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IBM Corporation Comments in Response to “*Interim Guidance for Determining Subject Matter Eligibility for Process Claims in View of Bilski v. Kappos*,” 75 Fed. Reg. 43922 (July 27, 2010).

IBM appreciates the Office’s prompt issuance of interim guidance to apply the holding of the U.S. Supreme Court in *Bilski v. Kappos* to patent examination, and the opportunity to comment thereon. The issue of subject matter eligibility of process claims is of critical importance to the patent community. We are grateful to the Office for its continued focus in this area, including the promise of additional guidance (i.e., “expanded explanation and specific examples”) as indicated in the above-captioned Notice.

We are mindful of the challenges faced by the Office in applying new law to examination of a large volume of patent applications in diverse fields. We believe that proper application of the *Bilski* decision will focus questions regarding subject matter eligibility on a very small number of process claims currently reviewed by examiners. Thus, with appropriate guidance, the difficult determination of whether certain processes are patent-eligible should arise infrequently, allowing the Office and applicants to focus their attention on the merits of an invention as reflected in the requirements for novelty, non-obviousness, and a full and particular description.

While we provide examples below of patent-eligible process claims, we are troubled by the Office’s suggestion in the Interim Guidance that such examples are needed to provide guideposts. The Court’s view in *Bilski* of the scope of patentable subject matter is quite broad, applying no extra-statutory limitations on the definition of “process.” Rather than describing with detail the vast territory of patentable processes, it seems more productive for the Office to focus on the narrow area of exceptions confirmed by the Court. IBM believes that the proper guidance for determining patent-eligibility in the rare cases where it arises can thus be elucidated by focusing on the Court’s positive understanding of the statutory categories in 35 U.S.C. § 101, limited only by the exceptions for laws of nature, physical phenomena, and abstract ideas. Significant reliance on any other test – such as the machine-or-transformation test – is likely to

overcomplicate the inquiry and is in any event inconsistent with the Court's holding in *Bilski*.

In the comments that follow, IBM explains in more detail our view of the *Bilski* decision and some examples of how we believe patent claims should be evaluated for subject matter eligibility consistent with that decision, with a particular focus on the field of information technology. Information technology inventions are patent-eligible – in fact, they will satisfy any reasoned application of the machine-or-transformation test, and are even more certainly outside the scope of *Bilski*'s exceptions (e.g., abstract ideas). While processes directed to certain non-technological methods (such as risk hedging) incidentally carried out in an information technology environment may be properly understood as unpatentable abstractions, we believe these instances are few and do not implicate the vast majority of information technology inventions.¹ Our detailed discussion of process inventions is limited to information technology, but we believe our approach could be applied to other fields to help clarify the subject matter eligibility analysis.

With respect to the specific questions posed in the Notice, we believe that while the machine-or-transformation test is by no means dispositive, if the test is properly applied, any process claims that meet that test are, in the words of the Court of Appeals for the Federal Circuit ("Federal Circuit"), "surely patent-eligible," and thus not directed to abstract ideas. *In re Bilski*, 545 F.3d 943, 954 (Fed. Cir. 2008). The Supreme Court's analysis of the test is consistent with this view. See *Bilski* slip op. at 7-8. However, if a claim fails the machine-or-transformation test, the Court's holding means this failure must not be dispositive of subject matter eligibility. For example, processes in emerging technologies may not be susceptible to a reasonable analysis under the machine-or-transformation test, but instead may warrant evaluation using a more flexible framework. The Court's explicit rejection of the machine-or-transformation test as the sole test for patentability of process claims underscores the wisdom of avoiding rigid or categorical rules for evaluating new technology.

We recognize the value of collecting information in response to the third question to help the Office identify abstract and thus unpatentable process inventions on a case-by-case basis. However, while IBM believes non-technological processes should not be patentable,² we believe that information the Office collects at this time should not be used to establish categorical exclusions. The Supreme Court in *Bilski* explicitly rejected broad categorical exclusions from patentable subject

¹ To be more precise, such processes when considered as a whole are not information technology inventions at all. Adding insignificant extra solution activity does not transform an abstract idea into patentable subject matter. See *Bilski*, slip op. at 14.

² See Brief Amicus Curiae of International Business Machines Corporation in Support of Neither Party, *Bilski v. Kappos*, 130 S.Ct. 3218 (2010) (No. 08-964), 2009 U.S. S. Ct. Briefs LEXIS 705; "IBM Establishes Worldwide Patent Policy to Promote Innovation," IBM Corp. Press Release, Sept. 26, 2006 <http://www-03.ibm.com/press/us/en/pressrelease/20325.wss> (last visited Sep. 19, 2010).

matter, including one for “business methods.” *Bilski*, slip op. at 10-11. Instead, four Justices suggested that to avoid chilling “creative endeavor and dynamic change,” the Federal Circuit might succeed in developing a narrow category of business process inventions that are properly described as abstract ideas. *Id.* at 12. The Supreme Court’s *Bilski* decision thus does not require the Federal Circuit to address this issue, and in any event that court has not had an opportunity to do so. Thus, we believe the information collected in response to this question could be more appropriately used by the Office or the public to assist the Federal Circuit in developing categorical approaches to abstract process inventions should they decide to undertake such an effort. Such information could also be used now to help the Office and the public identify abstract process inventions on a case-by-case basis, consistent with the Court’s opinion in *Bilski*.

The Machine-or-Transformation Test Does Not Determine Patent Eligibility of Processes

The machine-or-transformation test is not the touchstone for patent-eligibility. By reading the scope of 35 U.S.C. § 101 broadly, the Supreme Court in *Bilski* repudiated the notion that processes must fit into a narrowly-defined structure in order to be eligible for patent protection. Instead, the Court made clear that any process is patentable subject matter so long as it does not run afoul of the three judicial exceptions: laws of nature, physical phenomena, and abstract ideas. Thus, the proper question is not whether a process can be said to satisfy certain narrow criteria to fall within § 101, but whether an otherwise statutory process is so divorced from any practical application that it falls within one of the narrow exceptions, e.g., an abstract idea. This is a difficult burden to meet.

The Supreme Court in *Bilski* recognized Congress’ intent to give the patent laws a “wide scope,” to “ensure that ingenuity should receive a liberal encouragement.” *Bilski*, slip op. at 4 (citations omitted). The Court repeated its caution against “read[ing] into the patent laws limitations and conditions which the legislature has not expressed.” *Id.* at 6 (citations omitted).

In rejecting the view that the machine-or-transformation test should be the sole test for patent-eligibility of process claims, the Court clarified that the categories recited in 35 U.S.C. § 101 should be understood as having their ordinary meaning, such that the term “process” need not be tied to a machine or transform an article. *Id.* at 7. The Court thus rejected the argument that the meaning of process needs to be limited by another category of patentable subject matter – a product, apparatus, or composition of matter – to be patent-eligible.³ Given the high level policy focus of the *Bilski* decision, we understand the Office’s desire to

³ *Bilski*, slip op. at 7. “The Court is unaware of any ‘ordinary, contemporary, common meaning,’ ... of the definitional terms ‘process, art or method’ that would require these terms to be tied to a machine or to transform an article.” *Id.* (citing *Diehr*).

continue relying on the machine-or-transformation test to determine patent eligibility to achieve certainty and uniformity. However, we believe the Office's approach to process patentability in the Interim Guidance as well as the Interim Examination Instructions for Evaluating Subject Matter Eligibility Under 35 U.S.C. 101 (August 24, 2009) ("Interim Instructions") places too much emphasis on the machine-or-transformation test and is thus too limiting and inconsistent with the holding in *Bilski*. For example, the Office's definition of "article" in the Interim Instructions limits permissible "electronic data" to that representative of "a physical object or substance." Given *Bilski*'s rejection of the machine-or-transformation test as too narrow for defining subject matter eligibility, such an additional limitation on permissible "articles" is at odds with the Court's view of the proper scope of "process" under 35 U.S.C. § 101. Processes need not be tied to a machine or transformative of *any* article to be patentable subject matter, let alone an article representative of a physical object or substance.⁴

Furthermore, application of the machine-or-transformation test has not resulted in uniformity or certainty in patent examination.⁵ Four Justices in *Bilski* recognized the difficulties in applying the machine-or-transformation test to modern inventions: "As numerous amicus briefs argue, the machine-or-transformation test would create uncertainty as to the patentability of software, advanced diagnostic medicine techniques, and inventions based on linear programming, data compression, and the manipulation of digital signals." *Id.* at 9 (citations omitted). Given the patent system's primary goal of protecting new inventions and emerging technologies, the test for patentable subject matter must be flexible, not tied to rigid formulations or outdated concepts. While the machine-or-transformation test may have worked for the Industrial Age, invention and industry in the Information Age have left it behind.

A straightforward approach analyzing claimed inventions in each statutory category without reliance on other statutory categories will more appropriately discern the patentable from the unpatentable, without unnecessarily burdening examiners or applicants. This independent analysis should avoid some of the more problematic and anomalous results of the lower courts' and the Office's recent application of the machine-or-transformation test, which is a test for patentability of process inventions, to inventions in other statutory classes. For example, claims to a computer or computer system are claims to an apparatus, not a process. Likewise, claims to a program product, or computer-readable medium, are claims to a product, not a process. In distinguishing the claims in *State Street* from those at issue in *Bilski*, Justice Stevens in his concurrence noted: "... *State Street* dealt with whether a piece of software could be patented and addressed only claims directed at machines, not processes." *Id.* at 31, n. 40.

⁴ For example, transformation of data representing the state of a process being performed in a machine (such as processor) should meet the limitations of both 35 U.S.C. § 101 and proper application of the machine-or-transformation test.

⁵ As discussed further *infra* in the context of information technology inventions.

Thus, when analyzing claims for subject matter eligibility, we believe the Office should apply the statutory language (as required by *Bilski*), without imposing on applicants a test that adds unnecessary constraints and more inconsistency than clarity. That said, we believe the machine-or-transformation test, when properly applied,⁶ can play an important role – a role ascribed by *Bilski* – to support or confirm beyond doubt the patent-eligibility of process inventions where appropriate.

Novelty and Subject Matter Eligibility Must Not Be Conflated

IBM agrees with the Office that claims must be evaluated as a whole, and that “each claim should be reviewed for compliance with every statutory requirement for patentability in the initial review of the application.” Notice at 43923. Examiners should not rely on subject matter rejections to avoid or replace the important remaining patentability analysis. We are thus concerned by recent Board opinions that fail to address existing appealed obviousness rejections and instead create subject matter rejections in their place.⁷ These troublesome decisions highlight the dangers of relying too heavily on a subject matter rejection. One decision perfunctorily applies *Bilski*’s abstract idea exclusion to apparatus claims containing hardware limitations.⁸ While we do not comment on the patentability (including subject matter eligibility) of these claims, it is entirely unclear to us why the Board believed that all claims (including those directed to processes and apparatuses) ran afoul of the abstract idea exception and why the Board neglected to address the obviousness rejection.

IBM believes it is of paramount importance that claimed inventions are examined on the merits for compliance with all statutory requirements, including patent-eligibility and patentability. The analysis of patent-eligibility must focus on the claim as a whole, and must not result in a rejection simply because the claim appears to recite something which is already known in the art. Thus, a claim to a car, word processing software, a floppy disk, an eight track tape or a personal computer is patent-eligible, even if it is not novel or non-obvious. These separate statutory requirements must be analyzed separately. A contrary result would have the effect of erasing from the pantheon of permissible patent-eligible subject matter anything that can broadly be identified as “old.” This cannot be the kind of subject matter analysis the Court or the Office intends.⁹

⁶ See, e.g., problems discussed in preceding paragraph; and unnecessary limitations on “article” definition discussed *supra* in this section.

⁷ See, e.g. *Ex Parte Birger*, No. 2009-006556 (BPAI July 15, 2010); *Ex Parte Proudler*, No. 2009-006599 (BPAI July 12, 2010).

⁸ See *Ex Parte Birger*, *supra* n. 7, where claim 52 comprises a processor.

⁹ On a related point, we are concerned with the Office’s requirements for a “particular” machine or article in the context of applying the machine-or-transformation test. Since, e.g., a computer or processor is clearly patentable subject matter, the degree of “particularity” in reciting these elements is irrelevant for analysis under 35 U.S.C. § 101. Compare *Ex Parte Nawathe*, No. 2007-3360 (BPAI Feb. 9, 2009): “We note that the recited method, while being computerized, is

Furthermore, while we recognize the difficulty inherent in evaluating claims that may be vague or overbroad, such problems can often be understood and addressed through the requirements of 35 U.S.C. § 112. We suggest the Office consider the possible relationship between its instructions regarding, e.g., claims directed to general concepts¹⁰ in the context of patentable subject matter and evaluation of claims for precision and full support from the specification. Since claims should be evaluated for compliance with all statutory requirements, it will likely be informative to understand such claims in light of both requirements.

Information Technology Inventions Are Patent-Eligible

While IBM does not believe processes must satisfy the machine-or-transformation test to be patent-eligible, we do believe that information technology process inventions will satisfy a proper application of this test.

As an initial matter, it is uncontroverted that claims directed to computers, information technology systems and media, and computer hardware components are patent-eligible. Such claims are directed to products, machines, or apparatuses that are and have been patentable before and after *Bilski* and *State Street*.¹¹ As noted above, subject matter eligibility of such inventions should not be conflated with determinations of novelty.

Software-related inventions are often claimed in the form of a process performed in an information technology environment. Some of these processes directly affect the operation of hardware, such as BIOS software. (See Example Claim 1, Appendix A). Those processes govern the basic functionality of the information technology system, and are claimed in direct relation to the hardware on which they act. The relationship to the hardware is by no means incidental, it is fundamental. Some software processes act upon mechanical systems, controlling for example the operation of the brakes on a car, or the operation of a “rubber-molding press,” as in Example Claim 2 in Appendix A. Again, the interaction of the process steps with the operation of a machine is explicit and

not tied to a particular machine for executing the claimed steps. We find that the computerized recitation purports to a general purpose processor (Fig. 2.), as opposed to a particular computer specifically programmed for executing the steps of the claimed method.” Given that a general purpose processor is unquestionably patentable subject matter in its own right, we do not understand the relevance of the degree of particularity in this context. Following this logic may lead to the conclusion that for software processes to be patentable, they would need to be “tied” to a novel computer or processor. Such a conclusion would be contrary to *Bilski* and undermine the purpose for which software was created in the first place. See discussion of hardware/software functional equivalence, *infra* p. 7. As noted above with respect to *Ex Parte Birger* and *Ex Parte Proudler*, we do not comment on the patentability (including subject matter eligibility) of these claims, we merely note what appears to be a logical flaw in the Board’s reasoning.

¹⁰ See “Interim Guidance for Determining Subject Matter Eligibility for Process Claims in View of *Bilski v. Kappos*,” 75 Fed. Reg. 43922, 43925, Section D (July 27, 2010).

¹¹ See also Justice Stevens’ concurrence quoted *supra* p. 4 from *Bilski*, slip op. at 31, n. 40.

fundamental to the process. In either case, the claimed process is “tied to a machine” in that it actively operates on and changes the functionality of the machine.

Application software such as word processing software or graphics software manipulates data structures and displays images, and interacts with input/output devices and graphical user interfaces. (See Example Claim 3). This type of software invention, often claimed as a process, has no meaning outside the hardware environment and embodies functional changes thereto, and thus is necessarily “tied to a machine.”¹²

To the extent the machine-or-transformation test is applied, we agree with the Office that it is not necessary to explicitly recite a machine in the claims.¹³ Some information technology process inventions may be claimed without explicitly reciting hardware, but are nevertheless inherently “tied to a machine” in that they must be performed on a computer system to be enabled or even meaningfully defined. For example, a software controlled process requiring real-time collection and analysis of a large quantity of data and immediate action thereon, which is impossible to perform without the aid of a computer system, is enabled by hardware such as a microprocessor and memory and is thus inherently “tied to a machine” regardless of whether the association is made explicit in the claim.¹⁴

The framework for recognition of software patentability derives from an understanding of the interplay between hardware and software which in turn derives from the functional equivalence between hardware and software. Software enables sophisticated information technology functionality by changing how the hardware works, without the need to alter the hardware every time a change in functionality is desired.¹⁵ In some cases, software provides an

¹² This is true regardless of whether the data manipulated represents a “physical object or substance” or not. As discussed above, we do not believe the Office’s previously-stated limitation on the transformation of electronic data is required by or consistent with *Bilski*, which does not by its terms require satisfaction of the machine-or-transformation test, only that a process avoid the three judicial exceptions.

¹³ See Interim Instructions, pp. 7-8.

¹⁴ We believe it would be very helpful in this regard if the Office would provide examples of claims inherently “tied to a machine,” including guidance regarding recitation of a machine in the specification, when a machine is not explicitly recited in a claim.

¹⁵ See, e.g. *In re Lowry*, 32 F.3d 1579, 1583 (Fed. Cir. 1994): “In Lowry’s invention, the stored data adopt no physical ‘structure’ per se. Rather, the stored data exist as a collection of bits having information about relationships between the ADOs. Yet this is the essence of electronic structure. In *Bernhart*, this court’s predecessor noted:

There is one further rationale used by both the board and the examiner, namely, that the Provision of new signals to be stored by the computer does not make it a new machine, i.e. it is structurally the same, no matter how new, useful and unobvious the result. . . . To this question we say that if a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program; its memory elements are differently arranged. The fact that these physical changes are invisible to the eye should not tempt us to conclude that the machine has not been changed.

alternate implementation of a solution that could otherwise be performed by reconfiguring hardware. In other cases, software provides a solution to a problem that reconfiguration of the hardware cannot solve (e.g., due to time or physical space requirements). The fact that changes in functionality can be implemented through software creates exponentially more resulting hardware functionality than the same information technology system without the software. Virtually all modern systems that utilize information technology would not exist without software, including computers, automobiles, cell phones, and security and medical equipment to name only a few. Just as a new hardware configuration would be patent-eligible, so too is the software process invention that enables or creates that functionality. We include two additional examples in Appendix A, directed to inventions whose functionality would not be possible through the use of hardware alone – one to a Reduced Instruction Set Computer (Example Claim 4 is for optimizing a compiler) and one to an encryption method (Example Claim 5).

While we have described a number of important information technology inventions, our examples are but a small subset of the broad and diverse range of inventions in this field, which in many instances must be or may be embodied in the form of software. It would be impossible to comprehensively enumerate or describe all types and forms of information technology inventions, all of which are properly understood as patent-eligible. As described above, the functional equivalence of hardware and software naturally leads to an understanding that information technology inventions are “tied to a machine.” Any guidance that directs examiners to require such information technology inventions be claimed only as hardware to be patent eligible would be inconsistent with the *Bilski* opinion. Furthermore, *Bilski* only requires that processes do not fall into one of the three judicial exceptions to be patent-eligible. To the extent we have shown that information technology inventions meet the machine-or-transformation test, we have thus gone farther than *Bilski* requires and, in the words of the Federal Circuit, proven that such inventions are “surely patent-eligible.”

While there are many forms of unambiguously patent-eligible process inventions, we recognize that mere field-of-use limitations or insignificant extrasolution activity will not transform an unpatentable abstract idea into a patentable process. For example, the Court found *Bilski*’s dependent claims, covering “broad examples of how hedging can be used in commodities and energy markets,” unpatentable since they add only field of use or token postsolution components.¹⁶ However, we note that *Bilski*’s claims did not recite or require, explicitly or inherently, the use of information technology.¹⁷ As we have discussed above,

Bernhart, 417 F.2d at 1400, 417 F.2d at 1400 (emphasis added).”

¹⁶ *Bilski*, slip op. at 14.

¹⁷ “In the examiner’s answer, it is stated that ‘Applicant[’s admission] that the steps of the method need not be performed on a computer (Appeal Brief at page 6) coupled with no disclosure of a computer or any other means to carry out the invention, make it clear that the invention is not in the technological arts’ (EA4).” *Ex Parte Bilski*, No. 2002-2257, 2006 Pat. App. LEXIS 51, *4 (BPAI March 8, 2006)

the Court's broad reading of patentable subject matter, and rejection of an approach that conflates different statutory categories, means that only in very rare circumstances should a patent claim that explicitly or implicitly uses a machine or acts on a product or substance be characterized as falling in one of the exceptions to 35 U.S.C. § 101 (e.g. as an abstract idea).

We note the Office's Interim Guidance is consistent with IBM's approach in certain respects, e.g., by indicating the relevance of machine-implemented steps and changes in functionality as positive factors for determining subject matter eligibility. However, we believe that the machine-or-transformation test, as applied by the Office, in many instances reaches the wrong result and in any event its application has been inconsistent.¹⁸ We recommend the Office provide further guidance to simplify and clarify reliance on any features related to the machine-or-transformation test.

More importantly, we believe the Office should make clear that while some aspects of the machine-or-transformation test may be instructive, that test is not the touchstone for patentability of process inventions and the Office should not place the burden on applicants to prove that an invention satisfies that test. Instead, examination of each category of patentable subject matter should be performed independently to determine if the claim is impermissibly directed to physical phenomena, laws of nature, or abstract ideas, or is alternatively directed to one of the statutory classes of patent-eligible subject matter. Such guidance would help ensure that examiners do not unnecessarily evaluate and reject process claims which are clearly directed to patentable subject matter. We agree with the Office that "...the large majority of examiners ... do not routinely encounter claims that implicate the abstract idea exception." Notice at 43923. This must be equally true for the significant numbers of applications directed to software-related inventions as it is for any other class of patentable subject matter. We believe that careful application of the Court's guidance in *Bilski* will minimize the need to evaluate claims to determine whether they are patent-eligible. We suggest the Office collect statistics regarding the rate of subject matter rejections as a function of Technology Center to help ensure its use is limited according to the Office's expectations and consistent with the Court's guidance.¹⁹

Conclusion

IBM thanks the Office for providing prompt guidance for determining patent-eligibility of process claims after the Supreme Court's decision in *Bilski*, and for

¹⁸ See, e.g., Brief Amicus Curiae of International Business Machines Corporation in Support of Neither Party, *Bilski v. Kappos*, *supra* n. 2.

¹⁹ We are particularly interested in statistics relating to information technology applications, in part since we and others have noted what appears to be disproportionately intense subject matter scrutiny of such inventions by the Office.

providing the patent community an opportunity to comment thereon. We look forward to additional guidance from the Office, and will be grateful for an opportunity to continue to contribute our views and work with the Office on this issue of critical importance to the patent community.

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Appendix – Claim Examples

Example Claim 1

A method for loading BIOS into a local computer system which has a system processor and volatile memory and non-volatile memory, the method comprising the steps of:

(a) responding to powering up of the local computer system by requesting from a memory location remote from the local computer system the transfer to and storage in the volatile memory of the local computer system of BIOS configured for effective use of the local computer system,

(b) transferring and storing such BIOS, and

(c) transferring control of the local computer system to such BIOS.

Claim 15 of U.S. Patent No. 5,230,052 to Richard A. Dayan et al., entitled "Apparatus and method for loading BIOS into a computer system from a remote storage location"

Example Claim 2

A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising:

providing said computer with a data base for said press including at least,

natural logarithm conversion data (\ln),

the activation energy constant (C) unique to each batch of said compound being molded, and

a constant (x) dependent upon the geometry of the particular mold of the press,

initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure,

constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding,

constantly providing the computer with the temperature (Z),

repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is

$\ln v \text{ equ } CZ+x$

where v is the total required cure time,

repetitively comparing in the computer at said frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time, and

opening the press automatically when a said comparison indicates equivalence.

Diamond v. Diehr, 450 U.S. 175, 181 (1981).

Example Claim 3

A system for providing context-sensitive on-line documentation to an operator of a data processor having storage means, display means, and means for receiving inputs from said operator, comprising:

an application executed by said data processor for performing a number of different functions selected by an operator;

a unitary readable document stored in said data processor and containing text at predetermined locations relating to respective ones of said functions;

a set of screens stored in said data processor containing information relating to the selection of different ones of said functions and further containing data identifying a number of labels associated with various cursor positions in said screens;

a display manager executed by said data processor and responsive to said functions selected by said operator during execution of said application for selecting among said screens in said set, and responsive to operator-selected ones of said cursor positions for selecting certain of said labels;

a browse utility initiated by a command from said operator during the execution of said application to access said document, and then executed by said data processor in place of said application, and responsive to said display manager for presenting on said display means text at those predetermined locations in said document corresponding to said certain labels, said browse utility further including means for moving from said predetermined locations to arbitrary other locations in said document under operator control, and means responsive to yet a further command from said operator for terminating execution of said browse utility and returning to said application.

U.S. Patent No. 4,970,678 to Robert Sladowski et al., entitled "System for providing context-sensitive on-line documentation in a data processor"

Example Claim 4

A method for use within the code optimization phase of an optimizing compiler operable to move certain range check instructions out of single entry strongly connected regions (SCR) or loops and into linear regions of the instruction stream whereby computational efficiency is increased with no loss of program accuracy,

said method comprising placing a range check trap instruction into the header node of the SCR provided there is only one conditional exit from the SCR based on the induction variable, and additional conditional exits none of which are based on the induction variable, modifying the conditional exit test based on the value of the induction variable (v), and inserting additional checks at the loop exit point(s) to insure that the induction variable has reached the value it would have obtained in the original (unmodified) program.

U.S. Patent No. 4,571,678 to Gregory J. Chaitin, entitled "Optimization of range checking"

Example Claim 5

A method for establishing cryptographic communications comprising the step of:

encoding a digital message word signal M to a ciphertext word signal C , where M corresponds to a number representative of a message and

$$0 \leq M \leq n-1$$

where n is a composite number of the form

$$n=p \cdot q$$

where p and q are prime numbers, and

where C is a number representative of an encoded form of message word M ,

wherein said encoding step comprises the step of:

transforming said message word signal M to said ciphertext word signal C whereby

$$C=M^e \pmod n$$

where e is a number relatively prime to $(p-1) \cdot (q-1)$.

U.S. Patent No. 4,405,829 to Ronald L. Rivest et al., entitled "Cryptographic communications system and method"