COPYRIGHT—COMPUTER SOFTWARE COPYRIGHT INFRINGEMENT—THREE-STEP TEST FOR SUBSTANTIAL SIMILARITY, INVOLVING ABSTRACTION, FILTRATION, AND COMPARISON, SHOULD BE APPLIED IN DETERMINING WHETHER COMPUTER SOFTWARE COPYRIGHT HAS BEEN INFRINGED—*Computer Assocs. Int'l, Inc. v. Altai, Inc.*, 982 F.2d 693 (2d Cir. 1992)

Rapid technological innovation in software design and the concomitantly speedy incorporation of these new ideas into better software products has driven the phenomenal growth of the young but burgeoning computer software industry.[1] The overnight financial success of software companies like Microsoft[2] has inspired many aspiring entrepreneurs to enter the increasingly competitive marketplace for software.[3] Inevitably, this marketplace competi-

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[1] *See generally* STEPHEN MANES & PAUL ANDREWS, GATES: HOW MICROSOFT'S MOGUL REINVENTED AN INDUSTRY—AND MADE HIMSELF THE RICHEST MAN IN AMERICA (1993) (biography of Bill Gates, founder of Microsoft). In 1955, fewer than 500 computers, with an aggregate retail value of less than $200 million, existed in the entire world. *Id.* at 2. In 1980, desktop personal computers were sold directly to individual consumers, but the total sales of the nascent industry were still well under $1 billion. *See id.* at 149. Today, computers are ubiquitous; in 1990, the sales of software industry leader Microsoft alone amounted to $1.47 billion. *Id.* at 422. In 1992, "Microsoft tacked on $975 million in calendar year revenues - more than 90% of all revenue growth in the PC software industry. . . ." Kathy Rebello *et al.*, *Is Microsoft Too Powerful?*, BUSINESS WEEK, Mar. 1, 1993, at 85.

For a trenchantly irreverent history of the computer software industry, see ROBERT X. CRINGELY, ACCIDENTAL EMPIRES: HOW THE BOYS OF SILICON VALLEY MAKE THEIR MILLIONS, BATTLE FOREIGN COMPETITION, AND STILL CAN'T GET A DATE (1992). The author, whose trade gossip column appears weekly in the computer trade magazine, *InfoWorld*, humorously yet cogently chronicles the development of the personal computer (PC) industry. According to the author, the PC industry—with over $70 billion in hardware and software sales worldwide in 1990—is the world's largest industry "[a]fter automobiles, energy production, and illegal drugs." *Id.* at 4.

[2] Bill Gates and Paul Allen formed Microsoft as a partnership in 1975; Microsoft's entire income for that year amounted to $16,005. MANES & ANDREWS, *supra* note 1, at 84, 90. In 1986, after Microsoft's initial public offering, Microsoft shares closed at $27.75 per share, giving the company a value of $311 million. *Id.* at 306-07. By early 1992, Microsoft's market capitalization stood at more than $22 billion, and Bill Gates's net worth was over $7 billion. *Id.* at 9. A Microsoft programmer who had the foresight to hold onto all of her stock options today would be a millionaire almost four times over. *Id.* at 176.

[3] *See* Rebello, *supra* note 1, at 84. During the 1980s, numerous start-up software companies became overnight successes, including most notably Microsoft, Novell, Lotus, Borland, Ashton-Tate, Aldus, Adobe Systems, Symantec, and Software Publishing. *Id.*; *see also* CRINGELY, *supra* note 1, at 68-69, 192, 209-10, 215-16, 220-26, 254-57, 259-61, 262-63, 277-80. On the other hand, nineteen out of twenty software start-ups fail. CRINGELY, *supra* note 1, at 37, 232. And, of course, not all of the software companies that do survive ultimately earn the several billion, or even several million, dollars in gross revenues; many entrepreneurs are content making a reasonable living, occupying some tiny niche in the vast software marketplace. *See id.* at 246.

tion has spilled over into the courtroom as industry competitors fight to influence the legal standards that will shape, if not define, the structure and character of the computer software market.[4] These legal battles, which take the form of copyright infringement suits, raise thorny but perhaps not intractable issues relating to the proper scope of copyright protection.[5]

Copyright law and intellectual property law in general are concerned with economic efficiency; indeed, the constitutional clause authorizing congressional legislation in this area specifically states as its goal and purpose the promotion of progress in science and the "useful arts."[6] According to traditional economic theory, without copyright protection to stimulate artistic creativity, literary and artistic works would be underproduced and, hence, social welfare would not be maximized.[7] On the other hand, overbroad copy-

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[4] *See, e.g.*, Brown Bag Software v. Symantec Corp., 960 F.2d 1465, 1469 (9th Cir. 1992) ("Brown Bag alleged that Symantec's Grandview infringed Brown Bag's copyright and trademark rights in PC-Outline"), *cert. denied*, 113 S. Ct. 198 (1992); Ashton-Tate Corp. v. Ross, 916 F.2d 516, 520-21 (9th Cir. 1990) (plaintiff alleged that his list of user commands was incorporated into Ashton-Tate's Full Impact spreadsheet program thereby making him a joint author; court held that the list of commands was not protectable); Lotus Dev. Corp. v. Borland Int'l, Inc., 788 F. Supp. 78, 80 (D. Mass. 1992) (Lotus alleged that Borland's Quattro Pro program infringed its copyright in Lotus 1-2-3); Apple Computer, Inc. v. Microsoft Corp., 717 F. Supp. 1428, 1429 (N.D. Cal. 1989) (Apple Computer alleged that the user interface of Microsoft Windows 2.03 and Hewlett Packard's NewWave infringed Macintosh graphic user interface); Lotus Dev. Corp. v. Paperback Software Int'l, 740 F. Supp. 37, 68 (D. Mass. 1990) (Lotus asserted that the user interface and menu structure of its program was copyrightable); Manufacturers Technologies, Inc. v. CAMS, Inc., 706 F. Supp. 984, 987 (D. Conn. 1989) (Manufacturers Technologies alleged that CAMS, Inc. infringed its copyright in software programs); Digital Communications Assocs., Inc. v. Softklone Distrib. Corp., 659 F. Supp. 449, 462 (S.D. Fla. 1987) (plaintiff asserted that the status screen of its Crosstalk XVI communications program was copyrightable as a compilation of command terms).

[5] *See* RAYMOND T. NIMMER, THE LAW OF COMPUTER TECHNOLOGY ¶ 1.02 (1992). For example, courts must determine what elements of a computer program are protected under the federal copyright laws; in particular, courts must decide what protections, if any, are applicable to the structure of a program, its visual displays, and other elements of its user interface. *Id.* In deciding these legal issues, courts must consider how their decisions will impact competition and product development in the software industry. *Id.* at ¶ 1.01. Furthermore, because the copyright laws were originally designed to protect and encourage the creative expression of artists and authors, courts must adapt rules and concepts (intended for application to literary and artistic works) for use in protecting software technology. *Id.* The result has thus far been confusing if not utterly chaotic. *See id.*

[6] In enumerating the powers of the federal government, the Constitution provides that Congress shall have the power "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." U.S. CONST. art. I, § 8, cl. 8.

[7] *See generally* William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325 (1989). Judge Posner, one of the most visible

right protection can stifle legitimate competition and *ipso facto* detrimentally impact public welfare.[8] Therefore, in fashioning copyright protection, Congress and the courts must balance the need to provide creative incentive with the contrapuntal need to encourage economic competition.[9]

In the area of computer software, courts have struggled arduously to establish this delicate equilibrium.[10] The initial line of computer software copyright cases established that software was in-

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and outspoken leaders of the Chicago School law and economics movement, has often voiced his view that the purpose of law is wealth maximization and that law generally promotes Pareto efficient allocation of resources. *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 17-23 (2d ed. 1977); RICHARD A. POSNER, THE ECONOMICS OF JUSTICE 6 (1981). Of course, this utilitarian theory of law is not new, and in fact originated with David Hume (who proposed utility maximization as a norm) and was popularized by Jeremy Bentham. *See* JESSE DUKEMINIER & JAMES E. KRIER, PROPERTY 137-38 (2d ed. 1988) (citing JEREMY BENTHAM, THE THEORY OF LEGISLATION 111-13 (4th ed. 1882)). While the law and economics movement has many adherents, not everyone subscribes to its teachings; many legal academicians have criticized wealth maximization as a normative principle and as a descriptive principle. *See, e.g.*, JULES L. COLEMAN, MARKETS, MORALS AND THE LAW 95-132 (1988) (contending that moral imperatives are more important than wealth maximization). In addition, some proponents of a "non-Posnerian" law and economics approach have argued that economic efficiency can be achieved without conferring intellectual property rights and, furthermore, that patents and copyrights (like any other monopoly) will lead to a suboptimal allocation of resources. *See* Tom G. Palmer, *Intellectual Property: A Non-Posnerian Law and Economics Approach*, 12 HAMLINE L. REV. 261, 304 (1989) ("Patents and copyrights have no place in a regime based on individual rights and are insupportable on either the grounds of (utilitarian) efficiency or of a jurisprudence of law and economics.") (alteration in original); *but cf.* Michael I. Krauss, *Property, Monopoly, and Intellectual Rights*, 12 HAMLINE L. REV. 305, 308-18 (1989) (specifically criticizing Palmer's analysis).

[8] *See* Peter S. Menell, *Tailoring Legal Protection for Computer Software*, 39 STAN. L. REV. 1329, 1360-61 (1987). Professor Menell offers a detailed hypothetical example illustrating how copyright protection for operating systems software might discourage innovation and promote wasteful research and development expenditures. *Id.* Professor Menell also posited that "secondary inventions," such as design improvements, modifications, and refinements of the initial innovation, could be hindered by overly expansive legal protection for intellectual property. *Id.* at 1338.

Because innovation is a process of accretion, removing such works from the public domain is likely to hinder rather than promote scientific or artistic advances. *See* NIMMER, *supra* note 5, at ¶ 1.02[1] ("Every author (or inventor) is both a first developer and a second user who borrows from and builds on earlier innovations. An incentive system that protects the 'first' author too strongly may harm subsequent development, while too little protection eviscerates incentives.").

[9] *See* Menell, *supra* note 8, at 1372 ("Legal protection for . . . operating systems must reward important innovations without bestowing pure monopolies on expression."). Professor Menell proposed that Congress create a commission comprised of lawyers, computer scientists, and economists to reexamine the issue of legal protection of computer software. *Id.*

[10] *See supra* note 4 and *infra* note 12 (listing cases in which courts attempted to balance the need for creative incentive with the need for economic competition).

deed copyrightable, and that literal copying or translation of either source or object code[11] constituted copyright infringement.[12] The "second generation" of software copyright cases, beginning with the seminal *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*,[13] extended copyright protection to the non-literal elements of a computer program, i.e., its "structure, sequence, and organization."[14] Many academics criticized the *Whelan* decision and its proposed substantial similarity test as conceptually overbroad,[15] and

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11 Object code is "a concatenation of '0's and '1's . . . . that directs the computer to perform functions." Whelan Assocs., Inc. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222, 1230-31 (3d Cir. 1986).

12 *See, e.g.*, Apple Computer, Inc. v. Formula Int'l Inc., 725 F.2d 521, 522 (9th Cir. 1984) (concluding that operating system software is copyrightable); Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1249 (3d Cir. 1983) (holding that source and object code of operating system are copyrightable), *cert. dismissed*, 464 U.S. 1033 (1984); Williams Elecs., Inc. v. Artic Int'l, Inc., 685 F.2d 870, 873, 874 (3d Cir. 1982) (determining that object code of video game program is copyrightable); Midway Mfg. Co. v. Strohon, 564 F. Supp. 741, 742 (N.D. Ill. 1983) (holding that defendant infringed plaintiff's " 'literary works' copyright in the computer program stored in certain Read Only Memory chips (ROMs) located in the PAC-MAN game's printed circuit board"); Data Cash Sys., Inc. v. JS&A Group, Inc., 480 F. Supp 1063, 1069 (N.D. Ill. 1979) (concluding that because "the ROM is not in a form which one can 'see and read' with the naked eye, it is not a 'copy' within the meaning of the 1909 Act"), *aff'd on other grounds*, 628 F.2d 1038 (7th Cir. 1980).

13 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 479 U.S. 1031 (1987).

14 *Id.* at 1248. The *Whelan* court recognized that the design or structure of a complex computer program involves tremendous creativity and often is the most costly aspect of program development. *Id.* at 1237. The court reasoned that extending copyright protection to non-literal details of program design was therefore appropriate, noting that extending such protection would provide "the proper incentive for programmers by protecting their most valuable efforts. . . ." *Id.*

15 *See, e.g.*, Peter S. Menell, *An Analysis of the Scope of Copyright Protection for Application Programs*, 41 STAN. L. REV. 1045, 1074 (1989) (positing that the *Whelan* decision espoused an "extremely broad view of what should be considered expression within the structure, sequence, and organization of application program code"); Steven R. Englund, Note, *Idea, Process, or Protected Expression?: Determining the Scope of Copyright Protection of the Structure of Computer Programs*, 88 MICH. L. REV. 866, 881 (1990) ("The widespread application of the [*Whelan*] rule is likely to have undesirable consequences."); Thomas M. Gage, Note, Whelan Associates v. Jaslow Dental Laboratories [sic]: *Copyright Protection for Computer Software Structure—What's the Purpose?*, 1987 WIS. L. REV. 859, 860 (1987) (asserting that *Whelan*'s holding "provides overly broad copyright protection when viewed in relation to the stated goals of intellectual property"); Marc T. Kretschmer, Note, *Copyright Protection for Software Architecture: Just Say No!*, 1988 COLUM. BUS. L. REV. 823, 839 (1988) ("The problem with the *Whelan* formulation is that it's [sic] overbroad statement of the idea defeats the actual purpose of the idea/expression test."); Peter G. Spivack, Comment, *Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software*, 35 UCLA L. REV. 723, 747 (1988) (contending that the *Whelan* rule is (1) "hopelessly overbroad in theory," (2) "produces an inefficient result," and (3) "will severely impede progress in the computer programming field").

industry commentators decried the spate of "look and feel"[16] cases filed in *Whelan*'s wake.[17]

Recently, in *Computer Associates International, Inc. v. Altai, Inc.*,[18] a decision widely viewed as sharply curtailing the scope of computer software copyright protection,[19] the Second Circuit explicitly rejected the *Whelan* standard and instead articulated a new test for determining computer software copyright infringement.[20] The *Altai* court's formulation for judging substantial similarity of non-literal elements of computer programs consists of three steps:

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16 The phrase "look and feel" is a term of art referring to the user interface, including the screen displays, the menu sequence and structure, and keyboard interactions. *See* Brian Johnson, Comment, *An Analysis of the Copyrightability of the "Look and Feel" of a Computer Program:* Lotus v. Paperback Software, 52 OHIO STATE L.J. 947, 953 (1991) ("In general, the 'look and feel' of a computer program can be defined as the elements of a program that a user of the program will deal with upon using the program. . . . The 'look and feel' of a program generally refers to software elements of a computer, not hardware."). One commentator has defined "look and feel" as "[t]he visual and tactile 'aura' created by the particular layout of displays and input formats used in the interface . . . ." Alfred C. Yen, *A First Amendment Perspective on the Idea/Expression Dichotomy and Copyright in a Work's "Total Concept and Feel,"* 38 EMORY L.J. 393, 419 n.152 (1989).

The "look and feel" doctrine, originally called the "total concept and feel" doctrine, was first developed in the 1970s. *See* Christian H. Nadan & James W. Morando, *Standardization and Interoperability Become Key Factors in Copyright Law,* COMPUTER LAW., April 1993, at 14. Under this doctrine, infringement would be found if the allegedly infringing work evoked the same "feeling" as plaintiff's work even if none of the individual elements or parts of the allegedly infringing work actually infringed any part of the plaintiff's work. *Id.* In *Roth Greeting Cards v. United Card Co.*, for example, the court found infringement where the defendant's greeting cards were substantially similar in mood, color, and scheme. *Id.* (citing Roth Greeting Cards v. United Card Co., 429 F.2d 1106, 1110 (9th Cir. 1970)).

17 *See, e.g.*, Ronald Abramson, *Why* Lotus-Paperback *Uses the Wrong Test And What the New Software Protection Legislation Should Look Like,* COMPUTER LAW., Aug. 1990, at 9. (predicting line of cases producing unwarranted software monopolies); Jim Seymour, *The Case Against 'Look-and-Feel' Lawsuits,* PC WEEK, Mar. 17, 1987, at 34 (asserting that "Look-and-Feel lawsuits stink."); *Copyright Suits Could Slow Innovation,* INFOWORLD, July 9, 1990, at 1; Roberta Furger & Rachel Parker, *Software on Trial,* INFOWORLD, Jan. 9, 1989, at 31.

18 982 F.2d 693 (2d Cir. 1992).

19 *See, e.g.*, Altai *Cited in Lotus Win Over Borland,* COMPUTER L. STRATEGIST, Aug. 1992, at 1 ("It was widely expected that the Second Circuit's decision in *Computer Assocs. International, Inc. v. Altai, Inc.* would make it more difficult for major software developers to demonstrate that 'clones' of their best-selling programs infringed upon their copyrights.") (citations omitted); John Markhoff, *Ruling Restricts Software Copyright Protection,* N.Y. TIMES, June 24, 1992, at D1 (stating that *Altai* departs from *Whelan* and would thereby "make it easier for companies to copy original works"); Deborah Pines, *Criteria for Software Infringement Adopted: Circuit Court Limits Copyright Protections,* N.Y.L.J., June 24, 1992, at 1 (contending that the *Altai* three-part test sharply narrows software copyright protection).

20 *Altai*, 982 F.2d at 705-11; *see also infra* notes 86-114 and accompanying text (discussing the Second Circuit's reasoning).

abstraction,[21] filtration,[22] and comparison.[23]

In 1988, Computer Associates (CA) brought a copyright infringement and trade secret misappropriation action against Altai, Inc.,[24] alleging that Altai's computer program, OSCAR, infringed ADAPTER,[25] part of CA's copyrighted computer program, SCHEDULER.[26] The dispute centered around OSCAR 3.5. This version was written by Altai in 1989 after an Altai employee admitted that, in writing an earlier version, OSCAR 3.4, he had used source code taken without permission from his previous employer, CA.[27] Although OSCAR 3.5 was rewritten by programmers who

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21 *Altai*, 982 F.2d at 706. The Second Circuit posited that "a court should dissect the allegedly copied program's structure and isolate each level of abstraction contained within it." *Id.* at 707.

22 *Id.* The panel declared that courts must "examin[e] the structural components at each level of abstraction to determine whether their particular inclusion at that level was 'idea' . . . ." *Id.* The Second Circuit explained that at each level of abstraction, a court must filter out all components dictated by efficiency concerns, compelled by external factors, or derived from the public domain. *Id.* The court asserted that what remains after the filtration step is a "core of protectable expression." *Id.* at 710.

23 *Id.* The court instructed that "[a]t this point, the court's substantial similarity inquiry focuses on whether the defendant copied any aspect of this protected expression, as well as an assessment of the copied portion's relative importance with respect to the plaintiff's overall program." *Id.* (citations omitted).

24 *Computer Assocs. Int'l, Inc. v. Altai, Inc.*, 775 F. Supp. 544, 549 (E.D.N.Y. 1991). CA, a Delaware corporation principally based in Garden City, New York, and Altai, a Texas corporation doing business in Arlington, Texas, both design, develop, and market computer software packages that run on a variety of computer hardware platforms. *Id.* In the whimsical tradition of upstart computer companies such as Apple and Lotus, Altai apparently chose to name itself after the altai, a mountain goat indigenous to the Altai Mountains. *See* WEBSTER'S NEW UNIVERSAL UNABRIDGED DICTIONARY 52 (2d ed. 1983).

25 ADAPTER was a subprogram (i.e., a wholly integrated component) of SCHEDULER, a job scheduling program originally designed by CA to run on IBM mainframe computers. *Altai*, 982 F.2d at 698. ADAPTER was never marketed as a separate, stand-alone software package. *Id.* ADAPTER was an "'operating system compatibility component,' which means, roughly speaking, it serves as a translator." *Id.* Similarly, OSCAR was the operating system compatibility module for Altai's job scheduling program, ZEKE. *Id.* at 699, 700. As the name suggests, a job scheduling program's primary function is to prioritize jobs or tasks which the computer must perform and schedule when those tasks will be executed. *Id.* at 698. The utility of dividing such a program into operating system dependent and operating system independent modules derives from the increased ease and lower cost of modifying such a modularized program (vis-a-vis a non-modularized program) so that it can run on another operating system. *Id.* at 699.

26 *Id.* at 698.

27 *Id.* at 700. In 1983, Altai decided to port ZEKE from the VSE operating system to the MVS operating system; in other words, ZEKE, which was originally designed to run on the VSE operating system, was redesigned to run on the MVS operating system. *Id.* at 699. James P. Williams, then an Altai employee and later its president, recruited long-time friend, Claude F. Arney, III, a programmer employed by CA, to

had not been involved in the development of OSCAR 3.4, CA alleged that the new version infringed "non-literal" aspects of ADAPTER.[28]

CA originally brought suit in the United States District Court

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assist in rewriting ZEKE. *Id.* Although Williams was a former CA employee and was aware of SCHEDULER and ADAPTER, he had not been involved in the development of these programs and had never seen either program's actual code. *Id.* Arney, by contrast, had worked on the VSE version of ADAPTER and was "intimately familiar" with certain aspects of the program. *Id.* In fact, when he left CA in January 1984, Arney kept copies of ADAPTER source code, in violation of his employment contract with CA. *Id.* at 699-700.

While planning the design of the MVS version of ZEKE, Arney suggested to Williams that they introduce a "common system interface" component into ZEKE; they decided to dub this compatibility component OSCAR. *Id.* at 700. Unbeknownst to Williams, Arney's inspired idea derived from his earlier work on ADAPTER. *Id.* Moreover, in creating OSCAR, Arney ultimately copied approximately 30% of OSCAR's source code from ADAPTER. *Id.* For three years, apparently still unaware that OSCAR contained misappropriated code, Altai used OSCAR 3.4 in its ZEKE, ZACK, and ZEBB products. *Id.*

[28] *Id.* at 700, 701. CA first discovered that Altai may have misappropriated parts of ADAPTER in July, 1988. *Id.* at 700. After verifying its suspicions, CA copyrighted versions 2.1 and 7.0 of SCHEDULER and immediately brought suit against Altai. *Id.* Upon learning of CA's allegations, Williams immediately launched an investigation and determined from Arney what parts of OSCAR had been copied. *Id.* As advised by counsel, Williams initiated a rewrite of OSCAR, assigning eight programmers who had not previously been involved in the development of OSCAR. *Id.*

Altai was apparently attempting to set up a "clean room defense." *See* NIMMER, *supra* note 5, at ¶ 1.22[1]. A plaintiff in a copyright infringement suit must prove: (1) that the defendant had access to the allegedly infringed work; and (2) that the second work is substantially similar to the allegedly infringed work. *Id.* By documenting that its programmers did not have access to CA's code, Altai hoped to negative the first element. *See Altai*, 982 F.2d at 700. This is actually a common strategy used in the computer industry to reverse-engineer ROM (Read Only Memory) chips:

> The standard method for creating a compatible ROM (the "clean room") is to have one team study the system (and any publicly available documentation, which in the case of the original PC included source code) and prepare a set of functional specifications for the software written in the ROM. Another team—which never had "access" to the copyrighted work—works in isolation solely from the functional specifications and writes a program that performs all of the specified functions.

Abramson, *supra* note 17, at 7-8.

Judge Pratt noted that there was conflicting evidence as to whether the programmers had access to the ADAPTER code during the rewrite process. *Altai*, 775 F. Supp. at 558. Choosing not to resolve the factual issue, Judge Pratt instead assumed that the programmers did have access. *Id.* Despite this assumption, Judge Pratt concluded that none of the programmers involved in the rewrite took advantage of such access by copying the ADAPTER code into the rewritten program. *Id.*

The Altai programming team completed the rewrite project in six months, by November of 1989. *Altai*, 982 F.2d at 700. Subsequently, Altai replaced OSCAR 3.4 with the "clean" version 3.5 and shipped the new version to its existing customers as a free upgrade. *Id.* Despite Altai's efforts to rectify the situation, CA did not drop its lawsuit. *See id.*

for the District of New Jersey.[29] The district court found that Altai's OSCAR 3.4 had infringed CA's SCHEDULER, and accordingly awarded damages of $364,444 to the plaintiff.[30] The district court determined, however, that OSCAR 3.5 was not "substantially similar" to ADAPTER, and hence denied relief on CA's second copyright infringement claim.[31] Finally, the district court held that federal copyright law preempted CA's state law claims of trade secret misappropriation.[32]

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[29] *Altai*, 982 F.2d at 700. By stipulation of the parties, however, the action was transferred to the Eastern District of New York. *Id.* Judge Mishler, to whom the case had initially been assigned, transferred the case on October 26, 1989, to Judge Pratt, who was sitting by designation in the district court. *Id.*

[30] *Id.* at 696. At trial, Altai conceded that it had copied roughly 30% of OSCAR 3.4 from Arney's copy of the ADAPTER code. *Altai*, 775 F. Supp. at 560.

[31] *Altai*, 982 F.2d at 697. In reaching its conclusion, the trial court relied heavily on Dr. Randall Davis, a computer science professor at the Massachusetts Institute of Technology and court appointed expert. *See Altai*, 775 F. Supp. at 549, 559-62. Dr. Davis testified that "there remained virtually no lines of code [in OSCAR 3.5] that were identical to ADAPTER." *Id.* at 561. On the other hand, Dr. Davis observed that there was some evidence of similarity with respect to parameter lists and macros, but then opined that "many, if not most, of the parameter lists and macros were dictated by the functionality of the program." *Id.* Ultimately, Dr. Davis was unable to determine whether the macros and parameter lists of ADAPTER had been copied to any meaningful extent. *Id.* Judge Pratt nevertheless concluded that CA had failed to sustain its burden of proof with respect to substantial similarity of the parameter lists and macros. *Id.* at 562. Lastly, Dr. Davis decided that the similarities in "'high level structure' (as reflected in the organization chart)" were irrelevant because the structure "was so simple and obvious to anyone exposed to the operation of the program." *Id.*

[32] *Altai*, 775 F. Supp. at 564. Prior to the 1976 revision of the Copyright Act, common law copyright provided protection for unpublished works, but once a work was published, federal statutory copyright law became the sole source of protection. EDMUND W. KITCH & HARVEY S. PERLMAN, LEGAL REGULATION OF THE COMPETITIVE PROCESS 455 (4th ed. 1991). Whereas the 1909 Copyright Act preserved state copyright protection for unpublished works, section 301 of the 1976 Copyright Act specifically preempted all state law protection equivalent to federal copyright protection. *Id.* at 456, 457.

Section 301 provides in relevant part:

> (a) On and after January 1, 1978, all legal or equitable rights that are equivalent to any of the exclusive rights within the general scope of copyright as specified by section 106 in works of authorship that are fixed in a tangible medium of expression and come within the subject matter of copyright as specified by sections 102 and 103, whether created before or after that date and whether published or unpublished, are governed exclusively by this title. *Thereafter, no person is entitled to any such right or equivalent right in any such work under the common law or statutes of any State.*
>
> (b) Nothing in this title annuls or limits any rights or remedies under the common law or statutes of any State with respect to—
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> (1) subject matter that does not come within the subject matter of copyright as specified by sections 102 and 103, including works of authorship not fixed in any tangible medium of expression; or

On appeal to the United States Court of Appeals for the Second Circuit, plaintiff CA challenged the district court's ruling, asserting that the district court committed error when (1) it applied a test for copyright infringement that did not sufficiently take into account a computer program's "non-literal elements" and (2) it "concluded that [CA's] state law trade secret claims had been preempted by the federal copyright act."[33] In its original decision, the Second Circuit panel affirmed the district court's decision in its entirety.[34] CA petitioned for rehearing on the preemption issue,

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(2) any cause of action arising from undertakings commenced before January 1, 1978;

(3) activities violating legal or equitable rights that are not equivalent to any of the exclusive rights within the general scope of copyright as specified by section 106; or

(4) State and local landmarks, historic preservation, zoning, or building codes, relating to architectural works protected under section 102(a)(8).

17 U.S.C. § 301 (1988 & Supp. V 1994) (emphasis added).

The district court reasoned that CA's trade secret misappropriation claim was identical in substance to its copyright infringement claim; that is, the alleged act of copying was the sole factual predicate for both claims. *Altai*, 775 F. Supp. at 565. The district court rejected CA's argument that trade secret misappropriation involves an additional element of the breach of a confidential relationship and hence was not preempted. *Id.* at 564. According to the district court, CA's trade secret claims were preempted because the right CA sought to vindicate in its misappropriation claim (i.e., the right to prevent others from making copies) was coextensive with CA's right under the federal copyright laws. *Id.* at 564-65. The district court acknowledged, however, that its preemption analysis would be different if CA had brought a claim against Arney, premised on a theory of illegal acquisition of a trade secret. *Id.* at 565.

Interestingly enough, despite dismissing CA's trade secret claim on preemption grounds, the district court proceeded to consider the merits of CA's allegations of trade secret misappropriation. *Id.* at 566. The district court first explained that because the action had been transferred from the District of New Jersey pursuant to 28 U.S.C. § 1404(a), the court should apply the choice of law rules of the transferor court. *Id.* (quoting Ferens v. John Deere Co., 494 U.S. 516 (1990); Van Dusen v. Barrack, 376 U.S. 612 (1964)). Applying New Jersey's "governmental interest" approach to conflict of laws, the district court concluded that Texas law would control the trade secret claim because "the most significant relationship and closest contacts with the occurrence and with the parties is with Texas." *Id.* Next, the district noted that CA's trade secret claim would be time-barred under Texas's two-year statute of limitations unless the running of the statute of limitations had been tolled by the discovery rule. *Id.* Finally, without actually deciding the issue, the district court stated that it was inclined to find that the discovery rule applied because the Texas courts were "moving toward the adoption of the discovery rule in all cases where 'it is difficult for the injured party to learn of the negligent act or omission.'" *Id.* (quotation omitted).

[33] *Altai*, 982 F.2d at 701. Although both parties originally appealed, Altai abandoned its appeal and conceded liability for copying ADAPTER into OSCAR 3.4. *Id.*

[34] *Id.* at 716. The original decision is available on Westlaw. *See* Computer Assocs. Int'l, Inc. v. Altai, Inc., Nos. 762, 91-7892, 91-7935, 1992 WL 139364 (2d Cir. June 22, 1992).

pointing out that parts of the record below were not included in the appendix on appeal.[35]

Granting the petition for rehearing, a divided panel, with Circuit Judge Altimari dissenting, withdrew its initial opinion and filed an amended opinion that vacated the district court's preemption ruling and remanded CA's trade secret claims to be determined on the merits.[36] On remand,[37] applying Texas law,[38] Judge Pratt held that the two-year statute of limitations had run on CA's trade secret misappropriation claim and accordingly dismissed the claim.[39]

Congress is authorized, but not mandated, by the Constitution to enact legislation protecting literary works.[40] The Copyright Act of 1976 (Copyright Act),[41] which became effective on January 1, 1978, sets forth the basic criteria for determining whether a work qualifies as copyrightable subject matter.[42] Section 102(a) provides that a work may be copyrighted if it is an original[43] "work of au-

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35 *Altai*, 982 F.2d at 716.

36 *Id.* Specifically, the panel majority held that a state law claim was not preempted if it required an "extra element" in addition to the elements necessary to establish copyright infringement. *Id.* The panel majority found that breach of duty constituted the "extra element" that distinguished state law trade secret misappropriation claims from federal copyright claims. *Id.* at 717. In a terse separate opinion, Circuit Judge Altimari dissented from this part of the court's analysis. *Id.* at 721 (Altimari, J., concurring in part and dissenting in part).

37 Computer Assocs. Int'l, Inc. v. Altai, Inc., 832 F. Supp. 50 (E.D.N.Y. 1993).

38 Judge Pratt applied New Jersey's choice of law rules. *Id.* at 51; *see* Computer Assocs. Int'l, Inc. v. Altai, Inc., 775 F. Supp. 544, 566 (E.D.N.Y. 1991). See *supra* note 32 for discussion of district court's reasoning with respect to choice of law issues.

39 *Altai*, 832 F. Supp. at 54. *See infra* notes 139-143 and accompanying text (discussing the district court's reasoning on remand).

40 *See* U.S. CONST. art. I, § 8, cl. 8.

41 17 U.S.C. §§ 101-1010 (1988 & Supp. V 1994).

42 17 U.S.C. § 102(a) (1988 & Supp. V 1994).

43 Originality does not require that the work be unique or of a high quality; originality merely requires that (1) the work must not have been copied from another; and (2) some personal choice regarding selection or arrangement must have occurred in creating the work. *See* 1 DAVID NIMMER & MELVILLE B. NIMMER, NIMMER ON COPYRIGHT § 2.01B (1989). Lack of originality, however, has been cited as the reason for not extending copyright protection to blank forms. *See, e.g.*, Cash Dividend Check Corp. v. Davis, 247 F.2d 458, 460 (9th Cir. 1957) (holding that while blank check forms lack sufficient originality to qualify for copyright protection, integrated work, including check form, is copyrightable); *see also* 37 C.F.R. § 202.1(c) (1991) (prohibiting copyright in "[b]lank forms, such as time cards, graph paper, account books, diaries, bank checks, scorecards, address books, report forms, order forms and the like, which are designed for recording information and do not in themselves convey information").

Recently, the United States Supreme Court held that the white page telephone directory was not copyrightable because arrangement of non-copyrightable facts in alphabetical order lacked the minimum level of creativity necessary to trigger copyright protection. Feist Publications, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 363, 364 (1991). The originality requirement may be particularly significant in the software

thorship"[44] fixed in a tangible medium of expression from which it can be perceived, reproduced, or otherwise communicated.[45] Under the Copyright Act, the author has exclusive rights in a copyrighted work, including the right to reproduce the work, to distribute copies, and to prepare derivative works.[46]

Copyright protection does not, however, extend to any "idea, procedure, process, system, method of operation, concept, principle or discovery."[47] The Supreme Court first articulated the idea-expression dichotomy in *Baker v. Selden.*[48] The *Baker* Court enunciated the rule that copyright protection is limited to the means of expressing an idea and does not confer rights in the underlying

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copyright arena when the structure and content of a program are controlled by external factors that dictate the author's choices. *See* Secure Servs. Technology, Inc. v. Time & Space Processing, Inc., 722 F. Supp. 1354, 1362-63 (E.D. Va. 1989) (rejecting copyright protection for communications protocol that was controlled by very explicit technical standard).

44 The Constitution authorizes Congress to provide authors with exclusive rights in their "writings." *See* U.S. CONST. art. I, § 8, cl. 8. The term "writing" had been construed broadly to encompass much more than traditional literary works such as books, newspapers, and magazines. MARGRETH BARRETT, INTELLECTUAL PROPERTY 135 (1991). When Congress substituted the term "works of authorship" in place of "writings," it decided not to extend copyright protection to all works that Congress had the constitutional authority to protect. *Id.*

45 Originally, this clause was construed to mean that the copyrightable work must be in a form perceivable and understandable by human beings. *See* NIMMER, *supra* note 5, at § 1.03[3][b]; *see also* White-Smith Publishing Co. v. Apollo Co., 209 U.S. 1, 18 (1908) (holding that musical composition recorded on a piano roll was not protected by copyright laws because it was not in a form others could see and read). The 1976 Copyright Act "overruled *White-Smith* and does not require that the work be directly perceivable" by humans. NIMMER, *supra* note 5, at § 103[3][b]. Rather, it is sufficient that the work be fixed in a tangible medium from which it can be reproduced or communicated "either directly or with the aid of a machine or device." *See* 17 U.S.C. § 102 (1988 & Supp. V 1994).

46 17 U.S.C. § 106 (1988).

47 17 U.S.C. § 102(b) (1988 & Supp. V 1994). This dichotomy between idea and expression is a fundamental one: creative expression is protected, but the copying of ideas does not violate copyright law. NIMMER, *supra* note 5, at ¶ 1.03[3][c]. No author may prevent others from copying or adapting ideas presented in the author's copyrighted work; copyright cannot grant an author control of an idea or process. *Id.* As a corollary, where the idea and its manner of expression are inextricably intertwined (i.e., where there is only one or very few ways of expressing an idea), the idea and its expression merge; copyright protection that effectively gives an author rights in an idea or process is barred. *Id.*

48 101 U.S. (11 Otto) 99 (1879). In *Baker*, the plaintiff obtained a copyright for a book that explained a particular bookkeeping method and included forms used to implement this method. *Id.* at 99-100. The defendant published a book that described the same method of bookkeeping and contained forms similar to those appearing in the plaintiff's book. *Id.* at 100. The plaintiff sued for copyright infringement. *Id.* The Court held that the forms could not be copyrighted because they were necessary for implementing the bookkeeping system (i.e., the idea underlying plaintiff's otherwise copyrightable expression). *Id.* at 103, 107.

ideas.[49] Therefore, according to the *Baker* Court, when the use of an idea necessarily requires copying the work that describes it (i.e., there is only one method of expressing that idea), copying will not constitute copyright infringement.[50] While *Baker* can be read narrowly to apply only when there is just one way to express an idea, in practice the *Baker* rule has been extended to apply when there are a limited number of ways to express an idea.[51]

In the 1960s, there was considerable debate as to whether computer programs were proper subject matter for copyright.[52] To resolve this and other debates raised by new technologies, Congress appointed a Commission on New Technological Uses of Copyrighted Works (CONTU) to study the relationship between copyright and computer software technology.[53] CONTU con-

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49 *Id.* at 102-03. Specifically, the *Baker* Court held that the forms necessary for implementing the bookkeeping system described in the plaintiff's book could not be copyrighted because a contrary rule would give the plaintiff a *de facto* monopoly in the bookkeeping method itself (i.e., the "idea" described in plaintiff's book). *Id.* at 103, 107.

50 *Id.* at 104; *see also* NIMMER, *supra* note 5, at ¶ 1.03[3][c] ("If expression and function cannot be separated, there can be no copyright.").

51 *See, e.g.*, Morrissey v. Procter & Gamble Co., 379 F.2d 675 (1st Cir. 1967). In *Morrissey*, the plaintiff claimed copyright in a set of rules for a sweepstakes contest. *Id.* at 676. The court found that there were only a very limited number of ways to express the subject matter. *Id.* at 678-79. Significantly, the *Morrissey* court denied copyright protection even though the plaintiff had shown that there were alternative ways to express the subject matter and that the defendant had copied the rules almost verbatim. *Id.* at 678.

52 *See* Note, *Copyright Protection for Computer Programs*, 64 COLUM. L. REV. 1274, 1330 (1964) (concluding that "[c]omputer programs, at least in printed form, clearly constitute 'writings' containing sufficient authorship to qualify for copyright protection"). In fact, early on, software developers relied primarily on trade secrecy and contract provisions for protection. NIMMER, *supra* note 5, at ¶ 1.03[2]. Notably, although copyright protection for software has been obtainable since 1964, a mere 1205 programs were registered with the Copyright Office between 1964 and 1978, with over three quarters of these copyrights owned by IBM and Burroughs Corporation. Martin T. Hillery, *The Second Circuit's Attempt to Define Copyright Protection for Computer Software: Is the Abstraction-Filtration-Comparison Test a Workable Solution?*, 66 ST. JOHN'S L. REV. 1127, 1129 n.9 (1993).

As demand shifted from custom designed software with limited distribution to mass marketed computer programs, developers increasingly realized the drawbacks of trade secret protection and the advantages of copyright protection. *See* NIMMER, *supra* note 5, at ¶ 1.03[2].

53 Pub. L. No. 93-573, 88 Stat. 1873 (1974). Congress provided the following mandate to the Commission:

> The purpose of the Commission is to study and compile data on: (1) the reproduction and use of copyrighted works of authorship—(A) in conjunction with automatic systems capable of storing, processing, retrieving, and transferring information . . . (c) The Commission shall make recommendations as to such changes in copyright law or procedures that may be necessary to assure for such purposes access to copy-

cluded that computer software should be protectable under the Copyright Act.[54] Adopting CONTU's recommendations wholesale, Congress subsequently enacted two amendments to the Copyright Act with little legislative history: (1) a definition of computer program was included in section 101;[55] and (2) section 117 was amended to allow the owner of a software package to make backup or archival copies.[56]

One month before the CONTU Report was released, the District Court for the Northern District of Texas, in *Synercom Technology, Inc. v. University Computing Co.*,[57] first considered whether nonliteral elements of a computer program were protected under the federal copyright law.[58] The *Synercom* court held that the input for-

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righted works, and to provide recognition of the rights of copyright owners.

Id. at § 201(b)-(c).

54 *See* Englund, *supra* note 15, at 890. During two years of deliberation, an ideological struggle emerged within CONTU between two camps—one led by Melville Nimmer, CONTU Vice-Chairperson, and the other led by Commissioner Arther Miller. *See id.* Executive Director Arthur Levine joined Comissioner Miller in his disagreement with the CONTU Report. *Id.* at 888. Thus, 'Commissioner Miller argued that CONTU believed that structure should never be protected because it is an idea or process, while Vice-Chairman Nimmer declared that CONTU believed that structure might be protected under the proper circumstances.' *Id.* at 890. Ultimately, Nimmer's views prevailed. *See Final Report of the National Commission on New Technological Uses of Copyrighted Works* (July 31, 1978), at 11 (recommending "the continued availability of copyright protection for computer programs"), *reprinted in* 3 COMPUTER/L.J. 53, 59 (1981) [hereinafter "CONTU Final Report"].

55 17 U.S.C. § 101 (1988) (defining "computer program" as "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result").

56 17 U.S.C. § 117 (1988 & Supp. V 1994). Section 117 "authorize[s] the owner of [a] diskette to copy . . . the software program for any reason so long as the owner uses the copy for archival purposes only and not for an unauthorized transfer." Vault Corp. v. Quaid Software Ltd., 847 F.2d 255, 266 (5th Cir. 1988) (footnote omitted); *cf.* Allen-Myland, Inc. v. International Business Machines Corp., 746 F. Supp. 520, 536, 537 (E.D. Pa. 1990) (concluding that section 117 does not allow defendant to make backup copies intended to build a library of programs for subsequent commercial distribution). Section 117 also authorizes the copy owner to modify or adapt a copyrighted program as an "essential step in the utilization of the computer program in conjunction with a machine." 17 U.S.C. § 117 (1988); *see also* Foresight Resources Corp. v. Pfortmiller, 719 F. Supp. 1006, 1010 (D. Kan. 1989) (allowing copy owner to enhance program for personal use).

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

58 *See id.* at 1004. Plaintiff Synercom marketed a structural analysis program, which models building structures under anticipated or actual conditions. *Id.* at 1005. Synercom was formed in 1969 by three former employees of McDonnell Automation Co. (McAuto), an engineering consulting firm. *Id.* In providing consulting services to its clients, McAuto used FRAN (Framed Structure Analysis Program), a public domain structural analysis program originally developed by IBM. *Id.* At the time, there were several public domain structural analysis programs being developed, including

mats[59] of a computer program were not copyrightable, explicitly rejecting the plaintiff's argument that the sequence and ordering of data was protectable expression rather than idea.[60] While in essence the first "look and feel"[61] case, *Synercom* would have little in-

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MIT's STRUDL, Berkeley's SAP, and Bell Aerospace's MAGIC. *Id.* Ironically, Synercom developed STRAN by modifying IBM's FRAN; in fact, thirty percent of Synercom's manuals contained paragraphs nearly identical to manuals previously published by McAuto, FRAN, and others. *Id.* at 1006, 1009, 1010.

Originally, Synercom retained Bonner and Moore, Inc. to market STRAN. *Id.* at 1008. When the initial joint venture fizzled, Bonner and Moore acquired an engineering consulting firm with a view toward developing their own structural analysis program; Bonner and Moore then asked EDI to manage the newly acquired consulting firm. *Id.* EDI, formed by two former Boeing engineers, had developed SACS, which was itself derived from SAMECS, a structural analysis program developed by Boeing. *Id.* EDI, under instructions from Bonner and Moore, modified its program to be fully compatible with STRAN, marketing this compatibility as a key feature to users who were already using Synercom's product. *Id.* at 1008-09. University Computing Company (UCC), a hardware company, was also initially involved in a joint venture with Synercom. *Id.* at 1006. UCC, like Bonner and Moore, had a falling out with Synercom and subsequently joined EDI in its marketing of SACS II. *Id.* at 1009.

59 The term "input formats," as used by the *Synercom* court, refers to the order and format of input data to be processed by the software package. *Id.* at 1011-12; *cf.* Englund, *supra* note 15, at 882 n.82 ("An input format may best be thought of as a language, or perhaps more precisely, a system of grammar."). By utilizing identical input formats, EDI and UCC could assure customers switching from Synercom's software package that data conversion would be unnecessary and that data entry clerks would not need to be retrained. *Synercom*, 462 F. Supp. at 1009.

To illustrate the meaning of the term "input formats," imagine using a simple computer program that calculates the average speed of an automobile. The hypothetical program requires the user to input two variables: the distance travelled, and the time it took to travel that distance. Of course, the program must specify which variable to input first, the units of measurement for those variables (e.g., miles for distance and hours for time), and the format that should be used (e.g., real numbers with up to five significant digits). The described arrangement and format of the input data constitute the "input formats" for the hypothetical program. If a new (and improved) program performing the same calculation required data entry in a different order or using different units of measurement (e.g., kilometers and seconds), then the user would be required to convert existing data records to conform to the new input formats in order to utilize the new program.

60 *Synercom*, 462 F. Supp. at 1013. The court did find, however, that EDI and UCC had infringed Synercom's STRAN User's Manuals, and granted Synercom injunctive relief and attorney's fees. *Id.* at 1014, 1015. The court also ordered further briefing on Synercom's unfair competition claim, and permitted the parties to proceed with discovery with respect to damages for copyright infringement of Synercom's manuals. *Id.* at 1014, 1015-16.

In determining that input formats constituted an idea rather than the expression of an idea, the *Synercom* court analogized input formats to the design of an automobile stickshift: whereas any description of the design (e.g., prose in a driver's manual, diagrams, photographs) would constitute protectable expression, the actual design or configuration of the gearshift mechanism is an idea which competitors may freely copy in the absence of patent protection. *Id.* at 1013.

61 The phrase "look and feel" "was coined as a label for the various nonliteral elements of a computer program." David L. Hayes, *What's Left of 'Look and Feel': A*

fluence on future "look and feel" cases.[62]

In the next series of cases, the defendant in each case was accused of literal copying of the allegedly infringed work, and hence the primary issue faced by these courts was whether software in its various forms was proper subject matter for copyright protection.[63] For example, in *Williams Electronics, Inc. v. Arctic International, Inc.*,[64] the Third Circuit Court of Appeals held that independent copyright protection was available for the object code of a video game program.[65] Later, in *Apple Computer, Inc. v. Franklin Computer Corp.*,[66] the Third Circuit rejected the argument that operating system programs in object code form were not copyrightable.[67] Fi-

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Current Analysis (Part I), COMPUTER LAW., May 1993, at 1. The "look" of a computer program encompasses its audiovisual elements (e.g., screen displays, aural output, visible parts of the user interface). *Id.* The "feel" of a program includes "the dynamic, operational flow of the program, its keystrokes and other means for invoking functions, and the general recognizable 'style' of operation the program presents to the user." *Id.* "Look and feel" is an elusive concept, defined differently by different commentators. *See* Johnson, *supra* note 16, at 953-61 (surveying the literature for various definitions of "look and feel").

62 *See, e.g.*, Whelan Assocs., Inc. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222, 1240 (3d Cir. 1986) ("To the extent that *Synercom* rested on the premise that there was a difference between the copyrightability of sequence and form in the computer context and in any other context, we think that it is incorrect."), *cert. denied*, 479 U.S. 1031 (1987).

63 *See* Menell, *supra* note 15, at 1048 (dividing computer software copyright infringement suits into "first" and "second" generations). The "first generation" lawsuits involved literal copying of software. *Id.*

64 685 F.2d 870 (3d Cir. 1982). Williams Electronics, manufacturer of the electronic video game, DEFENDER, registered copyrights in the game's visual screen displays and audiovisual effects, as well as the game program itself. *Id.* at 872. Rejecting defendant Arctic's semantic argument that unauthorized reproduction of the object code stored in ROM (Read Only Memory) did not represent an infringing copy, the court declared: "We cannot accept . . . an unlimited loophole by which infringement of a computer program is limited to copying of the computer program text but not to duplication of a computer program fixed on a silicon chip." *Id.* at 877.

65 *Id.* at 876-77. The court held that an enforceable copyright existed in the video displays produced as the game was played; because this finding was sufficient to establish copyright infringement, the court's holding with respect to the copyrightability of object code was entirely superfluous. *See id.* at 874.

66 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984). Apple alleged that the defendant, Franklin, had copied Apple's copyrighted operating systems programs and incorporated them into Franklin's personal computer. *Id.* at 1244. There was no doubt that Franklin had copied the programs; in fact, one of the Franklin programs still had the name of an Apple programmer embedded in the code. *Id.* at 1245. Nevertheless, the district court denied Apple a preliminary injunction because, in the district court's view, it was unclear whether the Copyright Act applied to operating systems or to object code. *Id.* at 1249.

67 *Id.* The Third Circuit reversed the district court, reaffirming that "a computer program in object code embedded in a ROM chip is an appropriate subject of copyright." *Id.* at 1249, 1255. Examining the legislative history of the Copyright Act of

nally, in *Apple Computer, Inc. v. Formula International Inc.*,[68] the Ninth Circuit rejected an argument that machine-resident programs[69] that do not directly produce visual images should be excluded from copyright, and held that the district court had not abused its discretion in granting a preliminary injunction.[70]

In the so-called "second generation" of software copyright cases, courts addressed non-literal copying, attempting to delineate between actions constituting infringement and permissible borrowing of ideas.[71] In the seminal "second generation" case, *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*,[72] the Third Circuit Court of Appeals extended copyright protection to the "structure,

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1976, the Third Circuit concluded that Congress intended to protect computer programs, whether in source or object code form, as literary works. *Id.* at 1249-52.

68 725 F.2d 521 (9th Cir. 1984). Apple sued Formula, claiming copyright, patent, and trademark infringement, and unfair competition. *Id.* at 523. Formula brought unfair competition and antitrust counterclaims, and sought declaratory relief with respect to the validity of Apple's patents and copyrights. *Id.* The district court granted Apple's motion for a preliminary injunction, and Formula appealed. *Id.* at 522.

69 A machine-resident program is permanently stored in a computer's main memory. *See* WILLIAM S. DAVIS, OPERATING SYSTEMS: A SYSTEMATIC VIEW 528 (3d ed. 1987). Computers typically utilize two types of main memory: RAM (random access memory) and ROM (read only memory). *Id.* at 10. RAM is volatile (i.e., its contents are lost when power to the computer is shut off), while ROM is permanent (i.e., its contents remain stored even when power is off). *Id.* at 89.

The machine resident programs at issue in *Formula* were operating system programs. *Formula*, 725 F.2d at 523. An operating system manages the resources of a computer (i.e., hardware, software, and data). DAVIS, *supra*, at 2-3; *see also* ANDREW S. TANENBAUM, OPERATING SYSTEMS: DESIGN AND IMPLEMENTATION 3-5 (1987) (defining operating systems). Operating system software is sometimes stored in ROM. DAVIS, *supra*, at 89.

70 *Formula*, 725 F.2d at 522. Formula, a retailer and wholesaler of electronic kits and electronic parts, sold a computer kit, using the trademark "Pineapple." *Id.* Devised to be compatible with software written for the Apple II home computer, Formula's computer kit included two computer programs stored in ROM. *Id.* Apple alleged that the ROM-resident operating system software included in Formula's kit infringed two of Apple's copyrighted computer programs. *Id.* For purposes of appeal, Formula admitted copying Apple's operating system software, but argued that operating system software, which controls the internal operation of the computer but otherwise produces no visible output, constitutes only "ideas" and therefore is not copyrightable. *Id.* at 522-23. Declaring that Formula's position was contrary to the Copyright Act's language and legislative history, the Ninth Circuit affirmed the district court's grant of a preliminary injunction. *Id.* at 524.

71 Menell, *supra* note 15, at 1048 ("A second generation of copyright infringement suits is now beginning to emerge, focusing on the extent to which nonliteral forms of copying constitute copyright infringement."); *see generally* W.H. Baird Garrett, Note, *Toward A Restrictive View of Copyright Protection for Nonliteral Elements of Computer Programs: Recent Developments in the Federal Courts*, 79 VA. L. REV. 2091 (1993).

72 797 F.2d 1222 (3d Cir. 1986).

sequence, and organization" of a computer program.[73] In *Whelan*, the plaintiff alleged that the defendant's dental laboratory records maintenance program written in BASIC[74] infringed her Dentalab program written in EDL.[75] Although the two programs involved in *Whelan* were similar in structure, the actual lines of source code had not been copied and were not identical.[76] The Third Circuit Court of Appeals conceded that copying of the source or object codes had not been proved, but concluded that Whelan's software copyright had been infringed because non-literal elements of the program had been incorporated into Jaslow's version.[77] Noting

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[73] *Id.* at 1248.

[74] BASIC is "'a widely adopted programming language that uses English words, punctuation marks, and algebraic notation to facilitate communication between the operator or lay user and the computer.'" Hillery, *supra* note 52, at 1136 n.43 (quoting THE RANDOM HOUSE DICTIONARY OF THE ENGLISH LANGUAGE 173 (2d ed. 1987)). BASIC "is an acronym for 'Beginner's All-Purpose Symbolic Instruction Code.'" *Id.* at 1136-37 n.43; Daniel J. Fetterman, *The Scope of Copyright Protection for Computer Programs: Exploring the Idea/Expression Dichotomy*, 43 WASH. & LEE L. REV. 1373, 1384 n.52 (1986).

[75] *Whelan*, 797 F.2d at 1227. In *Whelan*, Rand Jaslow contracted with a software developer, Strohl Systems Group, Inc., for a software package to maintain the records of a dental laboratory. *Id.* at 1225. They agreed that Strohl would have the right to market the product and that Jaslow would receive a royalty of ten percent for all copies sold. *Id.* The package, descriptively dubbed Dentalab, was designed and coded by Elaine Whelan, with Jaslow supplying the expertise concerning dental laboratories. *Id.* at 1225-26. Later, Strohl granted Elaine Whelan full rights to the Dentalab package, and Ms. Whelan subsequently transferred those rights to Whelan Associates. *Id.* at 1226. Initially, Whelan Associates contracted with Jaslow Laboratory to market the Dentalab software, but Jaslow later terminated this relationship in May of 1983, at the same time claiming full ownership of the Dentalab software. *Id.* at 1226 & n.3.

Jaslow then attempted to write a similar package for the IBM PC on his own in BASIC. *Id.* at 1226. The original package had been written in EDL (Event Driven Language), a language dissimilar to and less widely used than BASIC. *Id.* Because the dissimilarity between EDL and BASIC precluded simple translation, Jaslow, lacking programming experience, was unable to complete the PC version and therefore hired a professional programmer to finish the task. *Id.* at 1226-27.

[76] *Id.* at 1228. The expert witness for Jaslow testified that Jaslow's version was not "directly derived" from the versions belonging to Whelan. *Id.* Meanwhile, Whelan's expert witness testified that the writer of the PC version had a thorough understanding of the Series 1 program and must have had access to the Series 1 source code. *Id.* at 1247. The expert could not, however, conclusively determine whether actual copying of the Series 1 source code had occurred. *See id.* at 1228, 1247.

[77] *Id.* at 1248. The defendant argued that a computer program's structure constitutes an idea, not protectable under copyright law, rather than the expression of the idea. *Id.* at 1235. Acknowledging that copyright law does not protect ideas, the Third Circuit nevertheless rejected the defendant's contention, instead concluding that "the detailed structure of the Dentalab program is part of the expression, not the idea, of that program." *Id.* at 1239. The *Whelan* court identified the program's function as its "idea" and presumably every other aspect of the program as expression: "the idea is the efficient organization of a dental laboratory . . . . Because there are a variety of

that substantial costs in computer programming are attributable to developing the logic and structure of a program, the *Whelan* court reasoned that more than the literal computer code must be protected in order to encourage programmers to expend effort in designing software programs.[78]

While most courts have adopted the *Whelan* standard in some form,[79] the Fifth Circuit rejected *Whelan* in *Plains Cotton Cooperative Association v. Goodpasture Computer Service, Inc.*[80] Plaintiff Plains Cotton alleged that the defendant's GEMS program, which provided certain market information about cotton, infringed Plains Cotton's Telcot program.[81] The programs, while quite similar, were not identical.[82] Significantly, Goodpasture's programmers had formerly worked for the company that had been involved in a joint venture with Plains Cotton to develop a PC version of Telcot.[83] Nevertheless, the Fifth Circuit rejected Plains Cotton's copyright infringement claim, finding that the similarity between the two programs had been based largely on external factors with respect

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program structures through which that idea can be expressed, the structure is not a necessary incident to that idea." *Id.* at 1240.

78 *Id.* at 1237. The *Whelan* court dismissed the argument that overly expansive copyright protection would inhibit innovation in the software industry:

> [O]ne commentator argues that the process of development and progress in the field of computer programming is significantly different from that in other fields, and therefore requires a particularly restricted application of the copyright law. According to this argument, progress in the area of computer technology is achieved by means of "stepping-stones," a process that "requires plagiarizing in some manner the underlying copyrighted work." As a consequence, this commentator argues, giving computer programs too much copyright protection will retard progress in the field.
>
> We are not convinced that progress in computer technology or technique is qualitatively different from progress in other areas of science or the arts.

Id. at 1238 (citations omitted).

79 *See, e.g.*, Lotus Development Corp. v. Paperback Software Int'l, 740 F. Supp. 37 (D. Mass. 1990); Digital Communications Assocs., Inc. v. Softklone Distrib. Corp., 659 F. Supp. 449 (N.D. Ga. 1987).

80 807 F.2d 1256 (5th Cir. 1987).

81 *Id.* at 1259.

82 *Id.* Plains Cotton, a non-profit agricultural cooperative, developed a mainframe computer software system, Telcot, for providing certain market information about cotton to its members. *Id.* at 1258. The general manager of Plains started his own company, Commodity Exchange Service Company (CXS). *Id.* Plains and CXS agreed to jointly develop a PC version of Telcot. *Id.* Several years later, however, CXS went bankrupt and the programmers working on the development project went to work for defendant Goodpasture, where they completed a PC version of a cotton exchange program named GEMS. *Id.* at 1258-59.

83 *Id.* at 1258.

to the cotton market.[84] The court concluded that these factors, and hence the program structure determined by these factors, were ideas rather than protected expression.[85]

Against this backdrop, the Second Circuit decided *Computer Associates International, Inc. v. Altai, Inc.*[86] Writing for the panel majority, Circuit Judge Walker prefaced the court's opinion with an explication of the goals and purposes of federal copyright law.[87] Emphasizing that the objective of copyright law is to maximize social welfare, the court explained that achieving this objective requires the establishment of a "delicate equilibrium" between affording sufficient copyright protection to provide authors an incentive to create, and limiting such protection to prevent "the effects of monopolistic stagnation."[88] Circuit Judge Walker further elucidated that a court, in deciding whether and to what extent "non-literal" aspects of a computer program are to be protected under copyright laws, is therefore required to balance the opposing goals of creating incentive for innovation and of encouraging competition.[89]

To provide a foundation for understanding the majority's opinion, Circuit Judge Walker presented a lengthy, albeit elementary, tutorial about the process of creating a computer program.[90]

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84 *Id.* at 1262. Goodpasture's expert witness testified that the cotton marketing program had to present the same information (presumably in the same form) as contained in a cotton recap sheet; hence the similarities between GEMS and Telcot could be explained by constraints imposed by the cotton market. *Id.* at 1262 n.4.

85 *Id.*

86 982 F.2d 693 (2d Cir. 1992).

87 *Id.* at 696. Noting that the source of authority for congressional copyright legislation originates from Article I, § 8 of the United States Constitution, Circuit Judge Walker expounded that "'[t]he economic philosophy behind the clause . . . is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare.'" *Id.* (quoting Mazer v. Stein, 347 U.S. 201, 219 (1954)). Stressing that the benefit to the copyright holder is "clearly a 'secondary' consideration," Circuit Judge Walker further articulated that the "'ultimate aim is, by this incentive, to stimulate artistic creativity for the general public good.'" *Id.* (quoting Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 156 (1975)).

88 *Id.*

89 *Id.* The panel noted that although the issue of copyright protection for "non-literal" aspects of computer software had previously been addressed by courts in other circuits, the present case was one of first impression in the Second Circuit. *Id.* Moreover, the panel opined that the approach taken by other circuits was "less than satisfactory." *Id.*

90 *Id.* at 697-98. The Second Circuit first defined a computer program as "'a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.'" *Id.* at 697 (quoting 17 U.S.C. § 101 (1988)). The panel then proposed that a programmer, in writing these instructions, would work "'from the general to the specific.'" *Id.* (quoting Whelan Assocs., Inc. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222, 1229 (3d Cir. 1986), *cert. denied*, 479 U.S. 1031 (1987)).

Circuit Judge Walker next summarized the facts of the case and described in detail the functionality and structure of the software packages in controversy.[91] The panel also recounted the procedural history of the case[92] and summarized the appellant's arguments.[93]

The court began its analysis by reciting the black-letter law regarding copyright infringement.[94] The court explained that to prevail in a copyright infringement action, the plaintiff must prove that (1) the plaintiff owns a valid copyright, and (2) the defendant copied the copyrighted work.[95] This proof, elaborated the court, may be accomplished either by direct evidence or by establishing that (1) the allegedly infringed work could be accessed by the defendant, and (2) the defendant's product is "substantially similar"

According to Circuit Judge Walker, the first step in writing a program is to identify the ultimate function or purpose of the program. *Id.* The court identified the next step as the decomposition of the ultimate function into subtasks "which are also known as sub-routines or modules." *Id.* (citing Spivack, *supra* note 15, at 729). The next phase, lectured the panel, involves organizing the modules according to flow charts, which map the interactions between the modules. *Id.* (citing Kretschmer, *supra* note 15, at 826). Citing to and quoting from the expert appointed by the district court, Dr. Randall Davis, the panel further explained that the programmer must design for each module a parameter list which specifies what information is passed between modules. *Id.* at 697-98. In addition, the court described the category of modules known as "macros" and defined a macro as "a single instruction that initiates a sequence of operations or module interactions within the program." *Id.* at 698.

Continuing with the lesson, Circuit Judge Walker stated that the design stage is followed by a "coding" stage and then a "debugging" (i.e, error correction) stage. *Id.* Coding, explained the judge, consists of two steps: (1) generating source code from the program's "structural blue-print" created during the design stage; and (2) compiling or translating the source code into object code. *Id.* (citations omitted). The panel analogized source code generation to a "novelist fleshing out the broad outline of his plot by crafting from words and sentences the paragraphs that convey the ideas," and noted that the source code may be written in one of several different computer languages. *Id.* (citations omitted).

91 *Id.* at 698-700. The panel noted its assumption that the reader was familiar with the facts set forth in the lower court's opinion. *Id.* at 697 (citing Computer Assocs. Int'l, Inc. v. Altai, Inc., 775 F. Supp. 544, 549-55 (E.D.N.Y. 1991)). The court also praised Judge Pratt for his "comprehensive and scholarly opinion." *Id.* For a discussion of the factual background of this case, see *supra* notes 24-28 and accompanying text.

92 *Altai*, 982 F.2d at 700. The court further noted that Altai had abandoned its appellate claims, conceding liability for infringement of ADAPTER by OSCAR 3.4. *Id.* at 701.

93 *Id.* CA argued that "the district court failed to account sufficiently for a computer program's non-literal elements," and maintained that "the district court erroneously concluded that its state law trade secret claims had been preempted by the federal copyright act." *Id.* (citation omitted).

94 *See id.*

95 *Id.* (citing Novelty Textile Mills, Inc. v. Joan Fabrics Corp., 558 F.2d 1090, 1092 (2d Cir. 1977)) (other citation omitted).

to the plaintiff's copyrighted work.[96] Declaring that copyright protection extended beyond the strictly textual form of a literary work to its non-literal elements, the panel stated that copyright infringement would be found where "the fundamental essence or structure" of a work has been duplicated.[97]

Pronouncing as well settled the copyrightability of source code and object code, the Second Circuit agreed with Judge Pratt's finding that after Altai's careful rewrite, the literal elements of OSCAR were no longer substantially similar to those of ADAPTER.[98] Acknowledging that computer programs are a species of "literary works,"[99] the court reasoned that because non-literal elements of literary works were traditionally subject to copyright protection, the non-literal elements of computer software are similarly protected by copyright.[100] Nonetheless, argued Circuit Judge Walker, a court's analysis does not end with such a conclusion; rather, a court must determine the degree of copyright protection that should be extended to the program's non-literal elements.[101]

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96 *Altai*, 982 F.2d at 701 (citing Walker v. Time Life Films, Inc., 784 F.2d 44, 48 (2d Cir.), *cert. denied*, 476 U.S. 1159 (1986)). The lower court assumed that the defendant had access to CA's code while developing OSCAR 3.5. *Id.* (citing *Altai*, 775 F. Supp. at 558).

97 *Id.* (citation omitted). The court explained that copyright protection "'cannot be limited literally to the text, else a plagiarist would escape by immaterial variations.'" *Id.* (quoting Nichols v. Universal Pictures Corp., 45 F.2d 119, 121 (2d Cir. 1930), *cert. denied*, 282 U.S. 902 (1931)).

98 *Id.* at 702 (citing Whelan Assocs., Inc. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222, 1233 (3d Cir. 1986); CMS Software Design Sys., Inc. v. Info Designs, Inc., 785 F.2d 1246, 1247 (5th Cir. 1986); Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1249 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984); Williams Elecs., Inc. v. Artic Int'l, Inc., 685 F.2d 870, 876-77 (3d Cir. 1982)).

99 The 1976 Copyright Act defines literary works as "works, other than audiovisual works, expressed in words, numbers, or other verbal or numerical symbols or indicia, regardless of the nature of the material objects, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks, or cards, in which they are embodied." 17 U.S.C. § 101 (1988).

Citing the statute's legislative history, Circuit Judge Walker maintained that although computer software was not specifically included in § 101's definitional list, Congress intended software to be considered a literary work. *Altai*, 982 F.2d at 702 (citing H.R. Rep. No. 1476, 94th Cong., 2d Sess. 54, *reprinted in* 1976 U.S.C.C.A.N. 5659, 5667; *Whelan*, 797 F.2d at 1234; *Apple Computer*, 714 F.2d at 1247).

100 *Altai*, 982 F.2d at 702. CA argued that ADAPTER's structure (i.e., non-literal components such as its flow charts, parameter lists, and macros) had been copied by OSCAR. *Id.* In addition, CA contended that OSCAR 3.5 was "substantially similar" to ADAPTER "with respect to the list of services that both ADAPTER and OSCAR obtain from their respective operating systems." *Id.*

101 *Id.* at 703. The panel distinguished copyright protection of computer screen displays as an "audiovisual work" (which is also protected under the Copyright Act) from copyright protection of non-literal elements of literary works, noting that a program's audiovisual display may be copyrighted separately and independently from the

Noting that a copyright protects only the expression of an idea and not the idea itself,[102] the Second Circuit asserted that the idea-expression dichotomy applied with equal force to copyright protection for computer programs.[103] Admitting that the boundary between idea and expression was inherently fuzzy, Circuit Judge Walker postulated that determinations of whether an imitator has copied an idea or its expression are inevitably ad hoc.[104] Moreover, according to Circuit Judge Walker, the task of separating idea from expression is complicated by the utilitarian nature of computer software.[105]

The Second Circuit identified *Baker v. Selden*[106] as the "doctrinal starting point" for analyzing utilitarian works.[107] The panel next discussed *Whelan*,[108] noting that the *Whelan* court confronted substantially the same problem as the *Altai* court now faced.[109] Acknowledging that *Whelan* represented "the most thoughtful attempt" to differentiate between unprotected ideas and copyrightable expression in computer programs, the panel nevertheless criticized *Whelan* as "conceptually overbroad" and identified *Whelan*'s "crucial flaw" as the assumption that only a single idea underlies any computer program.[110] Maintaining that the *Whelan* opinion demonstrated a "somewhat outdated appreciation of computer science," the panel applauded Judge Pratt's decision not to follow *Whelan*.[111]

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underlying literary work. *Id.* (citation omitted). The Second Circuit warned that its analysis in the present case was therefore not controlling in infringement actions involving copyrighted audiovisual displays. *Id.*

102 *Id.* (citing Baker v. Selden, 101 U.S. (11 Otto) 99 (1879); Mazer v. Stein, 347 U.S. 201, 217 (1954)).

103 *Id.*

104 *Id.* at 704 (citing Peter Pan Fabrics, Inc. v. Martin Weiner Corp., 274 F.2d 487, 489 (2d Cir. 1960)). The Second Circuit characterized the process of drawing a line between idea and expression as "tricky business," and lamented the futility of attempting to clearly demarcate that boundary. *Id.* (quoting Nichols v. Universal Pictures Corp., 45 F.2d 119, 121 (2d Cir. 1930) ("Nobody has ever been able to fix that boundary, and nobody ever can.")).

105 *Id.* (citations omitted).

106 101 U.S. (11 Otto) 99 (1879). For a discussion of *Baker v. Selden*, *see supra* notes 48-51 and accompanying text.

107 *Altai*, 982 F.2d at 704. Applying *Baker*, the court concluded that like the utilitarian features of an accounting text, "those elements of a computer program that are necessarily incidental to its function are similarly unprotectable." *Id.* at 704, 705.

108 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 479 U.S. 1031 (1987).

109 *Altai*, 982 F.2d at 705.

110 *Id.* Positing that each subroutine itself is a program and could have a separate "idea," the panel reasoned that a program composed of several subroutines could therefore have several ideas. *Id.*

111 *Id.* at 705-06. The court asserted that "*Whelan*'s approach to separating idea

Circuit Judge Walker proposed a three-step procedure to replace *Whelan*'s antiquated approach, but specifically indicated that district courts could utilize modified versions of the proposed protocol.[112] The first step, elaborated the panel, is the abstraction step, wherein a court would deconstruct the allegedly copied program into its "constituent structural parts."[113] The panel explained that every program has several levels of abstraction and that a court should dissect the program's structure at every level of abstraction.[114]

The next step, instructed the panel, involves separating protectable expression from non-protectable components at each level of abstraction.[115] Specifically, the panel provided three examples of non-protectable material: elements dictated by efficiency,[116] ele-

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from expression in computer programs relies too heavily on metaphysical distinctions and does not place enough emphasis on practical considerations." *Id.* at 706 (citation omitted).

112 *Id.* The procedure, except for a minor modification, was identical to the one devised and applied by the trial court. *See* Computer Assocs. Int'l, Inc. v. Altai, Inc., 775 F. Supp. 544, 555-62 (E.D.N.Y. 1992). The appellate court explained:

> In taking this approach, however, we are cognizant that computer technology is a dynamic field which can quickly outpace judicial decision-making. Thus, in cases where the technology in question does not allow for a literal application of the procedure we outline below, our opinion should not be read to foreclose the district courts of our circuit from utilizing a modified version.

Altai, 982 F.2d at 706.

113 *Altai*, 982 F.2d at 706-07.

114 *Id.* at 707. The court elucidated:

> At the lowest level of abstraction, a computer program may be thought of in its entirety as a set of individual instructions organized into a hierarchy of modules. At a higher level of abstraction, the instructions in the lowest-level modules may be replaced conceptually by the functions of those modules. At progressively higher levels of abstraction, the functions of higher-level modules conceptually replace the implementations of those modules in terms of lower-level modules and instructions, until finally, one is left with nothing but the ultimate function of the program.

Id. (quoting Englund, *supra* note 15, at 897).

115 *Id.* This methodology had previously been proposed by Professor Nimmer; the Second Circuit, in endorsing this method, specifically credited Professor Nimmer as the originator of the filtration concept. *Id.* (citation omitted).

116 *Id.* at 707-09. Circuit Judge Walker posited that filtering out elements necessitated by efficiency concerns was merely an extension of the doctrine of merger. *Id.* at 707-08. The court stated that traditionally, merger occurs when there are only a limited number of ways to express a particular idea; hence, to avoid granting a monopoly on an idea, a court will refuse to protect the expression of the idea when there are essentially only a few ways that idea may be expressed. *Id.* at 708. Similarly, because "efficiency concerns may so narrow the practical range of choice as to make only one or two forms of expression workable options," the panel posited that the merger doctrine would preclude copyright protection of any aspect of a program's structure that

ments dictated by external factors,[117] and elements taken from the public domain.[118] The Second Circuit declared that once a court has eliminated these non-protectable elements, what remains is "a core of protectable expression."[119] Once this "golden nugget" of expression has been distilled, the Second Circuit asserted, a court may proceed to the final step of the test: comparing this core of protected expression to the allegedly infringing work to determine whether the defendant had indeed copied any part of this protected expression, as well as the extent, if any, of the copying.[120]

After setting forth its new substantial similarity test, the Second Circuit justified its newly announced test in a preemptive effort to stave off expected criticism.[121] The panel reminded the reader that the objective of copyright law is not to reward authors for their efforts.[122] While admitting that its decision would effectively narrow the scope of copyright protection for computer software, the Second Circuit maintained that this narrowing of copyright protection would benefit rather than harm the software industry.[123] Finally, Circuit Judge Walker opined, copyright protec-

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is efficiency driven. *Id.* In addition, the panel noted that because efficiency is an industry-wide objective and there are typically only a limited number of efficient implementations of any programming task, "the fact that two programs contain the same efficient structure may as likely lead to an inference of independent creation as it does to one of copying." *Id.*

117 *Id.* at 709-10. The panel explained that such elements were analogous to "stock" characters or standard literary devices, both of which are not copyrightable under the traditional *scenes a faire* doctrine. *Id.* at 709 (citing Hoehling v. Universal City Studios, Inc., 618 F.2d 972, 979 (2d Cir.), *cert. denied*, 449 U.S. 841 (1980)). The Second Circuit elaborated that external factors would include: "(1) the mechanical specifications of the computer on which a particular program is intended to run; (2) compatibility requirements of other programs with which a program is designed to operate in conjunction; (3) computer manufacturers' design standards; (4) demands of the industry being serviced; and (5) widely accepted programming practices within the computer industry." *Id.* at 709-10.

118 *Id.* at 710.

119 *Id.*

120 *Id.* at 710-11.

121 *See id.* at 711-12.

122 *Id.* at 711 (quoting Feist Publications, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 349 (1991)). Pointing out that the "sweat of the brow" doctrine had been laid to rest, the panel emphasized that hard work alone cannot confer copyright status to an otherwise uncopyrightable work. *Id.* (citing *Feist*, 499 U.S. at 349). Under the "sweat of the brow" doctrine, copyright was considered a reward for industriousness or effort in compiling a work. *Feist*, 499 U.S. at 352-53. The Supreme Court in *Feist* firmly rejected the doctrine, proclaiming that "[w]ithout a doubt, the 'sweat of the brow' doctrine flouted basic copyright principles." *Id.* at 354.

123 *Altai*, 982 F.2d at 712. The court stated that "[i]f the test we have outlined results in narrowing the scope of protection, *as we expect it will*, that result flows from applying, in accordance with Congressional intent, long-standing principles of copyright law to computer programs." *Id.* (emphasis added). Further, the court was "unper-

tion "is not ideally suited to deal with the highly dynamic technology of computer science," and recommended that Congress commission a CONTU II to reexamine its decision to extend copyright protection to computer programs.[124]

The panel next examined the district court decision in light of its new substantial similarity test.[125] First, the Second Circuit disposed of CA's claim that the district court relied too heavily on the opinion of the court-appointed expert, noting that the highly technical nature of computer programs warrants substantial reliance upon expert testimony.[126] Second, the panel noted that Judge Pratt's method of analysis mirrored its own proposed analytic

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suaded that the test we approve today will lead to the dire consequences for the computer program industry that plaintiff and some *amici* predict." *Id.*

124 *Id.* Circuit Judge Walker suggested that patent protection "might be the more appropriate rubric of protection for intellectual property of this kind." *Id.* (citation omitted).

125 *Id.* at 712-15.

126 *Id.* at 712-13. Under Rule 706 of the Federal Rules of Evidence and with the parties' consent, Judge Pratt appointed Dr. Randall Davis, a professor at the Massachusetts Institute of Technology, as the court's expert witness on substantial similarity. *Id.* at 712. Dr. Davis drafted a comprehensive report analyzing the computer programs at issue and weighing the parties' expert evidence. *Id.* at 712-13. Both parties cross-examined Dr. Davis. *Id.* at 713.

With respect to the use of expert testimony in copyright cases, the court noted that the Second Circuit normally applies a bifurcated test that was first articulated in *Arnstein v. Porter*. *Id.* (citing Arnstein v. Porter, 154 F.2d 464 (2d Cir. 1946)). In *Arnstein*, Ira B. Arnstein sued Cole Porter for copyright infringement of several musical compositions. *Arnstein*, 154 F.2d at 467. Under the *Arnstein* approach, the trier of fact decides the issue of substantial similarity in two steps: (1) as a threshold matter, the fact finder compares the two works in their entirety in order to determine whether any copying has occurred; and (2) once copying has been established, the fact finder must then determine if the copying was unlawful or "illicit." *Altai*, 982 F.2d at 713. While expert testimony may be used to aid the trier of fact in the first step, the second step requires the trier of fact to determine whether the "'defendant took from plaintiff's works so much of what is pleasing to [lay observers] who comprise the audience for whom such [works are] composed, that defendant wrongfully appropriated something which belongs to the plaintiff.'" *Id.* (quoting *Arnstein*, 154 F.2d at 473) (alteration in original). The Second Circuit posited that expert testimony is considered irrelevant for purposes of the second step and therefore not permitted. *Id.* (citing *Arnstein*, 154 F.2d at 468, 473). The court noted that *Arnstein*'s ordinary observer standard is really a specialized application of the "reasonable person" doctrine to copyright law. *Id.*

Observing that the "highly complicated and technical subject matter" at issue would likely be "somewhat impenetrable by lay observers," the *Altai* court carved out an exception to the *Arnstein* rule for software copyright cases. *Id.* Specifically, the court stated that computer programs "seem to fall outside the category of works contemplated by those who engineered the *Arnstein* test." *Id.* (citation omitted). Confining the application of the *Arnstein* ordinary observer standard to aesthetic works (e.g., music, literature), the *Altai* court held that the district court could determine in its own sound discretion whether and to what extent expert opinion was needed. *Id.* at 713-14. The *Altai* court then concluded that the district court's reliance on Dr. Davis

framework with one exception: Judge Pratt sifted out the non-copyrightable aspects of the allegedly *infringing* program rather than the non-copyrightable aspects of the allegedly *infringed* program.[127] While insisting that its own strategy was superior to that of the district court, the panel nevertheless concluded that the differences in methodology did not materially affect the outcome of the case.[128] Discerning no clear error in the district court's factual conclusions, the panel affirmed Judge Pratt's dismissal of CA's copyright infringement claim.[129]

Turning to the trade secret preemption issue, the panel majority first provided a brief synopsis of the procedural history relevant to this issue.[130] Analyzing section 301[131] of the Copyright Act, the

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was entirely appropriate because "Judge Pratt remained, in the final analysis, the trier of fact." *Id.* at 714.

127 *Altai*, 982 F.2d at 714. The panel noted that the defendant's program could contain protectable expression not present in the plaintiff's program. *Id.* This material, observed the court, would "have no bearing on any potential substantial similarity between the two programs. Thus, its filtration would be wasteful and unnecessarily time consuming." *Id.* The court further noted that by concentrating on the infringing, as opposed to the infringed, work, "a court may mistakenly place too little emphasis on a quantitatively small misappropriation which is, in reality, a qualitatively vital aspect of the plaintiff's protectable expression." *Id.*

128 *Id.* The court posited that because "Judge Pratt determined that OSCAR effectively contained no protectable expression whatsoever, the most serious charge that can be levelled against him is that he was overly thorough in his examination." *Id.*

129 *Id.* at 715. Judge Pratt found that after OSCAR 3.4 was rewritten to OSCAR 3.5, virtually no lines of code identical to ADAPTER remained. *Id.* at 714. With respect to the parameter lists and macros, Judge Pratt determined that, viewing the evidence in the light most favorable to CA, only a few of the parameter lists and macros in OSCAR 3.5 were similar to ADAPTER's protected elements, while the remaining similarities between OSCAR 3.5 and ADAPTER parameter lists and macros were attributable elements in the public domain or dictated by the programs' functional demands. *Id.* (quoting Computer Assocs. Int'l, Inc. v. Altai, Inc., 775 F. Supp. 544, 562 (E.D.N.Y. 1991)). Judge Pratt further opined that "CA failed to meet its burden of proof on whether the macros and parameter lists at issue were substantially similar." *Id.* at 715 (citing *Altai*, 775 F. Supp. at 562). Finally, Judge Pratt determined that the similarities between the organizational charts of the two programs should be accorded no weight "because [the charts were] so simple and obvious to anyone exposed to the operation of the program[s]." *Id.* (quoting *Altai*, 775 F.Supp. at 562) (alteration in original).

130 *Id.* at 715-16. Originally, while the proceedings were before Judge Mishler, Altai had moved to dismiss, arguing "that section 301 of the Copyright Act preempted CA's state law cause of action." *Id.* at 715. Judge Mishler denied the motion, reasoning that "'[t]he elements of the tort of appropriation of trade secrets . . . are not the same as the elements of a claim of copyright infringement.'" *Id.* (quoting *Altai*, 775 F. Supp. at 563). Later, the preemption issue was revisited, and Judge Pratt reversed Judge Mishler's prior ruling. *Id.* In its original opinion, the Second Circuit affirmed Judge Pratt's decision on preemption. *Id.* at 716. CA petitioned for rehearing, noting that portions of the record below had not been included in the appendix on appeal and contending that "Judge Pratt failed to consider its theory that Altai was liable for wrongful acquisition of CA's trade secrets through Arney." *Id.* The panel granted

court stated that a state-created cause of action is not preempted if it requires an "extra element" that changes the "'nature of the action so that it is *qualitatively* different from a copyright infringement claim.'"[132] Breach of duty, according to the panel majority, constitutes the "extra element" that qualitatively distinguishes state trade secret misappropriation claims from federal copyright infringement claims.[133]

According to the Second Circuit, the district court erred in determining that only Arney, CA's former employee, and not Altai, could be held liable for breach of a duty of confidentiality.[134] Specifically, the panel majority found that the district court had failed to consider the issue of constructive notice.[135] Therefore, the

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the petition for rehearing. *Id.* Upon reconsideration, the panel majority withdrew its initial opinion, vacated the judgment of the district court on the preemption issue, and remanded CA's trade secret claim for a determination on the merits. *Id.*

131 The Copyright Act of 1976 expressly preempts

> all legal or equitable rights that are equivalent to any of the exclusive rights within the general scope of copyright as specified by section 106 in works of authorship that are fixed in a tangible medium of expression and come within the subject matter of copyright as specified by sections 102 and 103 . . . .

17 U.S.C. § 301(a) (1988).

The sweep of § 301's preemptive effect is limited, however, by the following subsection:

> Nothing in this title annuls or limits any rights or remedies under the common law or statutes of any State with respect to . . . activities violating legal or equitable rights that are not equivalent to any of the exclusive rights within the general scope of copyright as specified by section 106 . . . .

17 U.S.C. § 301(b)(3) (1988 & Supp. V 1994).

132 *Altai*, 982 F.2d at 716 (quoting Mayer v. Josiah Wedgwood & Sons, Ltd, 601 F. Supp. 1523, 1535 (S.D.N.Y. 1985); Harper & Row, Publishers, Inc. v. Nation Enters., 723 F.2d 195, 201 (2d Cir. 1983), *rev'd on other grounds*, 471 U.S. 539 (1985)).

133 *Id.* at 717.

134 *Id.* at 718. The Second Circuit agreed with the district court that under New Jersey's choice of law rules, Texas law applied to CA's trade secret misappropriation claim. *Id.* Texas adopts the definition of trade secret found in the RESTATEMENT (FIRST) OF TORTS. *Id.* (citing RESTATEMENT (FIRST) OF TORTS § 757(c) (1939)). The court noted that under the Restatement,

> [o]ne who discloses or uses another's trade secret, without a privilege to do so, is liable to another if . . . . (c) he learned the secret from a third person with notice of the fact that it was a secret and that the third person discovered it by improper means or that the third person's disclosure of it was otherwise a breach of his duty to the other . . . .

Id. (citing RESTATEMENT (FIRST) OF TORTS § 757(c) (1939)).

135 *Id.* at 718-19. The panel majority posited that Altai may have had constructive notice of Arney's breach of his duty of confidentiality. *Id.* at 719. The Second Circuit observed that "[a] defendant is on constructive notice when, 'from the information which he has, a reasonable man would infer [a breach of confidence], or if, under the circumstances, a reasonable man would be put on inquiry and an inquiry pursued

court of appeals remanded to the district court to determine whether Altai had constructive notice and whether additional trade secret damages flowed from CA's creation of OSCAR 3.5.[136]

Concurring in part and dissenting in part, Circuit Judge Altimari wrote briefly, asserting that the original opinion of the panel had been correct in all respects.[137] Accordingly, Circuit Judge Altimari joined in Part 1 of the amended opinion (relating to the copyright infringement claim) and dissented from Part 2 of the amended opinion (relating to the trade secret misappropriation claim).[138]

On remand, Judge Pratt reconsidered Altai's statute of limitations defense.[139] After reiterating that New Jersey's conflict of law principles pointed to the application of Texas law and Texas's two-year statute of limitations for tort actions, the district court found that CA's cause of action accrued in 1984 when Arney first copied CA's ADAPTER codes.[140] Next, the district court determined that the discovery rule[141] was inapplicable to the case at bar, pointing

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with reasonable intelligence and diligence would disclose the [breach].'" *Id.* at 718 (citing RESTATEMENT (FIRST) OF TORTS § 757 cmt. 1 (1939)) (alteration in original). The district court had previously found that, prior to the commencement of CA's lawsuit, Altai had not been on actual notice of Arney's theft of trade secrets. *Id.* Nevertheless, according to the panel majority, the district court failed to consider whether Altai was on constructive notice of Arney's breach of his duty of confidentiality. *Id.* at 718-19. The Second Circuit also pointed out that Altai conducted its rewrite of OSCAR 3.5 with full cognizance of Arney's misappropriation. *Id.* at 719.

136 *Id.* at 720.

137 *Id.* at 721 (Altimari, J., concurring in part and dissenting in part).

138 *Id.* Circuit Judge Altimari's one sentence opinion is unenlightening with respect to the specific reasons behind the judge's disagreement with the panel majority's treatment of the trade secret misappropriation issue: "Because I believe that our original opinion is a reasoned analysis of the issues presented, I adhere to the original determination and therefore concur in Part 1 and respectfully dissent from Part 2 of the amended opinion." *Id.* (citations omitted).

139 Computer Assocs. Int'l, Inc. v. Altai, Inc., 832 F. Supp. 50, 51-54 (E.D.N.Y. 1993). After gratuitously noting that it previously had "been inclined to reject Altai's statute-of- limitations defense," the district court announced its intent to "examine more closely the argument advanced by Altai." *Id.* at 52.

140 *Id.* at 51-52. The court observed that Texas follows the Restatement of Torts with respect to trade-secret law; the Restatement establishes no limitations period but instead treats a trade secret misappropriation claim as a tort. *Id.* at 52 (citing RESTATEMENT (FIRST) OF TORTS § 757 (1939)). The court stated that in Texas, the limitations periods for various causes of action are found in the Civil Practice and Remedies Code; section 16.003(a), generally applicable to torts other than wrongful death claims, sets forth a statute of limitations of two years from the date when the cause of action accrues. *Id.* at 52 (quotation omitted). The district court then noted that the question of when the running of the statute of limitations commences "is a question of law to be determined by the court." *Id.* (citations omitted).

141 Under the discovery rule, the statute of limitations does not begin to run until the plaintiff discovers, or should have discovered "by exercise of reasonable care and

out that the Texas Supreme Court had never before applied the discovery rule to a trade secret misappropriation claim.[142] Because CA did not bring suit until 1988, the district court concluded that CA's trade secret misappropriation claim was time-barred.[143]

The paramount purpose of federal copyright law is to foster the dissemination of information and the growth of learning. The United States has never recognized an absolute, natural right of an author to prevent others from using or copying her work or ideas.[144] Authors are given limited property rights under copyright law, but only for the ultimate purpose of benefiting the public by encouraging the creation of "works of authorship." The author's interest is subordinate to that of the public and when there is a conflict, the public's interest must prevail.

The *Altai* court recognized these principles, and correctly de-

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diligence," the injury caused by the defendant. *See* BLACK'S LAW DICTIONARY 466 (6th ed. 1990).

142 *Altai*, 832 F. Supp. at 53. The district court distinguished a case cited by Altai, *Reynolds-Southwestern Corp. v. Dresser Industries, Inc.*, noting that the case was not controlling because it was not decided by the Texas Supreme Court and because it involved allegations of fraud. *Id.* (citing Reynolds-Southwestern Corp. v. Dresser Indus., Inc., 438 S.W.2d 135 (Tex. Ct. App. 1969)). The district further stressed that the discovery rule applied only to "'inherently undiscoverable causes of action.'" *Id.* (quotation and citation omitted).

143 *Id.* at 54. Additionally, the district court explained that the Texas Supreme Court does not allow for certification of questions of state law by a federal district court. *Id.* at 53-54 (citation omitted).

144 A commonly held misconception is that intellectual property laws are intended to protect one's natural right of title to the product of one's mental labor (i.e., the sweat of one's brow). This Lockean labor theory of property is age-old. *See, e.g.*, Haslem v. Lockwood, 37 Conn. 500, 506-07 (1871) (holding that a plaintiff who raked manure into heaps has property rights in manure because he greatly increased its value by his labor). It is, however, nevertheless inadequate. *See* Richard A. Epstein, *Possession as the Root of Title*, 13 GA. L. REV. 1221, 1225-30 (1979); Carol M. Rose, *Possession as the Origin of Property*, 52 U. CHI. L. REV. 73, 73-74 (1985).

To quote Justice Brandeis:

> [T]he fact that a product of the mind has cost its producer money and labor, and has a value for which others are willing to pay, is not sufficient to ensure to it this legal attribute of property. The general rule of law is, that the noblest of human productions—knowledge, truths ascertained, conceptions, and ideas—become, after voluntary communication to others, free as the air to common use.

International News Serv. v. Associated Press, 248 U.S. 215, 250 (1918) (Brandeis, J., dissenting).

Benjamin Kaplan once remarked that "if man has any 'natural' rights, not the least must be a right to imitate his fellows, and thus to reap where he has not sown. Education, after all, proceeds from a kind of mimicry, and 'progress,' if it is not entirely an illusion, depends on generous indulgence of copying." Douglas G. Baird, *Common Law Intellectual Property and the Legacy of* International News Service v. Associated Press, 50 U. CHI. L. REV. 411, 411 (1983) (footnote omitted).

cided the case by balancing the encouragement of innovation with the need to promote competition. Undoubtedly, the software industry—dominated by mega-corporations with a vested interest in preserving strong copyright laws in order to maintain the value of their intellectual property portfolios—will decry the *Altai* decision as uninformed and potentially crippling to our nation's fastest growing industry. Industry spokespersons will issue clarion calls for legislation to unwork the damage wrought by *Altai.* On the other hand, if one were to interview Jane Q. Programmer, the average programmer whose innovations have driven the industry, one would likely hear praise of the *Altai* decision and its braking effect on the "look and feel" litigation locomotive.

Invention and innovation typically involve building on previous ideas and designs.[145] While on occasion an innovation represents such a radical breakthrough that it is truly independent of previous developments in the field, most innovations are derived from old ideas. Allowing a few companies or individuals to "lock up" (i.e., copyright) the basic technology in an area such as computer software will destroy the incentive to innovate.

In addition, the public derives a benefit from standardization and uniformity in protocols and user interfaces.[146] If software

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145 Pablo Picasso once said, "Good artists copy. *Great* artists steal." *See* CRINGELY, *supra* note 1, at 142. In the computer software industry, a great program will beget scores of imitators or clones. As a corollary, all good programmers utilize programming techniques learned from existing computer programs. *See id.*

146 Software developers and vendors have long recognized the importance of uniform industry standards to insure compatibility and portability of software products. For this reason, the software industry has developed public domain standards and specifications; for example, IBM's Common User Access (CUA) standard for Systems Application Architecture (SAA) environments specifies user-interface components and guidelines to be used by applications program designers. *See* R.E. Berry, *Common User Access—A Consistent and Usable Human-Computer Interface for the SAA Environment,* IBM SYSTEMS J., Sept. 1988, at 281 (stating that CUA provides a basis for program development tool specifications).

It is no coincidence that many commercial software packages (e.g., Microsoft Quick Compilers, the Compuserve Information Manager, and practically any WINDOWS application) greet the user with the familiar File-Edit menu; all of these packages conform to the CUA standard. In fact, many software developers will utilize commercially sold function libraries implementing user interface elements conforming to the CUA standard (e.g., dialog, list and check boxes, pull-down menus, radio and push buttons) rather than develop them from scratch. For example, Custom MicroConcepts, Inc. markets CUAccess, a Clipper development package which allows users to build SAA CUA applications using CUAccess's Clipper function library. Given that so much of the design and structure of any computer program is driven by compatibility and functionality concerns, it makes sense to filter out those elements that are determined by external requirements and constraints before comparing two programs to determine whether they are substantially similar.

packages are compatible and share a common user interface (e.g., menu structure, mapping of function keys), users will spend less time learning to use a new software package. Allowing a company to claim property rights in the structure or format of an user interface will necessarily result in noncompatible proprietary interface standards (or worse, a de facto monopoly in each product category).

The idea-expression distinction, while perhaps viable as a standard for determining copyrightability of more mundane literary works, is completely inappropriate in the context of computer technology. Because the contours of such a standard are metaphysical and amorphous, in considering each new case, courts must apply an admittedly ad hoc and ill-defined test for copyright infringement. The uncertainty of such a standard will no doubt discourage innovation in the software industry.

Even worse, the idea-expression dichotomy misconceives the purpose and nature of the federal copyright laws. Copyrightability should not revolve around metaphysical distinctions between idea and expression,[147] but instead must be based upon whether protecting that particular class or form of software promotes social welfare.

Tsu-Man Peter Tu

147 Computer industry analysts have been critical of the "look and feel" lawsuits. One commentator asserted that "[l]ook and feel is a matter of not only how many angels can dance on the head of a pin but what dance it is they are doing and who owns the copyright." CRINGELY, *supra* note 1, at 73. Cringely analogized the granting of a "look and feel" copyright for a computer program to allowing Notre Dame ex-quarterback Knute Rockne to charge for every spiral pass thrown by another quarterback. *Id.* at 73-74.