



1-1-1990

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Recommended Citation

Meredith Chang, *Patenting of MIS Computer Programs: One Step Beyond, The*, 21 PAC. L. J. 761 (1990).

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The Patenting of MIS Computer Programs: One Step Beyond

INTRODUCTION

To obtain a patent on an invention, an applicant must meet both substantive and procedural requirements.¹ The first substantive requirement demands that the subject matter of the invention be suitable for patent protection: the "subject matter requirement."²

1. E. KITCH & H. PERLMAN, *LEGAL REGULATION OF THE COMPETITIVE PROCESS* 747 (3d ed. 1986) (setting out nine major requirements for a valid patent; four procedural requirements and five substantive requirements). The patent statute, 35 United States Code sections 1-293, codifies these requirements which are referred to below by section number only. *Id.* The five substantive requirements are: (1) Patentable subject matter (section 101); (2) originality (sections 101, 115); (3) novelty (sections 101, 102); (4) utility (section 101); and (5) non-obviousness (section 103). *Id.* The four procedural requirements are: (1) An application filed with the patent office by the inventor or his representative (sections 111, 115, 116, 117, 118); (2) an application filed within one year of the public use or publication of the invention (section 102(b)); (3) an application filed with a specification containing a "written description of the invention, and of the manner and process of making and using it in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same" (sections 112, 113, 114); and (4) an application filed with one or more claims "pointing out and distinctly claiming the subject matter" which constitutes the invention, and no more (section 112). *Id.*

2. 35 U.S.C. § 101 (1982) (this statute describes what is patentable subject matter). "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." *Id.* The term "process" means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material. 35 U.S.C. § 100(b) (1982).

Computer programs³ have never been held to be per se unpatentable subject matter.⁴ However, no court has been willing to grant patent protection to a computer program in and of itself.⁵ Instead, computer programs have been patented only when utilized in conjunction with other apparatus to effectuate some tangible purpose, such as a manufacturing process.⁶

Since the early 1980's, the Patent and Trademark Office has granted patents to computer programs that carry out automated business functions.⁷ These systems are commonly referred to as Management Information Systems (MIS).⁸ Patents on MIS are unusual because the computer programs involved do not include apparatus in the customary sense,⁹ but rather more closely resemble

3. A computer program is "[a] set of instructions or steps [in machine readable form] that tells a computer exactly how to handle a complete problem." Novick & Wallenstein, *The Algorithm and Computer Software Patentability: A Scientific View of a Legal Problem*, 7 RUTGERS J. COMPUTERS, TECH. & L. 313, 313 n.2 (1979) (quoting SIPPLE & SIPPLE, *COMPUTER DICTIONARY & HANDBOOK* 339 (2d ed. 1972)).

4. See *Gottschalk v. Benson*, 409 U.S. 63, 71 (1972) (holding that the decision therein does not preclude patents for all programs servicing computers). See also *infra* notes 75-84 and accompanying text (for a complete discussion of the case).

5. See, e.g., *Diamond v. Diehr*, 450 U.S. 175, 193-94 (1981) (holding that rubber molding process was patentable subject matter notwithstanding that in several of its steps it included use of a mathematical formula and a programmed digital computer); *Parker v. Flook*, 437 U.S. 584, 596 (1978) (holding that a computer-aided method for updating alarm limits in a catalytic conversion process, in which the only novel feature was a mathematical formula, was not patentable subject matter under 35 United States Code section 101); *Gottschalk*, 409 U.S. at 71-72 (holding that a formula for converting binary coded decimal numbers into pure binary numbers was not patentable because such formula had no substantial application except in connection with a digital computer, and the effect of such a patent would be the preemption of all uses of the mathematical formula). See also Report, *Patents on Programs? The Supreme Court Says No*, 13 JURIMETRICS J. 135, 136 (1973) (quoting Duggan, *Patents on Computer Programs? (Prater and Wei)*, COMM. ASSOC. FOR COMPUTING MACHINERY 589 (Oct. 1969)) ("A close reading of the . . . language leads to the conclusion that, while [a] particular machine or device may well be patentable, a computer program per se is not susceptible of patenting in and of itself"). *Id.*

6. See *Diamond v. Diehr*, 450 U.S. 175, 193-94 (1981) (holding that a mathematical formula by itself is not subject to patent protection. However, when a claim containing a mathematical formula implements or applies it in a structure or process which, if considered as a whole, is performing a function designed to be protected by the patent laws, the claim constitutes patentable subject matter). The process in *Diehr* involved the curing of synthetic rubber. *Id.*

7. See United States Patent No. 4,346,442; *Securities Brokerage-Cash Management System*, inventor Thomas E. Musmanno, Patent Application No. 173,331, filed July 29, 1980, granted August 24, 1982. The invention consists of data processing of an improved securities brokerage/cash management system which supervises, implements and coordinates a margin securities brokerage account; participation in one or more short term money market or comparable funds; and subscriber-initiated use of electronically responsive subscriber identity credit/debit media and/or checking systems. *Id.*

8. See Betts, *Patenting the MIS Strategic Edge*, *COMPUTERWORLD MAG.*, May 30, 1988, at 1.

9. Customarily, computer programs have received patents only when used as a component

computer programs in isolation.¹⁰

Initially, this comment will discuss the legislative development of the patent laws, and the statutory requirements for patenting inventions.¹¹ Second, this comment will review the controlling case law that interprets the patent laws as they pertain to computer related inventions.¹² Third, this comment discusses recent patents that have been granted to computer systems known as MIS,¹³ and considers the patentability of these inventions in light of case precedents and congressional intent.¹⁴ This comment then concludes that the interests of the patent system would be better served if MIS were not viewed as patentable subject matter. Lastly, this comment proposes simple guidelines to aid in the efficient administration of the patenting of computer related inventions.¹⁵

I. STATUTORY LAW

Article 1, section 8, of the United States Constitution grants Congress the power "To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."¹⁶ Pursuant to this authority, Congress enacted the patent and copyright statutes; Titles 35 and 17 of the United States Code, respectively.¹⁷ Copyright protection prohibits the unauthorized reproduction¹⁸ of certain subject matter,¹⁹ but does not prevent others from using

of some larger tangible process or invention. *See, e.g.*, *Diamond v. Diehr*, 450 U.S. 175, 178-80 (1981) (invention was a rubber molding process which utilized a computer to calculate proper cure time); *In re Bernhart*, 417 F.2d 1395, 1396 (C.C.P.A. 1969) (invention was a computer assisted drafting process which automatically made two-dimensional portrayals from three-dimensional objects); *In re Prater*, 415 F.2d 1378, 1378-80 (C.C.P.A. 1969) (invention was a computer-enhanced scientific instrument).

10. *See Betts, Patenting the MIS Strategic Edge*, *COMPUTERWORLD MAG.*, May 30, 1988, at 1 (suggesting that MIS inventions are essentially computer programs).

11. *See infra* notes 16-33 and accompanying text.

12. *See infra* notes 34-136 and accompanying text.

13. *See infra* notes 137-66 and accompanying text.

14. *See infra* notes 167-277 and accompanying text.

15. *See infra* notes 278-89 and accompanying text.

16. U.S. CONST. art. I, § 8, cl. 8.

17. A. MILLER & M. DAVIS, *INTELLECTUAL PROPERTY: PATENTS, TRADEMARKS, AND COPYRIGHT IN A NUTSHELL* 7-9, 280-81 (1983).

18. Reproduction can be by copies or phonorecords, or by public performance or display. 17 U.S.C. § 106 (1988).

19. Subject matter for a copyright includes literature, music, drama, pantomime, choreography, pictures, graphics, sculptures, motion pictures and sound recordings. 17 U.S.C. § 102(a) (1988).

inventive concepts contained therein.²⁰ Patents, in contrast, protect inventive concepts themselves, and thus offer a greater level of protection than a copyright.²¹ Patents, however, are effective for only seventeen years,²² while copyrights protect the subject matter for the life of the author plus fifty years.²³

For an invention to be patentable it must meet five substantive requirements which are set out in the patent statute.²⁴ First, the subject matter of the invention must be appropriate for patent protection (the "subject matter" or "section 101 requirement").²⁵ Second, the applicant must be the first inventor of the subject matter claimed (the "originality requirement").²⁶ Third, the invention must be novel.²⁷ Fourth, the invention must be useful (the "utility requirement").²⁸ Lastly, a patentable invention must demonstrate a meaningful departure or advancement from previously existing technology (the "non-obviousness requirement").²⁹

20. 17 U.S.C. § 102(b) (1988). The statute states that "[i]n no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." *Id.*

21. 35 U.S.C. § 271(a) (1982). "[W]hoever without authority makes, uses or sells any patented invention, within the United States during the term of the patent therefor, infringes the patent." *Id.* Patentable subject matter includes inventions such as processes, machines, manufactures, compositions of matter, or any new and useful improvements thereof. 35 U.S.C. § 101 (1952).

22. 35 U.S.C. § 154 (1980) (stating that "[e]very patent shall contain a short title of the invention and grant to the patentee, his heirs or assigns, for the term of seventeen years, . . . the right to exclude others from making, using, or selling the invention").

23. 17 U.S.C. § 302(a) (1976) (stating that a "[c]opyright in a work created on or after January 1, 1978, subsists from its creation and . . . endures for a term consisting of the life of the author and fifty years after the author's death").

24. See generally E. KITCH & H. PERLMAN, *LEGAL REGULATION OF THE COMPETITIVE PROCESS* 747 (3d ed. 1986); 35 U.S.C. §§ 1-293 (1952-86).

25. 35 U.S.C. § 101 (1982) (stating that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvements thereof, may obtain a patent therefor, subject to the conditions and requirements of this title"). See also *Gottschalk v. Benson*, 409 U.S. 63, 71-72 (1972) (holding that respondent's method for converting numerical information from binary-coded decimal numbers into pure binary numbers did not qualify as patentable subject matter); *Parker v. Flook*, 437 U.S. 584, 596 (1978) (holding respondent's method for updating alarm limits in a catalytic conversion process was not patentable subject matter).

26. 35 U.S.C. § 101 (1982) (providing that "[w]hoever invents or discovers any new and useful process . . . may obtain a patent therefor") (emphasis added); *id.* § 115 (1982) (providing that "[t]he applicant shall make [an] oath that he believes himself to be the original and first inventor of the process").

27. *Id.* § 101 (1982) (providing that "[w]hoever invents or discovers any new and useful process, . . . may obtain a patent therefor") (emphasis added); *id.* § 102 (1982) (setting out several requirements to ensure invention was not previously known or used).

28. *Id.* § 101 (providing that "[w]hoever invents or discovers any new and useful process . . . may obtain a patent therefor") (emphasis added).

29. *Id.* § 103 (1982) providing that:

If an invention meets these substantive requirements, the applicant must file a timely application with the Patent and Trademark Office (PTO), setting forth a detailed description of the claimed invention.³⁰ If the PTO determines that the invention conforms to all statutory requirements, a patent will issue.³¹ Unfavorable judgments by the PTO may be appealed to the Court of Appeals for the Federal Circuit (formerly the Court of Customs and Patent Appeals (CCPA)).³² Final appeal may be heard before the Supreme Court.³³

II. CASE LAW

A. *The Court of Customs and Patent Appeals and the Mental Steps Doctrine*

The majority of cases challenging the patentability of computer programs or computer related inventions have premised non-patentability on the grounds that computer related inventions do not fall into any of the categories of permissible subject matter described in

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains [p]atentability shall not be negated by the manner in which the invention is made.

Id.

30. E. KITCH & H. PERLMAN, *LEGAL REGULATION OF THE COMPETITIVE PROCESS* 747 (3d ed. 1986). To provide sufficient detail, an application must contain a "written description of the invention, and of the manner and process of making and using it in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same . . ." 35 U.S.C. § 112 (1982). To be timely, an application must be filed within one year of the public use or publication of the invention. 35 U.S.C. § 102(b) (1982).

31. 35 U.S.C. § 131 (1982) (providing that "[t]he Commissioner shall cause an examination to be made of the application and the alleged new invention; and if on such examination it appears that the applicant is entitled to a patent under the law, the Commissioner shall issue a patent therefor"); *id.* § 151 (1982) (providing that "[i]f it appears that applicant is entitled to a patent under the law, a written notice of allowance of the application shall be given or mailed to the applicant . . . [u]pon payment of this sum the patent shall issue").

32. 35 U.S.C. § 141 (1982) (providing that "[a]n applicant dissatisfied with the decision of the Board of Appeals may appeal to the United States Court of Appeal for the Federal Circuit"). See Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (1982). As of October 1, 1982 the U.S. Court of Appeals for the Federal Circuit came into existence through the merger of the U.S. Court of Claims and the U.S. Court of Customs and Patent Appeals. *Id.* The new court has exclusive jurisdiction over patent appeals from both the federal district courts and the Patent and Trademark Office. *Id.*

33. 28 U.S.C. § 1254 (1988) (The Supreme Court may review cases from the courts of appeals by certiorari or by certification of a court of appeal).

section 101 of the patent statute.³⁴ Categories of patentable subject matter include processes, machines, manufactures, compositions of matter, or any new and useful improvement thereof.³⁵ Inventors generally attempt to classify their computer related inventions as "processes" for section 101 purposes.³⁶

Early consideration of section 101 as applied to computer programs and computer related inventions led to what was known as the mental steps doctrine.³⁷ The mental steps doctrine prohibited the patenting of inventions whose novelty was contained in steps to be performed in the human mind.³⁸ The doctrine was based on the broadly interpreted but well-settled principle of patent law that laws of nature, scientific principles, and mere ideas are not patentable subject matter.³⁹ Because mathematical algorithms⁴⁰ have been construed as syn-

34. See, e.g., *Diamond v. Diehr*, 450 U.S. 175, 180 (1981) (patent examiner rejected patent claim on computer related invention solely on subject matter grounds); *Parker v. Flook*, 437 U.S. 584, 588 (1978) (holding that patentability of computer related invention turned solely on the proper construction of 35 United States Code section 101).

35. 35 U.S.C. § 101 (1982).

36. See, e.g., *In re Prater*, 415 F.2d 1393, 1403 (C.C.P.A. 1969); *In re Bernhart*, 417 F.2d 1395, 1401 (C.C.P.A. 1969); *In re Musgrave*, 431 F.2d 882, 888 (C.C.P.A. 1970).

37. See *In re Musgrave*, 431 F.2d 882, 889 (C.C.P.A. 1970) (suggesting that the genesis of the mental steps doctrine in patent law was *Don Lee, Inc. v. Walker*, 61 F.2d 58 (9th Cir. 1932)).

38. *In re Abrams*, 188 F.2d 165, 166-67 (C.C.P.A. 1951).

39. See *Le Roy v. Tatham*, 55 U.S. 156 (14 How. 1852) (principle that lead, under high pressure, can be made to form a pipe held unpatentable); *O'Reilly v. Morse*, 56 U.S. 62 (15 How. 1853) (claims to broad uses of electromagnetism held unpatentable); *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. 498 (20 Wall. 1874) (fastening a rubber eraser to the end of a pencil held unpatentable because it is an idea); *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86 (1938) (scientific truth, or mathematical expression of it, is not patentable); *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1947) (law of nature not patentable). In *Gottschalk v. Benson*, 409 U.S. 63 (1972), the principle was explained as follows:

[W]hile a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be . . . [A]n idea of itself is not patentable . . . [A] principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right . . . Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work . . . [H]e who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes . . . [I]f there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.

Id. at 67.

40. The Supreme Court defines the term "algorithm" as a procedure for solving a given type of mathematical problem. *Gottschalk*, 409 U.S. at 65. *Cf.*, *Paine Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358, 1367 (D. Del. 1983) (distinguishing between "math algorithm," which is a procedure for solving a given type of mathematical problem, and a "computer algorithm"). A computer algorithm is:

1) A fixed step-by-step procedure for accomplishing a given result; usually a simplified

onymous with scientific principles,⁴¹ the patent courts have routinely denied patents to applications which consist of mathematical algorithms.⁴² In a similar vein, the patent courts have denied patents to computer inventions which do no more than embody and execute a mathematical equation.⁴³

Eventually the CCPA took a less hostile posture towards inventions which included, but did not entirely consist of, mental processes or mathematical algorithms.⁴⁴ Beginning in 1968 with the decision of *In re Prater*,⁴⁵ and culminating in 1970 with the decision of *In re Musgrave*,⁴⁶ the CCPA ruled on a series of cases which shifted emphasis away from the question of mental steps, and concentrated on whether or not the invention pursued the constitution's stated purpose of pursuing the "useful arts."⁴⁷ This shift of emphasis greatly overshadowed consideration of the mental steps doctrine, and introduced new questions which ultimately spawned disagreement between the CCPA and the Supreme Court.⁴⁸

1. *In re Prater*

In *In re Prater*, the patent applicant had discovered a mathematical relationship involving the peaks in a spectrographic⁴⁹ array, which

procedure for solving a complex problem, also a full statement of a finite number of steps.

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

Id. (quoting from C. SIPPLE & C. SIPPLE, *COMPUTER DICTIONARY AND HANDBOOK* 23 (2d ed. 1975)). The Court implies that the "math algorithm" is the correct definition to be employed in considering the patentability of subject matter under 35 United States Code section 101. *Paine Webber*, 564 F. Supp. at 1367.

41. See *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939) ("[w]hile a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.").

42. See, e.g., *In re Abrams*, 188 F.2d 165, 167 (C.C.P.A. 1951) (novelty of invention existed in mathematical expression and was therefore nonstatutory subject matter); *Arshal v. United States*, 621 F.2d 421, 428-30 (Ct. Cl. 1980) (claim which mathematically treated input signals to produce useful output signals was held nonstatutory subject matter).

43. See *Gottschalk v. Benson*, 409 U.S. 63, 72-73 (1972) (computer program which converted binary-coded decimals into pure binary numbers was held unpatentable subject matter).

44. See *infra* notes 49-74 and accompanying text.

45. 415 F.2d 1378 (C.C.P.A. 1968) *modified on rehearing*, 415 F.2d 1393 (C.C.P.A. 1969).

46. 431 F.2d 882 (C.C.P.A. 1970).

47. *Id.* at 893.

48. See *infra*, notes 75-107 and accompanying text (describing the Supreme Court's reversal of CCPA decisions regarding patents on computer inventions).

49. A spectrograph is an instrument for dispersing radiation (as electromagnetic radiation

made possible a more accurate determination of the constituents in a gaseous mixture.⁵⁰ The patent application in *Prater* also disclosed an invention to carry out this mathematical discovery.⁵¹

The Patent Examiner rejected the patent application in *Prater*, in part because the claim relied upon the execution of a math algorithm which was "readable upon a mental process; and claims to a mental process are unpatentable."⁵² Specifically, the invention in *Prater* utilized an analog computer⁵³ to carry out the math algorithm, and the Patent Examiner reasoned that utilization of a machine to carry out mental operations did not immunize the invention from unpatentability under the mental steps doctrine.⁵⁴

The CCPA reversed the patent examiner's decision in *Prater*, holding that a machine used to carry out a process that was formerly carried out by mental steps is not unpatentable as long as the process is directed at a "useful art" within the intendment of the constitution.⁵⁵ The CCPA further defined the patent laws as they pertain to the use of math algorithms and mental steps in *In re Bernhart*,⁵⁶ decided one year after *Prater*.⁵⁷

or sound waves) into a spectrum and photographing or mapping the spectrum. WEBSTER'S NEW NINTH COLLEGIATE DICTIONARY 1133 (1984).

50. *In re Prater*, 415 F.2d 1378, 1378-80 (C.C.P.A. 1968).

51. *Id.* at 1379.

52. *Id.* at 1381. The other grounds used by the Patent Examiner for rejection were section 102 (novelty), section 103 (nonobviousness), and section 112 (lack of specificity). *Id.*

53. An analog computer is any class of device in which variable physical quantities such as electrical potential, fluid pressure, or mechanical motion are represented in a way analogous to the corresponding quantities in the problem to be solved. THE NEW ENCYCLOPAEDIA BRITANNICA 7 (15th ed. 1985). Analog computers use changes in mechanical, electrical, or other physical properties to represent changes in input data. *Id.* See also C. MILLARD, LEGAL PROTECTION OF COMPUTER PROGRAMS AND DATA 11 (1985).

Different numbers may be represented, for example, by different voltages and those voltage levels (and thus the corresponding numbers) may be continuously variable. A digital computer, however, operates in discrete steps and stores data as simply the presence or absence of a signal of some kind. Bender explains the essential difference of approach thus: Whereas analog computers function in terms of "how much," digital computers function in terms of "how many"; analog computers measure, while digital computers count.

Id.

54. *In re Prater*, 415 F.2d at 1381. The Patent Examiner relied on *In re Abrams*, 188 F.2d 165 (C.C.P.A. 1951), which held that if the novelty of an invention lies in a math algorithm the invention is nonstatutory, as the basis for rejection under the mental steps doctrine. *Id.* In overturning the Patent Examiner, the CCPA distinguished *Abrams* because the invention at issue in *Abrams* disclosed no means other than the mind for performing calculations and comparisons, and no alternative means existed at that time. *Id.* at 1389. Conversely, in *Prater*, alternative means did exist and were well described in the patent application. *Id.* at 1385.

55. *Id.* at 1389.

56. 417 F.2d 1395 (C.C.P.A. 1969).

57. See *infra* notes 59-64 and accompanying text (describing the holding in *Bernhart*).

2. In re Bernhart

The invention at issue in *In re Bernhart* employed a computer-calculated math algorithm and a mechanical plotting machine which acted together to generate two-dimensional portrayals of three-dimensional objects from any desired angle and distance and on any desired plane of projection.⁵⁸ After finding the invention patentable, the *Bernhart* court suggested that the mental steps doctrine only precluded the complete monopolization of all uses of a math algorithm.⁵⁹ The court also stated that if an invention discloses a means other than the human mind for carrying out the math algorithm, the question of the mental steps exclusion does not even arise.⁶⁰ Furthermore, if a patent-claim to a process includes a mathematical expression as its sole novel component, the claim is not unpatentable simply because the remaining components are old.⁶¹ The *Bernhart* court concluded that because the invention at issue disclosed a means for carrying out the algorithm, the issue of the mental steps doctrine did not arise.⁶²

Bernhart signalled the downfall of the mental steps doctrine. One year after *Bernhart*, the CCPA decided *In re Musgrave*,⁶³ which made the mental steps doctrine essentially obsolete.⁶⁴

3. In re Musgrave

The invention in *Musgrave* allowed an operator to determine, with a high degree of accuracy, the nature of sub-surface formations in the earth's crust.⁶⁵ The invention utilized an analog computer to

58. *In re Bernhart*, 417 F.2d 1395, 1396 (C.C.P.A. 1969).

59. *Id.* at 1399 (holding that no rule of law should be announced which would impress a monopoly upon all uses of the equations disclosed by appellants in their application).

60. *Id.* at 1400. "It would appear that the disclosure of apparatus for performing the process wholly without human intervention, merely shows that the disclosed process does not fall within the so-called 'mental steps' exclusion." *Id.* (citing *Prater*, 415 F.2d 1378, 1403 (C.C.P.A. 1969)).

61. *Bernhart*, 417 F.2d at 1399.

62. *Id.* at 1400-01.

63. 431 F.2d 882 (C.C.P.A. 1970).

64. *See id.* at 890-94.

65. *Id.* at 882.

perform mathematical operations.⁶⁶ The PTO rejected the application, citing the mental steps doctrine.⁶⁷

The CCPA, in overturning the PTO's decision, pointed out that nothing in congressional or other statutory language established the mental steps doctrine,⁶⁸ but rather that such doctrine was conceived from uncertain case law.⁶⁹ The *Musgrave* court concluded that "all that is necessary . . . to make a sequence of operational steps a statutory process within 35 U.S.C. § 101 is that it be within the technological arts so as to be in consonance with the Constitutional purpose to promote the 'useful arts.'"⁷⁰ This decision shifted the focus of analysis away from mental steps considerations and thus, after *Musgrave* was decided in 1970, the mental steps doctrine did not again pose a serious obstacle to the patentability of inventions containing mathematical equations or computer programs.⁷¹ This liberal interpretation of section 101 by the CCPA was not shared by the Supreme Court, however.⁷² The Supreme Court was slower to embrace the general idea of patents for computer related inventions and eventually expressed clear disagreement with the CCPA in their review of CCPA decisions.⁷³ The first case to finally reach the

66. *Id.* at 887.

67. *Id.* at 888.

68. *Id.* at 890.

69. *Id.* at 890-92.

70. *Id.* at 893. "Technological arts" were never defined by the court in *Musgrave*. Judge Baldwin, concurring in *Musgrave*, foresaw the following:

First and foremost will be the problem of interpreting the meaning of "technological arts": Is this term intended to be synonymous with the "industrial technology"—mentioned by Judge Smith? It sounds broader to me. Necessarily, this will have to be considered a question of law and decided on a case-by-case basis. Promulgation of any all-encompassing definition has to be impossible. This task is now before us.

Id. at 895 (Baldwin, J., concurring). See *In re Waldbaum*, 457 F.2d 997, 1003 (C.C.P.A. 1972) (the term "technological arts" is synonymous with the term "useful arts" as it is used in the Constitution); *In re Prater*, 415 F.2d 1378, 1389 (the term "industrial technology" is synonymous with the term "useful art" as it is used in the Constitution).

71. See *In re Musgrave*, 431 F.2d at 894-95 (Baldwin, J., concurring) (stating that very little remains of the mental steps doctrine).

72. See *infra* notes 75-107 and accompanying text (Supreme Court overruled decisions by the C.C.P.A. on section 101 grounds). See also *In re Musgrave*, 431 F.2d 882, 894 (C.C.P.A. 1970) (Baldwin, J., concurring) (an example of the liberal interpretation by the C.C.P.A. of section 101). Judge Baldwin believed that no limitations were placed on this holding, and that in effect, it was a pronouncement of new law. *Id.* (Baldwin, J., concurring).

73. See, e.g., *Gottschalk v. Benson*, 409 U.S. 63 (1972); *Parker v. Flook*, 437 U.S. 584 (1978) (both Supreme Court decisions overruled CCPA decisions granting patents to computer related inventions on the grounds that they would preempt the use of a mathematical formula). See also *Diamond v. Diehr*, 450 U.S. 175, 205-06 (Stevens, J., dissenting). Justice Stevens commented that the CCPA had been critical of previous Supreme Court decisions in the area of computer related patents, and had accused the Supreme Court of erroneously commingling distinct statutory provisions. *Id.* (Stevens, J., dissenting). Justice Stevens further commented

Supreme Court on the issue of computer related invention patentability was *Gottschalk v. Benson*.⁷⁴

B. U.S. Supreme Court Decisions

I. Gottschalk v. Benson

In *In re Benson*,⁷⁵ the CCPA found patentable a method of programming a general-purpose digital computer to convert signals from binary-coded decimal form to pure binary form.⁷⁶ The CCPA reasoned that it was beyond question that the computing machines themselves were considered "useful art," regardless of the uses to which they were put.⁷⁷ The CCPA further reasoned that a program which enhanced the internal operation of a computer would likewise be in the technological or useful arts.⁷⁸

The Supreme Court overruled the decision of the CCPA.⁷⁹ The Court held that granting the patent at issue would have the practical effect of patenting an idea, because the patent-seekers had failed to limit the scope of the application of their invention.⁸⁰ Since the invention had no practical application other than in connection with a digital computer, the Court deduced that such a patent would have the effect of preempting the mathematical formula used, thereby amounting to a patent on the algorithm itself.⁸¹

Although this was the first opportunity the Supreme Court had to speak on the issue of computer program patentability, the Court declined to set out clear standards in this area. Instead, the Court merely described what is *not* unpatentable.⁸² The Court expressly left

that the CCPA had expressly declined to use a method of claim analysis spelled out in a prior Supreme Court decision. *Id.* (Stevens, J., dissenting).

74. 409 U.S. 63 (1972).

75. 441 F.2d 682 (C.C.P.A. 1971).

76. *In re Benson*, 441 F.2d 682, 688 (C.C.P.A. 1971). Most digital computers perform their computing operations on information represented in pure binary form. Pure binary form can represent any decimal number as a combination of 0's and 1's. The mathematical operation necessary to convert a normal decimal number into a binary number requires that the decimal number be first converted into a "binary coded decimal." *Id.* at 682-83.

77. *Id.* at 688.

78. *Id.*

79. See *Gottschalk v. Benson*, 409 U.S. 63 (1972).

80. *Id.* at 71.

81. *Id.* at 71-72.

82. *Id.* at 71. The Court stated that "[w]e do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents." *Id.*

open the possibility of computer program patentability, but indicated that such a program did not exist in the *Benson* case.⁸³ The next opportunity the Supreme Court had to address the issue of computer related invention patentability came in *Parker v. Flook*.⁸⁴

2. Parker v. Flook

The applicant in *Flook* claimed to have discovered a "method for updating alarm limits" in catalytic conversion processes.⁸⁵ Specifically, when a catalytic conversion process takes place, certain reaction variables are monitored, e.g., temperature.⁸⁶ If the value for a reaction variable exceeds a predetermined "alarm limit," a signal is dispatched to warn of the abnormality.⁸⁷ Under certain conditions, such as non-steady-state operation,⁸⁸ it is appropriate to change the value of the alarm limits.⁸⁹ The invention in *Flook* monitored the reaction variable and a computer calculated a new value for the variable and adjusted the alarm limit appropriately.⁹⁰ The CCPA approved the patent, holding that the "post solution activity," that activity which took place after the computer utilized the math algorithm, limited the application of the algorithm; since approving the patent would not result in preemption of the algorithm altogether, the invention was outside the authority of *Benson*.⁹¹

The Supreme Court reversed the decision of the CCPA, holding that regardless of the presence of a math algorithm, the process simply exhibited no patentable invention.⁹² The Court reasoned that

83. *Id.* The court stated that "[i]t is said that the decision precludes a patent for any program servicing a computer. We do not so hold. It is said that we have before us a program for a digital computer but extend our holding to programs for analog computers. We have, however, made clear from the start that we deal with a program only for digital computers." *Id.*

84. 437 U.S. 584 (1978).

85. *Id.* at 585.

86. *Id.*

87. *Id.*

88. Steady state is "[a] characteristic of a condition, such as value, rate, periodicity, or amplitude, exhibiting only negligible change over an arbitrary long period of time. It may describe a condition in which some characteristics are static; others dynamic." VAN NOSTRANDS'S SCIENTIFIC ENCYCLOPEDIA 2087 (5th ed. 1976).

89. *Parker v. Flook*, 437 U.S. 584, 585 (1978).

90. *Id.*

91. *Id.* at 590. See *Gottschalk v. Benson*, 409 U.S. 63 (1972) (holding an invention not to be patentable subject matter because it would result in wholly preempting a mathematical algorithm).

92. *Parker v. Flook*, 437 U.S. 584, 594 (1978).

because an algorithm must be utilized in some inventive manner to be patentable, the mere discovery of an algorithm remains unpatentable unless applied in an inventive way.⁹³ The Court found the requisite “inventive concept” wanting in the *Flook* application.⁹⁴

The Court concluded by stating that neither its precedents nor the instant decision should be interpreted to foreclose the possibility of patent protection being granted for a novel and useful computer program, or to suggest that such protection is undesirable as a matter of policy.⁹⁵ However, the Court recognized that it “must proceed cautiously when asked to extend patent rights into areas wholly unforeseen by Congress.”⁹⁶ The *Flook* Court indicated that for an applicant to successfully obtain a patent under section 101 for an invention containing a math algorithm, the applicant must show more than a mere lack of total preemption of the algorithm.⁹⁷ Additionally, the applicant must show some “inventive concept.”⁹⁸

Justice Stewart, writing for the dissent, asserted that the patent application satisfied the requirement of section 101, which addresses the *subject matter* of the invention.⁹⁹ According to the dissent, the majority was denying the application on section 102 and 103 grounds, but was improperly classifying the rejection as being based on section 101 criteria.¹⁰⁰

The CCPA did not attach great significance to the *Flook* “inventive concept” requirement in their subsequent review of computer related patent applications.¹⁰¹ In fact, the CCPA continued to employ a pre-*Flook* test first articulated in *In re Freeman*, when evaluating com-

93. *Id.* at 594. “Even though a phenomenon of nature or mathematical formula may be well known, an inventive application of the principle may be patented. Conversely, the discovery of such a phenomenon cannot support a patent unless there is some other inventive concept in its application.” *Id.*

94. *Id.*

95. *Id.* at 595.

96. *Id.* at 596.

97. *Id.* at 594.

98. *Id.*

99. *Id.* at 599-600 (Stewart, J., dissenting). *See supra* note 25 (describing the subject matter requirement for patentability).

100. *Parker v. Flook*, 437 U.S. 584, 600 (1978) (Stewart, J., dissenting). Justice Stewart suggested that the requirements of sections 101, 102, and 103 (subject matter, novelty, and non-obviousness, respectively) should be addressed individually, rather than jumbling them together, as the majority did in this case. *Id.* (Stewart, J., dissenting). Reviewing the present invention against section 101 requirements only, the dissent found the invention to pass muster. *Id.* (Stewart, J., dissenting).

101. *See, e.g., In re Bradley*, 600 F.2d 807, 811-13 (C.C.P.A. 1979); *In re Diehr*, 602 F.2d 982, 985-89 (C.C.P.A. 1979). In both these cases, the CCPA evaluated the inventions under 35 United States Code section 101 and held that all passed the necessary requirements without mention of the “inventiveness” requirement articulated in *Flook*. *Id.*

puter related inventions under section 101.¹⁰² The CCPA test involved a two-step analysis:

First, it must be determined whether the claim directly or indirectly recites an algorithm in the *Benson* sense of that term, for a claim which fails even to recite an algorithm clearly cannot wholly preempt an algorithm. Second, the claim must be further analyzed to ascertain whether in its entirety it wholly preempts that algorithm.¹⁰³

Utilizing this test, the CCPA continued, post-*Flook*, to grant patents to inventions which made use of computers.¹⁰⁴ In March 1980, the Supreme Court agreed to review two such cases; *In re Diehr*¹⁰⁵ and *In re Bradley*.¹⁰⁶ Because of subsequent structural changes in the court system, these cases may be the last opinions by the Supreme Court on the issue of computer related patents.¹⁰⁷

3. *Diamond v. Diehr*

The invention sought to be patented in *Diamond v. Diehr*¹⁰⁸ was strikingly analogous to the invention in *Flook*.¹⁰⁹ The patent claim

102. See *In re Diehr*, 602 F.2d at 988.

103. *In re Freeman*, 573 F.2d at 1245. "Directly" refers to the recitation of a conventional math formula, and "indirectly" refers to words which in effect describe a math formula. *Id.* at 1246. The phrase "the *Benson* sense of the term" refers to a procedure for solving a given type of mathematical problem. *Gottschalk v. Benson*, 409 U.S. 63, 65. See also Gemignani, *Should Algorithms be Patentable?*, 22 JURIMETRICS J. 326 (1982) (stating that the two-part *Freeman* test was first articulated by the CCPA in *In re Noll*, 545 F.2d 141 (C.C.P.A. 1976)).

104. See *In re Bradley*, 600 F.2d 807, 813 (C.C.P.A. 1979); *In re Diehr*, 602 F.2d 982, 988-89 (C.C.P.A. 1979).

105. 602 F.2d 982 (C.C.P.A. 1979), cert. granted, 445 U.S. 926 (1980), aff'd 450 U.S. 173 (1981).

106. 600 F.2d 807 (C.C.P.A. 1979), cert. granted, 445 U.S. 926 (1980), aff'd without opinion, 450 U.S. 381 (1981). The Supreme Court heard arguments in the *Diehr* and *Bradley* cases on the same day, Oct 14, 1980, deciding the *Diehr* case first in a lengthy opinion, then affirming the CCPA's *Bradley* decision without opinion at 450 U.S. 381 (1981). Because the *Bradley* decision has no opinion, it is not mentioned hereafter.

107. See Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (1982). As of October 1, 1982, the CCPA and the United States Court of Claims merged to form a new patent appeals court, the United States Court of Appeals for the Federal Circuit. This new court has exclusive jurisdiction over all patent appeals, from both the Federal District Courts and the Patent and Trademark Office. *Id.* See also Samuels, *The Patentability of Computer Related Inventions*, 6 CORP. L. REV. 144, 155 (1983). Samuels expresses the opinion that due to the specialized nature of the United States Court of Appeals for the Federal Circuit, the Supreme Court will act with extreme deference, and will not likely address the issue of computer related invention patentability again. *Id.*

108. 450 U.S. 175 (1981).

109. *Parker v. Flook*, 437 U.S. 584 (1978). In *Flook*, the invention at issue monitored the variables involved in a catalytic conversion process, and altered the operating parameters, (alarm limits), when appropriate. *Id.* at 585. In *Diehr*, the invention monitored a rubber molding process and altered the "time-to-cure" as a function of the interior temperature of the mold. *Diehr*, 450 U.S. at 176.

was entitled *Direct Digital Control of Rubber Molding Process*,¹¹⁰ and involved the use of a computer program to improve the performance of rubber molding processes by accurately calculating the ideal cure time.¹¹¹ The invention constantly measured the interior temperature of a mold and fed this information to a computer, which continually recalculated the cure time by use of a well known mathematical equation.¹¹² When the recalculated time equalled the actual cure time, the computer signalled a device to open the mold.¹¹³

The *Diehr* opinion, written by Justice Rehnquist (who dissented in *Flook*), began by reciting section 101.¹¹⁴ The Court then found that the invention at issue fell into the "process" category of section 101.¹¹⁵ Further, the Court stated that the patentability of such a process should be considered with respect to Congress' intent that statutory subject matter includes "anything under the sun that is made by man."¹¹⁶ The opinion then set out language which defined the nature of a patentable process, the significance of which warrants its full reproduction.

That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. . . . A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery. In the language of the patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new or patentable; whilst the process itself may be altogether new, and produce an entirely new result. The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence. Transformation of an article to a

110. *In re Diehr*, 602 F.2d 982, 983 (C.C.P.A. 1979).

111. *Diamond v. Diehr*, 450 U.S. at 177-79. The computer is provided with temperature data from the mold, and then uses the temperature data in a mathematical equation to calculate the "updated cure time." *Id.*

112. *Id.* The well known equation is called an Arrhenius equation and is named after its discoverer, Svante Arrhenius. The mathematical expression of the equation is: $[\ln v = CZ + x]$. $\ln v$ is the natural logarithm of v , the total required cure time; C is the activation constant; Z is the temperature of the mold, and x is a constant which depends on the geometry of the mold. *Id.* at 178 n.2.

113. *Id.* at 178-79.

114. *Id.* at 182.

115. *Id.* at 185.

116. *Id.* at 183. The opinion was quoting S. REP. NO. 1979, 82 Cong., 2d Sess., 6 (1952); H.R. REP. No. 1923, 82 Cong., 2d Sess., 6 (1952), reprinted in 1952 U.S. CONG. & ADMIN. NEWS 2394, 2399. *Id.*

different state or thing is the clue to the patentability of a process claim that does not include particular machines.¹¹⁷

Utilizing the above description, the Court held that the invention at issue satisfied the requirements of patentable subject matter.¹¹⁸ The Court reasoned that the invention indisputably transformed an article, uncured synthetic rubber, into a different state or thing.¹¹⁹ Furthermore, the Court stated that "industrial processes such as this are the types which have historically been eligible to receive the protection of our patent laws."¹²⁰

The Court then distinguished its previous holdings in *Benson* and *Flook*, on the grounds that the applications in those cases essentially recited and preempted all uses of a mathematical formula.¹²¹ Mathematical formulas, like laws of nature, are not patentable.¹²² Because of the factual similarities between the *Flook* and *Diehr* inventions, the Court, whose membership had not changed in the interim period, had a difficult time distinguishing *Flook*.¹²³ The Court's opinion in *Diehr* admitted that arguably the claims in *Flook* did more than recite a mathematical formula.¹²⁴ In light of this admission, the statement made by the Court in *Flook*, that the claims therein did not preempt *all* uses of the math algorithm,¹²⁵ seems to support the conclusion that *Flook* was wrongly decided. However, the Court in *Diehr* asserted that the invention in *Flook* was factually distinguishable from the invention in *Diehr*, and thus *Flook* was still valid law.¹²⁶ The Court in *Diehr* did not mention "inventiveness," and thus seemed to invalidate the suggestion made by the *Flook* Court that questions of "inventiveness" should be introduced into a section 101 inquiry.¹²⁷

The Court concluded without reciting any formal test for reviewing patent applications which contain computer programs or math algorithms, but by setting forth general principles to be considered in

117. *Diamond v. Diehr*, 450 U.S. at 182-84.

118. *Id.* at 184.

119. *Id.*

120. *Id.*

121. *Id.* at 185-87.

122. *Id.* at 186.

123. *Id.* at 186-87. See also *supra* note 109 (describing the factual similarities between the inventions in *Flook* and *Diehr*).

124. *Diehr*, 450 U.S. at 192 n.14.

125. *Parker v. Flook*, 437 U.S. 584, 586 (1978).

126. *Diehr*, 450 U.S. at 186-88.

127. *Id.* at 189-90 (no mention of the "inventive concept" requirement is discussed).

the evaluation of such patent applications.¹²⁸ The Court asserted that the use of a computer, computer program, or mathematical formula in an invention does not automatically bar the invention from patentability.¹²⁹ However, the invention must apply the computer or formula in a useful manner which deserves the protection of the patent laws: that is to say, the invention must be “otherwise statutory.”¹³⁰ Furthermore, when considering applications for patents on processes the process should be evaluated in its entirety, and not dissected into new and old elements, because even a new combination of old elements may be patentable.¹³¹ The Court concluded by indicating in dicta that the two-step procedure set out in the *Freeman* test¹³² was appropriate for claims reciting a mathematical formula, but because no formula existed in the case at issue, the test was unnecessary.¹³³

Justice Stevens, in a four justice dissent, attacked the majority’s disregard for the “distinction between the subject matter of what the inventor *claims* to have discovered—the section 101 issue—and the question whether that claimed discovery is in fact novel—the section

128. *Id.* at 187-91.

129. *Id.* at 187. The Court stated that its earlier opinions lent support to its present conclusion that a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer. *Id.*

130. *Id.* at 187-88. “It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.” *Id.* at 187. “While a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be [citing *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939)].” *Id.* at 188.

131. *Id.* at 188. The Court stated that:

[i]n determining the eligibility of respondents’ claimed process for patent protection under section 101, their claims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis. This is particularly true in a process claim because a new combination of steps in a process may be patentable even though all the constituents of the combination were well known and in common use before the combination was made.

Id.

132. See *supra* note 103 and accompanying text (articulating the *Freeman* test).

133. *Diamond v. Diehr*, 450 U.S. at 191-93. The Court stated:

[w]e recognize, of course, that when a claim recites a mathematical formula (or scientific principle or phenomenon of nature), an inquiry must be made into whether the claim is seeking patent protection for that formula in the abstract . . . Because we do not view respondents’ claims as an attempt to patent a mathematical formula, but rather to be drawn to an industrial process for the molding of rubber products, we affirm the judgement of the Court of Customs and Patent Appeals.

Id.

102 issue.”¹³⁴ The dissent suggested that the Court should make a firm ruling that no computer related invention should qualify for patentability if the invention relies entirely on the use of a computer.¹³⁵ In addition, the dissent criticized the majority’s opinion and the precedents set by the Court because they fail to provide workable guidelines for patent attorneys to evaluate computer related inventions, and to determine in a predictable manner the patentability of such inventions.¹³⁶

III. THE MANAGEMENT INFORMATION SYSTEM PATENT

A. Background

The term “Management Information System,” (MIS), has a flexible meaning, and has been used to describe computer controlled systems which perform functions ranging from the preparation of an inventory report showing updated ending balances, to the simulation of how new products will fare in complex marketing environments.¹³⁷ The strict definition of the term varies depending on the source.¹³⁸

134. *Diehr*, 450 U.S. at 211. See also E. KITCH & H. PERLMAN, LEGAL REGULATION OF THE COMPETITIVE PROCESS 793 (3d ed. 1986).

It has been urged that novelty is an appropriate consideration under § 101. Presumably, this argument results from the language in § 101 referring to any “new and useful” process, machine, etc. Section 101, however, is a general statement of the type of subject matter that is eligible for patent protection “subject to the conditions and requirements of this title.” Specific conditions for patentability follow and § 102 covers in detail the conditions relating to novelty. The question therefore of whether a particular invention is novel is “fully apart from whether the invention falls into a category of statutory subject matter.”

Id. (quoting *In re Bergy*, 596 F.2d 952, 961 (C.C.P.A. 1979)).

135. *Diehr*, 450 U.S. at 219 (Stevens, J., dissenting). Justice Stevens declared:

I believe . . . concerns would be better addressed by (1) an unequivocal holding that no program-related invention is a patentable process under § 101 unless it makes a contribution to the art that is not dependent entirely on the utilization of a computer, and (2) an unequivocal explanation that the term “algorithm” as used in this case, as in *Benson* and *Flook*, is synonymous with the term “computer program.”

Id. (Stevens, J. dissenting).

136. *Id.* (Stevens J., dissenting). Justice Stevens noted that:

the cases considering the patentability of program-related inventions do not establish rules that enable a conscientious patent lawyer to determine with a fair degree of accuracy which, if any, program-related inventions will be patentable.

Id. (Stevens, J., dissenting).

137. J. KANTER, MANAGEMENT INFORMATION SYSTEMS ix (3d ed. 1984).

138. See, e.g., G. DAVIS, MANAGEMENT INFORMATION SYSTEMS: CONCEPTUAL FOUNDATIONS, STRUCTURE, AND DEVELOPMENT vii (1974) (“[a] management information system, or MIS, is an information system that, in addition to providing all necessary transaction processing for

However, a conveniently brief articulation was offered by James Hicks: "A management information system is a formalized, computer-based system able to integrate data from various sources to provide the information necessary for management decision making."¹³⁹

Because computer programs have traditionally qualified for copyright protection only, the Supreme Court decision in *Diamond v. Diehr* was enthusiastically received by many companies and individuals who sought a higher level of protection for their computer programs and computer related inventions.¹⁴⁰ In an apparent response to the decision in *Diehr*, the PTO began to grant patents on inventions which can generally be described as MIS's.¹⁴¹ MIS patents are controversial because they defy the unwritten doctrine that patents are for tangible inventions such as communication devices and manufacturing tools, but not for abstract entities such as data processing methodology embodied in a computer program.¹⁴²

an organization, provides information and processing support for management and decision functions"); J. HICKS, JR., *MANAGEMENT INFORMATION SYSTEMS: A USER PERSPECTIVE* 21 (1984) ("management information system is a formalized, computer-based system able to integrate data from various sources to provide the information necessary for management decision making"); J. KANTER, *MANAGEMENT INFORMATION SYSTEMS* 1 (3d ed. 1984) ("an MIS is a system that aids management in making, carrying out, and controlling decisions").

139. J. HICKS, JR., *MANAGEMENT INFORMATION SYSTEMS: A USER PERSPECTIVE* 21 (1984).

140. M. Betts, *Patenting the MIS Strategic Edge*, *COMPUTERWORLD MAG.*, May 30, 1988, at 1. "The trend toward software patents was prompted by the 1981 United States Supreme Court ruling in *Diamond v. Diehr*, which opened the floodgates for patenting software-related inventions such as industrial process control systems, digital telephone switches and robots. In the last two years there has been a sharp increase in the number of patents issued for automated systems, patent attorneys said, and more are on the way.) *Id.* at 10. See also B. DIETZ, *THE LEGAL PROTECTION OF COMPUTER SOFTWARE* 117 (1981) (Copyright protection has been available for computer programs under the old 1909 Act since at least 1964).

141. See, e.g., United States Patent No. 4,346,442: *Securities Brokerage-Cash Management System*, inventor Thomas E. Musmanno, Patent Application No. 173,331, filed July 29, 1980, granted August 24, 1982 (Invention providing data processing methodology and apparatus for effecting a system which allows automatic transactions between a margin brokerage account, a money market account, and a charge card account); United States Patent No. 4,736,294: *Data Processing Methods and Apparatus for Managing Vehicle Financing*, inventor Gwyneth Gill, Patent Application No. 65,176, filed June 23, 1987, granted April 5, 1988 (Invention disclosing data processing system that provides information to assist in granting a loan applicant credit, processing the loan, and determining at the time of making the loan the residual value of the vehicle at a predetermined option date); United States Patent No. 4,674,044: *Automated Securities Trading System*, inventor Leslie P. Kalmus, Patent Application No. 696,407, filed January 30, 1985, granted June 16, 1987 (Invention providing data processing and apparatus to effect automatic trading of securities).

142. See *Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358 (D. Del. 1983). The majority in *Paine Webber* ruled against plaintiff, who contended that the defendant's computer invention should be unpatentable because it defines "nothing more than the combination of familiar business systems." *Id.* at 1365. See also M. Betts, *Patenting the MIS Strategic Edge*, *COMPUTERWORLD MAG.*, May 30, 1988, at

Consider, for example, the following MIS inventions: United States Patent No. 4,694,397, entitled *Banking/Brokerage Computer Interface System*,¹⁴³ [hereinafter "Banking/Brokerage" invention], and U.S. Patent No. 4,736,294, entitled *Data Processing Methods and Apparatus for Managing Vehicle Financing*,¹⁴⁴ [hereinafter "Vehicle Financing" invention].

The first of these inventions uses a computer and associated program as an interface between a conventional bank account and a securities brokerage account.¹⁴⁵ The object of the invention is to facilitate automatic transactions between the two accounts, and to create independent and separate transactional activity records.¹⁴⁶ Specifically, the invention makes possible automatic transactions that would normally require human intervention. For example, if a user desires to buy securities, he need not make a trip to the bank to secure the funding. The user merely places an order with the brokerage house and the invention automatically transfers funds from the bank account to the securities account to complete the transaction.¹⁴⁷ Conversely, if funds are generated in the securities account, the invention will automatically transfer the funds for deposit in the bank account.¹⁴⁸ It is noteworthy that the two accounts may be located substantial distances from one another, with the communicated data relayed via satellite, overland microwave, or conventional switched data networks.¹⁴⁹

The second aforementioned MIS invention, the Vehicle Financing invention, processes vehicle financing data,¹⁵⁰ and provides information to assist a lender in granting a loan applicant credit.¹⁵¹ The invention processes the loan, and determines at the time of making

1. "From a legal standpoint, the MIS patents are unusual because they break the conventional wisdom that patents are for inventions such as mousetraps and zippers, not for computer software or methods of doing business . . ." *Id.* at 10.

143. United States Patent No. 4,694,397: *Banking/Brokerage Computer Interface System*, inventors David J. Grant and Andrew M. Vignola, Sr., Patent Application No. 686,976, filed December 27, 1984, granted September 15, 1987.

144. United States Patent No. 4,736,294: *Data Processing Methods and Apparatus for Managing Vehicle Financing*, inventor Gwyneth Gill, Patent Application No. 65,176, filed June 23, 1987, granted April 5, 1988.

145. United States Patent No. 4,694,397, *supra* note 143, at columns 1-2.

146. *Id.* at column 1.

147. *Id.*

148. *Id.*

149. *Id.* at column 3.

150. United States Patent No. 4,736,294: *Data Processing Methods and Apparatus for Managing Vehicle Financing*, inventor Gwyneth Gill, Patent Application No. 65,176, filed June 23, 1987, granted April 5, 1988.

151. *Id.* in the abstract.

the loan a residual value of the vehicle at a pre-determined option date.¹⁵² The patent includes 107 pages of computer programming, including 10,000 COBOL¹⁵³ instructions.¹⁵⁴

When comparing MIS patents such as the Banking/Brokerage and Vehicle Financing patents with previous computer related patents, it is apparent that these MIS patents differ in a qualitative way.¹⁵⁵ Recall the early computer-related invention patented in *Prater*.¹⁵⁶ The invention in *Prater* utilized a computer and accompanying program to analyze data generated from a spectrograph.¹⁵⁷ Thus although the invention made use of a computer program, the use of which was controversial under the then-viable mental steps doctrine,¹⁵⁸ the computer component enhanced the operation of a scientific instrument.¹⁵⁹ In this way, the patent on the invention seemed proper in view of the stated purpose of the Constitution: To promote the progress of science and useful arts.¹⁶⁰

Similarly, the invention in *Bernhart* involved the use of a computer and accompanying program to analyze data representative of three-dimensional images.¹⁶¹ The invention altered this data to generate data representative of a corresponding two dimensional image, and then generated this image by use of a mechanical plotter.¹⁶² Because this invention included apparatus (a plotter) to effectuate its purpose, the invention was found to recite statutory subject matter notwithstanding its computer component.¹⁶³

The *Prater* and *Bernhart* inventions differ from MIS inventions because the former contain significant components other than the computer related component.¹⁶⁴ Contrast these with the aforesaid

152. *Id.*

153. COBOL is a computer language commonly utilized in business applications. RADEMACHER, AN INTRODUCTION TO COMPUTERS AND INFORMATION SYSTEMS 547 (1983). (COBOL stands for Common Business Oriented Language). "First used in 1960, today it is the most widely used computer language for business applications in both medium-size and large organizations." *Id.*

154. See United States Patent No. 4,736,294, *supra* note 141.

155. M. Betts, *Patenting the MIS Strategic Edge*, COMPUTERWORLD MAG., May 30, 1988, at 10.

156. *In re Prater*, 415 F.2d 1378 (C.C.P.A. 1968). See *supra* notes 49-51 and accompanying text (describing the invention in *Prater*).

157. *In re Prater*, 415 F.2d at 1378-81.

158. See *supra* notes 37-43 and accompanying text (describing the mental steps doctrine).

159. *In re Prater*, 415 F.2d at 1380.

160. U.S. CONST. art. 1, § 8, cl. 8.

161. *In re Bernhart*, 417 F.2d 1395, 1396 (C.C.P.A. 1969).

162. *Id.*

163. *Id.* at 1401.

164. See *id.* (planar plotting apparatus); *In re Prater*, 415 F.2d at 1379 (complex configuration of components to carry out spectrographic analysis).

tioned MIS inventions. The Banking/Brokerage invention's inventive substance lies primarily in the computer and accompanying program used to interface the banking and brokerage accounts.¹⁶⁵ Similarly, the Vehicle Financing invention, with its 107 pages of computer programming, seems obviously to consist predominantly of programming methodology, and in this respect it is a significant departure from *Diehr* and its predecessors.¹⁶⁶

B. Do Diehr and its Predecessors Lay the Precedential Foundation for the Patenting of Management Information Systems?

1. Computer Programs

The determination of whether MIS inventions are deserving of patent protection depends, of course, on the nature of what exactly is claimed in the particular invention at issue.¹⁶⁷ Assuming for the sake of analysis that MIS inventions are more computer program than apparatus, we may proceed to scrutinize the propriety of granting patents to these inventions. It is interesting to note that the descriptions of the inventions in MIS patents invariably describe the invention to include apparatus.¹⁶⁸ This style of draftsmanship is likely employed to downplay the computer part of the invention in an effort to avoid a *Benson*-like patent denial.¹⁶⁹

In analyzing the case law to ascertain the appropriateness of granting patents to MIS's, it is discouraging to discover that the PTO, the patent courts, and Congress have been loath to express any collective and coherent consensus on the requirements or limits

165. See United States Patent No. 4,694,397, *supra* note 143, at sheets 1-6 (computer flowcharts show methodology of the invention).

166. See *supra* notes 49-136 and accompanying text (*Diehr* and its predecessors allowed computer related inventions to be patented only if apparatus accompanied the computer component).

167. 35 U.S.C. § 101 (1982) (section 101 describes patentable subject matter).

168. See, e.g., United States Patent No. 4,736,294, *supra* note 141, in the abstract ("Data processing methods and *apparatus* for managing vehicle financing are disclosed.") (emphasis added); United States Patent No. 4,674,044, *supra* note 141, in the abstract ("Data processing based *apparatus* makes an automated trading market for one or more securities.") (emphasis added); United States Patent No. 4,642,768 in the abstract ("Methods and *apparatus* for funding a future liability by means of an insurance investment program.") (emphasis added).

169. See *supra* notes 75-83 and accompanying text (describing the denial in *Benson*).

of computer related patents.¹⁷⁰ Instead, patent practitioners are forced to interpret a history of cases lacking consistency in both reasoning and results, and which one commentator aptly describes as twisted and convoluted.¹⁷¹

Despite the inconsistencies, there is authority from both the CCPA and the Supreme Court to suggest that not only MIS computer programs, but *any* computer program may, under appropriate conditions, be granted patent protection.¹⁷² Unfortunately, the opinions fail to clearly state these conditions.¹⁷³ Consider the plain language of the Supreme Court in *Benson*: "It is said that the decision precludes a patent for any program servicing a computer. We do not so hold."¹⁷⁴ The Supreme Court affirmed this language six years later in *Flook*, and added that patents on computer related inventions were not undesirable as a matter of policy.¹⁷⁵

Despite the fact that computer related inventions, including MIS inventions, are not per se unpatentable, many such inventions have failed to satisfy the requisite conditions required for patentability.¹⁷⁶ One relatively clear ground relied on by the courts for rejection of

170. See Gemignani, *Legal Protection for Computer Software: The View From '79*, 7 RUTGERS J. COMPUTERS, TECH. & L. 269, 292 (1980) stating that:

[t]he plot has all of the elements of a comic opera with four principle characters: the Patent Office, which steadfastly turns down every application for a patent on a computer program; the court of Customs and Patent Appeals, which has fought for program patents in the face of increasing opposition from the Supreme Court; the Supreme Court, itself confused and trying to apply "nineteenth century legal notions to computer technology without understanding the technology," which keeps reversing the court of Customs and Patent Appeals without directly confronting the issue of program patentability; and Congress, which, despite anxious pleas from the Supreme Court to resolve the issue by statute, does nothing.

Id. See also *In re Musgrave*, 431 F.2d 882, 890 (C.C.P.A. 1970) (noting that the case law pertaining to the mental steps doctrine and patentable subject matter was "something of a morass").

171. Ross, *The Patentability of Computer Firmware*, 59 J. PAT. OFF. SOC'Y 731, 744 (1977).

172. See, e.g., *Gottschalk v. Benson*, 409 U.S. 63, 71 (1972) (Supreme Court held their decision did not preclude the patenting of computer programs); *Parker v. Flook*, 437 U.S. 584, 595 (1978) (Supreme Court stated their decision should not be interpreted to mean patents on computer programs are contrary to policy, or not in furtherance of the useful arts); *In re Freeman*, 573 F.2d 1237, 1245 (C.C.P.A. 1978) (C.C.P.A. held that simply because an implementation uses a programmed computer, it is not thereby unpatentable). See also *supra* notes 108-127 and accompanying text (describing the Supreme Court's inconsistent treatment of computer related patent cases as exhibited in *Flook* and *Diehr*).

173. See, e.g., *Diamond v. Diehr*, 450 U.S. at 182-94; *Parker v. Flook*, 437 U.S. at 588-96; *Gottschalk v. Benson*, 409 U.S. at 67-73 (Supreme Court does not set out clear patentability requirements for computer inventions).

174. *Gottschalk v. Benson*, 409 U.S. at 71.

175. *Parker v. Flook*, 437 U.S. at 595.

176. See, e.g., *id.* at 594-96; *Benson*, 409 U.S. at 71-72 (computer related inventions found unpatentable).

these patent applications has been the recitation and preemption of a math algorithm.¹⁷⁷

2. Math Algorithms

The precise definition of the term "math algorithm" has generated some confusion among the courts.¹⁷⁸ The Supreme Court defines the term to denote a procedure for solving a given type of mathematical formula, but this definition has not been understood by all to mean the same thing.¹⁷⁹ It is certain that if an invention does recite and preempt the use of a math algorithm, whatever that term may precisely mean, the invention will not be afforded patent protection.¹⁸⁰ Before we can determine whether MIS programs recite and preempt math algorithms, we must first come to a firm understanding of the term "math algorithm."

The reasoning behind the intolerance towards inventions which attempt to patent math algorithms can be expressed by the following syllogism: Clearly laws of nature are unpatentable, and since math algorithms are numerical representations of laws of nature, they too are unpatentable.¹⁸¹ Taking this reasoning a step further, if a mathematical expression does not represent a law of nature, it would not be termed a "math algorithm" and its use in an invention should not prevent the invention from obtaining a patent. The question then

177. See *supra* notes 40-42 and accompanying text (discussing the historic unpatentability of math algorithms).

178. Compare *In re Toma*, 575 F.2d 872, 876 n.4 (C.C.P.A. 1978), where the board of appeals for the Patent and Trademark Office employed as its definition of the term algorithm:

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

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

Id. (quoting from C. SIPPLE & C. SIPPLE, *COMPUTER DICTIONARY AND HANDBOOK* 23 (2d ed. 1972)); with *id.* at 877 (the *Benson* definition of the term algorithm: "[A] procedure for solving a given type of mathematical problem," used by the CCPA).

179. *Gottschalk v. Benson*, 409 U.S. 63, 65 (1972).

180. See, e.g., *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63 (1972). In both cases the Supreme Court denied a patent because the inventions recited and preempted math algorithms.

181. See Novick & Wallenstein, *The Algorithm and Computer Software Patentability: A Scientific View of a Legal Problem*, 7 RUT. J. COM. TECH. & L. 313, 338 n.200 (1979). See also *Flook*, 437 U.S. at 589 (where the Court stated: "Reasoning that an algorithm, or mathematical formula, is like a law of nature, *Benson* applied the established rule that a law of nature cannot be the subject of a patent.").

becomes: Which mathematical expressions represent laws of nature?

Consider the following equation, known as the Law of Universal Gravitation:¹⁸²

$$F = (G \times M1 \times M2) / (r^2).$$

All objects with mass have an attractive force between them.¹⁸³ This equation represents the relationship of the magnitude of that force (F), with respect to the masses of the objects (M1 & M2), and the distance between them (r).¹⁸⁴ If M1 and M2 represent a person's mass and the mass of the earth, respectively, and r is the distance from the center of the earth to that person standing on the face of the earth, F is equal to that person's weight.¹⁸⁵ It is important to understand that this mathematical equation is not limited to this fact scenario. This same equation dictates physical relationships between the sun and the moon, the sun and the earth, and the salt and pepper shakers sitting on a kitchen table, as well as between all bodies in the universe; hence the name, the Law of Universal Gravitation. This equation is true today, it was true a thousand years ago, and it will be true a thousand years into the future. This equation is, in the purest sense, a representation of a law of nature.¹⁸⁶

Consider, on the other hand, the following equation:

$$\Delta\sigma \cdot \Delta\epsilon = (\Delta S \cdot k)^2 / E$$

This equation is used in the science of fracture mechanics.¹⁸⁷ The precise meanings of the symbols are unimportant for our discussion. One of the central aims of the science of fracture mechanics is to predict how long a flawed metal part can operate in a vibrating machine before failure; in large part, it is the study of metal fatigue.¹⁸⁸ The equation set out above was formulated based on estimations and assumptions about the properties and behavior of metals.¹⁸⁹ In practice this equation does not yield precise results, but rather gives results only to within a statistical approximation, and in rare cases

182. D. HALLIDAY & R. RESNICK, FUNDAMENTALS OF PHYSICS 243 (2d ed. 1981).

183. *Id.*

184. *Id.* G is the number 6.672×10 to the negative eleventh power. *Id.* at 243-44.

185. *Id.*

186. *Id.*

187. R. HERTZBERG, DEFORMATION AND FRACTURE MECHANICS OF ENGINEERING MATERIALS 508 (2d ed. 1983).

188. *See id.* at 519-98.

189. *Id.*

does not represent the true behavior of the material at all.¹⁹⁰ In the future, with continued research by scientists, the assumptions used to formulate the equation may be shown to be erroneous.¹⁹¹ The results yielded from the equation may have been accurate due to sheer fortuity.¹⁹² Therefore, it is not an expression of a law of nature in the strictest sense, like the Law of Universal Gravitation.

Lastly, consider the familiar equation:

$$ax^2 + bx + C = 0.$$

This is the standard form of a quadratic equation.¹⁹³ The roots of a quadratic equation may be determined by use of the quadratic formula:¹⁹⁴

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The quadratic formula is unlike the Universal Law of Gravitation and the fracture mechanics formula. It is a general solution to a mathematical problem that is not unique to any special field of practice, but rather is common to many fields of study, including non-scientific fields.¹⁹⁵ The central question now becomes manifest: To which, if any, of the foregoing mathematical expressions does the prohibition on reciting and preempting algorithms apply?

Substantial precedent stands for the proposition that the intent behind the doctrine prohibiting recitation and preemption of algorithms is to prevent laws of nature from being patented, and thus monopolized.¹⁹⁶ If this is true, mathematical expressions like the

190. *Id.* See also 10 ASM METALS HANDBOOK 95-124 (8th ed. 1975) (detailing catastrophic failures of assorted metal components due to fatigue).

191. R. HERTZBERG, DEFORMATION AND FRACTURE MECHANICS OF ENGINEERING MATERIALS 519-27 (2d ed. 1983).

192. *Id.*

193. E. SWOKOWSKI, FUNDAMENTALS OF COLLEGE ALGEBRA 69 (4th ed. 1978).

194. *Id.* at 72.

195. *Id.* at 73-74.

196. See, e.g., *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (where the Court articulates the limits of patentability for math and science related inventions). The *Benson* Court stated that:

Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work. He who discovers a hitherto unknown phenomena of nature has no claim to a monopoly of it which the law recognizes. While a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful

Universal Law of Gravitation, and possibly expressions akin to the fracture mechanics formula, would be prohibited from inclusion in any invention sought to be patented if such patent would have the effect of preempting the formula itself.

Recall, however, the definition of "math algorithm" offered by the Supreme Court: A procedure for solving a given type of mathematical problem.¹⁹⁷ The plain meaning of this definition seems squarely to describe equations such as the quadratic formula. If the purpose of the algorithm prohibition is to prevent the patenting of laws of nature, then the definition employed by the Supreme Court, which could include the quadratic formula applied to non-science fields, clearly seems to be over-inclusive. Be that as it may, when the mathematical relationships in MIS inventions are examined under either of the plausible definitions of the algorithm-prohibition, it is clear that neither of the plausible definitions are offended, and thus, that the math algorithm prohibition should not prevent the patenting of these inventions.¹⁹⁸

Consider again the Banking/Brokerage and Vehicle Financing inventions.¹⁹⁹ The mathematical relationships utilized in the Banking/Brokerage invention merely add and subtract to calculate interest and stock dividends.²⁰⁰ The Vehicle Financing invention is only slightly more sophisticated in that it utilizes statistical analysis to determine the depreciation in value of a vehicle.²⁰¹ Neither of the patents deals with "laws of nature" in the strict sense, nor do they recite any "quadratic-formula-like" equations.²⁰²

It seems obvious that the mathematical relationships in the above-mentioned patents were developed only to facilitate the specific goals of the respective inventions, and are not useful or even applicable to any other invention or field of study. They are merely elementary mathematical processes created for a specific, and quite limited,

structure created with the aid of knowledge of scientific truth may be.

Id. at 67 (quoting *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1936); *LeRoy v. Tatham*, 55 U.S. 156, 175 (14 How. 1852); and *Funk Bros. Seed Co. v. Kalo Co.*, 333 U.S. 127, 130 (1948)).

197. *Benson*, 409 U.S. at 65.

198. See *infra* notes 265-72 and accompanying text (describing patent courts' acceptance of MIS inventions for patent issuance, despite the challenge to the inventions' patentability on "math algorithm" grounds).

199. See *supra* notes 143-54 and accompanying text (describing the relevant inventions).

200. United States Patent No. 4,694,397, *supra* note 143, at column 2.

201. United States Patent No. 4,736,294, *supra* note 141, at columns 1-2.

202. See United States Patents, Nos. 4,694,397 & 4,736,294, *supra* notes 143 & 141, respectively.

use.²⁰³ In light of the above, and the fact that patents have actually been issued to MIS inventions, it is reasonably certain that MIS inventions, to the extent that they rely on mathematical formulas or relationships that are useful only to facilitate the specific goals of the inventions and are not otherwise widely useable, will not be denied patents on the ground that they recite and preempt math algorithms. However, this is only reasonably certain because the Patent Courts have been inconsistent and unpredictable in their treatment of inventions which include mathematical expressions, computer programs, or both.²⁰⁴

3. Are MIS inventions "otherwise patentable"?

In this analysis of the patentability of MIS inventions, we have thus far determined that even if these inventions consist primarily of computer programming, this alone would not disqualify them from patentability.²⁰⁵ Furthermore, the prohibition of reciting and preempting a math algorithm does not appear to pose a significant obstacle to the patenting of these inventions either.²⁰⁶

Recall, however, the guidelines to be followed as a result of the most recent statement on this issue by the Supreme Court.²⁰⁷ In *Diamond v. Diehr* the Court asserted that computer related inventions must apply the computer or formula to subject matter which deserves the protection of the patent laws: The invention must be drawn to subject matter which is "otherwise statutory," regardless of the presence or absence of the computer or computer program.²⁰⁸ *Diehr* further suggested that when analyzing claims to a process, which is what courts have customarily considered computer related inventions

203. Cf., *In re Bradley*, 600 F.2d 807, 812 (C.C.P.A. 1979) (the CCPA recognizes that some computer programs are devoid of any mathematical significance).

204. See Samuels & Samuels, *The Patentability of Computer-Related Inventions*, 6 CORP. L. REV. 144, 154 (1983) "Few areas of the law are as uncertain as the question whether computer-related inventions recite patentable subject matter under section 101 of the Patent Act of 1952." *Id.* "To a large extent, this is due to the judiciary's inability to set forth clear, definite rules, and to the fact that each patent application is unique, thus rendering precedent of limited value." *Id.*

205. See *supra* notes 172-75 and accompanying text (describing the Supreme Court's willingness to allow patents on appropriate computer programs).

206. See *supra* notes 199-204 and accompanying text (describing the insignificance of the "math-algorithm" prohibition, in the patenting of MIS inventions).

207. See *supra* notes 116-17 and accompanying text (describing the guidelines suggested by the Supreme Court in *Diehr*).

208. *Diamond v. Diehr*, 450 U.S. 180, 187 (1981).

to claim,²⁰⁹ the process should be evaluated as a whole and not broken up into parts.²¹⁰

Application of the *Diehr* guidelines to the MIS patents quickly points to a complication in the suggested analysis. The weight of authority on computer related patents clearly indicates that, unless specific apparatus are claimed, computer related inventions are considered "processes" insofar as section 101 is concerned.²¹¹ *Diehr* requires that such processes be analyzed "as a whole," but *Diehr* also requires that the subject matter be "otherwise statutory."²¹² In other words, the subject matter must be statutory regardless of the presence of the computer.²¹³ Quite logically, if one seeks to determine if the process is "otherwise statutory," the computer element of the invention would be ignored and the remaining invention would be evaluated as to its worthiness of a patent in its own right; the invention would be broken up into parts and analyzed. This course, however, is directly contrary to the *Diehr* instruction to analyze the invention "as a whole." This glitch in the logic notwithstanding, do MIS inventions present subject matter which is "otherwise statutory?"

Examination of representative patents reveals that the inventions generally process data of one form or another.²¹⁴ The data is typically representative of items such as money, credit, information, or the like.²¹⁵ Consider, for example, the aforementioned Banking/Brokerage and Vehicle Financing inventions.²¹⁶ The first of these inventions collects and analyzes data concerning stock prices and buy/sell instructions from the user, in addition to processing data associated

209. See, e.g., *id.* at 177 (where the court describes the computer related invention therein as a "process").

210. *Id.* at 188.

211. See, e.g., *id.* at 177-78; *Parker v. Flook*, 437 U.S. 584, 591; *Gottschalk v. Benson*, 409 U.S. 63, 64-65. In all three cases, the Supreme Court considered the computer related inventions at issue to be processes.

212. *Diehr*, 450 U.S. at 188-89.

213. *Id.* at 189.

214. See, e.g., United States Patent No. 4,694,397, *supra* note 143, at column 1 ("The present invention relates to financial business systems and deals more specifically with a data processing methodology and related apparatus for effectuating a on-line realtime banking/brokerage computer interface."); United States Patent No. 4,736,294, *supra* note 141, at column 1 ("This application relates to data processing methods and apparatus for managing vehicle (e.g., automobile) financing."); United States Patent No. 4,674,044, *supra* note 141, at column 1 ("This invention relates to business systems and, more specifically, to an improved data processing based system for implementing an automated trading market for one or more securities.").

215. See *supra* note 214 (examples of representative data).

216. See *supra* notes 143-54 (describing the two inventions).

with a conventional bank account.²¹⁷ Similarly, the Vehicle Financing invention analyzes data pertaining to a purchaser's credit history and uses this data, along with data pertaining to the particular vehicle sought to be purchased, to effectuate a proposed vehicle financing agreement.²¹⁸ It seems clear that these MIS inventions do not operate on physical substances in any way analogous to the rubber curing process in *Diehr*. However, is the fact that they essentially operate on *data* detrimental to their patentability?

Traditionally, computer related inventions have operated on physical substances. However, the modern trend taken by the PTO, and exemplified by MIS inventions, appears to be following a philosophy set out early by the CCPA in *In re Prater*.²¹⁹ In *Prater*, the CCPA deduced that because "machine" patents (like electric meters) were not required to work on physical substances, there was no reason "processes" should be required to do so either.²²⁰ There is, however, substantial language in several Supreme Court opinions which suggest the opposite: That process inventions must indeed operate on physical substances to be patentable.²²¹ CCPA opinions have labelled this language of the Supreme Court as "dicta," but if this language by the Supreme Court is in fact the law, then inventions like MIS's would be unpatentable because they cannot be said to operate on physical substances.²²²

Patent commentators have argued against the principle that process inventions must operate on physical substances, because in practice

217. See United States Patent No. 4,694,397, *supra* note 143, at column 2.

218. See United States Patent No. 4,736,294, *supra* note 141, at columns 2-3.

219. *In re Prater*, 415 F.2d 1378, 1388 (C.C.P.A. 1968).

It is also appropriate, while pursuing this path of reasoning, to observe that the law does not require that a *machine*, to be patentable, must act on physical substances, for example, an electric meter. It does not seem consistent to impose such a requirement on the other category of 35 U.S.C. § 101—a process—without clearly evident and distinguishing reasons which are not thus far apparent.

Id.

220. *Id.*

221. See, e.g., *Gottschalk v. Benson*, 409 U.S. 63, 70 ("[t]ransformation and reduction of an article to a different state or thing is the clue to the patentability of a process claim that does not include particular machines"); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876) ("[a] process is a mode of treatment of certain materials to produce a given result. It is an act, or series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing").

222. See *In re Prater*, 415 F.2d 1378, 1387-88 (C.C.P.A. 1968); *In re Musgrave*, 431 F.2d 882, 893 (C.C.P.A. 1970) (both cases describing language in past Supreme Court decisions which indicates that process inventions must act on physical substances as "dicta"). See also *infra* notes 259-63 and accompanying text (where MIS-like inventions are described and shown not to operate on physical substances).

this leads to unreasonable results.²²³ Consider the following: Although theoretically possible,²²⁴ in practice, computer programs, or "software," which are typically contained on magnetic disc, have not been afforded patent protection;²²⁵ but on the other hand, the more tangible machine elements of a computer, or "hardware," have had wider acceptance as patentable inventions.²²⁶ Advancements in computer technology have added an additional player to the computer patent game.²²⁷ This technology is known as "firmware."²²⁸ Firmware possesses attributes common to both hardware and software.²²⁹ In layman terms, firmware performs the same task as software, the only difference being that firmware is embodied in a form traditionally recognized as being hardware; a semiconductor "chip," for example.²³⁰ The question that then arises is whether firmware is patentable like hardware, or unpatentable like software?²³¹ Or, in terms of "process" inventions: If an unpatentable computer program contained on magnetic disc programs a computer to perform a certain process on data, does that program/process suddenly become patentable if embodied in a form traditionally accepted as appropriate for patent protection? Common sense would demand a "no" answer. However, the answer appears to be "yes," based on the fact that patents have been issued to firmware inventions.²³²

Patent commentators criticize this result because it gives significance to a meaningless distinction.²³³ Commentators argue that the inventive substance of a typical data processing invention lies in the process itself, and to give meaning to the embodiment chosen to

223. See Miller, *Software Patents Today*, PAT. L. ANN. 151-52 (1972); Novick & Wallenstein, *The Algorithm and Computer Software Patentability: A Scientific View of a Legal Problem*, 7 RUT. J. COM. TECH. & LAW 334-35 (1979).

224. See *supra* notes 172-75 and accompanying text (discussing Supreme Court opinions that make clear that computer programs are not per se barred from patentability).

225. Duggan, *Patents on Programs? The Supreme Court Says No*, 13 JURIMETRICS J. 135, 135-38 (1973).

226. See Ross, *The Patentability of Computer Firmware*, 59 J. PAT. OFF. SOC'Y 731, 767 (1977). See also Miller, *Software Patents Today*, PAT. L. ANN. 151 (1972).

227. Ross, *The Patentability of Computer Firmware*, 59 J. PAT. OFF. SOC'Y 731, 736-37.

228. *Id.* at 737.

229. *Id.* at 765.

230. *Id.* at 766-69.

231. *Id.* at 769.

232. See, e.g., *In re Bradley*, 600 F.2d 807 (C.C.P.A. 1979) (a firmware invention held to claim statutory subject matter). See also United States Patent Nos. 4,042,972; 4,040,033; 4,015,242; 4,012,717; & 3,778,775 (all firmware inventions which obtained patents from the PTO).

233. See Novick & Wallenstein, *The Algorithm and Computer Software Patentability: A Scientific View of a Legal Problem*, 7 RUTGERS J. COM. TECH. & LAW 313, 334-35 (1979).

effectuate such process is illogical.²³⁴ Would-be patent holders of such inventions argue, however, that by embodying a program/process in a hardware package, the invention changes from the "process" category of section 101 to the "machine" category.²³⁵ This line of reasoning is, however, quite reminiscent of an old and disingenuous ploy used to avoid patent rejection of unpatentable processes by describing the processes as apparatus in the patent application.²³⁶ Some patent commentators go further and argue that whether or not these inventions are "disguised process" or "apparatus" is really irrelevant because either should theoretically be patentable.²³⁷ Apparatuses are clearly patentable, and so are processes.²³⁸ Furthermore, the firmware example makes it clear that it is illogical to give consideration to the embodiment chosen to effectuate a process invention.²³⁹ Therefore, some commentators argue that process inventions such as those contained in MIS, software, or firmware, and which act upon data, should be patentable regardless of their embodiment or the fact that they do not operate on physical substances.²⁴⁰ One patent court has impliedly accepted this rationale, although the Supreme Court has yet to comment on the issue.²⁴¹ Because patents have already been issued to a handful of MIS inventions, and because at least one of these patents has been declared valid in a challenge suit, we may conclude that, at least until a higher court rules differently, MIS inventions appear to be "otherwise statutory" as that term is described in *Diehr*.²⁴²

234. *Id.* See also *In re Bradley*, 600 F.2d 807, 809 (C.C.P.A. 1979) (indicating that it does not matter what apparatus is used to effectuate a process; it is the process and not the apparatus which is being patented).

235. *In re Bradley*, 600 F.2d at 812. See also Ross, *The Patentability of Computer Firmware*, 59 J. PAT. OFF. SOC'Y 731, 769 (1977).

236. Miller, *Software Patents Today*, PAT. L. ANN. 151-52 (1972). See also Betts, *Patenting the MIS Strategic Edge*, COMPUTERWORLD MAG., May 30, 1988, at 1 (stating that "[b]efore the Supreme Court decision [in *Diehr*], when the patent office frowned on software patents, the patent applications were artfully drafted to downplay their software content, . . . Now, the applicants have come out of the closet and explicitly describe the software in flow charts, diagrams and lines of code . . .").

237. See Novick & Wallenstein, *The Algorithm and Computer Software Patentability: A Scientific View of a Legal Problem*, 7 RUTGERS J. COM. TECH. & LAW 313, 334-35 (1979).

238. 35 U.S.C § 101 (1982).

239. See *supra* notes 227-38 and accompanying text (describing the paradox of firmware patents).

240. See *supra* note 233.

241. See *Paine, Webber, Jackson, & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358 (D. Del. 1983) (upholding a challenge to a patent on data processing methods which did not operate on physical substances).

242. See United States Patents Nos. 4,674,044; 4,736,294; & 4,346,442, *supra* note 141,

The one case which has directly challenged the subject-matter validity of an MIS invention is *Paine Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*²⁴³

C. *Paine Webber v. Merrill Lynch*

1. *The Invention*

The MIS patent at issue in *Paine Webber* resembled the Banking/Brokerage invention mentioned above.²⁴⁴ The Cash Management Account, as it is called, connects three financial services via computer and associated program.²⁴⁵ The invention allows automatic transactions to transpire between a securities account, a money market account, and a Visa checking account.²⁴⁶ The patent holder asserted that this inter-connection provides its users with synergistic benefits.²⁴⁷ For example, money generated in the securities account is automatically re-invested in the money market account to make maximum use of investment capital.²⁴⁸ Additionally, investment equity in the securities and money market accounts are considered when calculating credit limits in the Visa account.²⁴⁹ The patent-holder claimed that these features, and others, make the invention an efficient and time-saving device.²⁵⁰

2. *The Opinion*

Paine Webber sought a declaration that the patent was invalid because it failed to claim a process, machine, manufacture or com-

and 4,694,397, *supra* note 143 (all MIS or MIS-like inventions which have obtained patents). See also *infra* notes 244-73 and accompanying text (describing an unsuccessful judicial challenge to the validity of an MIS patent). See generally *supra* notes 129-30 and accompanying text (describing the meaning of the "otherwise statutory" requirement of *Diehr*).

243. 564 F. Supp. 1358 (D. Del. 1983).

244. See *supra* notes 145-49 and accompanying text (describing the Banking/Brokerage invention).

245. *Paine Webber*, 564 F. Supp. at 1361.

246. *Id.*

247. *Id.* at 1362.

248. *Id.*

249. *Id.*

250. *Id.*

position of matter as required by section 101.²⁵¹ Furthermore, Paine Webber contended that the invention was “nothing more than the combination of familiar business systems . . . which have been connected together so that financial information can be exchanged among them,” and that such systems cannot form the subject matter of a valid patent.²⁵² Paine Webber asserted this position in reliance upon several pre-computer-era “business system” cases, where the inventions at issue were denied patents under section 101.²⁵³ As evidence that the invention was merely a “business system,” Paine Webber pointed to the fact that the invention’s specifications lacked mention of any specific apparatus, but rather described the invention in terms of “means” for performing certain functions.²⁵⁴ This style of draftsmanship, contended Paine Webber, showed the invention to be unpatentable subject matter.²⁵⁵

The court began addressing Paine Webber’s contentions by stating that specific categorization of the invention into one of section 101’s categories, is unnecessary in a section 101 analysis.²⁵⁶ The court only needed to determine if the invention claimed patentable subject matter, regardless of the label of the claim.²⁵⁷ Thus, Paine Webber’s argument, that inability to categorize an invention into a section 101 category precludes the invention’s patenting, failed.²⁵⁸

In regard to Paine Webber’s contention that the invention was an unpatentable “business system,” the court found Paine Webber’s case-law authority unpersuasive.²⁵⁹ Rather, the court found a closer analogy in previous computer related inventions which underwent judicial review by the CCPA.²⁶⁰ In *In re Toma*, the CCPA found a computerized method to translate natural spoken languages to be

251. *Id.* at 1365.

252. *Id.*

253. *Id.* The cases relied upon by Paine Webber to support their “business systems” contention were: *Loew’s Drive-In Theatres, Inc. v. Park-In Theatres, Inc.*, 174 F.2d 547 (1st Cir. 1949); *In re Patton*, 127 F.2d 324 (C.C.P.A. 1942); *Hotel Security Checking Co. v. Lorraine Co.*, 160 F. 467 (2d Cir. 1908); *Berardini v. Tocci*, 190 F. 329 (S.D.N.Y. 1911), *aff’d*, 200 F. 1021 (2d Cir. 1912); *United States Credit System Co. v. American Credit Indem. Co.*, 53 F. 818 (S.D.N.Y. 1893), *aff’d*, 59 F. 139 (2d Cir. 1893).

254. *Paine Webber*, 564 F. Supp. at 1365.

255. *Id.*

256. *Id.* at 1366.

257. *Id.*

258. *Id.*

259. *Id.* at 1368-69.

260. *Id.*

statutory subject matter.²⁶¹ In *In re Phillips*, the CCPA found that a computer program designed to prepare architectural specifications, which eliminated written specifications, was also a statutory subject matter.²⁶² Using these precedents as examples, the court in *Paine Webber* concluded that the invention at issue effectuated a highly useful business method, and was not an unpatentable "business system."²⁶³ Furthermore, the court found that Paine Webber's objection to the non-specific drafting of the invention's specifications was without merit because section 112 of the patent statute sanctioned such draftsmanship.²⁶⁴ With these issues addressed, the court turned to the age-old question of whether the invention recited and pre-empted a math algorithm.²⁶⁵

The court utilized the familiar *Benson* definition²⁶⁶ of a math algorithm in its analysis of the claimed invention.²⁶⁷ Significantly, the court defined and distinguished a computer algorithm²⁶⁸ from a math algorithm,²⁶⁹ the former being considerably narrower in scope than the latter.²⁷⁰ The court determined that the mathematical relationships contained in the invention were of the computer algorithm type, and thus not unpatentable under the authority of *Benson*.²⁷¹ Because the invention utilized a computer program but did not preempt the use of a math algorithm, and because Paine Webber's challenges to the invention's patentability were also denied, the court held that the threshold requirement of section 101 was met.²⁷² The court specifically found that the invention taught a method to effectuate a business transaction, and that this was sufficient to fulfill the subject matter requirement for patentability as set out in section 101.²⁷³

261. *In re Toma*, 575 F.2d 872, 877 (C.C.P.A. 1978).

262. *In re Phillips*, 608 F.2d 879, 883 (C.C.P.A. 1979).

263. *Paine, Webber, Jackson, & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358, 1369 (D. Del. 1983).

264. *Id.* at 1365.

265. *Id.* at 1366.

266. The Supreme Court describes the term "algorithm" as a "procedure for solving a given type of mathematical problem." *Gottschalk v. Benson*, 409 U.S. 63, 65 (1972).

267. *Paine Webber*, 564 F. Supp. at 1368.

268. *Id.* at 1367. The computer algorithm is a procedure consisting of an operation to combine data, mathematical principles and equipment for the purpose of interpreting and/or acting upon a certain data input. *Id.*

269. *Id.* at 1366-67.

270. *Id.* at 1367.

271. *Id.* at 1368.

272. *Id.* at 1369.

273. *Id.*

3. *The Significance of Paine Webber*

Unfortunately (but predictably) the decision in *Paine Webber* did not make clear, in a single stroke, that which has been unclear for several years. Although the example set by the cash management account certainly provides an additional case law guideline to patent practitioners who must analyze computer related inventions to determine their patentability, the lack of any express guidelines on the proper analysis to be taken leaves many questions unanswered. Must process inventions operate on physical substances to be patentable?²⁷⁴ Are MIS and other computer related inventions processes or apparatus? Does it matter?

Despite its perpetuation of these ambiguities, the decision in *Paine Webber* does seem to follow a general trend towards relaxing the standards for patenting computer related inventions.²⁷⁵ For example, United States Patent No. 4,483,680 was issued in 1984 and provides a computer assisted geneological information and recording service; and United States Patent No. 4,464,122, also issued in 1984, provides a computer assisted health potential summary and incentive system.²⁷⁶ Whether this trend toward liberal application of patent standards will prove to be beneficial to the goals of the patent system remains in doubt, however.²⁷⁷

IV. CONCLUSION

The availability of patent protection for companies and individuals who invest the time and resources to develop new and useful inventions is an important national interest, beneficial to both the inventor and society in general. The financial benefit to the inventor, however,

274. See *supra* notes 143-54 and accompanying text (discussing the patentability of processes which do not operate on physical substances).

275. See Walsh, *The Disclosure Requirement of 35 U.S.C. § 112 and Software Related Patent Applications: Debugging the System*, 18 CONN. L. REV. 855, 856 n.4 (1986).

276. United States Patent No. 4,483,680: *Geneological Information Recording and Arrangement Method and Apparatus*, inventor Louise A. Daly, Patent Application No. 560,737, filed December 12, 1983, granted November 20, 1984. United States Patent No. 4,464,122: *Health Potential Summary and Incentive System*, inventor Berkeley Fuller, Patent Application No. 446,344, filed December 2, 1982, granted August 7, 1984.

277. See, e.g., Bulkeley, *Will Software Patents Cramp Creativity?*, Wall St. J., Mar. 14, 1989, § B, at 1, col. 1; Schneidawind, *Key Software Patent May Bring Warfare*, S.F. Chronicle, April 19, 1989, § C, at 1, col. 1.

should be no more important than the broad range of benefits to society.²⁷⁸ It is manifest, therefore, that the patent system should never be used for the benefit of an inventor where that use also substantially undermines the societal goals of the patent system. The patentability of MIS inventions presents just such a problem.

It is beyond question that the MIS inventions discussed earlier, and others, provide a useful service to those who employ them; but at what cost to society's productivity? There are indications that the growing acceptability of computer program patents, such as MIS-invention patents, has led to a chilling of the creative process which the patent laws were designed to promote.²⁷⁹

The problem originates in the Patent Office itself, where examiners are ill-equipped to handle the burgeoning number of computer related patent applications filed yearly.²⁸⁰ IBM alone files 200 of these, and other top United States companies have recently doubled and even quadrupled their number of computer related patent applications.²⁸¹ The problem is exacerbated by the fact that the Patent Office takes an average of thirty-two months to process a computer program

278. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480 (1974). The *Kewanee* Court stated that:

The stated objective of the Constitution in granting the power to Congress to legislate in the area of intellectual property is to "promote the Progress of Science and useful Art." The patent laws promote this progress by offering a right of exclusion for a limited period as an incentive to inventors to risk the often enormous costs in terms of time, research, and development. The productive effort thereby fostered will have a positive effect on society through the introduction of new products and processes of manufacture into the economy, and the emanations by way of increased employment and better lives for our citizens.

Id.

279. See Bulkeley, *Will Software Patents Cramp Creativity?*, Wall St. J., Mar. 14, 1989, § B, at 1, col. 1 (describing how the growing threat of patent infringement litigation has slowed the progress of computer software development). See also Schneidawind, *Key Software Patent May Bring Warfare*, S.F. Chronicle, Apr. 19, 1989, § C, at 1, col. 1 (describing how a patent, recently issued to a small Southern California software company, could have the effect of fundamentally changing the structure of the personal computer software industry).

280. See Bulkeley, *Will Software Patents Cramp Creativity?*, Wall St. J., Mar. 14, 1989, § B, at 1, col. 1 (describing the Patent Office as unsophisticated and inept in the area of computer software patentability). See also *Gottschalk v. Benson*, 409 U.S. 63, 72 (1972) (quoting a 1966 report of the Presidents Commission on the Patent System):

The Patent Office now cannot examine applications for programs because of a lack of a classification technique and the requisite search files. Even if these were available, reliable searches would not be feasible or economic because of the tremendous volume of prior art being generated. Without this search, the patenting of programs would be tantamount to mere registration and the presumption of validity would be all but nonexistent.

Id.

281. Bulkeley, *Will Software Patents Cramp Creativity?*, Wall St. J., Mar. 14, 1989, § B, at 1, col. 1.

related application.²⁸² During the time period the Patent Office is reviewing an application, companies in the fast-moving computer industry sometimes unwittingly infringe patents, only later to be charged licensing fees, or even worse, to be dragged into court in an infringement suit. Many such suits have in fact been litigated, much to the distress of computer industry managers.²⁸³ Corporate counsels have complained that “[t]he playing field is now littered with explosive devices. You don’t know they’re there, [patents] until you step on one.”²⁸⁴ Even more disturbing is the possibility that some of the most traditionally innovative sources of computer inventions, the small companies, will be hardest hit by the pervasive patenting of computer programs because of these companies’ limited resources available for legal efforts.

Can these problems be solved? Can MIS inventions, as well as other computer program related inventions, enjoy the rewards of patent protection without unduly hindering the creative process? It is certainly clear from the analysis of MIS inventions, and the related judicial decisions, that the patent laws as they exist today are not opposed to patents on computer related inventions, MIS or otherwise. The problems seem to lie in the administration of the patent system with regard to these inventions. All commentators seem to agree that the present system is confused and unpredictable. The patent laws need to be revised so that deserving computer-related inventions can receive timely and meaningful patent protection; but such revision is not a simple task. There exists a “technology gap” between the inventors of computer-related inventions and the people responsible for their patent administration.²⁸⁵ This technology gap will take time to bridge. In the interim, it seems prudent to proceed conservatively in this area so that a fair and uniform application of the law can be assured.

In pursuit of this objective, the proposal set forth by Justice Stevens, in his dissent in *Diamond v. Diehr*, seems squarely on point.²⁸⁶ Justice Stevens recognized in 1982 that the patent laws do not allow a conscientious patent attorney to predict with any certainty

282. *Id.*

283. *Id.*

284. *Id.*

285. See generally Newell, *Response: The Models Are Broken, The Models Are Broken!*, 47 U. PITT. L. REV. 1023 (1986).

286. 450 U.S. 173, 219 (1981) (Stevens, J., dissenting).

which, if any, computer related inventions may be patented.²⁸⁷ Because this situation still exists, and because certainty in this area is to the benefit of all concerned, it is suggested that Justice Stevens' proposed rule be adopted as law. Justice Stevens proposed that no program related invention be patentable unless it makes a contribution to the art that is not dependent entirely on the use of a computer.²⁸⁸ This rule would have the effect of rendering MIS inventions unpatentable. Lack of patentability does not destroy an inventions worth, however. Many commentators believe current copyright and trade secret laws adequately protect computer related inventions.²⁸⁹

This author suggests, that as a corollary to Justice Stevens' proposed rule, Congress should declare that patentable processes, unlike patentable machines, must operate on physical substances. This rule would help end the war of semantics which arises when classifying inventions in section 101 categories. The combination of these measures would instill predictability in this currently confused area, and would allow the future controlled statutory expansion of the patent laws for deserving computer related inventions.

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287. *Id.* (Stevens, J., dissenting).

288. *Id.* (Stevens, J., dissenting).

289. See generally, Von Spakovsky, *The Limited Patenting of Computer Programs: A Proposed Statutory Approach*, 16 *CUMB. L. REV.* 27 (1985).

