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Computer Software Copyright Infringement: The Second Generation

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COMPUTER SOFTWARE COPYRIGHT INFRINGEMENT: THE SECOND GENERATION*

INTRODUCTION

The protection of software manufacturers' products is crucial to the billion dollar computer industry. Unauthorized copying of software has grown rapidly in recent years, and as a result, it has had a severe economic impact upon the computer industry.[1] In the past, computer companies have sought to protect their software by using technical software protectors,[2] as well as by attempting to redress copyright infringements in the courts. The determination of when a computer program has infringed another protected program has led to a controversial legal doctrine. Referred to as the "look and feel" doctrine, its application redefined the scope of copyright protection available to computer programs.[3]

In 1986, the Third Circuit Court of Appeals in *Whelan Associates v. Jaslow Dental Laboratory, Inc.*,[4] addressed the scope of copyright protection afforded a computer program. In holding that the copyright protectable expression of a program includes its structure, sequence, and organization, the court arguably expanded the scope of copyright protection afforded to computer programs.[5]

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1. *See* Note, *Copyrightability of Software: Piracy on the Waters of Protection*, 37 S.C.L. REV. 679 (1986).

2. *See* Vault Corp. v. Quaid Software Ltd., 655 F. Supp. 750 (E.D. La. 1987). Vault Corporation, the producer of PROLOK, a technical protector of computer software, sought a preliminary injunction preventing Quaid Software from selling "CopyWrite," a program which enables the computer user to make archive copies of programs which have been protected by the PROLOK protector. *Id.* at 752. The court held that Vault Corporation was not entitled to the preliminary injunction in view of its failure to establish a reasonable probability of success on its claim of copyright infringement and violations of the Louisiana Software License Enforcement Act and the Uniform Trade Secrets Act. *Id.* at 763; *see also* Reid, *Consumers Win as More Software Firms End Copy Protection*, Wash. Post, Nov. 10, 1986, at F13.

3. Davidson, *Common Law, Uncommon Software*, 47 U. PITT. L. REV. 1036, 1101 (1986); Tell, *Software Copyrights: Keep Out the Pirates—But Let Innovators In*, Bus. Wk., Aug. 31, 1987, at 31 col. 2; N.Y. Times, May 11, 1987, at D2; Schrage, *PC Lawsuits Have the Look and Feel of a Losing Situation*, Wash. Post, Feb. 9, 1987, at 25.

4. 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 107 S. Ct. 877 (1987).

5. *Id.* at 1248. The *Whelan* court used the terms organization, sequence, and structure interchangeably. *Id.* at 1224 n.1. This notion may be contrary to what a professional program-

This Comment discusses the scope of copyright protection afforded to computer programs. Part I will define basic computer terminology as well as discuss the development of computer program copyrightability. Part II will analyze and criticize the *Whelan* decisions focusing on the district and circuit courts' expansion of the scope of computer program copyright protection. Finally, Part III will discuss the second generation of computer program copyright infringement litigation. This part distinguishes between those cases which support the *Whelan* expansion and those cases which expressly or impliedly disagree with broad copyright protection of computer programs. In addition, this part advocates adherence to a strict approach to copyright protection of computer programs.

I. BACKGROUND

A. Definitions of the Technical Computer Language

Computer software is a collection of programs or data used to perform certain tasks. A program is a sequence of instructions (sometimes referred to as "code") which is placed into the memory of the computer and interpreted or executed by a central processing unit.[6]

Specifically, a computer program is a representation of an algorithm,[7] usually prepared in some other format, to solve a particular problem.[8] A source program is generally written in a high level

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mer may perceive as the correct use of these terms in the rather technical area of computer programming. It would seem, from the outset, that it would be improper for the court to use terminology in the context of a computer related issue with little idea of how such terminology might be perceived by the professional programmer. "The more technical the case, the more intensive must be the court's effort to understand the evidence [and applicable science], for without an appropriate understanding of the case before it the court cannot properly perform its appellate function." Ethyl Corp. v. EPA, 541 F.2d 1, 36, *cert. denied*, 426 U.S. 941 (1976).

6. S. MADNICK & J. DONOVAN, OPERATING SYSTEMS 4-5 (1974).

7. E. HOROWITZ & S. SAHNI, FUNDAMENTALS OF DATA STRUCTURES 2 (1983).

> An *algorithm* is a finite set of instructions which, if followed, accomplish a particular task. In addition every algorithm must satisfy the following criteria: (i) *input*: there are zero or more quantities which are externally supplied; (ii) *output*: at least one quantity is produced; (iii) *definiteness*: each instruction must be clear and unambiguous; (iv) *finiteness*: if we trace out the instructions of an algorithm, then for all cases the algorithm will terminate after a finite number of steps; (v) *effectiveness*: every instruction must be sufficiently basic that it can in principle be carried out by a person using a pencil and paper. It is not enough that each operation be definite as in (iii), but it must also be feasible.

Id.

8. Butler, *Can a Computer be an Author? Copyright Aspects of Artificial Intelligence*, 4 COMM/ENT L.J. 707, 718 (1982).

language[9] which is then compiled or translated into a machine readable form or object program.[10] The operating system of a computer then provides an environment for the execution of the program.[11] A program in execution is a process.[12] "A structured program of any size can be read and understood in a completely systematic manner, by reading and understanding its . . . abstractions."[13] It is from

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9. For example, BASIC, FORTRAN, EDL, COBOL, PASCAL.

10. The source program is a program written in a high level language (e.g. FORTRAN, BASIC, EDL). The object program is the corresponding machine language program. The source program is written in a human readable language, and the object program is written in binary code, a machine readable language. *See* Sprowl, *Proprietary Rights in Programmed Computers: Looking Beyond the Hardware/Software Distinction for More Meaningful Ways of Characterizing Proprietary Interests in Digital Logic Systems*, 1983 ARIZ. L. REV. 785, 787-93 (discussing digital information).

11. S. MADNICK & J. DONOVAN, *supra* note 6, at 5.

> The operating system provides an environment in which particular software packages can execute. An example is a compiler, which is a program that translates a *source program* in a high level language to a corresponding machine language program, or *object program* . . . . During compilation the compiler needs the operating system to read the source program, print its listing and punch its output decks.

Id.

12. A. TANENBAUM, STRUCTURED COMPUTER ORGANIZATION 12 (1976)

> A concept that is fundamental to understanding how computers are organized is the process concept. A *process* (sometimes called a *sequential process*) is basically a program in execution. It is an active entity, capable of causing events to happen. . . . A process is in contrast to a program, which is a passive entity. A program lying on someone's desk cannot do anything by itself.
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> One can draw an analogy between a process and a living animal. Both are capable of doing things. Both are capable of changing their environment in certain ways. On the other hand, both a program and a dead animal, or model of an animal, are passive and cannot cause events to happen. This discussion is certainly not meant to suggest that a process is alive but merely to point out that the difference between a process and a program has a certain similarity to the difference between a living and a nonliving animal.
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> At any instant of time, a process is in a certain state. The state of a process tells how far the process is in its computation. It contains all the information needed to stop the process and then restart it later. The process state consists of (at least) the following information:
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> 1. The program.
> 2. An indication of which instruction is to be executed next.
> 3. The values of all the program's variables and data.
> 4. The status and position of all input/output devises being used.
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> As a process progresses in time, its state changes. Different instructions, in turn, become "the next instruction to be executed." The variables take on successive values.

Id.

13. R. LINGER, H. MILLS & B. WITT, STRUCTURED PROGRAMMING: THEORY AND PRACTICE 147 (1979). "A structured program of any size can be read and understood in a completely systematic manner, by reading and understanding its hierarchy of prime programs and their abstractions." *Id.* A prime program is a program written in a design level language such as Program Design Language ("PDL").

these abstractions that the actual program is developed. The abstraction of a program can take the form of a flowchart or a program design which reduces the solution to the problem for which the program is being developed to solve, into smaller units called modules.[14] Modules are of prime concern when designing a program because their arrangement directly relates to the efficiency of the program. The most efficient program developed as a solution for a particular problem is one which will solve the problem correctly with the least amount of execution time and resources in a computer. The modules of a program can be arranged and the data can be organized in a limited number of ways in order for a program to solve a problem correctly. Even smaller is the number of possible ways to arrange the modules and organize the data so that the program executes efficiently.[15]

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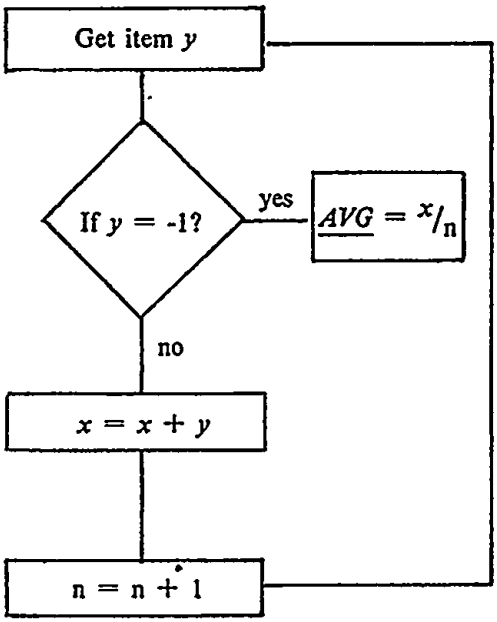
14. A flowchart is a pictorial description of the general sequence of operations involved in the logical solution of a programming problem. A module is a group of instructions that perform a set of functions for the program. The following is an example of a flowchart representation of the steps used to compute the average of a list of numbers:



Given the list of numbers: 5, 10, 15, 20, 25, 30, -1, the program, which this flowchart represents, would process the list using the following steps:

1. Read the list beginning with the number 5 and ending when it reaches -1.
2. Compute the average of 5, 10, 15, 20, 25, 30 and set AVG equal to 95/6 or 15.8.

See U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, INTELLECTUAL PROPERTY RIGHTS IN AN AGE OF ELECTRONICS AND INFORMATION 82 (1986). [hereinafter OTA Report].

15. *See generally* S. BAASE, COMPUTER ALGORITHMS: INTRODUCTION TO DESIGN AND ANALYSIS (1983) (analysis of program structure to determine the most efficient program organization to solve problem correctly).

Computer science and its related profession, computer programming, can be considered the study and practice of creating data representations and performing data transformations.[16] These data operations are executed by the computer through the use of programs.

B. Legal Background on the Copyrightability of Computer Software

Copyright law has its origin in the United States Constitution. The United States Congress is empowered to secure copyright protection on the works of authors and inventors.[17] The philosophy behind Congress' granting copyright protection is based on a conviction for the protection of an individual's achievement. Congress decided that the encouragement of individual effort by personal gain of authors and inventors is the most effective method to advance the public welfare. As a result, copyright protection was established.

Prior to 1909, the Supreme Court recognized a common law copyright which protected works of authors prior to publication.[18] Pursuant to their constitutional grant of power, Congress enacted the Copyright Act of 1909.[19] It was not until the Copyright Act of 1976[20] (Copyright Act) that Congress pre-empted the common law copyright. The Copyright Act enumerated the general categories of the subject matters which can be protected by a copyright.[21] Because

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16. E. HOROWITZ & S. SAHNI, *supra* note 7, at 4. "Therefore, computer science can be defined as the study of data, its representation and transformation by a digital computer." *Id.*

17. U.S. CONST. art. I, Sec. 8, cl. 8. Congress is empowered to secure copyright protection on the works of authors and inventors based on four criteria. First, the protection sought must be based on Congress' power to "promote the progress of science and useful arts." *Id.* Second, the Congress can only extend protection over the work for a limited period. Third, the copyright protection is limited to the works of authors. The term author has been defined as being any originator seeking protection over his or her work. Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53 (1884). Fourth, the protection provided by Congress must be directed at securing to authors and inventors the exclusive right to their respective works. Mazer v. Stein, 347 U.S. 201 (1954).

18. Wheaton v. Peters, 33 U.S. 591 (1834).

19. The Copyright Act of 1909, ch. 320, 35 Stat. 1075.

20. The Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541 (1976) (codified at 17 U.S.C. §§ 101-810 (1982)); 17 U.S.C. § 301 (1982) (preemption section of the Copyright Act).

21. 17 U.S.C. § 102(a) (1982).

> (a) Copyright protection subsists, in accordance with this title, 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. Works of authorship include the following categories:
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> (1) literary works;
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> (2) musical works, including any accompanying words;
>
> (3) dramatic works, including any accompanying music;

this list did not specifically include computer programs, the question of whether computer programs are copyrightable subject matter was extensively debated.[22] However, it is now settled that computer programs are within the scope of copyright law protection.[23]

The Copyright Act defines literary works as expressions not only in words but also in "numbers, or other verbal or numerical symbols or indicia."[24] This broad definition of literary works within the statute has been interpreted to encompass different forms of expressions including computer programs.[25] To remove any lingering doubts as to the copyrightability of computer programs, Congress amended the Copyright Act in 1980[26] to refer to computer programs in two areas. First, it stated that the reproduction of computer programs may constitute an infringing act.[27] Second, the amendment added a definition of a computer program to the copyright laws.[28] In sum, a computer program, whether it is written in source code or object code,[29] is con-

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(4) pantomimes and choreographic works;
(5) pictorial, graphic, and sculptural works;
(6) motion pictures and other audiovisual works; and
(7) sound recording.

Id.

22. R. NIMMER, THE LAW OF COMPUTER TECHNOLOGY 1-3 n.1 (1985) (see text accompanying n.1); NATIONAL COMM'N ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT (1978).

23. Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1249 (3d Cir. 1983) (a "computer program, whether in object code or source code, is a 'literary work' and is protected from unauthorized copying"), *cert. dismissed*, 464 U.S. 1033 (1984); 1 M. NIMMER & D. NIMMER, NIMMER ON COPYRIGHT § 2.04[C] (1987) ("The statutory definition of 'literary works' is broad enough to include computer data bases and programs in that it includes all 'verbal or numerical symbols or indicia, regardless of the nature of the material objects, such as tapes, discs, or cards, in which they are embodied.' ") (citing 17 U.S.C. § 101 (1982)).

24. 17 U.S.C. § 101 (1982).

25. *See* 17 U.S.C. § 102(a)(1) (1982); Tandy Corp. v. Personal Micro Computers, Inc., 524 F. Supp. 171 (N.D. Cal. 1981) (The court held that the object code which was part of the operating system on a Read-Only-Memory chip was copyrightable subject matter.); NATIONAL COMM'N OF NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT 16 (1978) ("it was clearly the intent of Congress to include computer programs within the scope of copyrightable subject matter in the Act of 1976").

26. Act of Dec. 12, 1980, Pub. L. No. 96-517, 94 Stat. 3015, 3028.

27. 17 U.S.C. § 117 (1976), *as amended by* the Act of Dec. 12, 1980, Pub. L. No. 96-517, § 10(b), 94 Stat. 3015, 3028.

28. 17 U.S.C. § 101 (1976), *as amended by* the Act of Dec. 12, 1980, Pub. L. No. 96-517, § 10(a), 94 Stat. 3015, 3028 ("A 'computer program' is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.").

29. 1 M. NIMMER & D. NIMMER, *supra* note 23, at § 2.18[J] n.82.1 ("A source code is a computer program written in any of several programming languages employed by computer programmers. An object code is the version of a program in which the source code language is converted or translated into the machine language of the computer with which it is to be

sidered a literary work and copyright law protects it from unauthorized copying.[30]

There are three basic criteria of the Copyright Act which determine whether a work qualifies as copyrightable subject matter. First, the work must be of original authorship.[31] Second, the work must be fixed in a "tangible medium of expression from which it can be perceived, reproduced, or otherwise communicated."[32] Finally, the protection of a work will not extend to the "idea, procedure, process, system, method of operation, concept, principle, or discovery" encompassed in such work.[33] When a literary work is found to be copyrightable, the Copyright Act provides the copyright owner with certain rights which include the control over the reproduction, dissemination and adaptation of the work,[34] as well as derivative works based upon the copyrighted work.[35]

The Copyright Act first requires that the work being considered for protection be of original authorship.[36] Originality does not require that the new work be unique or of high quality. It merely requires that the work be of independent creation.[37]

The second requirement of the Copyright Act is that for a work to be copyrightable, the work must be fixed in a tangible medium of expression.[38] A copyright does not protect the shortlived authorship (i.e., where the work is fixed in the memory of the computer momentarily), but only that expression fixed in some form capable of repro-

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used.") (quoting NATIONAL COMM'N OF NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT 21 (1978)).

30. *See* Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1249 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984); Tandy Corp. v. Personal Micro Computers, Inc., 524 F. Supp. 171 (N.D. Cal. 1981).

31. 17 U.S.C. § 102(a) (1982).

32. *Id.*

33. *Id.* at § 102(b).

34. *Id.* at § 106.

35. *Id.* Derivative work is defined in 17 U.S.C. § 101 (1982). "A 'derivative work' is . . . based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction . . ." *Id.*

36. *Id.* at § 102(a). The copyright concept of originality is not as stringent as the patent standards of "novelty" or "invention"; it requires only that the work be created by its author. *See* 35 U.S.C. §§ 101-103 (1982).

37. Hubco Data Products Corp. v. Management Assistance, Inc., 219 U.S.P.C. 450 (D. Idaho 1983) (The court held that operating system software stored on disk or tape was copyrightable subject matter.).

38. 17 U.S.C. § 102(a) (1982) ("fixed in tangible medium of expression"); *Id.* at § 101 (contains the definition of "fixed").

duction (e.g., magnetic tape).[39] The copyrightable work need not be directly perceived by a human, as long as it is fixed in a medium from which it can be communicated into a form that can be perceived by human beings.[40]

The third factor considered when determining whether a work should be provided copyright protection is the exclusionary statute which denies copyright protection for an "idea, procedure, process, system, method of operation, concept, principle, or discovery."[41] Copyright protection attaches only to the mode of expression, not to the idea or process described by the expression. From a computer programming viewpoint, the concept of performing a sequential search is not copyrightable, but a particular expression written by a programmer of that concept is protectable.[42]

A copyright establishes proprietary rights in the author's expression of an idea, but does not preclude the use of the idea or described process by others.[43] This distinction between expressions and ideas or processes has established a system that has encouraged creative expression while safeguarding the rights of others to use, adapt, and build on the original idea.[44] This distinction is also applied as a test when determining whether a particular expression of a work (e.g., a

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39. H.R. Rep. No. 94-1476, 94th Cong., 1st Sess. 52 (1975). "The definition of fixation would exclude transient reproductions such as those projected briefly on a screen, shown electronically on a catho ray tube, or captured momentarily in the memory of a computer." *Id.*

40. R. NIMMER, *supra* note 22, at 1-4, 1-5. The Copyright Act overrules the early Supreme Court decision of *White-Smith Music Publishing Co. v. Apollo Co.*, 209 U.S. 1 (1908) (The Court held that a piano role of a player-piano was not a copy of a musical composition, because it was not in a form which others could see or read.).

41. 17 U.S.C. § 102(b) (1982) (codifying the principles of Baker v. Selden, 101 U.S. 99 (1879)).

42. A sequential search is a search through a data file that checks each entry in the file starting at the first entry and ending when the particular entry you are searching for is found or when the end of the file is reached. S. BAASE, *supra* note 15, at 18. For example:

Input: L,n,X where L is an array with n entries and the algorithm is searching for the first instance of X in the array.

Output: j, the position of X in the array.

Steps:

1. j = 1.
2. while j <= n and L(j) <> X
3. do j = j + 1 end
4. if j > n then j = 0.

43. Davidson, *Protecting Computer Software: A Comprehensive Analysis*, 1983 ARIZ. ST. L.J. 611, 617.

44. This is the general purpose behind the development of copyright law. *See* OTA Report, *supra* note 14, at 32-37.

computer program) is separable from the underlying idea and is, therefore, copyrightable subject matter.[45]

The Copyright Act does not extend copyright protection to the underlying idea or process of a particular work.[46] This is based on the theory that copyright protection does not extend to an idea so as to create a monopoly on that idea. This idea/expression dichotomy is also used as the primary defense in a computer copyright infringement action.[47]

If an accused work is merely a use of the underlying idea or process of the original work, then the accused work has not infringed the copyright of the original work.[48] However, if the accused work uses an expression of the underlying idea or process of the original work and the underlying idea can be expressed differently — rather than the manner in which the accused work was expressed — then the accused work has infringed the copyright of the original work. Proof of an infringement requires showing that the accused work is either a literal reproduction of the original or that the accused party had access to the original work and the two works are substantially similar.[49] When an idea or process cannot be separated from the particular expression of that idea or process then copyright protection of the expression is denied.[50] In addition, if there is only one or a limited number of ways in which to express an idea, then copyright protection is denied in order to preserve the free use and exchange of that idea.[51]

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45. *See, e.g.*, Whelan Assocs. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222, 1238-40 (3d Cir. 1986), *cert. denied*, 107 S. Ct. 877 (1987).

46. 17 U.S.C. § 102(b) (1982). "In no case does copyright protection of 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.*

47. Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1252 (3d Cir. 1983) (The Third Circuit held that both source and object code for parts of an operating system program were copyrightable subject matter.), *cert. dismissed*, 464 U.S. 1033 (1984).

48. An accused work is a work which has been accused of being a copy of the original program.

49. *Whelan Assocs.*, 797 F.2d at 1231-32; E.F. Johnson Co. v. Uniden Corp., 623 F. Supp. 1485, 1492 (D.C. Minn. 1985); Williams v. Arndt, 626 F. Supp. 571, 579 (D. Mass. 1985); 3 M. NIMMER & D. NIMMER, *supra* note 23, at § 12.11[D].

50. Baker v. Selden, 101 U.S. 99 (1879) (codified in 17 U.S.C. § 102(b) (1982)); 3 M. NIMMER & D. NIMMER, *supra* note 23, at § 13.03[A].

51. Lansberg v. Scrabble Crossword Game Players, Inc., 736 F.2d 485 (9th Cir. 1984); Morrissey v. Proctor & Gamble Co., 379 F.2d 675, 678-79 (1st Cir. 1967) (Copyright protection does not extend to ideas where there are a limited number of expressions.).

Copyright protection has been denied to blank forms where the expression in the form could not be separated from the idea,[52] and to other blank forms where no expression was involved.[53] However, when a form communicates information then the form is copyright protectable,[54] even if the information on the form is not protectable subject matter.[55] In addition, a court has protected blank forms where they are sufficiently innovative and their arrangement of information is itself informative.[56] The expression of an idea cannot be protected if that expression cannot be separated from the underlying idea or process. This principle has been codified in the Copyright Act[57] and is the third factor considered when determining whether a work should be given copyright protection. If the expression of a work is separable from the idea upon which it was based, then the expression may be protected depending upon whether the expression satisfies the other two requirements outlined above. However, if the expression of an idea is inseparable from the underlying idea, then the expression is not protected by copyright law.

For a literary work to be copyrightable or protected from infringement, the work must be an original work fixed in a tangible medium of expression. The copyright of a work will not protect the underlying idea, procedure, process, system, or method of operation. In the computer software industry these criteria for copyrightability are relevant when determining whether programs are copyrightable, or as a defense in an infringement action. However, it is difficult to match these criteria to relevant guidelines regarding computer software protection, because it deals with a creative industry which is quite different from the music and print industries which the Copyright Act was originally designed to govern. Decisions regarding the protection of software are connected to issues concerning the protection of machine processes and scientific or technological concepts which have traditionally been addressed by patent law. Evaluating the cri-

52. Baker v. Selden, 101 U.S. 99 (1879); Aldrich v. Remington Rand, Inc., 52 F. Supp. 732 (N.D. Tex. 1942).

53. Cash Dividend Check Corp. v. Davis, 247 F.2d 458 (9th Cir. 1957).

54. Harcourt, Brace & World, Inc. v. Graphics Controls Corp., 329 F. Supp. 517 (S.D. N.Y. 1971); R. NIMMER, *supra* note 22, at 1-6, 1-7.

55. Eckes v. Card Prices Update, 736 F.2d 859 (2d Cir. 1984) (compilation case: protection given to the structure of book).

56. Manpower, Inc. v. Temporary Help, Inc., 246 F. Supp. 788 (E.D. Pa. 1965) (The court held that the plaintiff's blank forms which were used as time sheets were sufficiently innovative in their arrangement of information to constitute a copyrightable work.).

57. 17 U.S.C. § 102(b) (1982) (codification of Baker v. Selden, 101 U.S. 99 (1879)); 1 M. NIMMER & D. NIMMER, *supra* note 23, at § 2.08[D][1].

teria referred to above, as it relates to the copyrightability and infringement of computer programs, includes an adjudication of the extent of protection afforded to the product of this new technology where that protection may significantly affect the commercial and scientific options of others.[58] These determinations were not common matters generally considered by copyright law prior to the computer age.

Following the verification that a computer program passes the three-part analysis described above, and is therefore copyrightable subject matter,[59] the remaining issue is what elements of the program are included as part of the protected expression. This is the principal issue to be determined in a computer program copyright infringement action where there is no evidence of literal copying. Once the protected aspects of an original work have been defined, it can be determined whether the accused work has any substantial similarities to these protected elements.

In determining when a computer software copyright infringement has occurred, several federal courts have advanced various approaches. When this issue was recently addressed by the Third Circuit Court of Appeals, copyright infringement was found to have occurred despite the lack of literal copying of computer code.[60]

II. *WHELAN ASSOCIATES, INC. v. JASLOW DENTAL LABORATORY, INC.*

A. Factual Background

Jaslow Dental Laboratory (Jaslow), the appellant, is a manufacturer of dental prosthetics owned and operated by Edward Jaslow

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58. If the courts extend the copyright protection of computer programs to include non-literal elements of the programs (flow logic or algorithm), it would severely limit the possibility of other programmers creating new advanced expressions of the idea upon which the original program was based and bring a halt to the advancement of the public welfare which Congress was empowered to promote. *See supra* note 17 and accompanying text. This hypothetical extension of copyright protection would hinder the growth of the computer software industry. *See* Note, *Copyright Protection for Computer Flow Logic and Algorithms*, 5 COMPUTER L.J. 257 (1984) (advocates the extension of copyright protection over the flow logic or algorithm of the computer program). This article fails to recognize inseparability between the flow logic or algorithm of a program and the program's underlying idea. An algorithm or computer flow logic is more analogous to the method of operation or process categories usually protectable by means of a patent.

59. *See, e.g.*, Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1252 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984).

60. Whelan Assocs. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222 (2d Cir. 1986), *cert. denied*, 107 S. Ct. 877 (1987).

and his son, Rand Jaslow. Rand attempted to develop a computer program that would automate various business operations of the laboratory.

After a poor attempt to develop the software, Jaslow entered into a contract with Strohl Systems Group to develop a custom-made computer program.[61] Elaine Whelan developed the computer system for Jaslow. All software developed by Strohl Systems for Jaslow was to be owned by Strohl Systems.[62]

Strohl Systems designed and installed the software written in EDL,[63] on an IBM Series 1 computer, located at the Jaslow Dental Laboratory.[64] In 1979, Strohl Systems commenced marketing the new dental system to other laboratories under the trade name "Dentalab."

After Myles Strohl and Elaine Whelan separated their equal interests in the computer company, Elaine Whelan formed Whelan Associates, Inc.[65] (Whelan) and became the new owner and marketer of the Dentalab system.[66]

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61. Whelan Assocs. v. Jaslow Dental Laboratory, Inc., 609 F. Supp. 1307, 1309 (D.C. Pa. 1985) (On August 31, 1978, Strohl submitted a written proposal to Jaslow to design and implement a computer software system. The proposal outlined the general scope of the functions to be included in the design, an outline of the development method, and a time for completion. As compensation, Strohl was to receive $18,000.00 plus certain expenses.).

62. *Id.* at 1310. The letter dated September 30, 1978, stated:

> We propose that all software developed by us for your laboratory system remain under our ownership. This basic system can then be marketed to similar laboratories by our organization. A royalty of ten percent of the basic package price would be returned to Jaslow for each system sold. Modifications to the system would be sold separately with all proceeds to our organization. If the above points of agreement are acceptable, would you please sign and return the enclosed copy.

Id. Although Jaslow never acknowledged this letter in writing, it is deemed to have been accepted. *Id.*

63. EDL or Event Driven Language. This is a high level programming language that works on the IBM Series 1 computer. It is important to note at this point that the basic structure and the basic operations of most computer languages are substantially similar. The exceptions are the logic oriented languages, i.e., SNOBOL or PROLOG and the lower level assembly languages.

64. *Whelan Assocs.*, 609 F. Supp. at 1310. Elaine Whelan conferred extensively with Rand Jaslow to determine the operations of the dental laboratory. Both Strohl and Jaslow knew that the operation of all dental laboratories was substantially the same and that it would be quite feasible to adapt the system to other laboratories.

65. *Id.* at 1309-12. Elaine Whelan was referred to as the designer and developer of a series of software programs known as the Dentalab package.

66. *Id.* at 1311 (although 'Dentalab' was originally authored by Strohl Systems, both Strohl Systems and Myles Strohl assigned all rights in the program to Elaine Whelan and Whelan Associates was listed as the claimant of the copyright on the 'Dentalab' system).

On July 30, 1980, Jaslow agreed to be the sales representative of the Dentalab system for Whelan.[67] During the two-year period in which this business relationship thrived, Whelan enhanced the original system as well as having translated the Dentalab EDL code into the BASIC computer language for use on the newer IBM Datamaster 26 computer.[68] In 1983, Jaslow's attorney notified Whelan that Jaslow planned to terminate its relationship immediately.[69] Following this notice, Rand Jaslow formed a new corporation, Dentcom, to market dental laboratory software including the Dentalab package.[70] In addition, Rand developed a new dental package written in BASIC for use on the IBM Personal Computer. This new computer program, which was marketed by Dentcom under the trade name "Dentcom-PC,"[71] has been accused of copyright infringement by Whelan.[72] Because Rand had previously obtained a copy of the Dentalab EDL source code,[73] Whelan claimed that the Dentcom-PC program was substantially similar to the Dentalab package and infringed the Dentalab copyright.

B. The District Court's Findings of Fact and Rulings of Law

After Jaslow sent notice to Whelan of its intent to terminate their agreement, Whelan filed suit in the federal district court alleging that the Dentalab copyright was being infringed by Dentcom's li-

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67. *Id.* at 1312 (the court noted that it was the intent of the parties to establish a working relationship).

68. *Id.* at 1314 (Whelan also developed a Dentalab package for use on the IBM Personal Computer, a smaller, less expensive computer which both Whelan and Jaslow anticipated would be the most profitable computer system. However, neither the Dentalab system written for the Datamaster 26 computer nor the Dentalab system written in BASIC for the IBM Personal Computer were at issue in this case.).

69. *Id.* at 1313 (On June 22, 1982, Jaslow had notified Whelan of its intent not to renew the sales representative agreement; however, Jaslow continued to work in accordance with the agreement.).

70. *Id.* at 1314 (Whelan had sold sixteen Dentalab systems for use on IBM Series 1 computers.).

71. *Id.* at 1314-15 (Four years after his first attempt, Rand once again tried to develop his own dental package for the IBM Personal Computer written in BASIC and with the help of Jonathan Novak he completed the new program. This program had functions which were similar to the Dentalab system.).

72. *Id.* at 1315 (Dentcom sold 23 licenses for the IBM Personal Computer Dentcom system under the name 'Dentalab' and 'Dentlab'.).

73. *Id.* at 1316 (Rand had obtained a copy of the EDL source code at some time during the development of the Dentalab system. At trial, Rand claimed he was either the owner or co-owner of the system and therefore entitled to have a copy of the program. In addition, Whelan had testified that Rand was never authorized to have a copy of the source code and that it was taken from Whelan without consent.).

censing of the Dentalab and Dentcom packages.[74] Subsequent to the denial of Jaslow's motion for a preliminary injunction, the trial began.[75] The majority of the testimony came from Rand Jaslow, Elaine Whelan and two expert witnesses. Rand Jaslow and Elaine Whelan testified as to the prior dealings between the parties. Dr. Thomas Moore, Whelan's expert, concluded that there were many similarities between the two programs, including the file structures, screen outputs, and operations of five subroutines,[76] and that, in his opinion, Dentcom was a derivative work of the Dentalab system. In addition, Dr. Moore acknowledged that he did not examine all of the lines of code of each of the two programs.

Mr. Stephen Ness, Jaslow's expert, testified that he had compared the Dentalab program written in BASIC[77] with the Dentcom-PC program also written in BASIC. Mr. Ness concluded, after a line-by-line comparison of the source and object codes of the two programs, that there were differences in the programming style, program structure, data structures, and overall algorithms of the programs. Mr. Ness added that the Dentcom-PC program was not derived from the Dentalab system. Mr. Ness stated that he was not familiar with the EDL computer language, that he did not compare the EDL code with the Dentcom-PC BASIC code, and that the Datamaster program had some overall structural similarities with the Dentcom-PC system.[78]

After listing a series of findings of facts relating to Jaslow's defenses, the district court found in favor of Whelan Associates, Inc.[79] The court deduced that Whelan owned all of the rights of the protected Dentalab system by virtue of its agreement with the Strohl Systems Group. The court found that Dr. Moore was a more quali-

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74. *Whelan Assocs.*, 797 F.2d at 1227-28 (By mutual agreement, the parties removed the trade secret action filed in the state court by Jaslow to the federal court.); *see Whelan Assocs.*, 609 F. Supp. at 1313, 1316-17.

75. *Whelan Assocs.*, 797 F.2d at 1228 (this motion was denied because Jaslow failed to show a likelihood of success on the merits); *see Whelan Assocs.*, 609 F. Supp. at 1315.

76. These subroutines performed the order entry, invoicing, accounts receivable, end-of-day procedures and end-of-month procedures and were considered the essential functions of the system. A subroutine is a group of instructions that perform a set of functions for the program and can be called from any point in the execution of the program.

77. This was the program written by Whelan Associates for use on the IBM Datamaster 26 computer. Note that Whelan stated that the Datamaster 26 package was essentially a translation of the IBM Series 1 package written in EDL.

78. *Whelan Assocs.*, 797 F.2d at 1228.

79. *Id.* at 1227. Jaslow raised four defenses. Two of the defenses were based on the invalidity of Whelan's copyright. The other two defenses raised by Jaslow were that the Dentcom program was developed independently from the Dentalab program and that "Dentalab" or "Dentlab" were descriptions of goods or services and not the name of a particular product.

fied expert witness than Mr. Ness and that Mr. Ness' testimony was not persuasive because he had never observed the two programs in operation and because he was not familiar with the computer language of one of the programs at issue.[80] The court seemed to think that Dr. Moore's more detailed analysis of the five subroutines of the two systems made him a more credible expert witness.

C. The District Court Broadened the Scope of Copyright Protection of Computer Programs

The district court's most controversial conclusion, which was questioned on appeal, related to the scope of copyright protection afforded to computer programs. The issue was whether or not the Dentcom-PC program infringed on the copyright of Whelan's Dentalab system: The district court's reasoning followed a sequence of steps which culminated in two rules of law.[81]

First, "[t]he expression of the idea in a software computer program is the manner in which the program operates, controls and regulates the computer in receiving, assembling, calculating, retaining, correlating, and producing useful information either on a screen, printout or by audio communications."[82] Second, "[t]he expression of the idea embodied in a computer program is protected by the copyright laws even though it must be altered and refined to be made adaptable to different types of computers that have different methods of responding to command controls and therefore require different source codes."[83] Based on the above rules, including the

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80. *Whelan Assocs.*, 609 F. Supp. at 1322. The court reasoned that because Mr. Ness did not observe the two programs in operation, his overall conclusions as to the systems' dissimilarities were not persuasive. Two reasons explain why this was an incorrect conclusion on the part of the district court. First, the issue in the case was not the infringement of the audiovisual aspects of the program. Second, the operation of the program is only visible to the observer in the audio-visual aspects and the paper printouts. Because these were not protected by the copyright in issue, they are not at issue in the case. *See* Digital Communications Assocs. v. Softklone Distrib. Corp., 659 F. Supp. 449, 455 (N.D. Ga. 1987) ("copyright protection of a computer program does not extend to screen displays generated by the program.").

81. *Whelan Assocs.*, 609 F. Supp. at 1319-21. The court first found that the Copyright Act, as amended by the Computer Software Copyright Act of 1980, has added a definition of a computer program to the Copyright laws and has given them protection. Second, the court said that the mere idea or concept as contained in a computer program is not the subject of copyright protection. The court found that because there was no contention that other dental laboratory programs that were being marketed infringed on the copyright of the Dentalab package, different computer programs may functionally serve similar purposes, e.g., the automation of the dental laboratory business functions, without being duplicates of each other.

82. *Id.* at 1320; *see* 1 M. NIMMER & D. NIMMER, *supra* note 23, at § 2.18[J].

83. *Whelan Assocs.*, 609 F. Supp. at 1320; *cf.* Q-CO Indus., Inc. v. Hoffman, 625 F. Supp. 608 (S.D.N.Y. 1985).

very broad interpretation of the expression of a computer program, the court held that the Dentcom-PC code was not precluded from a possible infringement of the dentalab system simply because it was written in a different computer language.[84] The evidence demonstrated that Jaslow had copied the expression of the Dentalab system program.

In a copyright infringement case, there are two methods of testing the evidence of infringement.[85] In *Whelan*, the first test, which requires evidence of direct copying, was not applicable because the original work was written in one computer language and the accused work was written in a different language. Therefore, the court applied the second test which requires evidence that the accused party had access to the original work, and that the accused work was substantially similar to the original work.[86] In *Whelan*, access was not at issue because Rand Jaslow had stipulated to the fact that he had access to a copy of the source code of the Dentalab program.[87] As a result, the primary issue was whether the Dentcom-PC program was substantially similar to the Dentalab program. The court concluded that because of the similarities, as testified to by Dr. Moore, the Dentcom-PC program was substantially similar to the Dentalab system.[88]

The district court broadened the scope of copyright protection of a computer program by basing infringement on the existence of similarities in the sequence of operations of the programs. This conclusion placed the district court at odds with the conclusions of an earlier district court which was faced with the same issue.[89] The Third Circuit Court of Appeals has affirmed the district court's decision in what has become a highly controversial opinion.

D. The Third Circuit Court of Appeals—Extension of the Scope of Copyright Protection of Computer Programs

In *Whelan*, the district court held that the Dentcom-PC program infringed the copyright of the Dentalab program because of the substantial similarities in the overall structure of the two programs. Therefore, the controversial issue before the Third Circuit Court of

84. *Whelan Assocs.*, 609 F. Supp. at 1319-21.

85. Custom Decor, Inc. v. Nautical Crafts, Inc., 502 F.Supp. 154 (E.D. Pa. 1980); 3 M. NIMMER & D. NIMMER, *supra* note 23, at § 12.11[D].

86. *Whelan Assocs.*, 609 F. Supp. at 1321.

87. *Id.*

88. *Id.* at 1321-22.

89. *Q-CO Indus., Inc. v. Hoffman*, 625 F. Supp. 608, 614 (S.D.N.Y. 1985).

Appeals was whether or not the structure, sequence, or organization of a computer program is copyright protectable expression of a program.[90]

After concluding that computer programs are protected from more than literal copying,[91] the Third Circuit had to determine the boundaries of the scope of copyright protection for computer copyright infringement purposes. The court held that the copyright of a computer program protects from unauthorized copying what is in essence the "look and feel" of a computer program.[92]

The court adopted a broad rule of law based on a very simple analysis of previous decisions in combination with the Copyright Act. In 1976, the rule developed in *Baker v. Selden*[93] was codified in section 102(b) of the Copyright Act.[94] This section states that copyright protection will not be extended to the idea or process underlying an expression, and if the idea is inseparable from the expression, then the work is unprotectable.[95] The court reasoned that, because the idea involved in *Whelan* was the computer automation of a dental laboratory and this idea can be expressed in other non-infringing programs or expressions, the program that implemented this idea was an expression separable from the underlying idea and protected by the copyright laws.[96]

Because other literary works are protected from non-literal infringement, the court held that the computer program is protected from non-literal copying.[97] The non-literal elements of a computer program, which are considered part of the expression of the program, include the structure, sequence, and organization of the program.[98] The expression of a computer program is protected from copyright infringement. Therefore, the copyright of a computer program has been infringed when the structure, sequence, and organiza-

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90. *Whelan Assocs.*, 797 F.2d at 1234.

91. 17 U.S.C. § 102(a)(1) (1982) extends the copyright protection afforded literary works to computer programs. The copyright of a literary work is infringed when an accused work is substantially similar to the original. This means the accused work does not have to be an exact reproduction of the original to infringe on the copyright of the original work. Additionally, a copyright of a literary work can be infringed upon by translating the work from one language to another. *See* Radji v. Khakbaz, 607 F. Supp. 1296, 1299 (D.C. 1985) (translation of English language book into Farsi).

92. *Whelan Assocs.*, 797 F.2d at 1248.

93. 101 U.S. 99 (1879).

94. 17 U.S.C. § 102(b) (1982).

95. *Id.*

96. *Whelan Assocs.*, 797 F.2d at 1240.

97. *Id.* at 1248.

98. *Id.*

tion of an accused program is substantially similar to the original work.[99]

III. THE "SECOND GENERATION" OF COMPUTER PROGRAM LITIGATION

Computer software litigation has evolved through what has been referred to as "two generations."[100] In the first generation, the issue was whether computer programs are or should be protected by the copyright laws. The courts have resolved this issue in favor of protecting the source code or object code of computer programs embedded or stored in any type of medium.[101]

The second generation of computer program litigation, of which *Whelan* is a part, concerns a determination of the scope of copyright protection which the courts will afford to computer programs.[102] This generation of litigation involves defining the boundaries that copyright protection will provide to computer programs. The courts' determinations will depend upon what is considered the expression of an idea embodied in a computer program and what is considered an idea upon which the expression was created. It is this judicial line-drawing that will affect the commercial and scientific options of other computer software companies.[103]

If the copyrightable expression in a computer program is limited to the strict line-by-line program code, those people that copy[104] or add value to existing programs[105] will be able to escape liability for copyright infringement by varying the original code in a trivial way. However, if the copyrightable expression includes the logic, design, structure,[106] performance,[107] or output of a computer program,[108]

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99. *Id.*

100. OTA Report, *supra* note 14, at 79 n.79; *see* Goldberg, *Computers and Copyright: The Next Generation*, 196 N.Y.L.J. 57, Sept. 19, 1986, at 1 col. 1.

101. *Id.* at 79; *see* Apple Computer, Inc. v. Formula Int'l, Inc., 724 F.2d 521 (9th Cir. 1984) (Copyright also extends to protect programs in PROMs (Programmable Read Only Memorys) and EPROMs (Erasable Programmable Read Only Memorys)).

102. OTA Report, *supra* note 14, at 79. For a discussion of what constitutes a copy of a computer program, see Wharton, *Use and Expression: The Scope of Copyright Protection for Computer Programs*, 6 COMPUTER L.J. 433, 434-54 (1985).

103. *See supra* note 58 and accompanying text.

104. *See, e.g.*, Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984).

105. Nimmer & Krauthaus, *Copyright and Software Technology Infringement: Defining Third Party Development Rights*, 62 IND. L. REV. 12 (1986).

106. *Whelan Assocs.*, 797 F.2d at 1248.

107. Broderbund Software, Inc. v. Unison World, Inc., 648 F. Supp. 1127 (N.D. Cal. 1986); *see* Note, *Broderbund Software, Inc. v. Unison World, Inc.: "Look and Feel" Copy-*

then the copyright would be protecting the "procedure, process, system, or method of operation of the original work"[109] which the Copyright Act prohibits.

A. The Strict Line-by-Line Approach

When determining the scope of copyright protection of computer programs, it is difficult for the courts to protect their descriptive aspects — the symbols or words used in the program — without at the same time protecting their functional aspects or what the symbols or words do in a computer. Copyright may either protect too little if the copyrightable expression is limited to the literal code, or it may protect too much if the copyrightable expression extends beyond the literal program code.

In *Synercom Technology, Inc. v. University Computing Co.*,[110] what the *Whelan* Court referred to as "Judge Patrick Higginbotham's scholarly opinion,"[111] Judge Higginbotham concluded that the defendant did not infringe on the plaintiff's copyright of a computer program. The scholarly judge reasoned that the defendant either copied the underlying idea which the input forms expressed, or the input formats of the original computer program were unprotectable expressions of ideas.[112]

In *Synercom*, the computer input formats, which specified the manner in which the user entered data into a structural analysis engineering system, were at issue.[113] The plaintiffs alleged that the defendants had infringed the copyright of their program by giving the users of a competing system, developed by the defendant, a data preprocessing program which consisted of a sequence of instructions that were identical to Synercom's input forms.[114]

Following a determination that the input format was an expression of an idea, the next issue was whether the defendants had borrowed that portion of the expression which was separable from the underly-

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right Protection for the Display Screens of An Application Microcomputer Program, 13 RUTGERS COMPUTER & TECH. L.J. 105 (1987).

108. Broderbund Software, Inc. v. Unison World, Inc., 648 F. Supp. 1127 (N.D. Cal. 1986).

109. 17 U.S.C. § 102(b) (1982); *see* OTA Report, *supra* note 14, at 81.

110. 462 F. Supp. 1003 (N.D. Tex. 1978).

111. *Whelan Assocs.*, 797 F.2d at 1239.

112. *Synercom Technology, Inc.*, 462 F. Supp. at 1014.

113. *Id.* at 1007.

114. *Id.* at 1012. The court concluded that the input forms were expressions of ideas because they were instructive and conveyed information.

ing idea.[115] The court concluded that the defendants had not borrowed any of the plaintiff's protected expression. Instead, the defendants had appropriated the ideas embodied in the input forms and expressed those ideas differently. Alternatively, the court held that even if the defendants had copied the plaintiff's expression, the expression created by the plaintiff was not copyright protectable because it was inseparable from the underlying idea.[116] According to the first conclusion, there was no infringement of the plaintiff's copyright protected work and, in the alternative, the input format was considered an unprotectable expression of an idea.[117]

In dicta, the court analogized the plaintiff's contention that the order and sequence of data was a protectable expression of an idea to a situation in which a person accused of an infringement read the manual of a computer program, took the underlying ideas from that manual and wrote a new program and manual. This new program and manual could not be considered an infringing work.[118] An infringement would exist when a computer program is converted from one language into another, or when a flowchart or set of step-by-step instructions written in a human language is translated into a computer program. "[T]he preparation of a computer program in *any* language from a general description of the problem to be solved . . . is very dissimilar to the translation of a literary work, or to the translation of a program from one language to another."[119] The plaintiff's copyright was not infringed because the defendant developed the pre-processing program from the general descriptions of an idea contained in the forms.

Although *Synercom* dealt with a question of infringement of an input form and not a computer program, the copyright principles derived are applicable to computer copyright infringement actions.[120] Because the input forms, like computer programs, create data representations and perform data transformations, the principles derived in *Synercom* were relevant to the *Whelan* case.[121]

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115. *Id.*

116. *Id.* at 1014.

117. *Id.* at 1013-14. The court insisted that the input formats must contain some indicia of creativity greater than the bare expression of a sequence and arrangement to qualify for copyright protection.

118. *Id.* at 1013 n.5.

119. *Id.* (Emphasis supplied).

120. *Whelan Assocs.*, 797 F.2d at 1238.

121. *Id.* at 1239.

1. The Initial Conflict With *Whelan*

The *Whelan* court recognized that the *Synercom* holding was adverse to the notion of broadening the scope of copyright protection.[122] Judge Higginbotham said that there was a difference between the copyrightability of the organization of the input formats of a computer program and the copyrightability of the organization of other types of works.[123] While the Copyright Act intended sequencing and ordering to be protectable in appropriate circumstances, the computer program context is not one of those appropriate circumstances. The *Whelan* court rejected this argument.[124] While Congress did consider that computer programs would present a unique situation in copyright law, and the Copyright Act did propose that, in appropriate circumstances, the ordering and sequencing of a work is protectable, Congress did not create an exception to this general proposition. Therefore, without an exception to this general postulate, the proposition is applicable to computer programs and their copyrightability.[125]

While Congress may not have made an exception to this general rule, computer programs are significantly different from other literary works. A computer program is a literary work; however, when in operation in the computer, it is a process. Therefore, the computer program is a hybrid between that which is protectable by a copyright and that which should be protected by a patent.[126] When the program is not running in the computer, it is merely a literary work and passive, and the copyright is the proper method of protection. However, when the program is being executed by the computer, it is active and is considered a process (the program processes information

122. *Id.*

123. *Synercom Technology, Inc.*, 462 F. Supp. at 1014.

124. *Whelan Assocs.*, 797 F.2d at 1240.

125. *See* OTA Report, *supra* note 14, at 80-81.

126. *Id.*; Maier, *Software Protection—Integrating Patent, Copyright and Trade Secret Law*, 69 J. PAT. TRADEMARK OFF. SOC'Y 151 (1987) (The author discusses the hybrid nature of computer software and how copyright, patent, and trade secret law are all viable means of protecting software effectively.); Note, *supra* note 58, at 257; Note, *Protection of Computer Software—A Hard Problem*, 26 DRAKE L. REV. 180 (1976) (analysis of problems which arise when dealing with the protection of computer software using patent, trade secret and copyright law). This statement is not meant to suggest that patent protection of computer programs cannot be obtained. See Maier, *supra*, at 157, for a sample list of patented computer programs. This suggests that copyright protection of computer programs and patent protection of programs can coexist.

in the computer)[127] which is theoretically protectable under patent law.[128]

The *Whelan* court reasoned that, if it could answer one last question raised in *Synercom*, then it could justify its own broad holding. If the sequencing of instructions in a computer program is considered the expression of an idea, what separable idea is being expressed in the Dentalab program?[129] The court concluded that the idea at issue in *Whelan* was the automation of certain functions of a dental laboratory. Because there were other programs available that expressed this idea, and those programs did not infringe Whelan's copyright, the structure of the Dentalab program was separable from the underlying idea. Therefore, the structure of a computer program is a copyright protectable expression.[130]

This is not a sound conclusion.[131] The problem to be solved in *Whelan* was to computerize the Jaslow Dental Laboratory. To accomplish this goal, the *Whelan* court broke the problem down into different parts which consisted of five subroutines. It is these five parts or subroutines that contained the five separate ideas which Whelan decided would solve the dental laboratory problem.[132] The overall structure of these subroutines should not have been accepted by the *Whelan* court as evidence of an infringement either because the underlying ideas expressed in the structure of the subroutines could not be separated from the expression, or because the ideas expressed in the subroutines can only be expressed in a limited number of ways to perform efficiently.

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127. *See supra* note 12 and accompanying text.

128. *See* Maier, *supra* note 126, at 157-59 (The Patent Office is now patenting software and the author explains why and how software is patented); *see also* Anthony & Colwell, *Litigating the Validity and Infringement of Software Patents*, 41 WASH. & LEE L. REV. 1307 (1984) (applicability of patent law to software).

129. *Whelan Assocs.*, 797 F.2d at 1240.

130. *Id.* at 1248.

131. R. NIMMER, *supra* note 22, at S1-17 (1986),

> The [*Whelan*] court's view of protected expression reflects a broad conception of the idea of the program. The idea apparently consisted simply of the notion of a program for "operating a dental laboratory." In a fiction novel, the equivalent defines the idea of *War and Peace* as a "novel about society." This definition creates an expansive protection of the original author and is unnecessary to the result.

Id.; see also Karajala, *Copyright, Computer Software, and The New Protectionism*, 28 JURIMETRICS J. 51 n.62 (1987). The *Whelan* Court's conclusion that the underlying idea of the Dentalab program was the automation of a dental laboratory is a rather tautological argument. By definition, a program which automates a dental laboratory is a program focusing on the ideas involved in the automation of the dental laboratory.

132. These subroutines performed the order entry, invoicing, accounts receivable, end-of-day procedures and end-of-month procedures.

The *Whelan* court concluded that since the structure of the program was not essential to the purpose or function of the program, *i.e.*, the automation of the dental laboratory, the structure was part of the protectable expression.[133] This opinion is not a sound one because the structure or sequence of operations of a program is crucial to the program's operation and efficiency. Because the structure is essential to the operation or function of the program, the structure is inseparable from the underlying idea upon which the program was based.

There cannot be an infringement where the overall structure of the programs are substantially similar. This is an obvious conclusion because many programs that solve any one particular problem will look and operate similarly. Each program that solves any one particular problem will generally consist of the same overall structure because they were both written to efficiently solve the same problem.[134]

Preparing a computer program from a general description of the problem to be solved, or adapting an existing program for operation on a second computer,[135] is not similar to translating a literary work from one language into a second. Substantial creativity is required and the resulting program is not a copy of the original.

B. The Strict Line-by-Line Approach (continued)

The *Whelan* court was faced with deciding whether the Dentcom-PC program was substantially similar to the Dentalab system. The court concluded that the proper test for determining substantial similarity in a computer program copyright infringement action was to combine the test developed in *E.F. Johnson Co. v. Uniden Corp.*,[136] with its predecessor, the "lay observer" test.[137] *Whelan* adopted a

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133. *Whelan Assocs.*, 797 F.2d at 1233-42.

134. Q-CO Indus., Inc. v. Hoffman, 625 F. Supp. 608 (S.D.N.Y. 1985); *see* Stern, *The Bundle of Rights Suited to New Technology*, 47 U. PITT. L. REV. 1229, 1238-39 (1986) ("When a defendant's computer program contains code that is an exact copy of or quite close to an exact copy of the code in a plaintiff's copyrighted computer program, the defendant will almost surely be held liable to the plaintiff for copyright infringement." This is less clear, however, when the actual code of the defendant's program is substantially different from the plaintiff's code.).

135. *See, e.g.*, SAS Inst., Inc. v. S & H Computer Sys., Inc., 605 F. Supp. 816 (M.D. Tenn. 1985) (duplication of the expression satisfies the substantial similarity test for establishing liability).

136. 623 F. Supp. 1485 (D.C. Minn. 1985).

137. 3 M. NIMMER & D. NIMMER, *supra* note 23, at § 13.03[A] (The test consists of determining whether an average lay observer would recognize the alleged copy as having been appropriated from the copyrighted work.).

single substantial similarity inquiry according to which both lay and expert testimony would be admissible.

In *E.F. Johnson*, the defendant reverse-engineered[138] the plaintiff's program which was part of a land based mobile radio transmission system. The district court held that the "ordinary lay observer test," generally used to determine substantial similarity, was unworkable when dealing with computer program infringement cases.[139] The court concluded that basing substantial similarity on the "total concept and feel"[140] of the copyrighted work as determined by the ordinary observer, and relying on the ordinary observer to find enough material similarities,[141] was a problem. The ordinary lay observer could not discover the technical similarities between computer programs. The court proposed an alternative approach, the "iterative test" of substantial similarity.[142]

The iterative test requires proof that the defendant used the copyrighted work in preparing the alleged copy, and that the defendant's work is an iterative reproduction of the original.[143] Under this test, proof of infringement would be made by an analysis of the "quantitative and qualitative evidence of similarities"[144] as measured by the "court's evaluation of expert testimony."[145]

While the *E.F. Johnson* court concluded, based on either of the substantial similarity tests, that the defendant had infringed the plaintiff's copyright, the court indicated in dicta that copyright protection does *not* extend to the "general outline" of a program.[146] In sum, when disposing of a computer copyright infringement action, it is improper for a court to compare the overall structure of the ac-

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138. OTA Report, *supra* note 14, at 84.

> Reverse engineering refers to the unauthorized, although not necessarily illegal, reproduction of programs in their object or source code form for the purpose of teaching, analyzing, or evaluating the concepts, techniques, or ideas embodied in the program. This process promotes innovation by allowing programmers to build on the works of others in the creation of new works. It also eliminates the need for redundant research and development. Reverse engineering allows abstract knowledge and techniques to be passed on, while prohibiting the wholesale appropriation and sale of another's work.

Id.

139. Note, *Copyright Infringement of Computer Programs: A Modification of the Substantial Similarity Test*, 68 MINN. L. REV. 1264, 1285-94 (1984) (in depth review of why the ordinary observer test is unworkable in the field of computer software infringement litigation).

140. *E.F. Johnson*, 623 F. Supp. at 1493.

141. 3 M. NIMMER & D. NIMMER, *supra* note 23, at § 13.03[A].

142. *E.F. Johnson*, 623 F. Supp. at 1493.

143. Note, *supra* note 139, at 1294-1302 (analysis of proposed iterative approach).

144. *E.F. Johnson*, 623 F. Supp. at 1493.

145. *Id.*

146. *Id.* at 1501 n.17.

cused program with the original because the protected expression of a computer program would not include its overall structure. The copyright of a program would only protect the program from literal copying. This new test has been applied by other courts when determining the issue of substantial similarity of computer programs.[147]

The facts in *Whelan* are very similar to the facts in *Q-CO Industries, Inc. v. Hoffman*,[148] which also resulted in copyright infringement litigation. Both cases dealt with a defendant who adapted an original computer program for use on a different, more popular computer. However, the two cases were resolved differently. In *Q-CO*, the court held that the program developed by the defendant based on the plaintiff's idea, a teleprompter with word processing capabilities, did not infringe the plaintiff's copyright protected expression.[149]

In *Q-CO*, the defendants, Hoffman and Som, developed a program for the plaintiff, Q-CO Industries.[150] The program generated large characters which scrolled the video screen at variable speeds and had a few word processing functions. The teleprompter program was designed for use in different television and theater presentations.[151] The defendants then left the employ of the plaintiff and created a program that performed similar functions on a different computer system.[152] Because of the differences in the computer systems, the defendants had to make substantial changes in the manner in which the new program would generate the large characters as compared to the old program's operations. The court held that the new program did not infringe the plaintiff's copyright in the original program.[153]

The *Q-CO* court reasoned that, because the "order and organization"[154] of computer programs are more like concepts or ideas rather than expressions, and because the source codes of the programs were in different languages, there was no infringement.[155] Because of the differences in the computer systems, it was impossible to show that

147. Whelan Assocs. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222 (3d Cir. 1986); *cert. denied*, 107 S. Ct. 877 (1987).

148. 625 F. Supp. 608 (S.D.N.Y. 1985).

149. *Id.* at 616.

150. *Id.* at 610-11. The defendants developed the VPS-500 program designed for the Atari 800-XL computer.

151. A teleprompter is an electronic device that unrolls a script line-by-line as a prompting aid.

152. This new program was named the CPC-1000. It performed similar functions as the VPS-500 program but on an IBM Personal Computer.

153. Q-CO Indus., Inc., 625 F. Supp. at 616.

154. *Id.*

155. *Id.* at 615-16.

the defendants' program was a copy of the original work.[156] This decision indicates that the protected expression in a computer program does not include the overall structure, sequence, and organization of the program. Unless there is evidence that the accused computer program is substantially similar to the original program, there is no copyright infringement. The measure of substantial similarity is based on the available evidence of literal copying and not structural similarities.

Q-CO Industries, Inc. v. Hoffman,[157] was the last major case that dealt with copyright infringement of a computer program prior to the Third Circuit Court of Appeals decision in *Whelan Associates v. Jaslow Dental Laboratory, Inc.*[158] The *Whelan* court decided to broaden the scope of copyright protection of computer programs. This broad scope of protection would make it difficult for future programmers to enhance the ideas encompassed in existing programs without violating the copyright of the original program.[159] This was one of the primary reasons why the Fifth Circuit, when recently faced with the issue of whether or not to accept the *Whelan* court's extension of the scope of copyright protection of a computer program, decided that the sequence and organization of a computer program are inseparable from the underlying ideas upon which the program was developed.[160] The court refused to provide the plaintiff with a monopoly on the underlying idea, because to do so would be contrary to the purpose of the Copyright Act.[161]

In *Plains Cotton Cooperative Association v. Goodpasture Computer Service, Inc.*,[162] the plaintiff, owner of a computer software system that provided its users with information regarding cotton prices, accounting systems and the capability to consummate cotton sales electronically,[163] sued former employees for copyright infringement and trade secret misappropriation. After developing the computer system for the plaintiff, the defendants were employed by a new company which developed a similar program for use on a differ-

156. *Id.* at 616.

157. 625 F. Supp. 608 (S.D.N.Y. 1985).

158. 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 107 S. Ct. 877 (1987).

159. OTA Report, *supra* note 14, at 83.

160. Plains Cotton Coop. Ass'n v. Goodpasture Computer Serv., Inc., 807 F.2d 1256, 1262 (5th Cir.), *cert. denied*, 108 S. Ct. 80 (1987).

161. *See supra* notes 46-47 and accompanying text.

162. 807 F.2d 1256 (5th Cir.), *cert. denied*, 108 S. Ct. 80 (1987).

163. *Id.* at 1258. The system was called "Telcot."

ent computer.[164] Although this case dealt with an appeal from a district court's decision denying the plaintiff's motion for a preliminary injunction, the Fifth Circuit's opinion regarding the scope of protection of computer programs is applicable to the present discussion. In deciding whether or not to grant a preliminary injunction, the court must ascertain whether or not the plaintiff has proven a substantial likelihood of success on the merits.[165]

The *Plains Cotton* court, remaining consistent with Judge Higginbotham's decision,[166] concluded that the input formats which determined the organization and configuration of the information fed into the computer were ideas and not protectable expression.[167] The court reasoned that, because the input formats in *Synercom*[168] "represent[ed] a level of computer software design more specific than functional design and more general than line-by-line program design, the issue of copyrightability is relevant to the issue of whether [there was an infringement in the present action]."[169]

The court rejected the *Whelan* approach that the structure or sequence of a computer program is copyright protectable.[170] The court determined that the plaintiff did not satisfy its burden of proof in a preliminary injunction motion because the evidence seemed to indicate that the sequence and organization of the cotton marketing software at issue was inseparable from the general cotton industry ideas upon which the original program was developed.[171]

In the context of the present discussion, the Fifth Circuit has joined Judge Higginbotham's position that the structure of a computer program is not copyright protectable because the structure is inseparable from the underlying idea. The opinions of Judge Higginbotham and the Fifth Circuit are "at odds"[172] with the Third Circuit's conclusion.

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164. *Id.* at 1259. The second program was developed for use on a personal computer and marketed under the trade name "GEMS".

165. *Id.*

166. *Id.* at 1262.

167. *Id.*

168. *See supra* note 114 and accompanying text.

169. *Plains Cotton*, 807 F.2d at 1262.

170. *Id.*

171. *Id.* ("the similarities between the GEMS and Telcot programs are dictated by the externalities of the cotton market").

172. *Whelan Assocs.*, 797 F.2d at 1239.

C. The Broad Approach: Expansion of the Scope of Copyright Protection of Computer Programs

When determining the scope of copyright protection of computer programs, it is difficult for the courts to protect their expression without, at the same time, protecting their underlying ideas. Copyright may either protect too little if the copyrightable expression is limited to the literal code, or it may protect too much if the copyrightable expression extends beyond the literal program code.

In the past few years, several courts have concluded that it is proper to protect the structure, sequence, or organization of either a computer program[173] or the output of a computer program, the audiovisual display screens.[174] These courts have justified their conclusions based on the theory that the structure, sequence, and organization of a program or the sights and sounds of a display are separable from the underlying ideas upon which the program or screen was developed. In *Whelan*, the court held that the structure, sequence, and organization of a computer program is copyright protectable.[175] Therefore, any similarities in structure, sequence, or organization of computer programs would result in a copyright infringement.

In *Stern Electronics, Inc. v. Kaufman*,[176] the Second Circuit Court of Appeals broadened the scope of protection afforded an audiovisual work when it held that "[t]he repetitive sequence of a substantial portion of the sights and sounds of [a video]. . . game qualifies for copyright protection as an audiovisual work."[177]

In *Stern Electronics*, the issue was whether the defendant infringed Stern's copyright in its audiovisual work, a computer video game called "Scramble."[178] Before this decision, there was a requirement that to prove an infringement in an audiovisual work, the plaintiff must prove exact copying.[179] The court held that the repetitive sequence of a substantial portion of the sights and sounds of the video game qualified as an aspect of the copyright protectable expression of an audiovisual work.[180] Therefore, the organization and

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173. *See, e.g., Whelan Assocs.*, 797 F.2d at 1222.

174. Plains Cotton Coop. Ass'n v. Goodpasture Computer Serv., Inc., 807 F.2d 1256 (5th Cir. 1987); Stern Elecs., Inc. v. Kaufman, 669 F.2d 852 (2d Cir. 1982).

175. *Whelan Assocs.*, 797 F.2d at 1248.

176. 669 F.2d 852 (2d Cir. 1982).

177. *Id.* at 856.

178. The computer game was embedded in the Programmable Read Only Memory of the computer.

179. *See* Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984).

180. *Stern Elecs.*, 669 F.2d at 856.

sequence of the audiovisual display is protected, and this expression can be compared in a copyright infringement action.

While the principal holding in *Stern Electronics* may be applicable to a computer program infringement action,[181] there is a significant difference between a computer program and an audiovisual display. According to *Stern Electronics*, an audiovisual display's organization and sequence of sights and sounds is protected by the copyright laws.[182] The Copyright Act separates that which is protected by an audiovisual copyright and that which is protected by a literary copyright.[183] A computer program is protected as a literary work and the display screens of a video game or program are protected by the audiovisual copyright. The *Whelan* court, noting the differences between audiovisual screen protection and computer program protection, concluded that display screen similarities were admissible as indirect evidence of computer program infringement.[184] However, in view of the highly technical nature of the computer software field and the difficulty of having a lay observer,[185] *i.e.*, a judge, not trained in distinguishing between a program and its output, even with the aid of expert witnesses, a judge "could not evaluate [the audiovisual similarities] rationally"[186] and consider these similarities as indirect rather than direct evidence of computer program copyright infringement.[187]

The audiovisual display is the output of a computer program and its structure and sequence of sights and sounds is the final result of the creative process which began in the development and coding of the program. The display's organization or sequence of operations is the only element of a display which can be protected because there are no other physical elements of an audiovisual display. In contrast, a computer program consists of words or symbols fixed in a tangible medium. The courts may protect a program from literal copying as well as possibly protecting its less concrete aspects, namely the structure and sequence. The audiovisual display is physically distinguishable from a computer program. Therefore, based on the physical differences between programs and audiovisual displays, it would be

181. *See supra* note 120.

182. *Stern Elecs.*, 669 F.2d at 857; 17 U.S.C. § 102(a)(6) (1982).

183. 17 U.S.C. § 102(a)(1) & (6) (1982).

184. *Whelan Assocs.*, 797 F.2d at 1244.

185. *But see Whelan Assocs.*, 797 F.2d at 1245.

186. *Whelan Assocs.*, 797 F.2d at 1245.

187. *Id.* at 1245; *see also* Digital Communications Assocs. v. Softklone Distrib. Corp., 659 F. Supp. 449, 455-56 (N.D. Ga. 1987).

difficult to justify even the inferential use of display screens as a basis for a computer program copyright infringement conclusion.

Stern Electronics dealt with the extension of copyright protection of the audio visual output of a computer program. In *SAS Institute, Inc. v. S & H Computer Systems, Inc.*,[188] a district court considered the extension of copyright protection of computer programs. The *SAS* court went beyond measuring or comparing the amount of literal identity between computer instructions and considered the structural similarities of computer programs.

In *SAS*, the defendant, S & H Computer Systems, licensed the source code of the plaintiff's complex statistical analysis program.[189] This program consisted of 186,000 lines of instructions to be executed by a computer. The defendant licensed the plaintiff's program to develop a competing program which would run on a different popular computer system.[190] Generally, in a copyright infringement action not involving an exact duplicate of the original code but rather a partial copy, there are two issues to be decided. First, does the accused party have access to the original program? Second, is the accused program substantially similar to the original program?[191] Because access was uncontested, the district court was faced with the all too popular issue of whether or not the two programs were substantially similar.

The court concluded that S & H had infringed the protected expression of the SAS program based on several factors. First, forty-four of the 186,000 lines of code of the original work were literally copied. Of these lines, there were several instances in which SAS indicated that the lines of the original code were unnecessary additions to the program and did not perform a needed function.[192] Second, the S & H code contained undocumented SAS program options.[193] Third, the S & H program had no associated design documentation.[194] Fourth, the S & H code contained a number of instances in which the word "SAS" appeared.[195]

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188. 605 F. Supp. 816 (M.D. Tenn. 1985).

189. *Id.* at 819.

190. *Id.* The computer used by the SAS Institute program was an IBM computer. *Id.* at 818. SAS Institute licensed the program to S & H to be used as a statistical analysis system but S & H used the program to produce a new version of the program to be used on the VAX computer. *Id.* at 821.

191. 3 M. NIMMER & D. NIMMER, *supra* note 23, at § 12.11[D].

192. *SAS Inst., Inc.*, 605 F. Supp. at 823.

193. *Id.* at 824.

194. *Id.* at 823.

195. *Id.*

In addition to this evidence of *literal* copying, the court found similarities in the organizational patterns and structure[196] of the two programs. S & H argued that it had adopted SAS's organizational scheme but it had written the actual program instructions independently. Therefore, there was no infringement because a computer program copyright can only protect the original program from literal copying. The organizational patterns and structure of a computer program do not communicate information so as to qualify as protectable expression. The court rejected this argument and stated that even adopting a program's organizational scheme would constitute copyright infringement.[197] The court held that the evidence of literal copying combined with the organizational similarities constituted infringement of SAS's copyright protected program.[198] It is important to add that the court based its decision to a large extent on S & H's misconduct and almost fraudulent intentions[199] in contracting with SAS for the use of the original source code.[200] The court did not have to broaden the scope of copyright protection of computer programs. The combination of fraud in inducement of the contract and the instances of literal copying would have resulted in an infringement.

1. Initial Support for *Whelan*

The *Whelan* court concluded that its holding was supported by the *SAS* conclusion.[201] The court said that the *SAS* decision stood for the proposition that organizational similarities of computer programs were relevant in deciding whether an accused computer program infringed on the original program.[202]

In the course of deciding the issue of whether there was substantial similarity, the *SAS* court stated that "piracy of even a quantitatively small fragment . . . may be qualitatively substantial."[203] The court added that "[i]t certainly cannot be said that [forty-four] specific examples of copying as a matter of law are insubstantial."[204]

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196. *Id.* at 830.
197. *Id.* at 826.
198. *Id.* at 830.
199. *Id.* at 827.
200. *Id.* at 830-31; Gesmer, *Developments in the Law of Computer Software Copyright Infringement*, 26 JURIMETRICS J. 224, 229 (1986).
201. Whelan Assocs. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222, 1239 (3d Cir. 1986), *cert. denied*, 107 S. Ct. 877 (1987).
202. *Id.*
203. *SAS Inst., Inc.*, 605 F. Supp. at 829-830.
204. *Id.*

While the court did say that there was evidence that S & H had copied the organizational and structural details of the SAS program,[205] the court decided that the S & H program infringed on SAS's protected program when it found the forty-four instances of literal copying.[206] This conclusion is based on the SAS court's implications that the number of lines literally copied was not important, but rather that the lines were copied. The SAS court's statements as to the structure of the programs were not as crucial as the instance of exact copying along with the misconduct of the defendant.[207] In sum, it was improper for the *Whelan* court to conclude that a case which involved "piracy of even a quantitatively small fragment"[208] provides adequate support to widen the scope of copyright protection of computer programs.

D. The Broad Approach (continued)

The *SAS* court's decision indicates the beginning of the consideration of organizational similarities between computer programs in a copyright infringement action. *Williams v. Arndt*,[209] a case which depicts a situation visualized by Judge Higginbotham in *Synercom*,[210] held that the translation of a step-by-step set of detailed prose instructions written in a human language into a computer program was an infringement.[211]

In *Williams*, the defendant translated the plaintiff's detailed set of instructions which described a method of analysis for commodity trading into a computer program.[212] The issue was whether the defendant's program, which performed a particular method of commodity trading analysis, infringed on Williams' copyright.[213] The court held that the defendant infringed on the plaintiff's copyrighted booklet which contained detailed instructions of this new method.[214] The court's conclusion might indicate that the protected expression

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205. *Id.*

206. Note that some of the copied lines contained the word "SAS" and served no purpose in the original program.

207. *SAS Inst., Inc.*, 605 F. Supp. at 827.

208. *Id.* at 829-30.

209. 626 F. Supp. 571, 579 (D. Mass. 1985).

210. Synercom Technology, Inc. v. University Computing Co., 462 F. Supp. 1003, 1013 n.5 (N.D. Tex. 1978).

211. *Williams*, 626 F. Supp. at 581.

212. *Id.* at 573.

213. *Id.* Williams, the plaintiff, had written a pamphlet which first described this new method of commodities trading analysis.

214. *Id.* at 577-82; Gesmer, *supra* note 200, at 229.

in a literary work may include the sequence of operations included in the literary work.[215] However, the court's discussion of the defendant's misconduct and the evidence of literal copying[216] would seem to weaken this conclusion. It would be an easy chore to distinguish this case from *Whelan* based on these facts.[217] In addition, it is arguable that the protected set of instructions merely indicated a general description of the problem to be solved. Therefore, the accused program was not an infringing work, because its development required substantial imagination and independent thought.[218]

According to *Williams*, in a computer program infringement action, a court can compare the sequence and structure of an accused work with the sequence and structure of the original work. If the structures are substantially similar, then the original work has been infringed. This conclusion has extended the scope of copyright protection of a computer program. In a recent decision concerning an audiovisual copyright infringement, a California district court concluded that copyright protection of a computer program is not limited to the literal aspects of the program, but rather that the protection extends to the overall structure of a program, including its audiovisual displays.[219]

In *Broderbund Software, Inc. v. Unison World*,[220] the plaintiffs filed suit alleging a copyright infringement of their "Print Shop" program.[221] After specifically agreeing with *Whelan* and its determination that, for substantial similarity purposes, the court can compare the protected "structure, sequence, and organization" of a computer program, the court held that the overall structure, sequence, and arrangement of video screens, in the plaintiff's program, constituted protected expression resulting in an infringement.[222] The court concluded that, because the idea upon which the original program was created, the development of a banner producing program,[223] was separable from the purely aesthetic expression on the video screens,

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215. *Id.*

216. *Williams*, 626 F. Supp. at 579.

217. *See supra* notes 61-84 and accompanying text.

218. Synercom Technology, Inc. v. University Computing Co., 462 F. Supp. 1003, 1013 n.5 (N.D. Tex. 1978).

219. Broderbund Software, Inc. v. Unison World, Inc., 648 F. Supp. 1127, 1133 (N.D. Cal. 1986); *see* Note, *supra* note 107, at 105.

220. 648 F. Supp. 1127 (N.D. Cal. 1986).

221. The "Print Shop" program is used for creating customized greeting cards, signs, banners, and posters on a computer.

222. *Broderbund Software*, 648 F. Supp. at 1133.

223. *Id.* at 1133-34.

and because other non-infringing programs with the same underlying idea exist, the defendant had violated the copyright laws.

Without reiterating the differences between audiovisual works and literary works,[224] it is important to focus on the court's misinterpretation of the *Whelan* court's analysis. The *Broderbund* court said that "*Whelan* . . . stands for the proposition that copyright protection is not limited to the literal aspects of a computer program, but rather that it extends to the overall structure of a program, including its audiovisual displays."[225] While it is true that *Whelan* extended copyright protection of computer programs beyond the literal code,[226] it did not extend the protection of the program to include the structure of the audiovisual displays. *Whelan* indicated that similarities of audiovisual displays can be used as indirect evidence of computer copyright infringement.[227] The *Broderbund* court's statement seems to indicate that the court neglected the statutory difference between textual works, *i.e.*, computer programs, and audiovisual displays.[228] Aside from the court's incorrect reliance on *Whelan* as a basis for its decision, the physical aspects of audiovisual works would seem to justify the extension of audiovisual copyright protection to include the overall structure, sequence, and arrangement of the sights and sounds of video displays.

E. Advocate of the Strict Approach

The above analysis of the second generation of computer copyright infringement cases began with the notion that copyright may either protect too little if the protected expression is limited to the literal code, or it may protect too much if the expression extends beyond the literal program code. Appropriate copyright protection for a computer program lies in the objectives of the Copyright Act's underlying public policy. Copyright protection is based on the Federal government's conviction that the encouragement of individual effort by personal gain of authors and inventors is the most effective method to advance the public welfare.

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224. *See supra* notes 179-85 and accompanying text for background material concerning the differences between audiovisual and literary works.

225. *Broderbund Software*, 648 F. Supp. at 1133. *But see* Digital Communications Assocs. v. Softklone Distrib. Corp., 659 F. Supp. 449, 455-56 (N.D. Ga. 1987).

226. Whelan Assocs. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222, 1248 (3rd Cir. 1986), *cert. denied*, 107 S. Ct. 877 (1987).

227. *Id.* at 1244.

228. *Broderbund Software*, 648 F. Supp. at 1133.

Considering the interests of the proprietors and creators in their protected computer program expressions, it is important that programs be adequately protected. If the courts determine that the copyright protection of computer programs is to be narrowly construed, *i.e.*, protecting only the literal code, the creators and proprietors will find that the very element of their programs which distinguishes their products from their competitor's products, *i.e.*, the logic and design, is unprotected.[229] In addition, if the literal code is considered the only protected expression of a program, copyright protection will be of limited use, because the literal expression can easily be changed by competitors.[230]

If the courts continue to interpret the expression in computer programs as broadly as they have in *Whelan*, the developers of computer programs will be adversely affected. If the copyright of a computer program is held to protect the "method of achieving certain results—embodied in the program structure or algorithms, copyright may block software innovators by precluding the creation of programs that differ in detail, but implement and perhaps improve on [the original] copyrighted program."[231]

In conclusion, because of the economic, commercial, and scientific effects resulting from the extension of copyright protection to include the structure and organization of a computer program, it would be improper for the courts to pursue their present course of extending the protectable expression to include the intangible or inconcrete aspects of a computer program. Should the courts decide to continue broadening the scope of copyright protection for computer programs and include the sequence of operations of a program as protectable expression, they will run the risk of protecting the idea encompassed in the program and provide copyrightable subject matter with patent-like protection. This is a likely result because the structure of the program is inseparable from the underlying idea and protecting the idea or process is prohibited by copyright law but permitted by patent law. The only way to prevent these effects from occurring would be to restrict the scope of the protectable expression of computer programs to the literal code. While this approach may negatively

229. Note, *supra* note 58, at 267-85 (author advocates the protection of flow logic or algorithm of a computer program).

230. *See* Nimmer & Krauthaus, *supra* note 105, at 12 (discussion of value added software); Stern, *supra* note 134, at 1238-39 (discusses similarities in Wordstar, a word processing program, with other word processing programs).

231. OTA Report, *supra* note 74, at 83.

affect others' interests,[232] it is the only approach which is judicially sound.

The courts are not in a position to affect the scientific and commercial interests of others, but rather this is an issue which should be addressed by Congress. This is the more realistic conclusion because the courts' present extension of copyright protection of computer programs potentially conflicts with the patent system and its definition and protection of functional information. "Overly broad copyright protection would give the owner [of the program] patent-like protection over processes for a much longer duration than patent law provides, and do so with no examination of the program's novelty or nonobviousness, as is required by patent law."[233] Therefore, because of the conflict created by the courts in broadening the scope of copyright protection for computer programs, Congress should direct the courts and instruct them as to the correct scope of computer program copyright protection.[234]

CONCLUSION

The Third Circuit's extension of copyright protection of computer programs in *Whelan Associates v. Jaslow Dental Laboratory, Inc.*,[235] has *potentially* placed the copyright protection of computer programs in conflict with the patent system's protection of functional processes. The court's proposal to protect the intangible "look and feel" of a program is a difficult standard for other courts to interpret properly. At present, for lack of a better standard which would protect the interests of all parties, the courts should adhere to the well grounded standard of comparing evidence of *only* literal copying as proof of substantial similarity in a computer copyright infringement action.

Jeffrey Allen Berkowitz

232. *Id.*

233. *Id.*

234. Davidson, *supra* note 43, at 760-82 (discusses various proposals for legislative change made before 1984).

235. 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 107 U.S. 877 (1987).