Copyright - Copyright Act of 1976 - Operating System Computer Programs Expressed in Object Code and Stored on ROM Are Copyrightable

Janet E. Fisher

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COPYRIGHT—COPYRIGHT ACT OF 1976—OPERATING SYSTEM COMPUTER PROGRAMS EXPRESSED IN OBJECT CODE AND STORED ON ROM ARE COPYRIGHTABLE

Apple Computer, Inc. v. Franklin Computer Corp. (1983)

Apple Computer, Inc. (Apple) is a California corporation[1] engaged in the manufacture and sale of personal computers,[2] peripheral equipment,[3] and computer programs.[4] Until 1982, Apple manufactured the Apple II

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1. Apple Computer, Inc. v. Franklin Computer Corp., 545 F. Supp. 812 (E.D. Pa. 1982), *rev'd*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984) (withdrawn pursuant to Rule 53 of the Supreme Court Rules). Apple, incorporated in 1976, has grown quickly to become a recognized industry leader. 714 F.2d at 1242. When this action was commenced in 1982, Apple had already sold more than 400,000 Apple II computers, and had net sales totaling $335 million for the 1981 fiscal year. *Id.*

2. 714 F.2d at 1242. Personal computers, also called "microcomputers" because of their size and relative versatility, contain a variety of integrated circuits. 545 F. Supp. at 812-13. These circuits are photo-chemically imprinted silicon chips, which are mounted on a large flat circuit board called a "mother board." *Id.* at 813. The various processes of personal computers are managed by a central processing unit (CPU), a specialized circuit that executes all programs. *Id.* The CPU does the primary calculations required of all programs and shifts answers to other parts of the system. *Id.* All instructions for the CPU are contained on computer programs. 714 F.2d at 1243. For a discussion of the composition and operation of personal computers, see N. CHAPIN, COMPUTERS: A SYSTEMS APPROACH (1971); W. DAVIS, INFORMATION PROCESSING SYSTEMS 48 (2d ed. 1981); U. POOCH & R. CHATTERGY, MINICOMPUTERS (1980). For a detailed nontechnical description of the functions and interrelationships of the various components of a microcomputer, see Note, *Copyright Protection for Computer Programs in Read Only Memory Chips*, 11 HOFSTRA L. REV. 329 (1982).

3. 714 F.2d at 1242. "Peripheral equipment" refers to the physical parts of a computer other than the CPU, such as the keyboard, screen, printer, and disk drives. 545 F. Supp. at 814.

4. 714 F.2d at 1242. Computer programs, also known as "software," are generally defined as detailed sets of instructions that direct the computer to perform certain tasks or to solve certain problems. 545 F. Supp. at 813-14. While there is some controversy over the specific definition of software, an increasingly well-accepted definition focuses on three essential elements of all computer programs: (1) the underlying idea or process upon which the program is based (also known as the "algorithm"); (2) the program itself coded in some programming language; and (3) the supporting documentation, such as flow charts, instructional manual and other materials that explain the operation of the program. Keplinger, *Computer Software—Its Nature and Its Protection*, 30 EMORY L.J. 483, 484-85 (1981) (citing MODEL PROVISIONS ON THE PROTECTION OF COMPUTER SOFTWARE 12 (World Intellectual Property Org. 1978)). *See also* Davidson, *Protecting Computer Software: A Comprehensive Analysis*, 23 JURIMETRICS 339 (1983) (defining software as "all materials encompassing or describing computer programs").

Generally, the creation of a computer program occurs in four stages. Pope & Pope, *Protection of Proprietary Interests in Computer Software*, 30 ALA. L. REV. 527, 530 (1979). The first stage is the development of a flow chart or graphic representation of the program's logic. *Id.* The flow chart expresses the algorithm, which is the mathe-

(894)

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personal home computer.[5] Independent programmers, working under contract with Apple, developed numerous application programs[6] designed to be used on the Apple II.[7] To achieve compatibility with the Apple II, the application programs were formulated in accordance with the Apple II's internal operating system programs.[8] These operating system programs are ex-

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matical expression of the solution to a given problem. *Id.* The second phase is the development of a "source program," which is a translation of the flow chart into a high-level, human-oriented programming language such as FORTRAN (FORmula TRANslation), COBOL (Common Business Oriented Language) or BASIC (Beginners All-purpose Symbolic Instruction Code). *Id.* These high-level languages use common words and mathematical symbols to perform different functions. *Id.* Source programs may be punched on decks of cards or imprinted on disks, magnetic tapes, or drums. *Id.* The third phase is the development of an "assembly program," which is a translation of the programming language into machine language, or mechanically readable numerical computer language. *Id.* at 530-31. Finally, the fourth phase is the development of an "object program," which translates the assembly program into a series of electrical impulses that interact directly with the machine. *Id.* at 531. For a further discussion of the various phases of computer programs, see Davidson, *supra*; Gemignani, *Legal Protection for Software: The View From '79*, 7 RUGERS J. COMPUTERS, TECH. & L. 269 (1980); Comment, *The Protection of Property Rights in Computer Software*, 14 AKRON L. REV. 85 (1980); Comment, *Copyright Protection for Programs Stored in Computer Chips: Competing with IBM and Apple*, 7 HAMLINE L. REV. 103 (1984); Comment, *Copyright Protection for Computer Programs*, 47 TENN. L. REV. 787 (1980); Note, *supra* note 2.

5. 714 F.2d at 1242.

6. *Id.* All computer programs can be classified, according to their functions, as either "application programs" or "operating system programs." *Id.* at 1243. Application programs, which comprise the great majority of all software, are inserted into the computer to perform specific tasks, such as making calculations, tabulating data, producing graphics, word processing, or playing games. *Id.* These programs are generally written in high-level programming languages, and are designed to be understandable to even the unsophisticated computer user. 545 F. Supp. at 814. For a discussion of operating system programs, see note 8 *infra*.

7. 714 F.2d at 1242. As a result of its early success, Apple has been able to develop, through the services of independent programmers, a vast body of application programs that are available for use with the Apple II computer. Petition for Certiorari at 4, Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984). In 1983, it was reported that 15,000 programs have been independently developed for the Apple II computer. N.Y. Times, Sept. 25, 1983, at F2, col. 1. It is generally acknowledged that the availability and variety of application programs designed to run on a particular computer are the major considerations in a consumer's decision to purchase a particular make of computer. 545 F. Supp. at 814.

8. 545 F. Supp. at 814. The application programs designed specifically for use in the Apple II will not run on computers utilizing different operating system programs. *Id.* Operating system programs coordinate the various components of the computer system to enable it to execute application programs. *See* Note, *supra* note 2, at 546-47 (citations omitted).

Operating system programs "consist of routines that electronically activate a computer and manage the various internal housekeeping functions that a computer must perform in order to run any application program. Operating systems are, in short, a computer's technological life support system." Petition for Certiorari at 3, Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984). For a description of the functions performed by the operating system programs involved in the principal case, see note 14 *infra*.

pressed in object code[9] and are stored on flexible magnetic disks called "floppy disks" or in silicon chips called Read Only Memory (ROM).[10] Since 1979, Apple has sought to protect its operating system programs by registering them with the United States Copyright Office.[11]

Franklin Computer Corp. (Franklin) is a Pennsylvania corporation which manufactured and marketed the ACE 100 personal computer.[12] The ACE 100 was designed to be "Apple compatible," so that the peripheral

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9. 714 F.2d at 1243. Computer programs, both application and operating systems, may be written in one of three programming languages. *Id.* High-level languages, such as FORTRAN or BASIC, which contain easily understood English words and phrases, are used by programmers when initially designing a program. *Id.* The next language level, referred to as "assembly language," is made up of alphanumeric labels. *Id.* The high-level languages and assembly languages are collectively referred to as "source code." *Id.* A computer, however, cannot read source code; it can only understand instructions written in a machine language called "object code," a binary expression utilizing only the two symbols, 1 and 0. *Id.* These symbols indicate the opening and closing of switches governing electrical impulses within the central processing unit of the computer. *Id.* Special operating system programs that translate source code into machine-readable object code are known as "compiler programs." *Id.* For a discussion of the distinction between source code and object code, see Gagliardi, *Software: What Is It?*, 8 APLA Q.J. 233, 238-39 (1980); Stern, *Another Look at Copyright Protection of Software: Did the 1980 Act Do Anything for Object Code?*, 3 Computer L.J. 1 (1981); Note, *The Copyrightability of Object Code*, 59 NOTRE DAME L. REV. 412 (1984). For a general discussion of the levels of programming languages, see Note, *Copyright Protection of Computer Program Object Code*, 96 HARV. L. REV. 1723 (1983) [hereinafter cited as Note, *Object Code Protection*]; Note, *supra* note 2.

10. 714 F.2d at 1243. Memory is the part of the computer that stores information for later use. *See* Note, *supra* note 2. There are a variety of memory devices used in computers. The main memory component is called the Random Access Memory (RAM) which is a volatile internal memory chip that is erased when the power of the computer is turned off. 714 F.2d at 1243 n.3. *See also* 545 F. Supp. at 813. Another type of memory device is the Read Only Memory, or ROM, which is a permanent internal device consisting of a semi-conductor silicon chip incorporated into the circuitry of the computer. 714 F.2d at 1243. The ROM contains the object code for a particular program. *Id.* As its name suggests, information stored on a ROM cannot be erased or changed in any way. *Id.* Another memory device commonly used is the "floppy disk" or diskette, a flexible magnetic disk resembling a phonograph record, which is inserted into and read by the computer. *Id. See generally* Stern, *ROMs in Search of a Remedy: Will They Find It?*, 1 COMPUTER L. REP. 4 (1982).

11. Appellant's Opening Brief at 5, Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984). The process of copyright registration is governed by the Copyright Act of 1976, 17 U.S.C. §§ 408-410 (1982). Generally, a claim to copyright may be made by any person by registering the work with an application and payment of the set fee. *Id.* §§ 408, 708. A number of requirements must be met before a copyright registration certificate will be issued, including subject-matter suitability and originality. 1 M. NIMMER, NIMMER ON COPYRIGHT § 2.01 (1983). For a discussion of the Copyright Office policy of accepting computer programs for copyright registration, see note 62 *infra*.

As owner of the copyright, Apple had the exclusive right to reproduce the copyrighted programs. *See* 17 U.S.C. § 106 (1982).

12. 714 F.2d at 1243. Franklin, incorporated in 1981, had sold approximately 1,000 computers, and had gross sales totaling $7 million at the commencement of this action. *Id. See also* Zonana, *Apple's Copyright Protection Victory Seen as Blow to Franklin Computer, Others*, Wall St. J., Sept. 2, 1983, § 1, at 2, col. 3.

equipment and, more importantly, the application programs developed specifically for use in the Apple II could be run on the ACE 100 as well.[13] To achieve this compatibility, Franklin designers copied fourteen copyrighted operating systems of the Apple II.[14]

On May 12, 1982, Apple filed suit in the United States District Court

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13. 714 F.2d at 1243. More accurately, the ACE 100 was designed to be compatible with Apple-compatible software as it was specifically designed to utilize the thousands of application programs that had been developed by independent programmers for use on the Apple II. 545 F. Supp. at 814-15. The availability and variety of these programs were the major incentives behind the development of the ACE 100 in 1982. *Id.* at 814.

> The founders of Franklin recognized the need in the market for an "Apple-compatible" computer, that is, a computer with hardware and operating systems designed so that it could run the broad range of application programs that heretofore could be run only on the Apple II computer and use the peripheral hardware originally developed for use in conjunction with the Apple II. Franklin's objective was to respond to that market demand with such a compatible computer, but one that had enhanced capabilities as well.

Brief for Appellee at 7, *Apple Computer*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984).

14. 714 F.2d at 1245. Franklin never denied having copied the programs. *Id.* Franklin had been advised by its legal counsel that Apple's operating systems were an integral part of the Apple II technology and were thus not subject to copyright protection. Petition for Certiorari at 5, *Apple Computer*, 714 F.2d at 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984). Franklin had also commissioned a study to determine the feasibility of redesigning the Apple operating systems without losing compatibility with Apple-compatible application programs, and concluded that redesign was not possible without losing compatibility. *Id.* "[A]pplication programs designed to run on the Apple II assume and depend upon the precise order and sequence of the electrical signals that constitute the [operating systems]; the programs will not run if there is any variance in the signal." Brief for Appellee at 7-8, *Apple Computer*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984). Thus, Franklin concluded that the only way to design a computer capable of utilizing the thousands of programs developed for use with the Apple II was to use the same operating systems found in the Apple II. *Id.* at 8.

The fourteen operating system programs copied by Franklin were described by the Third Circuit as follows:

> (1) *Autostart ROM* is sold as part of the Apple Computer and is embedded on a ROM chip. . . . When the computer's power is turned on, Autostart ROM performs internal routines that turn on the circuits in the computer and make its physical parts . . . ready for use.
> (2) *Applesoft* is Apple's version of the . . . BASIC language. The program is stored in ROM and is sold as part of the computer. Applesoft translates instructions written on the higher-level BASIC language into the lower-level machine code that the computer understands.
> (3) *Floating-Point BASIC* is the same program as Applesoft but is stored on disks rather than on ROMs. It is used in earlier versions of the Apple II computer that did not have the Apple soft program in ROM.
> (4) *Apple Integer BASIC*, another translation program, is stored on the DOS 3.3 Master Disk [and] . . . implements a simpler version of the Applesoft program.
> (5) *DOS 3.3*, the disk operating system program, provides the instructions necessary to control the operation between the disk system (disk drive) and the computer itself. It controls the reading and writing functions of the

for the Eastern District of Pennsylvania, alleging that Franklin was liable for copyright infringement.[15] Franklin answered by raising as an affirmative defense the invalidity of Apple's copyrights, contending that the programs

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disks and includes other routines which put all the data transfers in sequence.

(6) *Master Create* is stored on a disk. When a disk is prepared for use the DOS 3.3 program is placed on that disk in a form that is dependent on the amount of Random Access Memory (RAM) available. The Master Create program replaces the DOS 3.3 on the disk with a version that is independent of the amount of RAM available.

(7) *Copy*, which is stored on a disk, enables the user to copy programs written in Apple Integer BASIC from one disk to another.

(8) *Copy A*, also stored on a disk, enables the user to copy programs written in Applesoft from one disk to another.

(9) *Copy OBJO* contains a file of subroutines used by the Copy and Copy A programs.

(10) *Chain*, another disk stored program, allows data to be passed between different parts of a program when only one part of the program is in RAM at a given time. Thus, Chain preserves data already stored in RAM while another part of the program is being loaded into RAM.

(11) *Hello*, also disk stored, is the first program executed after the power is turned on and a disk is ready for use. It determines how much RAM is in the computer and which version of BASIC needs to be loaded into the computer.

(12) *Boot 13* is stored on a disk and sold on a Master Disk. It allows the user having a disk controller card that contains the Apple 16-Sector Boot ROM to use older versions of the Apple disk operating system.

(13) *Apple 13-Sector Boot ROM* is stored in a ROM located on the disk controller card plugged into the Mother Board. By turning on numerous circuits on the card and in the Apple II computer, this program causes other parts of the disk operating system used for 13-Sector format disks to load.

(14) *Apple 16-Sector Boot ROM*, stored in a ROM located on the disk controller card, turns on numerous circuits on the card and in the Apple II computer and causes other parts of the disk operating system used for 16-Sector format disks to load. It therefore enables the user to start or permit the running of another program or to prepare the computer to receive a program.

714 F.2d at 1244 n.4. Apple estimated that these programs were developed over a 46-month period, at a cost of more than $740,000, not including the costs of the development of antecedent programs or the costs of marketing. *Id.* at 1245. It is generally accepted that the costs of duplicating programs is minimal, particularly when compared with the high cost of initial research and development. *Id.* at 1254.

The process that Franklin allegedly utilized in copying the programs described above was explained as follows:

To copy Apple's program stored on ROM, Franklin's Chairman . . . , using his own Apple computer, transferred the program into part of the RAM memory in the same computer, and then transferred the entire program to a PROM chip using a plug-in device (called a "ROM burner"). To copy Apple's programs stored on diskettes, Franklin's Vice-President of Engineering inserted the Apple diskette into his computer and copied the programs onto a blank diskette by running Apple's copy program.

Appellant's Opening Brief at 7 n.5, *Apple Computer*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984).

15. 714 F.2d at 1244. Apple further alleged that Franklin was liable for patent infringement, unfair competition and misappropriation. *Id.* However, the district

were not copyrightable.[16] Apple moved for a preliminary injunction to re-
strain Franklin from the use, sale, or infringement of Apple's registered copy-
rights.[17] The district court denied the injunction, based on its expressed
doubt as to the copyrightability of the programs[18] and its conclusion that

court did not reach or address these allegations, as Apple's motion for a preliminary
injunction was limited to the alleged copyright infringement. 545 F. Supp. at 817.

16. 714 F.2d at 1244. Franklin argued that the copyrights were invalid because
the programs failed to meet the statutory requirements for copyrightability. *Id.* For
a discussion of the district court's disposition of this contention, see note 18 *infra*.

17. 714 F.2d at 1245. For a discussion of the district court's formulation of the
standards for granting a preliminary injunction in a copyright infringement case, see
note 19 *infra*. For a discussion of the Third Circuit's reversal on this issue, see notes
122-24 and accompanying text *infra*.

Before ruling on Apple's motion, the district court held a three-day evidentiary
hearing on the question of the copyrightability of the operating system programs in
suit. 714 F.2d at 1245. Apple produced evidence in the form of expert testimony to
the effect that the operating system programs of the ACE 100 were virtually identical
to those of the Apple II. *Id.* Franklin did not deny the copying charge, but defended
on the factual ground that it was not feasible for Franklin to develop operating pro-
grams capable of running Apple-compatible application programs. *Id.* For a discus-
sion of Franklin's feasibility studies, see note 14 *supra*. For a discussion of the district
court's characterization and resolution of the issue, see note 18 *infra*.

18. 545 F. Supp. at 812. The district court stated that Apple took the "not
implausible" position that Franklin had stolen the logic and structure of Apple's op-
erating system programs as *expressed* on the ROM found in the Apple II computer.
Id. at 815, 819-20 (emphasis added). Franklin's contention, as characterized by the
court, was that a system compatible with Apple-compatible software must necessarily
share a great deal of Apple's essential internal *structure* including the operating system
programs. *Id.* at 815 (emphasis added).

The district court noted the statutory requirements for copyrightability, an
"original work of authorship" and a "fixed . . . medium of expression." *Id.* at 816
n.4 (citing 17 U.S.C. § 102(a) (1982)). For a discussion of the statutory requirements,
see notes 66-73 and accompanying text *infra*. The court found two aspects of operat-
ing system programs in object code encoded on ROMs that potentially preclude their
copyrightability. First, the district court found that a ROM is properly characterized
as a "mechanical device." 545 F. Supp. at 823. When the ROM is engaged in a
computer, it "become[s] an essential part of the mechanical process." *Id.* (quoting
Keplinger, *Computer Intellectual Property Claims*, 1977 WASH. L.Q. 461, 464). As a
mechanical device, according to the district court, a ROM would be protected by
patent, rather than copyright law. *Id.* at 824.

Second, the district court stated that "the scope of copyright is limited to mate-
rial that can claim an underlying expressive or communicative purpose." *Id.* The
court acknowledged that some computer programs, even those written in object code,
may satisfy this standard, if the purpose of the program is to produce an image that
can be perceived and understood by a human audience. *Id.* at 825 (citing Midway
Mfg. Co. v. Artic Int'l, Inc., 547 F. Supp. 999 (N.D. Ill. 1982), *aff'd*, 704 F.2d 1009
(7th Cir.), *cert. denied*, 104 S. Ct. 90 (1983)). However, the court observed that operat-
ing system programs, which interact only with the computer itself, fail the standard,
since they do not communicate directly with human beings. *Id.* at 821, 825. The
court characterized operating system programs as "an essential part of the machine,"
the part that makes the computer run. *Id.* at 821. The court stated:

If the concept of "language" means anything, it means an ability to create
human interaction. It is the fixed expression of this that the copyright law
protects, and only this. To go beyond the bounds of this protection would
be ultimately to provide copyright protection to the programs created by a
computer to run other computers. With that, we step into the world of

Apple had failed to show a reasonable likelihood of success on the merits and sufficient irreparable harm.[19] On appeal, the Third Circuit[20] reversed, *holding* that operating system programs, written in object code and embedded on a ROM chip, are copyrightable. *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (3d Cir. 1983).

The United States Constitution provides the Congress with the "Power . . . To Promote the Progress of Science and Useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[21] Federal legislation enacted pursuant to

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Gulliver where horses are "human" because they speak a language that sound remarkably like the ones humans use. It is an intriguing analogy but false.

Id. at 825. For a discussion of the genesis of the test of communicative ability as a prerequisite for copyright, see notes 46-48 and accompanying text *infra*. For a discussion of the Third Circuit's response to the proposition that "expression" under §§ 101-102 must be directed at a human audience, see notes 103-06 and accompanying text *infra*.

Shortly after the district court entered its order denying Apple's motion for a preliminary injunction, the Third Circuit decided the case of Williams Electronics, Inc. v. Artic Int'l, Inc., 685 F.2d 870 (3d Cir. 1982) (application programs written in object code on ROMs copyrightable). Apple moved for reconsideration in light of the *Williams* decision. 714 F.2d at 1245. The district court denied the motion, stating that *Williams* did not address the operating system program issues raised by the Apple case. Apple Computer, Inc. v. Franklin Computer Corp., No. 82-2107 (E.D. Pa. Sept. 14, 1982) (memorandum and order). For a discussion of *Williams*, see notes 86-89 and accompanying text *infra*.

19. 545 F. Supp. at 812. The district court delineated the requirements for the issuance of a preliminary injunction as follows:
    1. A reasonable probability of success on the merits;
    2. Irreparable injury to the plaintiff that exceeds any injury to the enjoined defendant;
    3. The improbability of harm to other interested persons; and,
    4. A public interest that would be furthered.

Id. at 825 (citing Delaware River Port Auth. v. Transamerican Trailer Transport, 501 F.2d 917, 919-20 (3d Cir. 1974)). The court, after expressing its doubts as to Apple's probability of success on the merits, also noted that Apple was better suited to withstand any injury suffered during litigation than was Franklin to withstand the "devastating effect" a preliminary injunction would have upon its business. 545 F. Supp. at 825.

On appeal, the Third Circuit disagreed with the application of the standard for a preliminary injunction posited by the district court. 714 F.2d at 1254. For a discussion of the Third Circuit's position on the necessity of a showing of irreparable harm in copyright infringement cases, see notes 122-23 and accompanying text *infra*.

20. The case was heard by Circuit Judges Hunter, Higginbotham and Sloviter. Judge Sloviter wrote the opinion for the unanimous panel.

21. U.S. CONST. art. I, § 8, cl. 8. This clause is the basis of congressional authority to enact both copyright and patent laws. See M. NIMMER, *supra* note 11, § 1.02.

The Patent Act grants patent holders "the right to exclude others from making, using or selling the invention throughout the United States" for seventeen years from the date of the issuance of the patent. 35 U.S.C. § 154 (1982). The protection offered under the Patent Act extends to "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." 35 U.S.C. § 101 (1982). In addition to § 101's requirements of novelty and usefulness, § 103 adds a third requirement, nonobviousness: "A patent may not be obtained . . . if

this authority provides that any unauthorized copying of a properly copy-

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. . . the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103 (1982). *See also* Graham v. John Deere Co., 383 U.S. 1 (1966) (novelty, utility, and nonobviousness are explicit conditions of patentability). The difficulty, expense, and time required for an applicant to establish these criteria, and the limitation of protection to 17 years, make patent protection an unattractive alternative if copyright protection is available. *See generally* Pope & Pope, *supra* note 4; Nycum, *Legal Protection for Computer Programs*, 1 COMPUTER L.J. 1 (1978); Rose, *Protection of Intellectual Property Rights in Computers and Computer Programs: Recent Developments*, 9 PEPPERDINE L. REV. 547 (1982).

In addition to the difficulties of the stringent standards for patentability in general, it is unclear whether patent protection is available for computer programs at all. Pope & Pope, *supra* note 4, at 534-42. The Patent Act is silent on its applicability to computer programs, and judicial decisions in the area have left the question unresolved. *Id.* The Supreme Court has had several occasions upon which to make a determination on the patentability of computer programs, but has not yet made a definitive ruling. *See, e.g.,* Diamond v. Diehr, 450 U.S. 175 (1981). In *Diehr*, the Court upheld the validity of a patent on a synthetic rubber curing process which consisted of several steps including a formula for calculating appropriate cure time with the use of a digital computer. *Id.* at 178. The fact that the process was based primarily upon the use of a computer program was significant, because the Court had previously held that an algorithm, a procedure for solving a given type of mathematical problem, was not, of itself, patentable. *See* Parker v. Flook, 434 U.S. 1033 (1978) (algorithm not patentable); Gottschalk v. Benson, 409 U.S. 63 (1972) (method for converting binary-coded decimal numerals into pure binary form not patentable, since effect would be to grant monopoly over mathematical formula). While *Diehr* did not hold that algorithms and computer programs are per se patentable, the ruling indicates that an algorithm may be given patent protection if it is used in a "process" that fits within the scope of the Patent Act's protection. *See Diehr*, 450 U.S. at 178. Some commentators have read *Diehr* as illustrative of the Supreme Court's willingness to sustain the patentability of program-related inventions. *See* Keplinger, *supra* note 4; Note, *Protection of Proprietary Rights in Computer Programs: A "Basic" Formula for Debugging the System*, 57 ST. JOHN'S L. REV. 92 (1982). For a discussion of the impact of *Diehr* on patentability of computer programs, see generally Comment, *Copyright Protection for Video Games, Computer Programs and Other Cybernetic Works*, 5 COM./ENTERT. L.J. 477 (1983); Note, *Patentability of Computer Programs*, 34 BAYLOR L. REV. 125 (1982); Note, *A Patent Claim Based Primarily on a Computer Program Can Comprise Patentable Subject Matter*, 9 FLA. ST. U.L. REV. 381 (1981); Note, *The Patentability of Processes and Incorporated Algorithms*, 8 OHIO N.U.L. REV. 535 (1982); Note, *Patentability of a Process that Includes a Programmed Digital Computer: The Court Invents a New Standard*, 7 U. DAYTON L. REV. 157 (1981). For a general discussion of the applicability of patent law to computers, computer programs, and program-related inventions, see Bender, *Computer Programs: Should They Be Patentable?*, 68 COLUM. L. REV. 214 (1968); Davis, *Computer Programs and Subject Matter Patentability*, 6 RUTGERS J. COMPUTERS & L. 1 (1977); Kayton, *Update of Legal Protection of Computer Software Via Patents*, 8 APLA Q.J. 273 (1980); Novick & Wallenstein, *The Algorithm and Computer Software Patentability: A Scientific View of a Legal Problem*, 7 RUTGERS J. COMPUTERS TECH. & L. 313 (1980); Comment, *Computer Software, supra* note 4; Comment, *Patentability: Piecing Together the Computer Software Patent Puzzle*, 19 ST. LOUIS U.L.J. 3351 (1975); Note, *Computer Programs and Proposed Revisions of the Patent and Copyright Laws*, 81 HARV. L. REV. 1541 (1968); Note, *Patentable Subject Matter—Computer Software*, 24 N.Y.L. SCH. L. REV. 975 (1979); Note, *The Patentability of Computer Programs*, 38 N.Y.U. L. REV. 891 (1963); Note, *An Anomaly in the Patent System: The Uncertain Status of Computer Software*, 8 RUTGERS J. COMPUTERS, TECH. & L. 273 (1980); Note, *Adequate Legal Protection for Computer Programs*, 1968 UTAH L. REV. 369.

righted work constitutes a copyright infringement.[22] Congress has continu-
ally expanded the scope of copyright protection in response to new
developments and advancements in communication technology.[23] How-

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22. *See* 17 U.S.C. §§ 106(a), 501 (1982). For a discussion of the scope of copy-
right protection afforded by the 1976 Copyright Act, see notes 65-73 and accompany-
ing text *infra*. For a discussion of the history of federal copyright legislation see note
23 *infra*.

Although the 1976 Copyright Act does not specifically define "infringement," it
provides that a violation of a copyright holder's exclusive rights constitutes an in-
fringement. 17 U.S.C. § 501(a) (1982). Unauthorized copying is generally recog-
nized as inconsistent with the exclusive right of a copyright holder to control
reproduction of the copyrighted work. *See* 3 M. Nimmer, *supra* note 11, § 13.01. To
establish a case of copyright infringement, a plaintiff must prove that he owned the
copyright, and that there was "copying" by the defendant. *Id.* Possession of a copy-
right certificate constitutes prima facie evidence of ownership. 17 U.S.C. § 410(c)
(1982). The certificate of copyright registration is prima facie evidence of the validity
of the copyright. *Id.*

23. *See* H.R. REP. NO. 1476, 94th Cong., 2d Sess. 51, *reprinted in* 1976 U.S. CODE
CONG. & AD. NEWS 5659, 5664 [hereinafter cited as H.R. REP. NO. 1476]. The grad-
ual expansion of the protective coverage of the various copyright statutes has mainly
been due to the rapid technological changes that have taken place in the last century.
Id. The House Report states:

> The history of copyright law has been one of gradual expansion in the types
> of works accorded protection. . . . [T]echnological developments have
> made possible new forms of creative expression that never existed before. In
> some of these cases the new expressive forms—electronic music, filmstrips,
> and computer programs, for example—could be regarded as an extension
> of copyrightable subject matter Congress had already intended to protect,
> and were thus considered copyrightable from the outset without the need of
> new legislation. In other cases, such as photographs, sound recordings, and
> motion pictures, statutory enactment was deemed necessary to give them
> full recognition as copyrightable works.

Id.

The first copyright statute, enacted in 1790, protected only "maps, charts, and
books." Act of May 31, 1790, ch. 15, 1 Stat. 124. Gradually, through amendments
and revisions, copyright protection was extended to newly developed forms of expres-
sion and communication: Act of April 29, 1802, ch. 36, 2 Stat. 171 (designs, etchings,
engravings); Act of Feb. 3, 1831, ch. 16, 4 Stat. 436 (musical compositions); Act of
Aug. 18, 1856, ch. 169, 11 Stat. 138 (dramatic compositions); Act of Mar. 3, 1865, ch.
126, 13 Stat. 540 (photographs and negatives); Act of July 8, 1870, ch. 230, 16 Stat.
198 (statutes and models).

In 1909, Congress enacted a complete revision of the copyright statute, ex-
tending copyright protection to "all the writings of an author." Act of Mar. 4, 1909,
ch. 320, 35 Stat. 1075 (repealed 1976). The legislative history of the 1909 Act indi-
cates that Congress was concerned that the term "author" could be too narrowly
construed by courts and intended to provide the fullest possible protection. *See* H.R.
REP. NO. 2222, 60th Cong., 2d Sess. 10 (1909). It was suggested that the term
"works" be substituted, thus evidencing this intent more clearly, "but it was thought
better to use the word 'writings', which is the word found in the Constitution." *Id.*
The 1909 Act faced new interpretive problems with the development of radio, mo-
tion pictures, television, and other revolutionary forms of technological expression.
See Note, *Revision of the Copyright Law*, 51 HARV. L. REV. 906 (1938) (arguing that a
revision of the 1909 Act was necessary to provide protection for emerging technol-
ogy). *See also* Capitol Records, Inc. v. Mercury Records Corp., 221 F.2d 657, 660 (2d
Cir. 1955) (questioning in dictum congressional intent to extend copyright protection
to publicly-performed musical compositions). For a discussion of the problems en-

ever, because the scope of protection afforded under the various copyright acts is limited by the constitutional authorization, "writings" of "authors" has remained the essential criteria of copyrightability.[24]

Generally, courts have construed both "authors" and "writings" broadly in extending copyright protection to a variety of forms of expression beyond the strictly written word.[25] In upholding the copyrightability of photographs in the case of *Burrow-Giles Lithographic Co. v. Sarony*,[26] the Supreme Court defined "writings" as all forms "by which the ideas in the

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gendered by the 1909 Act, *see generally* A. LATMAN, THE COPYRIGHT LAW 9, 22 (1979).

In 1976, the 1909 Act was repealed and replaced by a new act which extends copyright protection to all "original works of authorship fixed in any tangible medium of expression." Copyright Act of 1976, Pub. L. No. 94-553, § 101, 90 Stat. 2541, 2544-45 (codified at 17 U.S.C. § 102(a) (1982)) [hereinafter cited as 1976 Act]. For a discussion of the history of the 1976 Act, see notes 63-73 and accompanying text *infra*.

24. *See* 1 M. NIMMER, *supra* note 11, §§ 1.06, 1.08. The constitutional standard is discernible in the current formulation of the scope of copyrightability: "original works of authorship fixed in any tangible medium of expression." 17 U.S.C. § 102(a) (1982). The term "author" is the basis for the requirement of originality. *See, e.g.*, Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53, 58 (1884) (defining "author" as "[h]e to whom anything owes its origin; originator; maker"). The requirement of a "writing" has evolved into a basic requirement that a work exist in some physical, tangible mode. *See id. See generally* Note, *Study of the Term "Writings" in the Copyright Clause of the Constitution,* 31 N.Y.U. L. REV. 1263 (1956).

25. *See, e.g.*, Goldstein v. California, 412 U.S. 546 (1973) (sound recordings); Mazer v. Stein, 347 U.S. 201 (1954) (statuettes); Bleistein v. Donaldson Lithographing Co., 188 U.S. 239 (1903) (commercial lithographic circus poster); Walt Disney Prods. v. Air Pirates, 581 F.2d 751 (9th Cir. 1978) (cartoon characters), *cert. denied*, 439 U.S. 1132 (1979); Edwin K. Williams & Co. v. Edwin K. Williams & Co.-East, 542 F.2d 1053 (9th Cir. 1976) (account books containing instructions on use of forms), *cert. denied*, 433 U.S. 908 (1977).

26. 111 U.S. 53 (1884). The copyright statute in effect in *Burrow-Giles* included "photographs" as one of the classes of copyrightable works. *Id.* at 56. The plaintiff brought suit against a lithographic company for violating the plaintiff's copyright in a photograph of Oscar Wilde. *Id.* at 54. Judgment was entered for the plaintiff, and the defendant appealed, arguing that the statute was unconstitutional, since a photograph was not a "writing" of an "author" in the constitutional sense. *Id.* at 55-56. Emphasizing the interpretive flexibility of constitutional provisions, and the inclusion in copyright statutes of protectible works that were not literally "writings," the Court concluded that photographs, as "original intellectual conceptions of an author," satisfied the constitutional standard. *Id.* The Court analyzed the constitutional question by referring to the copyright statutes enacted in 1790 and 1802, both of which included among protected works maps, charts, designs, engravings, and other prints, as well as books. *Id.* at 57. The Court stated that "[t]he construction placed upon the Constitution by the first act of 1790, and the act of 1802, by the men who were contemporary with its formation, many of whom were members of the convention which framed it, is of itself entitled to very great weight." *Id.* Thus, the Court concluded that unless photographs were of a completely different genre than any of the groups of works protected in the original statutes, there was no reason to believe that Congress could not extend protection to them as well, for as the Court aptly noted, "[t]he only reason why photographs were not included in the extended list in the act of 1802 is probably that they did not exist. . . ." *Id.* at 58.

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mind of an author are given visible expression,"[27] and "author" as "he to whom anything owes its origin."[28] Under this formulation, neither a work's lack of artistic merit nor its commercial nature,[29] nor even its failure to express a recognizable idea or sentiment precludes copyright protection.[30] Thus, in *Reiss v. National Quotation Bureau*,[31] Judge Learned Hand found that a code book containing a list of meaningless words was copyrightable.[32] Ad-

27. *Id.* at 58. Thus, the *Burrow-Giles* Court rejected the suggestion that a work must be printed in words on a page to be eligible for copyright protection. *Id.* at 53. The Supreme Court has on numerous occasions reaffirmed the broad construction of "writings." *See* American Tobacco Co. v. Werckmeister, 207 U.S. 284 (1907). In upholding the copyrightability of paintings, the *Werckmeister* Court stated that the foundation of copyright law lies in the protection of ideas embodied in visible forms. *Id.* at 290-91. More recently, the Court has observed that "writings . . . include any physical rendering of the fruits of creative intellectual or aesthetic labor." Goldstein v. California, 412 U.S. 546, 561 (1973). Federal courts have generally followed the Supreme Court's broad view of "writings." *See, e.g.,* Mazer v. Stein, 347 U.S. 201 (1954) (statutettes); Deutsch v. Arnold, 98 F.2d 686 (2d Cir. 1938) (handwriting analysis chart). *See generally,* Note, *supra* note 24.

28. 111 U.S. at 58. The *Burrow-Giles* Court's reference to "origin" is viewed by most commentators as the basis for the requirement of originality. *See* 1 M. NIMMER, *supra* note 11, § 1.06[A]. In essence, the requirement became that of emanation from an ascertainable source, reflecting the constitutional standard that a work owe its origin to an author. *Id.* Until the enactment of the 1976 Act, the requirement of originality was characterized as a judicially created gloss upon the copyright statute. *See* Puddu v. Buonamici Statuary, Inc., 450 F.2d 401, 402 (2d Cir. 1971) ("Although the Copyright Act [of 1909] nowhere expressly invokes the requirement of originality, courts have uniformly inferred this from the constitutional and statutory condition of authorship."). In the 1976 Act, Congress for the first time specifically referred to originality as a statutory requirement. *See* 17 U.S.C. § 102(a) (1982). For a discussion of the requirement of originality in the 1976 Act, see notes 66-67 and accompanying text *infra.*

29. *See* Bleistein v. Donaldson Lithographing Co., 188 U.S. 239 (1902). In *Bleistein,* the Court upheld the copyrightability of a commercial circus poster, noting that the requisite degree of creative effort necessary for copyrightability could be fulfilled by "a very modest grade of art." *Id.* at 250. Justice Holmes, writing for the Court, observed that it should not be the province of the judiciary to determine what is or is not appropriately artistic: "It would be a dangerous undertaking for persons trained only to the law to constitute themselves final judges of the worth of pictorial illustrations, outside of the narrowest and most obvious limits." *Id.* at 251.

30. *See* Reiss v. National Quotation Bureau, 276 F. 717 (S.D. N.Y. 1921). For a discussion of *Reiss,* see notes 31-32 and accompanying text *infra.*

31. 276 F. 717, 719 (S.D.N.Y. 1921). The plaintiff's book, *'Simplex' Pocket Blank Code,* consisted substantively of 6,325 words of five letters each. *Id.* at 718. Although the words had no recognizable meaning, they were pronounceable. *Id.* They were intended to be used in the creation of a private cable code: the purchasers could decide upon the meanings to be given to the code words. *Id.* Judge Hand noted that while the words had no present meaning, they did "have a prospective meaning, but as yet they have not received it." *Id.*

32. Id. at 719. Drawing an analogy to concededly copyrightable pattern and design works, Judge Hand observed that a work's ability to communicate an idea was not a prerequisite to its classification as a "writing." *Id.* Judge Hand then applied this principle to words themselves, finding no reason why ability or failure to communicate a message should control copyrightability. *Id.* The *Reiss* defendants argued that in order to be the "writing of an author" in the constitutional sense, words necessarily must have a definite meaning. *Id.* at 718. Echoing the *Burrow-Giles* Court's

THIRD CIRCUIT REVIEW

ditional cases have extended copyright protection to a variety of coded materials and graphic expressions.[33]

Despite the broad scope of copyright protection for various forms of expression and for works exhibiting little creative or intellectual merit, judicially-created limitations have restricted the spectrum of copyrightable materials.[34] In *Baker v. Selden*,[35] the Supreme Court established two related limitations on the copyrightability of a work or expression.[36] The first limitation, known as the "utilitarian function" principle, denies copyright protection to works which are purely utilitarian in nature[37] if their value lies in

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emphasis on a flexible interpretation of the Constitution, Judge Hand rejected this narrow interpretation of the constitutional standard:

> [I]f our Constitution embalms inflexibly the habits of 1789 there may be something in the point. But it does not; its grants of power to Congress comprise, not only what was then known, but what the ingenuity of men should devise thereafter. Of course, the new subject matter must have some relation to the grant; but we interpret it by the general practices of civilized peoples in similar fields, for it is not a strait-jacket, but a charter for a living people.

Id. at 719. The code book, Judge Hand concluded, could properly be characterized as the "writing of an author." *Id.*

33. *See, e.g.*, Deutsch v. Arnold, 98 F.2d 686 (2d Cir. 1938) (handwriting analysis chart); Hartfield v. Peterson, 91 F.2d 998 (2d Cir. 1937) (cable and telegraphic code book); Guthrie v. Curlett, 36 F.2d 694 (2d Cir. 1929) (freight tariff index table); Edward & Deutsch Lithographing Co. v. Boorman, 15 F.2d 35 (7th Cir.) (interest and discount tables), *cert. denied*, 273 U.S. 738 (1926); Harcourt, Brace & World, Inc. v. Graphic Controls Corp., 329 F. Supp. 517 (S.D.N.Y. 1971) (answer sheets for student achievement tests, consisting of lines and boxes).

34. *See* Baker v. Selden, 101 U.S. 99 (1879). For a discussion of the utilitarian function principle and the idea-expression dichotomy established in *Baker*, see notes 37-40 *infra*. *See* White-Smith Music Publishing Co. v. Apollo Co., 209 U.S. 1 (1908). For a discussion of the *White-Smith* rule of readability, see notes 45-48 and accompanying text *infra*.

35. 101 U.S. 99 (1879).

36. *Id.* In *Baker*, the Court denied copyright protection to a series of blank forms published in a copyrighted book explaining a system of bookkeeping. *Id.* at 100. The plaintiff's book, *Selden's Condensed Ledger or Bookkeeping Simplified*, consisted of an introductory essay explaining the bookkeeping system, and forms or blanks, consisting of ruled lines and headings which illustrated the system and its use. *Id.* The system differed from standard bookkeeping systems in its unique arrangement of columns and headings, which allowed presentation of a day, a week, or a month's operation on a single page or adjacent pages. *Id.* The defendant's book utilized a similar arrangement, but placed the columns on different pages and used different headings. *Id.* The Court noted that the copyright of the book protected the explanatory essays only and did not extend to the blank forms themselves. *Id.* at 107.

37. *Id.* at 104-05. The Court distinguished between the description and the use of the system, noting that while a copyright may prevent a duplication of the description, anybody purchasing the book was free to use the system. *Id.* at 104. Drawing an analogy to other "arts," the Court noted that a treatise on the composition and use of certain medicines would be subject to copyright protection, "but no one would contend that the copyright of the treatise would give the exclusive right to the art or manufacture described therein." *Id.* at 102. The same distinction would apply to a treatise on the application and mixture of colors for painting, or to the mode of drawing lines illustrating a book on artistic perspective. *Id.* Similarly, "[t]he copyright of a work on mathematical science cannot give to the author an exclusive right

their very usefulness.[38] The second limitation, known as the idea-expression dichotomy, states that a copyright may not be granted in an idea, although copyright may protect a particular expression of an idea.[39] The idea itself belongs to the world as a whole, and cannot be claimed to be the property of a single author.[40] A corollary to this rule states that where one expression of an idea constitutes the exclusive medium of communicating that idea, then the idea and its expression have merged, and the expression may not be copyrighted.[41] Relying on *Baker*, the First Circuit, in *Morrissey v. Procter & Gamble Co.*,[42] denied copyright protection to a set of sweepstakes rules, since

to the methods of operating which he propounds, or to the diagrams which he employs to explain them, so as to prevent an engineer from using them whenever occasion requires." *Id.* at 103.

38. *Id.* at 105. As a system to be used, the forms in Selden's book were held not the proper subject of copyright. *Id.* The Court stated: "The description of the art in the book, though entitled to the benefit of copyright, lays no foundation for an exclusive claim to the art itself. The object of the one is explanation; the object of the other is use." *Id.*

The utilitarian principle limitation of *Baker* has been applied to deny copyright protection to various purely functional items. *See, e.g.*, Brown Instrument Co. v. Warner, 161 F.2d 910 (D.C. Cir. 1947) (calibrated graphic charts, intended for use as integral parts of a device for mechanically recording temperature, pressure, etc., held not copyrightable as not intended to convey information, but rather to be used), *cert. denied*, 332 U.S. 801 (1947); Taylor Instrument Cos. v. Fawley-Brost Co., 139 F.2d 98 (7th Cir. 1943) (chart used in connection with a recording thermometer not copyrightable because it neither taught nor explained the use of the art but was an essential element of the machine), *cert. denied*, 321 U.S. 784 (1944). Not all utilitarian works, however, have been denied copyrightability. In the leading case of Mazer v. Stein, 347 U.S. 201 (1954), the Supreme Court upheld a copyright of a statuette that was utilized as a lamp base. *Id.* at 217. The Court was careful to note that the copyright extended only to the statuette, and not to the lamp itself. *Id.* at 218. If the lamp and statuette ingredient are incapable of being separated, neither could be copyrighted. *Id.* *See also* Norton Printing Co. v. Augustana Hosp., 155 U.S.P.Q. (BNA) 133 (N.D. Ill. 1967) (business, medical, legal and other forms are not per se uncopyrightable; they may be protected by copyright if they convey information).

39. *Baker*, 101 U.S. at 100-01. Nimmer has suggested that this idea-expression distinction is derived in part from a recognition of the impact of the first amendment in the area of intellectual property rights, acting as a prohibition on any monopoly over pure ideas. *See* 1 M. NIMMER, *supra* note 11, § 1.10[B][2]. The first amendment reflects a commitment to the free exchange of ideas which may conflict with the restrictions inherent in copyright. *See* Lee v. Runge, 404 U.S. 887, 893 (1971) (Douglas, J., dissenting) ("the arena of public debate would be quiet, indeed, if a politician could copyright his speeches or a philosopher his treatise and thus obtain a monopoly on the ideas they contained. We should not construe the copyright laws to conflict so patently with the values that the First Amendment was designed to protect.").

40. *Baker*, 101 U.S. at 100.

41. *See* Morrissey v. Procter & Gamble Co., 379 F.2d 675 (1st Cir. 1967). This principle is derived from dictum in *Baker* in which the Court noted that when certain illustrations and diagrams of a method or art were "necessary incidents" to the expression of that art, those illustrations and diagrams would belong to the public. *See Baker*, 101 U.S. at 103.

42. 379 F.2d 675 (1st Cir. 1967). In *Morrissey*, the plaintiff was the owner of a copyright of a set of sweepstakes rules utilizing participants' social security numbers. *Id.* at 676. The rules specified that an entrant should print his or her name, address, and social security number on a boxtop or plain piece of paper, informed entrants

those particular rules were virtually the only means of expressing the idea of the sweepstakes.[43] *Morrissey* has come to represent a principle that has particular relevance in the computer program area: when an idea can be communicated either through a single or a very limited set of expressions, copyright cannot protect any expression of that idea.[44]

Another judicially-imposed limitation on the scope of copyright protection, the rule of readability, focused on whether or not a copy has been made of the protected material in determining whether there was an infringement.[45] In *White-Smith Music Publishing Co. v. Apollo Co.*,[46] the Supreme

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that official contest rules were available upon request, and warned against use of incorrect social security numbers. *Id.* at 678. Defendant's set of rules duplicated the plaintiff's substantially, changing only a few phrases. *Id.*

43. 379 F.2d at 678. The court stated:
> When the uncopyrightable subject matter is very narrow, so that the topic necessarily requires, if not only one form of expression, at best only a limited number, to permit copyrighting would mean that a party or parties, by copyrighting a mer⸍ ⸌andful of forms, could exhaust all possibilities of future use of the substance. In such circumstances it does not seem accurate to say that any particular form of expression comes from the subject matter.

Id. at 678-79 (citations omitted).

44. *Id.* at 678-79. Conversely, however, if an idea can be expressed in a variety of totally different manners, a variety of copyrights may exist in relation to that idea. *See* Dymow v. Bolton, 11 F.2d 690, 691 (2d Cir. 1926). The Ninth Circuit enunciated a standard, which focuses on the extent of the copyright owner's monopoly, to be applied in cases involving possible merger of idea and expression. *See* Herbert Rosenthal Jewelry Corp. v. Kalpakian, 446 F.2d 738 (9th Cir. 1971). In *Kalpakian*, the court held that a piece of jewelry shaped like a bee was not copyrightable. *Id.* at 742. The idea (that of a jeweled bee) and the expression of the idea (the jeweled bee itself) were found inseparable. *Id.* The court characterized the merger inquiry as follows: "[F]rom how large an area of activity did Congress intend to allow the copyright owner to exclude others? We think the production of jeweled bee pins is a larger private preserve than Congress intended to be set aside in the public market without a patent." *Id.*

However, the validity of the application of the *Morrissey* rule to computer programs has been questioned by some commentators. *See generally* Note, *Object Code Protection, supra* note 9, at 1736-37 (there are generally an unlimited number of sequences on instructions that could be combined in a program to achieve a single result; thus there could never be a merger of the idea contained in a given program and its expression). *See also* Reznick, *Copyright Protection for Computer Formats and the Idea/Expression Dichotomy*, 8 RUTGERS J. COMPUTERS, TECH. & L. 65, 72 (1980) ("the *Morrissey* test . . . presumes that a court can determine with reasonable certainty the finite possibilities of expressions of an idea").

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

46. *Id.* In *White-Smith*, the owner of a copyright on certain musical compositions alleged infringement by the manufacturer of perforated piano rolls which reproduced the music written on the copyrighted song sheet. *Id.* at 9. The piano rolls were used in player pianos. *Id.* at 10. They consisted of
> perforated sheets, which are passed over ducts connected with the operating parts of the mechanism in such manner that . . . [a]s the roll is drawn over the tracker board, the notes are sounded as the perforations admit the atmospheric pressure, the perforations having been so arranged that the effect is to produce the melody or tune for which the roll has been cut.

Id.

The plaintiff sought an injunction against the defendant's use of the plaintiff's

Court stated that in order to constitute a copy, the alleged copy must be "in a form which others can see and read,"[47] and held that perforated piano rolls that reproduced music written on copyrighted song sheets were not copies for infringement purposes, since they could not be perceived and understood by human beings.[48] The subsequent extension of the *White-Smith* doctrine to exclude phonograph records from copyright protection caused considerable confusion in the music industry.[49]

The first copyright infringement cases involving computer programs demonstrated the continuing vitality of the *Baker* and *White-Smith* doctrines: in *Synercom Technology v. University Computing Co.*,[50] the District Court for the Northern District of Texas acknowledged that program input formats, which by their particular placement of words, lines and shaded areas communicate to the programmer how and where to place data, constitute an "expres-

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copyrighted musical compositions on the piano rolls. *Id.* at 8-9. The defendant argued that copyright protection extended only to the physical manifestation of the plaintiff's original idea, i.e., the sheet music representing the musical composition. *Id.* at 11-12.

47. *Id.* at 17. The Court stated that " 'a copy is that which comes so near to the original as to give every person *seeing* it the idea created by the original.' " *Id.* (quoting West v. Francis, 106 Eng. Rep. 1361, 1363 (1822)) (emphasis added by Court).

48. *Id.* at 17. Based upon expert testimony presented, the Court defined a copy of a musical work as "a written or printed record of it in intelligible notation." *Id.* Prior to its being reduced to written or printed form, the Court stated, a musical composition is an "idea existing in the mind of the composer." *Id.* The Court quoted with approval from an earlier decision of the First Circuit:

I cannot convince myself that these perforated sheets of paper are copies of sheet music within the meaning of the copyright law. They are not made to be addressed to the eye as sheet music, but they form a part of a machine. They are not designed to be used for such purposes as sheet music, nor do they in any sense occupy the same field as sheet music. They are a mechanical invention made for the sole purpose of performing tunes mechanically upon a musical instrument.

Id. at 12 (quoting Kennedy v. McTammany, 33 F. 584 (D. Mass. 1888)).

The Court, therefore, concluded that the only "copy" that can be made of a musical composition is a note-by-note transcription of the music sheet. *Id.* at 17-18. Such sheets were capable of being read and understood by human beings, while the series of perforations on a piano roll were not. *Id.*

49. *See* Capitol Records, Inc. v. Mercury Records Corp., 221 F.2d 657 (2d Cir. 1955); Corcoran v. Montgomery Ward & Co., 121 F.2d 572 (9th Cir.), *cert. denied,* 314 U.S. 687 (1941). In *Corcoran,* the author of a copyrighted poem alleged infringement of his copyright by a record producer who used the poem in a drama contained on a record. *Id.* at 572, 574. The Ninth Circuit found no infringement, reasoning that the result was "foreclosed" by the ruling in *White-Smith. Id.* at 573.

50. 462 F. Supp. 1003 (N.D. Tex. 1978). In *Synercom,* an engineering consulting firm had developed and copyrighted a stress analysis program to solve complex engineering problems. *Id.* at 1004-05. The program was designed to compute the stress on each section of a structure when the structure was in actual use. *Id.* at 1004. In an action for alleged infringement of those programs, the defendants first argued that the programs were mere forms, not intended to convey information, and thus not subject to copyright protection. *Id.* at 1011. Second, the defendants maintained that the "idea" behind the plaintiff's programs and the "expression" contained therein were inseparable, and therefore the permissible use of the unprotectable idea alone necessarily required use of the expression. *Id.* at 1012.

sion."[51] However, the court held that the ideas expressed in the input for-
mats could be expressed only by using the identical sequence and
arrangement of those formats, and that accordingly the idea and its expres-
sion were inseparable.[52] Therefore, the court held that the use of the formats
did not constitute infringement.[53] The *Synercom* decision was the first to indi-
cate that computer programs were potentially copyrightable, but the court
also suggested that any computer program was likely to fail the idea-expres-
sion test of *Baker* and *Morrissey*.[54]

Another court denied copyright protection to a computer program in
Data Cash Systems, Inc. v. JS&A Group, Inc.[55] There, the creator of a hand-held
computer chess game alleged infringement of a copyrighted program in-
scribed in object code on a ROM.[56] The court applied the *White-Smith* rule

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51. *Id.* at 1012. The court distinguished *Baker v. Selden* on the basis that the
forms in *Baker* did not communicate any information. *Id.* at 1011. In this case, by
comparison, the formats used communicated "the selection arrangements and the
sequence." *Id.* at 1012. Thus the "formats" at issue in *Synercom* were clearly distin-
guishable from the mere blank "forms" involved in *Baker. Id.*

52. *Id.* at 1012-13. The court stated:
The difficult question is whether [the defendant] plagiarized Synercom's
idea or its expression. If the idea is the sequence and ordering of data, there
was no infringement. If sequencing and ordering of data was, however,
expression, it follows that [the defendants'] preprocessor program was
infringed.
Id. at 1013. The court stated further: "The argument asks if the idea and the usage
are not separable, what is the expression?" *Id.* at 1012. Thus, whether the defend-
ants had infringed the plaintiff's copyright depended upon whether the expression
element could be distilled from the idea-expression complex. *Id.*

53. *Id.* at 1013-14. The court recognized that by making only a few variations of
the order of the format instructions, 3,628,800 possible manners of communicating
with the machine could be expressed. *Id.* at 1012. Nevertheless, the court found that
the defendant had appropriated only the idea expressed by the formats. *Id.* The
court, in an admittedly "over-simplified" hypothetical, drew an analogy to the "fig-
ure H" pattern of an automobile shift stick, which like a computer format, may be
expressed in several different ways, including prose description, diagram, or photo-
graph. *Id.* at 1013.
Each of these expressions may presumably be protected through copyright.
But the copyright protects copying of the particular expressions of the pat-
tern, and does not prohibit another manufacturer from marketing a car
using the same pattern.
Id. The stick-shift analogy illuminates the court's focus: whether the sequence of
data that makes up a computer program is an idea or an expression of the idea that
was the origin of the program. *Id.* The question the court posed was: "If sequencing
and ordering is expression, what separable idea is expressed?" *Id.* The court failed to
see any real distinction between the formats at issue and the H-shaped manual trans-
mission pattern. *Id.*

54. *See* Reznick, *supra* note 44.

55. 480 F. Supp. 1063 (N.D. Ill. 1979), *aff'd on other grounds*, 628 F.2d 1038 (7th
Cir. 1980).

56. 480 F. Supp. at 1065-66. The plaintiff's game, "Compu Chess," used key-
board and data display devices to input and output information. *Id.* at 1066. The
human player would enter a move on the keyboard device by pressing certain keys,
and the computer would then relay its move on a data display device. *Id.* Because

of readability[57] to conclude that a program in object code on a ROM is not

the ROMs in the plaintiff's and defendant's games were identical, the court assumed that the defendant had copied the plaintiff's ROM. *Id.*

The *Data Cash* court began its discussion by describing the four stages of computer programming. *Id.* at 1065. For a discussion of the stages of programming, see note 4 *supra.* In describing the nature and function of object code programs, the court explained that "[o]bject programs, which enter into the mechanical process itself, cannot be read without the aid of special equipment and cannot be understood by even the most highly trained programmers." 480 F. Supp. at 1065 (citing J. BROWN & R. WORKMAN, HOW A COMPUTER SYSTEM WORKS 149-75 (1976); Keplinger, *Computer Intellectual Property Claims: Computer Software & Data Base Protection,* 1977 WASH. L.Q. 461, 464; Pope & Pope, *supra* note 4, at 530-31). This statement has been criticized on several grounds. First, there is considerable disagreement over the readability of programs in object code. *See, e.g.,* NATIONAL COMM'N ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT 22 (1979) [hereinafter cited as CONTU REPORT] (concluding that object code programs *are* capable of being understood by a skilled programmer); Keplinger, *supra* note 4, at 511 (noting the fundamental disagreement between the *Data Cash* court and CONTU REPORT on readability).

57. For a discussion of the *White-Smith* rule of readability, see notes 45-48 and accompanying text *supra.* The *Data Cash* court determined that the case would not be decided under the new 1976 Copyright Act. 480 F. Supp. at 1066. Section 117 of Title 17, as revised by the 1976 Act, preserved the existing law as it related to the scope of exclusive rights in copyrighted computer programs. *Id.* at 1067. Section 117 provided in pertinent part,

> [T]his title [title 17] does not afford to the owner of copyright in a work any greater or lesser rights with respect to [computer programs] . . . than those afforded to works under the law, whether title 17 or the common law or statutes of a State, in effect on December 31, 1977, as held applicable and construed by a court in an action brought under this title.

Copyright Act of 1976, Pub. L. No. 94-553, § 101, 90 Stat. 2541, 2564 (repealed 1980). The section was designed as an interim provision, pending submission of a report then being prepared by a special commission on the application of copyright law to computer programs, at which point the 1976 Act was to include specific provisions dealing with computer programs. H.R. REP. NO. 1476, *supra* note 23, at 116, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5731. For a discussion of the commission's report, and its impact on the law, see notes 80-83 and accompanying text *infra.*

The *Data Cash* court interpreted § 117 as precluding application of the 1976 Act to cases involving the copyrightability of computer programs. 480 F. Supp. at 1067. Thus, the court decided the case under the 1909 Act, which left it free to apply *White-Smith. Id.* at 109. It has been suggested that the *Data Cash* court's reading of § 117 was incorrect. *See* Tandy Corp. v. Personal Micro Computers, 524 F. Supp. 171, 174-75 (N.D. Cal. 1981) (the *Data Cash* court's interpretation of § 117 would create a great loophole, unintended by Congress, allowing free copying of computer programs). The legislative history of § 117 supports this position by suggesting that Congress intended that the section apply *only* to the question of the scope of exclusive rights granted by the copyright statute in computer programs. "With respect to the copyright-ability of computer programs, . . . the new statute would apply." H.R. REP. NO. 1476, *supra* note 23, at 116, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5731.

The *Data Cash* court noted in dictum that even if the 1976 Act were applicable, copyright protection thereunder would not extend to the object code of a computer program. 480 F. Supp. at 1066-67 n.4. The court characterized object code as a "mechanical device which is engaged in the computer to become an essential part of the mechanical process." *Id.* (citations omitted).

a "copy" of the original program as written in source code.[58] Under the *Data Cash* approach, source programs and flow chart representations of programs are copyrightable expressions; however, the same program translated into object code and embodied in a ROM is not subject to copyright protection because it is a mechanical device and is not a readable "copy."[59] This holding was subsequently weakened when the case was affirmed, not on the basis of the device/copy distinction, but on the ground that the plaintiff's programs did not carry the requisite copyright notices.[60]

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58. 480 F. Supp. at 1069. The court stated that the ROM chip in the defendant's game was not a copy of the program originally developed by the plaintiff. *Id.* The court began its analysis by defining "copy" under the *White-Smith* requirement of a form which others can see and read. *Id.* Analogizing the source code-ROM relationship to an architectural plan-completed building relationship, the court reasoned that the only "copy" of a computer program is "another computer program in its flow chart or source phase because these are comparable technical writings." *Id.* at 1068 (citing Nucor Corp. v. Tennessee Forging Steel Serv., 476 F.2d 386, 391 n.8 (8th Cir. 1973); Smith v. Paul, 174 Cal. App. 2d 744, 755, 345 P.2d 546, 553 (Cal. Dist. Ct. App. 1959)). Since a ROM, by comparison, "is not in a form which one can 'see and read' with the naked eye, it is not a 'copy' " of the original source program. 480 F. Supp. at 1069. For a discussion of the *White-Smith* doctrine, see notes 46-48 and accompanying text *supra*.

59. 480 F. Supp. at 1068-69. The *Data Cash* approach to copyrightability of computer programs has been generally criticized. *See, e.g.*, Williams Electronics, Inc. v. Artic Int'l, Inc., 685 F.2d 870 (3d Cir. 1982) (upholding copyrightability of object code on ROM); Midway Mfg. Co. v. Artic Int'l, Inc., 547 F. Supp. 999 (N.D. Ill. 1982) (ROM is within definition of "copy"), *aff'd*, 704 F.2d 1009 (9th Cir.), *cert. denied*, 104 S. Ct. 90 (1983); Apple Computer, Inc. v. Formula Int'l, Inc., 562 F. Supp. 775, 785 (C.D. Cal. 1983) (viewing the Seventh Circuit's treatment of *Data Cash* as "completely undermin[ing] the authority of the trial court's opinion"). *But see* Apple Computer, Inc. v. Franklin Computer Corp., 545 F. Supp. 812, 818 n.8 (E.D. Pa. 1982) (characterizing *Data Cash* as "definitive" and "persuasive"), *rev'd*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984). One commentator has likened the *Data Cash* decision to *White-Smith*. *See* MacGrady, *Protection of Computer Software—An Update and Practical Synthesis*, 20 HOUS. L. REV. 1033, 1042 (1983) ("Unquestionably, *Data Cash* is the *Piano Roll Case* of computer software."). Other commentators have generally characterized the *Data Cash* dictum, that the 1976 Act did not protect computer programs in object code, as unnecessary and of questionable merit. *See generally*, Keplinger, *supra* note 4, at 510-11; Schmidt, *Legal Proprietary Interests in Computer Programs: The American Experience*, 21 JURIMETRICS 345, 368 (1981); Comment, *Copyright Protection for Computer Programs*, *supra* note 4, at 804-05; Note, *Computer Firmware, Is It Copyrightable?*, 36 OKLA. L. REV. 119, 126-29 (1983).

60. Data Cash Sys. v. JS&A Group, 628 F.2d 1038 (7th Cir. 1980), *aff'g on other grounds*, 480 F. Supp. 1063 (N.D. Ill. 1979). The court of appeals pointed out that the district court's holding that a ROM was not a "copy" was neither briefed nor argued on appeal. *Id.* at 1041. Despite this, Professor Nimmer has suggested that the Seventh Circuit's decision is an implicit reversal of the district court's reasoning. 2 M. NIMMER, *supra* note 11, § 8.08 n.18. Nimmer notes that the circuit court affirmed solely on the ground of the plaintiff's failure to affix a copyright notice to its program encoded on a silicon ROM chip. *Id.* Copyright notices are only required to be affixed to "copies" and "phonorecords." 17 U.S.C. §§ 401(a), 402(a) (1982). Since a ROM chip is not a "phonorecord," Nimmer concludes, the court of appeals must have tacitly assumed that it was a "copy," despite the district court's suggestion to the contrary. 2 M. NIMMER, *supra* note 11, § 8.08 n.18. Nimmer's theory was acknowledged and at least tacitly approved by federal courts in recent cases. *See* Williams Electronics, Inc. v. Artic Int'l, Inc., 685 F.2d 870, 877 (3d Cir. 1982); Apple

Despite the questionable status of computer programs[61] engendered by the *Baker* and *White-Smith* doctrines as applied in *Synercom* and *Data Cash*, the United States Copyright Office has accepted programs for copyright registration since 1961, under the "rule of doubt."[62] Partially in response to this practice, Congress began in 1961 to work on a draft bill for a general revision of the Copyright Act.[63] Several subsequent drafts of a revised bill were periodically introduced into Congress through the early 1970's, but no action was taken[64] until 1976, when Congress enacted a complete revision of the

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Computer, Inc. v. Formula Int'l, Inc., 562 F. Supp. 775, 784 (C.D. Cal. 1983); Tandy Corp. v. Personal Micro Computers, Inc., 524 F. Supp. 171, 175 (N.D. Cal. 1981).

61. *See* H.R. REP. NO. 1476, *supra* note 23, at 51, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5664 (indicating that Congress considered computer programs to be copyrightable under the 1909 Act). Most commentators writing before passage of the 1976 Act believed that they were protectable. *See, e.g.,* Nimmer, *New Technology and the Law of Copyright: Reprography and Computers,* 15 U.C.L.A. L. REV. 931 (1968); Prasinos, *Worldwide Protection of Computer Programs by Copyright,* 4 RUTGERS J. COMPUTERS & L. 42 (1974); Note, *Copyright Protection for Computer Programs,* 64 COLUM. L. REV. 1274 (1964); Note, *Adequate Protection for Computer Programs, supra* note 21. *But see* Scafetta, *Computer Software Protection: The Copyright Revision Bills and Alternatives,* 8 J. MAR. J. PRAC. & PROC. 381 (1975); Comment, *Computer Program Protection: The Need to Legislate a Solution,* 54 CORNELL L. REV. 586 (1969); Note, *Computer Software: Beyond the Limits of Existing Proprietary Protection Policy,* 40 BROOKLYN L. REV. 116 (1973).

62. *See* UNITED STATES COPYRIGHT OFFICE, COPYRIGHT REGISTRATION FOR COMPUTER PROGRAMS (1964), *reprinted in* 11 BULL. COPYRIGHT SOC'Y 361 (1964). The Copyright Office stated:

> The registrability of computer programs involves two basic questions: (1) Whether a program as such is the "writing of an author" and thus copyrightable, and (2) whether a reproduction of the program in a form actually used to operate or be "read" by a machine is a "copy" that can be accepted for copyright registration.
>
> Both of these are doubtful questions. However, in accordance with its policy of resolving doubtful issues in favor of registration wherever possible, the Copyright Office will consider registration for a computer program. . . .

Id. at 361. The Copyright Office continued to accept computer programs for copyright registration under the 1909 Act until the last day it was in effect. *See* Keplinger, *supra* note 4, at 495. When the 1976 Act took effect on Jan. 1, 1978, the Copyright Office had registered approximately 2,000 programs. *Id.*

63. *See* H.R. REP. NO. 1476, *supra* note 23, at 47, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5660. The draft bill was not finalized and introduced into Congress until 1964. *Id.* The bill provided that the exclusive rights comprised in copyright "shall include the exclusive right to copy or record the work in any tangible medium of expression now known or later developed, from which it can be visually or aurally perceived, either directly or with the aid of a machine or device." HOUSE JUDICIARY COMM., 88TH CONG., 2D SESS., COPYRIGHT LAW REVISION, PART 3: PRELIMINARY DRAFT FOR REVISED U.S. COPYRIGHT LAW AND DISCUSSION AND COMMENTS ON THE DRAFT 4 (Comm. Print 1964).

64. *See* H.R. REP. NO. 1476, *supra* note 23, at 49-50, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5662-63. It is noteworthy that the Register of Copyrights, in introducing the 1965 revision, explained the statute's scheme of using general prefatory language: "[T]he approach . . . is to state the general concepts of copyright in language allow[ing] for future changes in patterns of reproduction and other uses of authors' works. At the same time, . . . [i]t contemplates that certain computer uses would come within the copyright owner's exclusive rights." HOUSE JUDICIARY COMM., 89TH CONG., 1ST SESS., COPYRIGHT LAW REVISION: PART 6, SUPPLEMEN-

Copyright Act.[65]

Section 102(a) of the Copyright Act of 1976 extends copyright protection to "original works of authorship fixed in any tangible medium of expression."[66] The requirement of originality was purposely left undefined, as Congress "intended to incorporate without change the standard of originality established by the courts under the . . . [1909] copyright statute."[67] The second requirement of section 102(a), fixation in a tangible medium of expression, is satisfied when a work's embodiment in a "copy" is sufficiently permanent to permit it to be "perceived, reproduced or otherwise communicated" for a period of more than transitory duration.[68] In addition, the Act explicitly broadened the scope of potential "media" for fixation by allowing for any medium "now known or later developed."[69] The legislative history of section 102(a) indicates that Congress deliberately used this broad language in order to avoid the artificial distinctions engendered by *White-Smith*'s requirement that a work be capable of human perception and understanding to be a "copy."[70]

TARY REPORT OF REGISTER OF COPYRIGHTS ON GENERAL REVISION OF U.S. COPYRIGHT LAW, 1965 REVISION BILL 18 (Comm. Print 1965). For a detailed discussion of the several proposed drafts for a revised copyright statute, see Keplinger, *supra* note 4, at 495-99.

65. Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541 (codified at 17 U.S.C. §§ 101-810 (1982)) [hereinafter cited as "1976 Act"].

66. 17 U.S.C. § 102(a) (1982). The section provides in pertinent part as follows:
Copyright protection subsists . . . in original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.
Id. Section 102 lists seven broad categories of "works of authorship":
(1)   literary works;
(2)   musical works, including any accompanying words;
(3)   dramatic works, including any accompanying music;
(4)   pantomimes and choreographic works;
(5)   pictorial, graphic, and sculptural works;
(6)   motion pictures and other audiovisual works; and
(7)   sound recordings.
Id. The legislative history of the section makes it clear that the list is intended to be merely illustrative and not exhaustive. *See* H.R. REP. No. 1476, *supra* note 23, at 53, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5666.

67. H.R. REP. No. 1476, *supra* note 23, at 51, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5664. For a discussion of the judicially created standard of originality under the 1909 statute, see note 28 *supra*.

68. 17 U.S.C. § 101 (1982). This section defines "copies" as "material objects . . . in which a work is fixed by any method now known or later developed, and from which the work can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device." *Id.*

69. 17 U.S.C. § 102(a) (1982). For the text of § 102(a), see note 66 *supra*.

70. *See* H.R. REP. No. 1476, *supra* note 23, at 52, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5665. The House Report, after explicitly repudiating the "largely unjustifiable distinctions derived" from *White-Smith*, states:
Under the bill it makes no difference what the form, manner, or medium of fixation may be—whether it is in words, numbers, notes . . . or any other graphic or symbolic indicia, whether embodied in a physical object in . . .

The broad scope of protection afforded by section 102(a) is limited by section 102(b), which excludes from copyright protection "any idea, procedure, process, system, [or] method of operation."[71] As such, section 102(b) codifies the two fundamental principles of *Baker v. Selden*: copyright cannot subsist in either ideas or utilitarian processes.[72] The legislative history of section 102(b) indicates that it was intended to limit the scope of protection available for computer programs, by restricting copyrightability to the "writing" involved in a program and excluding processes or methods of operation.[73]

The broadly drafted language of section 102, as well as the legislative history of the 1976 Act, seemed to suggest that computer programs were intended to be included within the scope of the Act's protection.[74] The

punched, magnetic, or any other stable form, and *whether it is capable of perception directly or by means of any machine or device "now known or later developed."*
Id. (emphasis added). For a discussion of the *White-Smith* doctrine, see notes 46-48 and accompanying text *supra.*

71. 17 U.S.C. § 102(b) (1982). The section provides as follows: "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." *Id.*

72. *See* H.R. REP. No. 1476, *supra* note 23, at 57, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5670. For a discussion of *Baker v. Selden* and the copyrightability of ideas or utilitarian processes, see notes 35-40 and accompanying text *supra.* The House Report specifically states that § 102(b) was not intended to enlarge or contract in any way the scope of copyright protection that existed prior to the 1976 Act. *See* H.R. REP. No. 1476, *supra* note 23, at 57, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5670. Rather, "[i]ts 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." *Id.*

73. *See* H.R. REP. No. 1476, *supra* note 23, at 57, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5670. The House Report states as follows:

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) 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.

Id.

74. For the text of § 102, see notes 66 & 71 *supra.* The category of "literary works," one of the seven enumerated categories of "works of authorship" protected under § 102(a), is broadly defined as "works . . . expressed in words, numbers, or other verbal or numerical symbols or indicia, regardless of the nature of the material objects, such as . . . tapes, disks or cards, in which they are embodied." 17 U.S.C. § 101 (1982). Arguably, this definition is sufficiently broad to encompass computer programs. *See* 1 M. NIMMER, *supra* note 11, § 2.04[C].

See also H.R. REP. No. 1476, *supra* note 23, at 54, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5667. The House Report states:

The term "literary works" does not connote any criterion of literary merit or qualitative value: it includes catalogs, directories, and similar factual, reference, or instructional works and compilations of data. *It also includes computer data bases, and computer programs* to the extent that they incorporate

Northern District of California drew this conclusion in *Tandy Corp. v. Personal Micro Computers, Inc.*,[75] and held that an operating system program enscribed on a ROM is copyrightable.[76] Rejecting the *Data Cash* court's approach,[77] the *Tandy* court found an operating system program to be a "work of authorship," and a ROM to be a "tangible medium of expression" within the meaning of section 102(a).[78]

The 1976 Act, as originally drafted, was a significant step in providing copyright protection for computer programs; however, the drafters explicitly indicated that the Act was not intended to constitute a definitive answer to the computer program question.[79] In 1974, while the 1976 Act was still in

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authorship in the programmer's expression of original ideas, as distinguished from the ideas themselves.

Id., reprinted in 1976 U.S. CODE CONG. & AD. NEWS at 5669 (emphasis added). While the House Report indicates congressional acceptance of computer programs under the 1976 Act, the Senate Report accompanying that Act does not explicitly refer to computer programs in discussing the scope of § 102(a). *See* S. REP. No. 473, 94th Cong., 2d Sess. (1975). Nimmer has suggested that this omission was intentional. *See* 1 M. NIMMER, *supra* note 11, § 2.04[C] n.21. However, the Senate Report does state that § 102(b) was intended to limit the scope of copyright protection for computer programs. *See* S. REP. No. 473, *supra*, at 54. Nimmer has characterized this reference as a "tacit assumption" on the part of the Senate that computer programs were to be copyrightable under the 1976 Act. *See* 1 M. NIMMER, *supra* note 11, § 2.04[C] n.21.

75. 524 F. Supp. 171 (N.D. Cal. 1981). In *Tandy*, the plaintiff, a manufacturer of a personal home computer, the Radio Shack TRS-80, alleged that the defendants copied an operating system program that translated high-level source code into machine-readable object code. *Id.* at 173. The program was stored on a ROM. *Id.* The defendants moved to dismiss the action, contending that ROM silicon chips are not "copies" of the original program written in source code and, therefore, are outside the scope of copyright protection under the doctrine of *White-Smith*. *Id.* For a discussion of the *White-Smith* doctrine, see notes 46-48 and accompanying text *supra*.

76. 524 F. Supp. at 173. The *Tandy* court rejected the defendants' argument, set forth in *Data Cash*, that § 117 of the 1976 Act precluded application of the substantive provisions of that Act to computer programs. *Id.* at 174-75. The court observed first that § 117 made clear on its face that it was not intended to modify § 102 on copyrightability, but rather to explain §§ 106-118, which contain limitations on the scope of protection afforded by § 102. *Id.* at 174. The court stated that § 117 was intended to address the problem caused by the inputting of properly copyrighted materials, such as books, into computers. *Id.* (citing H.R. REP. No. 1476, *supra* note 23, at 116, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5731). Thus, the court concluded that pre-1976 Act law would not apply to the determination of copyrightability. *Id.*

77. For a discussion of the approach taken by the *Data Cash* court to the interpretation of § 117, see note 57 *supra*.

78. 524 F. Supp. at 173. The *Tandy* court first stated that computer programs are "works of authorship" covered by § 102(a) of the Copyright Act, noting that the legislative history indicated congressional intent to extend protection to such programs. *Id.* (citing H.R. REP. No. 1476, *supra* note 23, at 51, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5664). Further, the court noted that the imprinting of a silicon chip (such as a ROM) with a program "falls easily" into the definition of "fixed" in § 102(a). *Id.* (quoting H.R. REP. No. 1476, *supra* note 23, at 52, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5665).

79. *See* CONTU REPORT, *supra* note 56, at 1. During the hearings conducted on the proposed revision of the copyright statute, it became clear that computer programs raised many questions that were not dealt with in the proposed revision. *Id.*

draft form, Congress established the National Commission on New Techno-
logical Uses of Copyrighted Works (CONTU)[80] for the purposes of con-
ducting a detailed study and making specific recommendations for
amendments to address the protection of computer programs by copyright.[81]
In 1979, CONTU issued its final report, recommending that computer pro-
grams be given explicit recognition as copyrightable works, subject to spe-
cific limitations.[82]

Because of the complexity of these problems, Congress deferred passing on specific
questions relating to the copyrightability of computer programs in the 1976 Act. *Id.*

80. Act of Dec. 31, 1974, Pub. L. No. 93-573, 88 Stat. 1873.

81. *Id.* § 201, 88 Stat. at 1873-74. The enabling legislation specifically author-
ized CONTU to recommend copyright legislation relating to "the creation of new
works by the application or intervention of automatic systems." *Id.* § 201(b)(2), 88
Stat. at 1873-74. The Commission, after expressing its unanimous view that com-
puter programs were entitled to some form of copyright protection, outlined the
objectives to be achieved by legislative amendment as follows:
  1. Copyright should proscribe the unauthorized copying of these works.
  2. Copyright should in no way inhibit the rightful use of these works.
  3. Copyright should not block the development and dissemination of these
     works.
  4. Copyright should not grant anyone more economic power than is neces-
     sary to achieve the incentive to create.
CONTU REPORT, *supra* note 56, at 12.

82. CONTU REPORT, *supra* note 56, at 1. Specifically, CONTU recommended:
    The new copyright law should be amended: (1) to make it explicit that
    computer programs, to the extent that they embody an author's original
    creation, are proper subject matter for copyright; (2) to apply to all com-
    puter uses of copyrighted programs by the deletion of the present section
    117; and (3) to ensure that rightful possessors of copies of computer pro-
    grams may use or adapt those copies for their own use.
Id.
    The CONTU Report indicates the Commission's belief that the addition of a
definition of a computer program would automatically extend copyright protection
to programs. CONTU REPORT, *supra* note 56, at 12. The Commission also recog-
nized the uncertainty surrounding the existing § 117's application to computer
programs:
    The 1976 Act, without change, makes it clear that the placement of any
    copyrighted work into a computer is the preparation of a copy and, there-
    fore, a potential infringement of copyright. Section 117, designed to subject
    computer uses of copyrighted works to treatment under the old law, vitiates
    that proscription, at least insofar as machine-readable versions are not *copies*
    under the 1909 Act. Therefore, to prevent any question concerning the im-
    propriety of program piracy and to assure that all works of authorship are
    treated comparably under the new law, section 117 should be repealed.
Id. at 12-13 (footnotes omitted) (emphasis in original). For a discussion of judicial
interpretation of the applicability of the original § 117, see notes 57 & 76 *supra.*
    Commissioner John Hersey, the only member of the Commission from the "liter-
ary world," wrote a strong dissent to the recommendations. CONTU REPORT, *supra*
note 56, at 27. He expressed the view, first posited in *White-Smith*, that copyright
should be reserved for works that communicate directly with human beings. *Id.* at
29-30. Commissioner Hersey stated that because computer programs in their object
code stages communicate only with a machine, they should not be eligible for copy-
right protection:
    It is clear that the machine control phase of a computer program is not
    designed to be read by anyone; it is designed to do electronic work that

In 1980, Congress amended the 1976 Act to incorporate the CONTU recommendations verbatim, including the definition of "computer program" and specific limitations on the exclusive rights of copyright holders in computer programs.[83] While the 1980 amendment finally erased remaining doubts as to the copyrightability of computer programs in general and application programs in particular, it did not clearly define the scope of the protection afforded and the extent of its limitations.[84] Specifically, the 1980 amendment does not explicitly address programs written in object code, as opposed to source code.[85] Further, the amendment is silent on the issue of protection for operating system programs.

In *Williams Electronics, Inc. v. Artic International, Inc.*,[86] the Third Circuit upheld the copyrightability of an application program written in object code enscribed on a ROM.[87] The court rejected any distinction between source

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> substitutes for the very much greater human labor that would be required to get the desired mechanical result. . . . The Commission report thus recommends affording copyright protection to a labor-saving mechanical device.

Id. at 30 (footnote omitted). Commissioner Hersey finally noted that computer programs should not be amenable to copyright protection under the *Baker v. Selden* proscription against copyright of purely utilitarian works. *Id.* at 31. For a discussion of *Baker v. Selden*, see notes 35-40 and accompanying text *supra.* Commissioner Hersey urged that copyright law should distinguish between application systems and operating systems: while the former would be protected, the latter would not, as they are part of the machine, thus becoming utilitarian objects. *Id.*

83. Software Copyright Act of 1980, Pub. L. No. 96-517, § 10, 94 Stat. 3015, 3028 (codified at 17 U.S.C. §§ 101, 117 (1982)). The definition of "computer programs" reads as follows: "A set of statements or instructions to be used directly or indirectly in a computer in order to bring about a desired result." 17 U.S.C. § 101 (1982). The new § 117 provides in pertinent part:

> 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.

Id. § 117.

84. Most commentators agree that there is no longer any question of the copyrightability of application programs in their source code stage. *See, e.g.,* 1 M. NIMMER, *supra* note 11, § 2.04[C]; Keplinger, *supra* note 4; Note, *Object Code Protection, supra* note 9.

85. *See* Stern, *Another Look at Copyright Protection of Software: Did the 1980 Act Do Anything for Object Code?,* 3 COMPUTER L.J. 1 (1981) (object code programs are properly excluded from the scope of the amended Copyright Act; a program in object code is not a "copy" of a protectable work, since object code is itself unintelligible). *Contra* Note, *Object Code Protection, supra* note 9 (object code copyrightable).

86. 685 F.2d 870 (3d Cir. 1982).

87. *Id. Williams* involved a challenge to the copyrightability of computer programs controlling the audiovisual effects of a video game ("attract" and "play" modes). *Id.* at 872. The programs were written in object code and stored on a ROM. *Id.* The defendant did not dispute the lower court's findings that defendant had

code and object code for copyright purposes, observing that affording protection for a program written in source code, but not for that same program translated into object code, would create an enormous loophole by which infringers could easily circumvent the copyright law.[88] According to the *Williams* court, object code fixed on a ROM constitutes a work of authorship fixed in a tangible medium of expression.[89]

While the *Williams* court did not address the issue of the

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copied the plaintiff's program, but challenged the finding that the copyrights on the programs were valid. *Id.* at 873.

88. *Id.* at 877. The defendant first argued that the programs failed to meet the "fixation" requirements of § 102(a) of the Copyright Act, claiming that audiovisual game images are transient, and that players of the game are in effect co-authors, because of their unique interaction with the game. *Id.* at 873-74. The court rejected these arguments, finding that there is always a repetitive sequence of a substantial portion of audiovisual games and that the fixation requirement is satisfied whenever a work is capable of being "reproduced or otherwise communicated." *Id.* (quoting 17 U.S.C. § 102(a) (1982)).

The defendant then asserted that a program written in object code stored on a ROM is a utilitarian object or machine part, thus precluding copyright protection. *Id.* at 874. The Third Circuit rejected this argument, stating that the plaintiff was merely attempting to protect its artistic expression (the audiovisual aspects of the game that appear on the screen), not to restrict the use of the ROMs. *Id.* at 874-75 (quoting Midway Mfg. Co. v. Artic Int'l, Inc., 704 F.2d 1009 (7th Cir.) (video games held copyrightable even when encoded on a ROM), *cert. denied*, 104 S. Ct. 90 (1983)).

The defendant next argued that while source code may be protected under the 1980 Act, the object code version of the program was not protected, because "a 'copy' must be intelligible to human beings and must be intended as a medium of communication to human beings." *Id.* at 876-77. In so contending, the defendant relied on the distinction first posited in *White-Smith*, and applied in the context of computer programs by *Data Cash. Id.* at 877. For a discussion of the *White-Smith* rule of readability, see notes 46-48 and accompanying text *supra*. For a discussion of the *Data Cash* application of that rule to computer programs, see notes 58-59 and accompanying text *supra*. The Third Circuit expressly and somewhat harshly rejected the notion that this distinction had any continuing vitality. 685 F.2d at 877. The court instead pointed to the language of the 1980 Act, which broadly defines "copy" to include "by *any* method now known or later developed, and *from which the work can be perceived*, reproduced, or otherwise communicated, either directly or *with the aid of a machine or device." Id.* (quoting 17 U.S.C. § 101) (emphasis added by the court). Under the statutory definition, the court concluded that a program written in object code is a "copy" of the original source program. *Id.* The court observed that affording protection only to source code but not object code would result in the creation of "an unlimited loophole by which infringement of a computer program is limited to copying of the computer program text but not to duplication of a computer program fixed on a silicon chip." *Id.* (citing Tandy Corp. v. Personal Micro Computers, Inc., 524 F. Supp. 171 (N.D. Cal. 1981)).

89. 685 F.2d at 874-77. Other cases have held that application programs utilized in audiovisual works, particularly video games, are copyrightable. *See, e.g.*, Midway Mfg. Co. v. Artic Int'l, Inc., 704 F.2d 1009 (7th Cir. 1983) (video games copyrightable), *aff'g* 547 F. Supp. 999 (N.D. Ill. 1982); Stern Electronics, Inc. v. Kaufman, 669 F.2d 852 (2d Cir. 1982) (audiovisual display of a video game is sufficiently "fixed" on a ROM to be copyrightable); Midway Mfg. Co. v. Strohon, 564 F. Supp. 741. (N.D. Ill. 1983) (video game program stored on ROM constitutes protectable "literary work"); GCA Corp. v. Chance, 217 U.S.P.Q. (BNA) 718 (N.D. Cal. 1982) (video game copyrightable); Atari, Inc. v. Amusement World, Inc., 547 F. Supp. 222 (D. Md. 1981) (same); Midway Mfg. Co. v. Dirkschneider, 543 F. Supp. 466 (D. Neb.

copyrightability of operating systems, that question was answered in the affirmative in *Apple Computer, Inc. v. Formula International, Inc.*[90] In holding that operating systems were copyrightable, the District Court for the Central District of California followed *Williams* and *Tandy* and extended copyright protection to programs written in object code on ROMs.[91] The court also rejected the defendant's attempt to distinguish application programs from operating systems for copyright purposes.[92] *All* computer programs, according to the *Formula International* court, are copyrightable under the Copyright Act.[93]

Against this background, the Third Circuit considered the question of whether a computer operating system, expressed in object code and embodied on a ROM, is copyrightable.[94] Because the Third Circuit could not pre-

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1981) (attract and play modes of video game copyrightable as an "audiovisual work").

90. 562 F. Supp. 775 (C.D. Cal. 1983), *aff'd*, 725 F.2d 521 (9th Cir. 1984). In *Apple v. Formula Int'l*, the Apple Corporation filed suit against the operator of an electronics supply store, alleging that defendant's build-it-yourself personal computer, the "Pineapple," contained operating systems virtually identical to those of the Apple II computer. *Id.* at 777. The programs involved were the same as those at issue in the principal case. *Id.* at 778. For a description of those programs, see note 14 *supra*.

91. 562 F. Supp. at 779. For a discussion of *Williams*, see notes 86-89 and accompanying text *supra*. For a discussion of *Tandy*, see notes 75-78 and accompanying text *supra*.

92. 562 F. Supp. at 780-81. The defendant relied on § 102(b)'s proscription against copyright of any "idea, procedure, system [or] method of operation," which it traced to the *Baker v. Selden* doctrine. *Id.* at 780. The defendant argued that operating systems fall squarely within this prohibition since these programs are designed solely to control computer functions rather than to produce any discernible "expression" to the human user. *Id.* However, the court rejected these contentions, noting that both application and operating system programs are designed to operate a computer in a way that will ultimately produce some meaningful communication to the user. *Id.* The court stated:

> It is difficult to understand how they can be classified into two categories for copyright purposes, with protection afforded to one category and not the other, based on whether they directly generate that communication or whether they merely direct certain machine functions which eventually result in that expression. Either all computer programs so embodied are within the terms "idea, procedure, system, method of operation" and are excluded, or all of them are outside those terms and thus protectable. There is nothing in any of the statutory terms which suggests a different result for different types of computer programs based upon the function they serve within the machine.

Id. See also GCA Corp. v. Chance, 217 U.S.P.Q. (BNA) 718 (N.D. Cal. 1982) (object code version of registered source code operating system programs is the same work and is protected).

93. 562 F. Supp. at 780-81. The court found it appropriate, in dictum, to discuss and distinguish the district court's opinion in the principal case. *Id.* at 784-85 (citing *Franklin*, 545 F. Supp. 812 (E.D. Pa. 1982), *rev'd*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984)). After noting the factual similarities between the two cases, the court declined to follow the district court's holding, finding that decision to have been "greatly undermined" by the Third Circuit's decision in *Williams*. *Id.* at 785.

94. 714 F.2d at 1246. The issue came before the Third Circuit in an appeal

cisely determine the basis for the district court's view that such a program was not copyrightable,[95] the Third Circuit divided the inquiry into three analytical steps: (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.[96]

The Third Circuit stated that the legislative history of the 1976 Copyright Act and its prior decision in *Williams Electronics v. Artic International, Inc.* established that programs expressed in object code are proper subjects of copyright.[97] The court noted that *Williams* had interpreted the 1980 amendments to the Act as "firmly establish[ing]" the copyrightability of computer programs in general.[98] The court felt that the definition of "computer program" adopted in 1980 encompassed programs in both object code and source code, because it refers to instructions "used directly or indirectly" by a computer.[99] The Third Circuit reasoned that since only programs in object code can be used *directly* by a computer, this language must have been

from the district court's denial of an injunction against Franklin's copyright infringement. *Id.* at 1242. Judge Sloviter, writing for the Third Circuit, stated by way of introduction: "This legal ruling is fundamental to all future proceedings in this action and, as the parties and amici curiae seem to agree, has considerable significance in the computer services industry." *Id.* (footnote omitted).

95. 714 F.2d at 1245-46. For a discussion of the district court's reasons for denying the injunction, see notes 18-19 and accompanying text *supra*. The Third Circuit noted the difficulty of discerning the exact grounds upon which the district court had denied Apple's motion for a preliminary injunction, "since there is no finding, statement, or holding on which we can focus which clearly sets forth the district court's views." *Id.* at 1246. Finding mostly "generalized concerns" expressed by the district court, the Third Circuit surmised that the district court had found that programs written in object code on ROMs were not copyrightable. *Id.*

96. *Id.* at 1246. The Third Circuit also identified a fourth issue on appeal: "[W]hether independent irreparable harm must be shown for a preliminary injunction in copyright infringement actions." *Id.* For a discussion of the Third Circuit's resolution of the issue of irreparable harm, see notes 122-24 and accompanying text *infra*.

97. 714 F.2d at 1246-47 (citing *Williams*, 685 F.2d 810 (3d Cir. 1982)). For a discussion of *Williams*, see notes 86-89 and accompanying text *supra*. The court briefly reviewed the basic requirements of copyright under the 1976 Act. 714 F.2d at 1246-47. For a discussion of the statutory requirements for copyrightability, see notes 66-69 and accompanying text *supra*.

98. 714 F.2d at 1248 (quoting *Williams*, 685 F.2d at 875). The *Franklin* court pointed out that the 1980 amendments had carved out an exception to the general prohibition against copying to permit computer programs to be duplicated for their owners' use under certain circumstances. *Id.* at 1248 (citing 17 U.S.C. § 117 (1982)) ("it is not an infringement for the owner of a copy of a computer program to make or authorize the making of another copy" when necessary "to the utilization of the computer program" or "for archival purposes only"). The Third Circuit believed that this language, and the CONTU Report which engendered it, clearly indicated that computer programs are copyrightable and that any unauthorized copying of a program constitutes an actionable infringement. *Id.* at 1248. For a discussion of the 1980 amendment, see note 83 *supra*.

99. 714 F.2d at 1248 (quoting 17 U.S.C. § 101 (1982)). For the text of the definition of "computer program," see note 83 *supra*.

intended to cover object code.[100] The court also noted that *Williams* had rejected the argument that source code programs should be distinguished from object code for purposes of copyright protection.[101] Finally, the court rejected the argument that object code could not constitute a "literary work," remarking that the broad copyrightable category of "literary works" in section 102 of the Act "is not confined to literature in the nature of Hemingway's *For Whom the Bell Tolls*."[102]

The court then turned to the second question of whether the embodiment of a computer program on a ROM precludes its copyrightability.[103] The court noted that *Williams* had rejected the argument that works enscribed on ROMs were not copyrightable because they are utilitarian objects or machine parts.[104] The *Franklin* court reaffirmed *Williams'* holding that the statutory requirement of "fixation" in a tangible medium of expression[105] is satisfied by a program's embodiment on a ROM, and therefore a program written in object code on a ROM is an appropriate subject of

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100. 714 F.2d at 1248 (citing Midway Mfg. Co. v. Strohon, 564 F. Supp. 741, 750-51 (N.D. Ill. 1983)). The court explained that source code programs must be translated into object code to be acted upon by the computer, and so concluded that only object code instructions are "directly" used by a computer. 714 F.2d at 1248. Further, the court noted that the CONTU majority had urged this broad definition because it took the position that object code is copyrightable. *Id.*

The *Apple* court noted that CONTU had considered and rejected the view that the definition of computer program should distinguish between the "machine control phase" of a computer program and the phase directed at a human audience. *Id.* (citing CONTU REPORT, *supra* note 56, at 28-30 (dissent of Comm'r Hersey)). Because no such distinction was included in the Act, the Third Circuit disapproved the district court's reliance on the common law doctrine of *White-Smith* "that copyrightability depends on a communicative function to individuals." 714 F.2d at 1248 (citation omitted). The Third Circuit stated: "[I]t is clear from the language of the 1976 Act and its legislative history that it was intended to obliterate distinctions engendered by *White-Smith.*" *Id.* For a discussion of the *White-Smith* doctrine, see notes 46-48 and accompanying text *supra.* For a discussion of the CONTU Report, see notes 80-82 and accompanying text *supra.*

101. 714 F.2d at 1248 (citing *Williams*, 685 F.2d at 876).

102. 714 F.2d at 1249. For the text of the definition of "literary works," see note 74 *supra.* The court observed that "literary works" includes works expressed in numbers or other numerical symbols. *Id.* (citing Harcourt, Brace & World, Inc. v. Graphic Controls Corp., 329 F. Supp. 517, 523-24 (S.D.N.Y. 1971); Reiss v. National Quotation Bureau, 276 F. 717 (S.D.N.Y. 1921)). Because a computer program is expressed in such symbols, the court concluded that it is a literary work regardless of whether it is expressed in source code or object code. *Id.* (citing Midway Mfg. Co. v. Strohon, 564 F. Supp. 741, 750-51 (N.D. Ill. 1983); GCA Corp. v. Chance, 217 U.S.P.Q. (BNA) 718, 719-20 (N.D. Cal. 1982)).

103. 714 F.2d at 1249. The court stated that the district court had suggested "that [the] embodiment of a computer program on a ROM, as distinguished from in a traditional writing, detracts from its copyrightability." *Id.* The court stated that this possibility had been rejected in the Third Circuit's opinion in *Williams*, which was handed down three days after the district court's decision. *Id.*

104. *Id.*

105. *Id.* For a discussion of the fixation requirement, see notes 68-70 and accompanying text *supra.*

copyright.[106]

Reaching what it characterized as the "heart" of the case, the *Franklin* court considered whether operating system programs are copyrightable.[107] Franklin argued, first, that an operating system is a "process, system, [or] method of operation" and is per se excluded from copyright protection under section 102(b).[108] The Third Circuit responded that Apple was not seeking to protect the actual *method* by which its program instructs the computer to perform, but rather the *instructions* themselves; hence the court did not regard section 102(b) as a bar to copyrightability.[109] The court stated that Franklin's argument "mistakenly focuse[d] on the physical characteristics of the instructions," confusing the "medium" with the "message."[110]

106. 714 F.2d at 1249. The *Franklin* court stated that *Williams* had held that the statutory requirement of "fixation" is satisfied by a ROM embodying the expression that a program represents. *Id.* (citing *Williams*, 685 F.2d at 874, 876; Stern Elec., Inc. v. Kaufman, 669 F.2d 852, 855-56 (2d Cir. 1982); Midway Mfg. Co. v. Strohon, 564 F. Supp. 741, 751-52 (N.D. Ill. 1983); Tandy Corp. v. Personal Micro Computers, Inc., 524 F. Supp. 171, 173 (N.D. Cal. 1981)). The court therefore reaffirmed that a computer program written in object code enscribed on a ROM is copyrightable. *Id.*

107. 714 F.2d at 1249-50. The court began by rejecting Apple's contention that the question of the copyrightability of operating system programs was also controlled by *Williams*, noting that the question was not even considered in that case because the *Williams* controversy involved only application programs. *Id.* Thus, the issue was one of first impression for the Third Circuit. *Id.* at 1250. For a discussion of the *Williams* holding with respect to application programs, see notes 86-89 and accompanying text *supra.* For a discussion of the distinction between operating system programs and application programs, see notes 6-8 *supra.*

108. 714 F.2d at 1250. For the complete text of § 102(b), see note 71 *supra.* The court explained that § 102(b) is a codification of a substantial portion of the holding and dictum of *Baker v. Selden.* 714 F.2d at 1250. The "process, system, or method of operation" exclusion related to *Baker's* distinction between discoveries, which are protectable only under patent law, and writings about discoveries, which are within the scope of copyright law. *Id.*

109. 714 F.2d at 1251. The court noted that the actual method used to instruct the computer would be protected, if at all, by patent law. *Id.* The court further observed that the question of the applicability of patent law protection to computer programs is unresolved. *Id.* (citing Diamond v. Diehr, 450 U.S. 175 (1981)). For a discussion of patent law in the context of computer programs, see note 21 *supra.*

110. 714 F.2d at 1251. The court explained that the fact that an operating system program may be etched on a ROM does not make it part of a machine. *Id.* This is apparent, the court pointed out, since one operating system need not be permanently imprinted in the machine on a ROM, but may be imprinted on another medium such as a diskette or magnetic tape. *Id.*

The *Franklin* court characterized Franklin's argument regarding operating systems as "inconsistent" with Franklin's concession that application programs were properly protectable under the Copyright Act. *Id.* Since both types of programs instruct the computer to do something, the court found no reason to distinguish an application program instruction which, for example, instructs a computer to prepare a tax return, and an operating system instruction which translates source code into object code. *Id.* The court stated:

Since it is only the instructions which are protected, a "process" is no more involved because the instructions in an operating system program may be used to activate the operation of the computer than it would be if instructions were written in ordinary English in a manual which described the necessary steps to activate an intricate complicated machine.

THIRD CIRCUIT REVIEW

Franklin also argued, on the basis of dictum in *Baker v. Selden*, that oper-
ating systems are per se uncopyrightable because a copyright cannot exist in
a "purely utilitarian" work.[111] The Third Circuit interpreted a more recent
Supreme Court case as rejecting the proposition that copyright is precluded
when the copyrighted work is put to a utilitarian use.[112] Further, the court
cited the CONTU Report's interpretation of "copyright practice past and
present, which recognizes copyright protection for a work of authorship re-
gardless of the uses to which it may be put."[113] Finally, the court noted its
special reliance on the fact that the statutory definition of computer program
does not distinguish between application and operating system programs,
nor had any court adopted such a distinction.[114] The Third Circuit thus
refused to hold that operating system programs are per se excluded from
copyright.[115]

The court turned to Franklin's second theory challenging the copyright
of operating system programs: that an operating system represents an *idea*,
which may not be copyrighted.[116] The court explained that the common
law idea-expression dichotomy was codified in section 102(b) "to make clear
that the expression adopted by the programmer is the copyrightable element

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Id. The court thus found no reason to extend less copyright protection to instructions
contained in an operating system than to the instructions contained in an application
program. *Id.*

111. 714 F.2d at 1251 (quoting *Baker*, 101 U.S. at 103 ("where the art [the book]
teaches cannot be used without employing the methods and diagrams used to illus-
trate the book . . . such methods and diagrams are to be considered as . . . given
. . . to the public . . . for the purpose of practical application")). The Third Circuit
refused to adopt a broad interpretation of this language. *Id.* (citing Taylor Instru-
ment Cos. v. Fawley-Brost Co., 139 F.2d 98 (7th Cir. 1943), *cert. denied*, 321 U.S. 785
(1944) (interpreting *Baker* as forming the critical distinction between "objects of ex-
planation" and "objects of use")).

112. *Id.* at 1251-52. The court rejected Franklin's reliance on the *Baker v. Selden*
prohibition against copyright in purely utilitarian works. *Id.* The court stated that
the Supreme Court's decision in *Mazer v. Stein* rejected that expansive a reading of the
Baker doctrine. *Id.* (citing Mazer v. Stein, 347 U.S. 201, 218 (1954)).

113. 714 F.2d at 1252 (quoting CONTU REPORT, *supra* note 56, at 21). The
court noted that the Report should be viewed as accepted by Congress since Congress
adopted the recommendations of the majority almost verbatim. *Id.* (citation
omitted).

114. *Id.* For the text of the statutory definition of "computer program," see note
83 *supra*. The court noted that the only other federal court to have considered a
possible distinction between application programs and operating systems reached the
conclusion that operating systems are not per se copyrightable. 714 F.2d at 1252
(quoting *Apple Computer, Inc. v. Formula Int'l, Inc.*, 562 F. Supp. at 780). Furthermore,
the Third Circuit noted that other courts had upheld the copyrightability of operat-
ing systems without discussing the question. *Id.* (citing *Tandy Corp. v. Personal Micro
Computers, Inc.*, 524 F. Supp. at 173; *GCA Corp. v. Chance*, 217 U.S.P.Q. at 719-20).

115. 714 F.2d at 1252.

116. *Id.* at 1252-54. The *Franklin* court recognized that the idea/expression di-
chotomy, drawn from *Baker v. Selden*, given full expression in *Mazer v. Stein*, and codi-
fied in § 102(b) of the Copyright Act, distinguishes works subject to copyright
protection from those given patent protection. *Id.* at 1252-53. For a discussion of the
distinction between patent law and copyright law protection, see note 21 *supra*.

in a computer program, and that the actual processes or methods embodied in the program are not within the scope of copyright law."[117] Observing that the line between the idea of a computer program and its expression is often difficult to ascertain, the *Franklin* court stated that "the line must be a pragmatic one" which focuses on "the preservation of the balance between competition and protection reflected in the patent and copyright laws."[118] The Third Circuit adopted a test which focuses upon whether the idea and its expression have merged, or whether other programs can be written which can perform the same function as the program in question.[119] If no such program can be designed without duplication, then there has been a merger of the idea and its expression, and copyright protection would be precluded under section 102(b).[120] The Third Circuit noted that the district court had made no findings as to whether some or all of Apple's operating systems could be rewritten and still perform the same function, and accordingly stated that the necessary findings could be made on remand.[121]

Finally, the Third Circuit rejected the district court's formulation of the standard for issuance of a preliminary injunction, stating that a prima facie showing of copyright infringement raises a presumption of irreparable harm.[122] Furthermore, the *Franklin* court stated that even absent this pre-

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117. 714 F.2d at 1252-53 (quoting H.R. REP. NO. 1476, *supra* note 23, at 57, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5670).

118. *Id.* at 1253 (quoting Herbert Rosenthal Jewelry Corp. v. Kalpakian, 446 F.2d 738, 742 (9th Cir. 1971)).

119. *Id.* The court explained that if a different program could be developed which could perform the same function as one of Apple's operating system programs, then that program is capable of being expressed in different modes. *Id.* Therefore, that program contains only one expression of the idea, not the idea itself, and is copyrightable. *Id.* The court recognized that the inquiry is whether there has been a merger of an idea and its expression, which occurs when there is only one or a very limited number of means of expressing a particular idea. *Id.* (citing *Morrissey*, 379 F.2d at 678-79; Freedman v. Grolier Enters., 179 U.S.P.Q. (BNA) 476, 478 (S.D.N.Y. 1973)). For a discussion of the merger doctrine, see notes 41-44 and accompanying text *supra*.

120. 714 F.2d at 1253. For the text of § 102(b), see note 71 *supra*. The court applied its test, by way of example, to the Applesoft program, the operating system which translates source code into object code. 714 F.2d at 1253. The idea expressed is the particular process: for example, translating source code into object code. *Id.* The Applesoft program is Apple's expression of that idea. *Id.* If another program could be written which expresses that idea, i.e., which is capable of performing the same translation, then the Applesoft expression would be copyrightable. *Id.* The court rejected Franklin's claim that merger had occurred since the Applesoft program represented the only means of translating source into object code that would be compatible with the application software developed for Apple, stating: "Franklin may wish to achieve total compatibility with independently developed application programs written for the Apple II, but that is a commercial and competitive objective which does not enter into the somewhat metaphysical issue of whether particular ideas and expressions have merged." *Id.*

121. 714 F.2d at 1253. The *Franklin* court noted, however, that "there seems to be a concession by Franklin that at least some of the programs [could] be rewritten." *Id.*

122. *Id.* at 1254. The Third Circuit stated that the "prevailing view [holds] that

sumption, the danger Franklin's copying posed to Apple's investment and competitive position would be sufficient to establish irreparable harm.[123] Accordingly, the court reversed the district court's denial of the preliminary injunction and remanded the case.[124]

In reviewing the *Franklin* decision, it is submitted that the court properly concluded that a computer program's enscription in object code onto a ROM does not preclude copyrightability.[125] The binary language represented by object code[126] is within the broad definition of "literary works," one of the categories of protected "works of authorship."[127] The legislative history of the 1976 Act and the CONTU Report support the view that Congress did not intend to distinguish programs written in source code and those

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a showing of a prima facie case of copyright infringement or a reasonable likelihood of success on the merits raises a presumption of irreparable harm." *Id.* (citations omitted).

123. *Id.* The Third Circuit recognized the expense in time and money incurred by Apple in developing its programs. *Id.* The court then rejected the district court's conclusion that Apple was better suited than Franklin to withstand the effects of litigation because of the "devastating effect" a preliminary injunction would have on Franklin's business. *Id.* at 1254-55. The court stated: "If that were the correct standard, then a knowing infringer would be permitted to construct its business around its infringement, a result we cannot condone." *Id.* at 1255 (citations omitted).

124. *Id.* at 1255. The Third Circuit observed that among the issues to be settled on remand was the question of whether any of Apple's operating systems could be rewritten, yet still perform the same function. *Id.* at 1253. This would be the crucial question in determining the copyrightability of Apple's programs. *Id.* However, Apple and Franklin have settled the case, pursuant to a negotiated settlement agreement, pursuant to which Franklin has agreed to redesign its operating systems. *See News In Brief,* 52 U.S.L.W. 2393, 2394 (Jan. 17, 1984). Thus, the question will remain uncertain until a federal court provides additional guidance.

125. *See* 714 F.2d at 1249. *See also* Davidson, *supra* note 4, at 369. For a description of object code, see note 9 *supra.* For a description of ROM, see note 10 *supra.*

126. Object code is a specific language that expresses the idea envisioned by a programmer when writing a program. *See* Note, *Object Code Protection, supra* note 9, at 1725. A programmer does not, of course, envision the program in its object code state, but rather utilizes the higher level source code languages in writing the expression of the program's function. *Id.* However, because computer programs are capable of making automatic translations of source code into object code, the two versions of the same program should be treated as one. *See* Davidson, *supra* note 4, at 368; Note, *Copyrightability of Object Code, supra* note 9, at 419. The *Franklin* district court acknowledged that this automatic translation "establishes a predictable one-to-one relationship between the two codes that preserves the programmer's original force of authorship." 545 F. Supp. at 822 (citing GCA Corp. v. Chance, 217 U.S.P.Q. 718, 720 (N.D. Cal. 1982) (copyrighting only source code protects object code; both are treated as one)).

127. For the definition of literary works, see note 74 *supra.* The definition specifically includes "numerical symbols or indicia" as expressions of literary works. 17 U.S.C. § 101 (1982). Object code is a numerical language. *See* note 9 *supra.* Further, the legislative history of the section expressly refers to computer programs as included as literary works. H.R. REP. No. 1476, *supra* note 23, at 54, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5667. *See also* Davidson, *supra* note 4, at 369; Note, *Object Code Protection, supra* note 9, at 1727 ("Object code falls into the category of 'literary works.' . . .").

written in object code for copyright purposes.[128] It is further submitted that the fact that object code might not convey a perceptible expression to humans has no bearing on the question of its copyrightability.[129] The *Franklin* court correctly recognized that any requirement of readability has been abrogated by the 1976 Act.[130]

It is also submitted that the *Franklin* decision avoids the inherent danger of according copyright protection only to computer programs written in source code, but denying protection to the same programs when translated into object code. Such "protection" would amount to a nullity, since a trained programmer could freely copy the copyrighted program once it has been compiled in object code.[131]

Furthermore, it is submitted that a program's embodiment on a ROM satisfies the statutory "fixation" requirement.[132] The *Franklin* court correctly rejected the argument that a ROM, when embedded in a computer, be-

128. *See* H.R. REP. NO. 1476, *supra* note 23, at 52, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5665 ("Under the bill it makes no difference . . . whether [the expression] is in words, numbers . . . or any other graphic or symbolic indicia."). Since only object code, and not source code, is expressed by numerical symbols, this language appears to refer specifically to object code. *See also* Note, *Object Code Protection, supra* note 9, at 1726-27. Similarly, the CONTU majority, after debating the distinction between source code and object code, recommended that *all* computer programs, regardless of the language in which they are expressed, be copyrightable. See CONTU REPORT, *supra* note 56, at 1, 21, 25.

129. *See Williams,* 685 F.2d at 876-77 (rejecting contention that in order to qualify for copyright, a work "must be intelligible to human beings"). *See also Reiss v. National Quotation Bureau,* 276 F. at 719 (a work's ability to communicate is not a prerequisite to copyright protection). *But see Data Cash,* 480 F. Supp. at 1069 (object code enscribed on ROM is not readable with the naked eye and is therefore not a "copy" of the original expression).

130. *See* 714 F.2d at 1248. It is submitted that the *Franklin* court properly rejected the district court's application of the *White-Smith* doctrine to computer programs written in object code. The legislative history of the 1976 Act clearly manifests congressional intent to abrogate the artificial and unworkable *White-Smith* rule of readability. *See* H.R. REP. NO. 1476, *supra* note 23, at 52, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5665. For a discussion of the *White-Smith* doctrine, see notes 46-48 and accompanying text *supra.*

131. *See Williams,* 685 F.2d at 877 (protecting only source code and not object code would create an "unlimited loophole" in the copyright law, allowing infringers freedom to copy protected programs); *Tandy,* 524 F. Supp. at 175 (lack of protection of object code would render protection of source code "virtually meaningless"). *See also* 2 M. NIMMER, *supra* note 11, § 8.08; Note, *Object Code Protection, supra* note 9, at 1744; Note, *Copyrightability of Object Code, supra* note 9, at 419 ("copyrighting the source code alone is insufficient because a dedicated programming expert can deduce the underlying object code from a copy of the source code").

132. The requirement of fixation is satisfied when a work is embodied in a "copy" which is "sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration." 17 U.S.C. § 101 (1982). A computer program enscribed on a ROM is capable of being perceived by a programmer, and is obviously capable of being reproduced. *See Williams,* 685 F.2d at 874; *Stern Electronics, Inc. v. Kaufman,* 669 F.2d at 856 n.4; *Midway Mfg. Co. v. Artic Int'l,* 547 F. Supp. at 1012-13; *Tandy,* 524 F. Supp. at 173. For a discussion of the fixation requirement, see notes 68-70 and accompanying text *supra.*

comes a "machine part."[133] A ROM, whether or not permanently wired into a computer, is a tangible object that contains an expression, and thus fits within the statutory standard.[134]

Finally, it is submitted that the *Franklin* court was correct in refusing to hold that operating system programs are per se uncopyrightable.[135] Neither section 102(a) nor the definition of computer program provides a basis for distinguishing application from operating systems turning on the function each plays in a computer.[136] Both types of programs may interact with other computer components, and both are capable of outputting information.[137] It has been suggested that only application programs are proper subjects of copyright, because the execution of the program ultimately leads to communication with the human user.[138] Operating system programs interact only with internal components of the computer itself.[139] A program's failure to create an ability to communicate to human beings, some courts and commentators have concluded, precludes copyright because the program is not an "expression" within the meaning of section 102(a).[140] It is submitted,

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133. *See* 714 F.2d at 1249. The majority of courts that have faced this question have agreed that a ROM does not become a "machine part," precluding copyrightability of the program it contains, by becoming embedded in a computer. *See Williams*, 685 F.2d at 874; *Midway Mfg. Co. v. Artic Int'l*, 704 F.2d at 1009; *Tandy*, 524 F. Supp. at 173. *But see Data Cash*, 480 F. Supp. at 1069 (ROM encoded with object code is a "mechanical tool or a machine part").

It is submitted that the contention that a ROM is a "machine part" misconstrues the nature and purpose of copyright protection by erroneously focusing on the physical characteristics of the ROM itself. While a ROM that is permanently wired into a computer can be considered part of the machine, it is not the ROM itself that is protected by copyright law, but rather the written expression encoded upon it. *See Williams*, 685 F.2d at 874; *Midway Mfg. Co. v. Strohon*, 564 F. Supp. at 751; Note, *Copyright Protection of Object Code*, *supra* note 9, at 1734.

134. *See* 17 U.S.C. § 101 (1982). For a discussion of the requirement of fixation, see notes 68-70 and accompanying text *supra*.

135. *See* 714 F.2d at 1253.

136. For a text of § 102(a), see note 66 *supra*. For the definition of computer program, see note 83 *supra*. For a description of operating system programs and application programs, see notes 6 & 8 *supra*.

137. *See* 714 F.2d at 1251. Davidson notes that some application programs relate only to internal components of the computer, while some operating system programs are able to output information directly to the computer user. *See* Davidson, *supra* note 4, at 373.

138. *See, e.g.*, Stern, *supra* note 10, at 7; Note, *The Copyrightability of Object Code*, *supra* note 9, at 429. The argument is premised upon the language of § 102(a) and the definition of "copy" in § 101 of the 1976 Act. Both sections require that a work be capable of being "perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device." 17 U.S.C. §§ 101, 102(a) (1982). The reference to "otherwise communicated" has been interpreted as implying a communicative ability requirement. *See* Note, *The Copyrightability of Object Code*, *supra* note 9, at 429.

139. *See* 714 F.2d at 1243. For a discussion of operating system programs, see note 8 *supra*.

140. *See, e.g.*, *Apple v. Franklin*, 545 F. Supp. at 824 (copyright requires ability to communicate to human beings), *rev'd*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984); Note, *The Copyrightability of Object Code*, *supra* note 9, at 429-30 ("ex-

however, that this argument misconceives the nature of copyright by focus-ing only on the *function* performed by a program. Copyright does not protect the actual function performed by a particular work, but protects only the written expression of the work.[141] Ultimate ability to communicate directly with a human audience is *not* required by the Copyright Act.[142]

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pression" requires human perceptibility). Commissioner Hersey's dissent to the CONTU Report was similarly premised on the proposition that copyright may only protect works that are capable of communicating directly with human beings. See CONTU REPORT, *supra* note 56, at 29-30 (Hersey, Comm'r, dissenting). Commis-sioner Hersey observed that an operating system program "communicates, if at all, only with a machine." *Id.* at 29 (Hersey, Comm'r, dissenting). Commissioner Nim-mer, in a concurring opinion to the CONTU Report, arguably supports this position. In his concurrence, Nimmer suggested that a future line of demarcation between protectable and non-protectable computer programs may be drawn between pro-grams which ultimately produce "works which themselves qualify for copyright pro-tection" and those which do not. See CONTU REPORT, *supra* note 56, at 27 (Nimmer, Comm'r, concurring).

> Thus, a program designed for use in conjunction with a legal information retrieval system would be copyrightable, since the resulting enumeration of cases on a given topic could claim copyright. A program designed for a computer game would be copyrightable because the output would itself constitute an audiovisual work. . . . On the other hand, programs which control the heating and air-conditioning in a building, or which determine the flow of fuel in an engine, or which control traffic signals would not be eligible for copyright because their operations do not result in copyrightable works.

Id. This position, however, does not advocate distinguishing operating systems from application programs on the principle of communication. Rather, Nimmer's focus is on the content of a particular program.

141. *See* 714 F.2d at 1251 ("only the instructions . . . are protected"). The *Formula* court similarly refused to distinguish computer programs on the basis of the function they serve within the computer. *Apple v. Formula*, 562 F. Supp. at 780. For the *Formula* court's discussion of this issue, see note 92 *supra*.

The CONTU majority explicitly rejected the distinction urged by Commissioner Hersey, stating:

> This distinction is not consistent with the design of the Act of 1976, which was clearly to protect all works of authorship from the moment of their fixation in any tangible medium of expression. Further, it does not square with copyright practice past and present, which recognizes copyright pro-tection for a work of authorship *regardless of the uses to which it may be put.* . . . It follows, therefore, that there should be likewise no distinction made between programs which are used in the production of further copy-righted works and those which are not.

CONTU REPORT, *supra* note 56, at 21 (emphasis added). *See also* H.R. REP. NO. 1476, *supra* note 23, at 57, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5670 ("Section 102(b) 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.") (emphasis added).

142. *See* 17 U.S.C. § 101 (definition of literary work), § 102(a). *See also* H.R. REP. NO. 1476, *supra* note 23, at 52, *reprinted in* 1976 U.S. CODE CONG. & AD. NEWS at 5665 (if a work is capable of being perceived with the aid of a machine, it satisfies the statutory requirement); CONTU REPORT, *supra* note 56, at 21. For a discussion of the statutory standards for copyrightability, see notes 66-69 and accompanying text *supra*.

As the *Franklin* court recognized, operating systems involve considera-
tion of the idea-expression dichotomy and its attendant merger doctrine.[143]
It is submitted that the court properly focused, in the context of computer
programs, on the distinction between the function to be performed by a par-
ticular program (the idea), and the written instructions, or specific program
code, used to execute that function (the expression).[144] The merger inquiry
is therefore determined by the number of ways a program can be expressed
to perform a particular function.[145] The court, however, refused to consider
whether the goal of compatibility should properly be involved in defining a
program function, summarily dismissing compatibility as a "commercial and
competitive objective" not involved in the idea-expression analysis.[146] It is
submitted that this conclusion is questionable, for the goal of compatibility,
theoretically, may be critical in the determination of whether a program can
be rewritten to avoid a merger. If "idea" is so broadly construed as to con-
note merely the general, basic function of a particular program, there are
potentially an infinite number of ways to rewrite that program to perform
that function.[147] If, however, the "idea" is more narrowly construed as the
function of a program in a manner that will make it compatible with avail-
able application programs, then the possibilities for rewriting may be so re-
duced as to result in a merger of the function and the expression.[148]

It is submitted that the goal of compatibility, while obviously "commer-

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143. *See* 714 F.2d at 1252-54. For a discussion of the idea-expression dichotomy,
see notes 39-40 and accompanying text *supra.*

144. *See* 714 F.2d at 1253. The only other court that considered the question
specifically defined the "idea" of a computer program as "making the machine per-
form particular functions." *Apple v. Formula,* 562 F. Supp. at 783. Similarly, the
CONTU Commission identified "accomplishing a given task" as the idea represented
by a computer program. See CONTU REPORT, *supra* note 56, at 20. Davidson,
however, proposes a somewhat narrower interpretation of the ideas that are expressed
by an operating system program: "the manner in which the operating system reads
information from or stores it on a diskette, and the manner in which the operating
system translates programs written in certain computer programs written in certain
computer languages." Davidson, *supra* note 4, at 370.

145. *See* 714 F.2d at 1253. For a discussion of the Third Circuit's treatment of
the merger question, see notes 118-20 and accompanying test *supra.*

146. 714 F.2d at 1253.

147. *See, e.g.,* CONTU REPORT, *supra* note 56, at 20 n.16 (quoting Dan Mc-
Cracken, Vice President of the Association for Computing Machinery, in response to
a Commission question of how many ways a given program could be rewritten, an-
swering, "[a]n infinite number in principle, and in practice dozens, hundreds").

148. Franklin articulated the problem as follows:

For example, if the idea of Apple's work, Auto-start ROM, is viewed as
simply the starting of any computer, then obviously there may be many
possible expressions of that. If the idea is viewed as starting a computer by
use of an operating system embedded in a ROM, the possible expressions of
that idea are fewer. If the idea is viewed as starting a computer that will be
compatible with a great percentage of the available application programs,
then the possible expressions of that idea may be fewer still. If the idea is
viewed as starting a computer that will be compatible with most of the
available application programs, then the possible expressions of that view
may be so few as to constitute a merger of idea and expression.

cial" in nature, also plays an important role in furthering the policy of pro-
moting competition in the computer industry. Allowing emerging computer
manufacturing companies to develop new computers that are largely com-
patible with existing application software is necessary to avoid a personal
computer market totally dominated by a few larger, well-established compa-
nies.[149] This policy, however, must be balanced against the competing pol-
icy interest of protecting the substantial investments made by large
computer companies in the research and development of new application
programs.[150] The *Franklin* decision represents an accommodation of these
two policies that results, at least under the facts of the case, in favoring the
protection policy.[151] Small companies which need to achieve compatibility
with existing application programs will no longer be permitted to do so sim-
ply by copying the operating system programs of the computers for which
the application programs were initially designed. Between the two extremes
of slavish copying (which costs practically nothing)[152] and the original de-
velopment of all new compatible operating system programs (which requires
a tremendous financial investment)[153] are a number of potential methods for

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Petition for Writ of Certiorari at 19, Apple Computer, Inc. v. Franklin Computer
Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 104 S. Ct. 690 (1984).

149. *See, e.g., Apple v. Formula*, 562 F. Supp. at 782. Defendant Formula appar-
ently made the market-dominance argument, which was characterized by the court
as a portrayal of "an attempt by a large established computer firm to preserve its
market position and hinder competition." *Id.* The *Formula* court, however, miscon-
strued the nature of the argument by responding that protecting operating system
programs through copyright will not hinder the growth of the "program-writing"
market. *Id.* In fact, it is not the *software* market that is the focus of the argument, but
rather the *hardware*, or computer manufacturing market. Since the availability of
existing application progiams is the primary consideration behind a consumer's deci-
sion in purchasing a computer, new companies must be able to produce computers
capable of running those programs in order to compete with industry giants such as
Apple. *See* Brief for Appellee at 6, Apple Computer, Inc. v. Franklin Computer
Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 140 S. Ct. 690 (1984). *See also* 545
F. Supp. at 814. For a discussion of Franklin's concerns in developing an Apple-
compatible computer, see note 13 *supra*.

150. For a discussion of the costs to Apple of producing the programs involved
in the suit, see note 14 *supra*.
    The *Formula* court articulated the importance of this policy:
    Simple economics suggests that Formula's strategy would hinder, not pro-
    mote, competition and innovation in the computer market. Few companies
    are going to invest the time and resources to develop new programs if their
    products can be freely duplicated by anyone. Such "competitors," who
    could undersell the originator simply because they don't have its develop-
    ment costs, would destroy the market which any innovater needs to recoup
    his investment.
Formula, 562 F. Supp. at 783.

151. It is possible that the *Franklin* court's quick dismissal of the validity of the
goal of compatibility was prompted, at least in part, by the fact that Franklin had
made no good faith attempt to develop compatible programs on its own, but simply
copied Apple's programs. *See* 714 F.2d at 1245.

152. *See* 714 F.2d at 1254; CONTU REPORT, *supra* note 56, at 11.

153. *See* note 14 *supra*.

redesigning systems that can achieve substantial compatibility.[154] These methods, however, do require a significant financial outlay,[155] and it is possible that some of the smaller companies lack the financial resources required for redesign. While the result may thus be a slight shrinkage in the computer manufacturing industry, the *Franklin* decision, if followed in other circuits,[156] will ultimately foster fair competition by setting clearly-defined limitations on acceptable methods of competing, and by prohibiting software piracy.

Janet E. Fisher

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154. *See, e.g.*, *Apple v. Formula*, 562 F. Supp. at 782 (Apple's competitors are free to design programs to achieve compatibility, but *some* creative effort must be involved). The *Formula* court noted that methods do exist whereby operating systems can be designed that achieve 98% compatibility. *Id.* One commentator has suggested a method by which a new program may be written using the "functional specification" contained in a given existing program that involves sufficient creative effort to avoid any infringement. *See* Comment, *Copyright Protection for Programs Stored in Computer Chips*, *supra* note 4, at 124-26.

155. *See* Comment, *Copyright Protection for Programs Stored in Computer Chips*, *supra* note 4, at 128.

156. The Ninth Circuit has recently followed the *Franklin* court decision. *See* Apple Computer, Inc. v. Formula Int'l, 725 F.2d 521 (9th Cir. 1984), *aff'g* 562 F. Supp. 775 (C.D. Cal. 1983).