copyrighted work. These rights are expressly limited in special situations such as library copying⁶⁸ and cable television licensing.⁶⁹ These limitations are intended to prevent copyright owners from abusing their rights in a monopolistic fashion.⁷⁰ Software publishers are attempting to persuade Congress to amend section 117 to remove the right to make

64. "The Commission is unanimous in its belief that computer programs are entitled to legal protection." CONTU REPORT, *supra* note 1, at 28.

65. "A 'computer program' is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." (Codified as amended at 17 U.S.C. § 101 (1982)).

66. 17 U.S.C. § 117. The new § 117 reads:

Notwithstanding the provisions of [17 U.S.C. § 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 of 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.

17 U.S.C. § 117 (1982).

67. See *Williams Elecs., Inc. v. Artic Int'l, Inc.*, 685 F.2d 870 (3d Cir. 1982); *Apple Computer Corp. v. Formula Int'l*, 562 F. Supp. 775 (C.D. Cal. 1983), *aff'd*, 725 F.2d 521 (9th Cir. 1984).

68. 17 U.S.C. § 108 (1982).

69. *Id.* § 111.

70. In addition to these limitations, antitrust law will operate to limit monopolies based on copyright protection. For example, two sheet music clearing houses, ASCAP and BMI, are governed by consent decrees providing for the independent licensing of copyrighted music. See *United States v. American Soc'y of Composers, Authors & Pub-*

archival copies. They argue this right promotes piracy by encouraging attempts to defeat antiduplication schemes.⁷¹ Good computer practice, however, dictates that back-up copies be made to protect the valuable data on the fragile diskettes. In light of this fact, the effect of the publishers' arguments is uncertain. There are also other efforts underway to increase publisher control of programs after they are in the hands of consumers.⁷²

The existing framework of decisional copyright and statutory anti-trust law is sufficient to prevent attempts to extend the coverage of copyright of computer programs beyond constitutional and policy limits. The current state of the law is also sufficient to stop commercial piracy of computer programs. As a practical matter protection against the noncommercial copying of programs is probably impossible without electronic antiduplication schemes, just as it has proven to be impossible to prevent noncommercial duplication of record albums by use of cassette tape recorders.

B. DECISIONAL LAW SINCE 1980

The cases decided in this area since 1980 can be divided into two groups. The first involves allegations of copyright infringement of computer-generated video displays, while the second involves alleged infringement of program copyrights. The former presents issues concerning the reproduction of copyrighted audio visual works of art⁷³ and provides a good example of the application of existing copyright doctrines to a new medium of expression. These cases can be used as a model for copyright application in the program area.

1. *Cases Involving Computer Generated Audio-Visual Works*

Since 1980 there have been eight reported cases dealing with copy-

lishers, 32 C.O. Bull. 870 (S.D.N.Y. 1960), *modified*, 37 C.O. Bull. 559 (S.D.N.Y. 1969); *United States v. Broadcast Music, Inc.* 35 C.O. Bull. 870 (S.D.N.Y. 1966).

71. Davidson, "Box-top" *Software Licenses*, BENCH & B. OF MINN., Mar. 1984, at 9.

72. Publishers are also attempting to obtain provisions for more effective enforcement of licensing agreements included within packaged software. These agreements limit the rights of ownership to the right to use the software. The primary focus of these attempts is upon the alteration of Article 2 of the Uniform Commercial Code. Although greater protection for authors is clearly necessary, state laws governing rights of authors and publishers might be equivalent to copyright and therefore preempted by federal copyright law. See *id.*

73. The courts have determined that a computer program which generates the video display is separate from the display itself for the purposes of determining copyright protection. See *Stern Elecs., Inc. v. Kaufman*, 523 F. Supp. 635, 638-39 (E.D.N.Y. 1981), *aff'd*, 669 F.2d 852 (2d Cir. 1982). The display is considered to be a work of art, and as such is separately provided for under the present Act. See 17 U.S.C. §§ 101, 102(a)(6) (1982).

right protection of arcade video games.⁷⁴ These have provided protection only to the extent permitted by existing common law standards.

One example of the use of common law principles has been the application of *scene a faire* to deny copyright protection to the use of a maze, such as the one used in the game Pacman,⁷⁵ or the concept of using weaponry for defense against attacking enemies, as in the game Galaxian.⁷⁶ Another example is the application of the *Morrissey* doctrine to deny protection to the "wrap around" feature of Pacman's game board which allows a player to exit from one side of the screen and re-enter from the other.⁷⁷ The doctrine was held to apply because there is only one way to make this feature occur on a video screen.

Among the features of video games granted protection in the cases were: (1) the unique shapes of video characters, such as those used in Pacman and Donkey Kong; (2) the unique shapes associated with certain types of play, such as missiles, bombs, or targets; and (3) the unique sounds associated with certain occurrences, such as the scoring of points, or destruction by the enemy. It should be noted, however, that only the unique shapes and sounds are protected. The white dots that the Pacman character "eats" are examples of shapes not distinctive enough to be protected by copyright.

The courts deciding these cases have held that game displays are sufficiently "fixed" to satisfy requirements of 17 U.S.C. § 102, even though play is unpredictable and different for each player.⁷⁸ Additionally, videotaped samples of game play constitute a sufficient deposit to satisfy the statutory requirements.⁷⁹ Finally, in answer to the contention that the player is the actual "author" of the game because it is he who controls the course of its action, one court explained that "playing

74. *Williams Elecs., Inc. v. Artic Int'l, Inc.*, 685 F.2d 870 (3d Cir. 1982); *Atari, Inc. v. North Am. Philips Consumer Elec. Corp.*, 672 F.2d 607 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1982); *Midway Mfg. Co. v. Strohon*, 564 F. Supp. 741 (N.D. Ill. 1983); *Williams Elecs., Inc. v. Bally Mfg. Corp.*, 568 F. Supp. 1274 (N.D. Ill. 1983); *Midway Mfg. Co. v. Bandai Am., Inc.*, 546 F. Supp. 125 (D.N.J. 1982); *Midway Mfg. Co. v. Artic Int'l, Inc.*, 547 F. Supp. 999 (N.D. Ill. 1982), *aff'd*, 704 F.2d 1009 (7th Cir. 1983), *cert. denied*, 104 S. Ct. 90, — U.S. — (1983); *Atari, Inc. v. Amusement World, Inc.*, 547 F. Supp. 222 (D. Md. 1981); *Stern Elecs., Inc. v. Kaufman*, 523 F. Supp. 635 (E.D.N.Y. 1981), *aff'd*, 669 F.2d 852 (2d Cir. 1982).

75. *Atari Inc. v. North Am. Philips Consumer Elec. Corp.*, 672 F.2d 607, 617 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1982).

76. *Midway Mfg. Co. v. Bandai Am., Inc.*, 546 F. Supp. 125, 139 (D.N.J. 1982).

77. *Atari, Inc. v. North Am. Philips Consumer Elec. Corp.*, 672 F.2d 607, 617 (7th Cir. 1982), *cert. denied*, 459 U.S. 880 (1982).

78. *Williams Elec., Inc. v. Artic Int'l, Inc.*, 685 F.2d 870, 873-74 (3d Cir. 1982); *Stern Elecs., Inc. v. Kaufman*, 523 F. Supp. 635 (E.D.N.Y. 1981), *aff'd*, 669 F.2d 852 (2d Cir. 1982).

79. *Atari, Inc. v. Amusement World, Inc.*, 547 F. Supp. 222, 227 (D. Md. 1981); *Midway Mfg. Co. v. Artic Int'l, Inc.*, 547 F. Supp. 999, 1006-07 (N.D. Ill. 1982), *aff'd*, 704 F.2d 1009 (7th Cir. 1983), *cert. denied*, 104 S. Ct. 90, — U.S. — (1983).

a video game is more like changing channels on a television than it is like writing a novel or painting a picture."⁸⁰

2. Cases Dealing with Program Copyright

The cases dealing with program copyright are considerably less coherent than visual display cases, of which ten cases have been reported.⁸¹ Most of these cases involve the outright copying of, or the preparation of derivative works from, the program without the copyright holder's permission. These decisions have settled a number of fundamental issues. For example, it has been decided that a computer program is a work of authorship,⁸² a ROM is a tangible means of expression,⁸³ and object code is a copy or derivative work of the source code.⁸⁴ In general, however, the law in this area remains unclear.

The year 1983 was particularly significant in the resolution of program copyright issues. Many controversies resulted in injunctions, damages, or settlements favorable to the copyright holder. By mid-year, many of the basic concepts were well established, though the question of the extent to which a "substantially similar" work would be permitted remained unsettled.⁸⁵ As the year progressed, the arguments of the alleged infringers became more refined. *Apple Computer, Inc. v. Franklin Computer Co.*⁸⁶ represents what was perhaps the peak of this refinement.

The case arose as a result of Franklin's outright copying of fourteen

80. *Midway Mfg. Co. v. Artic Int'l, Inc.*, 704 F.2d 1009, 1012 (7th Cir. 1983), *cert. denied*, 104 S. Ct. 90, — U.S. — (1983).

81. *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984); *Williams Elec., Inc. v. Artic Int'l, Inc.*, 685 F.2d 870 (3d Cir. 1982); *Apple Computer, Inc. v. Formula Int'l Inc.*, 562 F. Supp. 775 (C.D. Cal. 1983), *aff'd*, 725 F.2d 521 (9th Cir. 1984); *Midway Mfg. Co. v. Strohon*, 564 F. Supp. 741 (N.D. Ill. 1983); *S & H Computer Sys., Inc. v. SAS Inst., Inc.*, 568 F. Supp. 416 (M.D. Tenn. 1983); *Videotronics, Inc. v. Bend Elec.*, 564 F. Supp. 1471 (D. Nev. 1983); *Clark Equip. Co. v. Harlan Corp.*, 539 F. Supp. 561 (D. Kan. 1982); *Midway Mfg. Co. v. Artic Int'l, Inc.*, 547 F. Supp. 999 (N.D. Ill. 1982), *aff'd*, 704 F.2d 1009 (7th Cir. Ill. 1983), *cert. denied*, 104 S. Ct. 90, — U.S. — (1983); *Nintendo of Am., Inc. v. Elcon Indus., Inc.*, 564 F. Supp. 937 (E.D. Mich. 1982); *Tandy Corp. v. Personal Micro Computers, Inc.*, 524 F. Supp. 171 (N.D. Cal. 1981).

82. *Apple Computer, Inc. v. Formula Int'l Inc.*, 562 F. Supp. 775, 779 (C.D. Cal. 1983); *Tandy Corp. v. Personal Micro Computers, Inc.*, 524 F. Supp. 171, 173 (N.D. Cal. 1981).

83. *Apple Computer, Inc. v. Formula Int'l Inc.*, 562 F. Supp. 775, 779 (C.D. Cal. 1983); *Tandy Corp. v. Personal Micro Computers*, 524 F. Supp. 171, 178 (N.D. Cal. 1981).

84. *Williams Elec., Inc. v. Artic Int'l, Inc.*, 685 F.2d 870, 877 (3d Cir. 1982); *Apple Computer, Inc. v. Formula Int'l Inc.*, 562 F. Supp. 775, 779 (C.D. Cal. 1983), *aff'd*, 725 F.2d 521 (9th Cir. 1984).

85. None of the cases dealt with a situation where a second party has attempted to rewrite a copyrighted work so as to raise the question of substantial similarity.

86. 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984).

of Apple's programs. Some of these copies were of operating systems, and others were stored in ROM or on disk. At the trial court's hearing on the preliminary injunction, Franklin argued that Apple's operating system programs were a "process," "system" or "method of operation" excluded from copyright protection by 17 U.S.C. § 102(b).⁸⁷ Franklin also argued that the operating system programs merged idea and expression and were thus ineligible for protection.⁸⁸ Finally, Franklin argued that operating system programs are no different than the accounting system held not protectable in *Baker v. Selden*.⁸⁹

Similar arguments were being raised in the Third Circuit while Franklin was making them in the trial court. Three days after the *Apple v. Franklin* trial court decided there was merit in Franklin's contentions, the Third Circuit decided *Williams Electronics, Inc. v. Artic International, Inc.*⁹⁰ On review of the *Apple v. Franklin* decision, the court of appeals began its discussion stating that the *Williams* decision "laid to rest many of the doubts expressed by the trial court."⁹¹

The *Apple v. Franklin* appellate court characterized the issues as: "(1) whether copyright can exist in a computer program expressed in object code, (2) whether copyright can exist in a computer program embedded on a ROM, [and] (3) whether copyright can exist in an operating system program. . . ."⁹² These issues can be determined under the existing statutory scheme. Neither the statutes nor the recent decisions, however, address the questions of whether a particular program might be the only way to express a given idea, or whether a particular expression is necessary to the treatment of a given subject area. In addition, under the broad analysis necessary to decide these questions, it is difficult to develop standards for exceptions to any general rules that might be established.

The problems presented in *Apple v. Franklin* can be seen as a mat-

87. Brief for Appellant at 13, 714 F.2d at 1249.

88. *Id.* at 17, 714 F.2d at 1253. The court of appeals did not reach this argument, derived from *Morrissey*, because it was insufficiently developed at trial. 714 F.2d at 1253.

89. Brief for Appellant at 21, 714 F.2d at 1257.

90. 685 F.2d 870 (3d Cir. 1982).

91. 714 F.2d at 1247.

92. *Id.* at 1246. The third issue was not argued before the *Williams* court and the distinction between application and operating system programs has not been established. 17 U.S.C. § 101 defines only "computer programs" generally. The *Apple v. Franklin* court relied on this in its opinion. 714 F.2d at 1252.

Formula International also tried to make this distinction in its defense in *Apple v. Formula*, arguing that an operating system program fails to communicate anything to the user. The court refused to accept this distinction. 725 F.2d at 524.

It is important to note that both defendants tried to disqualify operating system programs as a class, rather than showing why a particular program violates the standards developed for programs in general.

ter of perspective. Looking at the object code, the end product of the programmer's efforts, one might conclude that an operating system is nothing more than a machine part. This perspective ignores the fact that the author wrote the source code for the operating system just as he would write any other program. The decisions discussed above are correct in holding that an author retains his rights when his source code is compiled into object code. The translation from one set of symbols to another should not be the focus of litigation; the court should examine the content of the expression to determine whether it satisfies the applicable standards.

Before developing this recommendation further, this Note will explore the unique problem posed by the copyright protection of operating system programs. This discussion will illustrate the necessity to balance the rights of programmers against the interests of society in reducing the barriers to entry into the computer market.

IV. OPERATING SYSTEMS

As explained earlier, an operating system is the program that runs the internal operations of a computer. Operating systems are required for every computer system and must be written with reference to the hardware specifications of the CPU chip. Copyright of some operating systems can operate as a patent to protect the system for seventy-five years without the limitations imposed by patent law. In order to prevent abuse, the standard of proof should be altered in such cases to require outright copying before finding an infringement. In order to understand how this abuse can occur, it is necessary to examine the function and structure of an operating system.

An operating system is composed of building blocks of sub-programs, called "subroutines," which perform discrete functions within the program. An operating system is never "run" like an application program would be, but rather lies in the background performing the internal functions which allow the computer to operate. Each discrete function is "called" by the application program as needed. For example, when it is necessary to write some information onto the disk, the application program calls the operating system and tells it what data to transfer. The operating system then decides where on the disk to write the data and performs the actual transfer. Another example is the "keyboard read" subroutine, which monitors the keyboard to see which keys, if any, are being struck by the operator.

The application program must communicate, or "interface," with the operating system in order to "access" the keyboard routine for input. This is commonly accomplished in either of two ways. The first method, used in Apple systems, is to implant the exact memory location

of the keyboard routine directly into the application program. When written in this manner, the application program can only be used on a machine with an operating system program having all of the various routines at the same memory locations. When this method is used, other manufacturers would want to use the same operating system programs, so that Apple's application programs, generally written by independent programmers, will also work on their machines.

The second method requires that only one memory location be common between two manufacturers. The designer of the operating system program creates a "jump table" containing all the starting addresses of the operating system routines in memory. An applications programmer needs to know only the address at which the table starts and the order of the functions in the table. One can then use the applications program on the equipment of a number of manufacturers. This method leaves manufacturers free to independently create mutually compatible systems.

Companies wishing to replicate a machine process using the first method must create a substantially similar operating system program,⁹³ running the risk of infringing another's copyright. Extending protection in this circumstance, however, would operate as a patent on the machine process. It is therefore important to develop principles to limit copyright protection in these cases.

V. ANALYTIC MODEL OF COMPUTER PROGRAMS

The development of copyright principles as applied to computer programs is in the incipient stage. The application of common law doc-

93. The Apple II does not use a jump table. The keyboard strobe subroutine begins at the 64,780th memory location. That routine is 36 bytes long. Another operating system function begins in the 37th memory location above the start of the keyboard routine. Thus, a competitor must express the idea embodied in the keyboard routine in no more than 36 bytes starting with the 64,780th memory location. This means the pattern and size of each subroutine "building block" of the two operating systems must be identical.

In addition, there are only a limited number of ways to express the idea embodied in a keyboard strobe subroutine in only 36 bytes. The sequencing of the subroutine's instructions to accomplish the task is too simple. Because the routines have to be in the same order, and because of the simplicity of the individual routines, it would be virtually impossible to write a compatible operating system without failing the substantial similarity test. See *Midway Mfg. Co. v. Strohon*, 564 F. Supp. 741, 752-53 (N.D. Ill. 1983) (89% identity between the bytes of two programs was judged substantially similar).

These constraints on design do not exist if a designer includes within the operating system a jump table. If such a table is included, a second designer can replicate the operation of the operating system without any similarity between the original and the copy, except for the location and contents of the jump table. This table would compose less than one percent of the whole operating system. Several very successful operating systems use this type of system and are prominent in their market shares.

trines to adjust the degree of similarity permitted between programs, for example, has yet to be developed. Computer programs should be subjected to the same scrutiny as other manners of expression in order to prevent abuse. The statutory and case law presently in place has developed as a response to the problems of copyright abuse in other manners of expression and can be equally effective in the program area.

The *Baker*, *Morrissey* and *scene a faire* doctrines⁹⁴ would not preclude copyright protection from any class of computer programs, but would operate to limit protection to individual programs in some cases. In applying these doctrines, the focus of analysis would appropriately be the content of the particular expressions.

Depending upon the facts in a particular case, these doctrines might operate to raise the degree of similarity necessary for a finding of infringement. In exceptional cases, even outright copying might be permitted. Theoretically, the operation of the *Morrissey* doctrine can raise the standard so as to preclude protection altogether. In this operating system context, this result would be both undesirable and unnecessary. A competitor does not need to copy another's system outright to obtain a desired compatibility. Therefore, the *Morrissey* doctrine should not be applied so as to preclude protection.

CONCLUSION

The policy of copyright is to encourage the communication of ideas for the benefit of society. Allowing similarity in the proposed situations is in the interest of society since to do so would preserve competition between manufacturers and create easier access for innovators wanting to enter the market, while still preventing a manufacturer from getting a free ride into a flourishing market by stealing another's work.

The standard for impermissible similarity for operating systems using jump tables should be that of "substantial similarity" first enunciated by Learned Hand in the *Peter Pan Fabrics* case.⁹⁵ If no jump table is used, substantial similarity should be permitted under the *Morrissey* and *scene a faire* doctrines, though outright copying should result in a finding of infringement.

The danger that a copyright could allow the monopoly of an idea is real. The computer industry has developed to the stage where a predictable scheme of protection for authors of programs is needed. Recognition of the *Baker*, *scene a faire* and *Morrissey* doctrines would

94. See *supra* text accompanying notes 37-41.

95. *Peter Pan Fabrics v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960); see *supra* text accompanying note 43.

prevent abuse while preserving competition and access to markets and encourage development and innovation.

James S. Altman
Georgia State University of Law