

Software Patents

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Topics Overview



- Computers and Software Defined
- Legal Protection for Software
- Brief History of Software Patents
- Searching Software Technology
- Drafting Software Patents
- International Software Protection
- Examples of Software Patents

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The Evolution of Computers



- 1945 – ENIAC (Electronic Numerical Integrator and Computer) -- hard wired programmable computer
- 1951 – UNIVAC/von Neumann Machines -- programmable computers with instruction sequencers
- 1970s – Intel's Microcontrollers (e.g., 8008)
- 1980s – Mainframe Computers
- 1990s – Desktop Computers

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Evolution of Computer Software

Hard Wired Machines

ENIAC was hard wired and could not use software



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Evolution of Computer Software

Machine Language (01100011)

UNIVAC/von Neumann Machines were programmable with sequenced instructions for stored binary values (0s and 1s)

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Evolution of Computer Software

Assembly Language (ADD = 01100011)

Used mnemonics rather than binary code with an assembler to convert language to binary

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Evolution of Computer Software

High-Level Language (If $x > y$, then $x + 1$)

Human readable notations
with subroutines and modules
(FORTRAN, BASIC,
COBOL, PASCAL, C)

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Evolution of Computer Software

Object-Oriented Language

```
class Student  
{int myAge = 5;  
int temp;  
temp = myAge + 2;  
myAge = temp;}
```

Data and procedures that act upon the data
are treated as a single object
(SIMULA, C++, VISUAL BASIC, JAVA)

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Source Code v. Object Code

- Source Code – High-level language or object oriented language readable by humans (If x then y , else z)
- Object Code – Machine language readable by the computer as a series of 1s and 0s produced when source code is compiled (11000101110101...)

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Source Code/ C++

```
public boolean action(Event evt, Object
arg) { // . . . if (arg.equals
("Search")) {
System.out.println("Search event is
detected"); PeString firstName = new
PeString (entry_1.getText ( ) ( );
PeMessage msg = new PeMessage
("Search"); msg.addDataElement
(firstName); PeDebug.println("===>msg
is: "+msg); //send this event to the UI
adaptor pc.sendMessage (msg); } return
true; }
```

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Protection of Software

There are more ways to legally protect computer software than virtually any other product:

- Copyrights
- Trade Secrets
- Patents
- Trademarks



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Overlap of Protection



Each of these bodies of law may be used to protect different aspects of computer software, although there is a great deal of overlap.

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Copyright Law



- Original work of authorship fixed in a tangible medium of expression
- Protects the “expression of the idea” not the idea itself
- Exclusive control to reproduce copies, prepare new works, distribute copies, perform the work in public

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Copyright Infringement

- Proof of infringement consists of establishing copying (access and substantial similarity)
- Remedies include injunctions, destruction of infringing copies, actual damages and infringer’s profits or, if registered, statutory damages up to \$100,000 for willful infringement and attorney fees

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Copyright Registration of Software

- Source code, object code, and screen displays are literary works eligible for copyright protection
- Multimedia works are audiovisual works eligible for copyright protection
- Deposit materials with copyright office may include a request for special relief for trade secrets (1st and last 25 pages of source code with trade secret portions of code blocked out)

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Limitations of Copyright

- Protects “expression” not “idea”
- Does not protect procedures, systems, or methods of operation
- Infringement requires substantial similarity of protectable expression, not just an overall similarity of the works
- Filtration Test: 3 steps – abstraction of program, filtration of non-protectable elements, comparison of remaining “golden nugget”

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Other Limitations of Copyright

- Merger Doctrine: if idea can be expressed only in one way, the expression is not protected (e.g., using efficient sorting algorithms)
- Elements dictated by external programming considerations not protectable expression (standards, industry practices)

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Trade Secrets



A trade secret is any formula, pattern, physical device, idea, process, compilation of information or virtually any other information that:

1. is not generally known or readily ascertainable by a competitor,
2. offers an economic advantage, and
3. for which reasonable steps to maintain secrecy are taken.

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Trade Secrets in Software

- Computer code (object and source)
- Design specifications
- Flowcharts
- Technical notes
- Software development tools
- System documentation
- Formulas, algorithms
- Data structures and compilations
- Customer lists

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Limitations of Trade Secrets

- Does not protect against reverse engineering
- Does not apply to independent creation
- Public disclosure ends the protection

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Trademarks ®

A trademark is a distinctive word, phrase, logo, or other device that is used to identify the source of a product and to distinguish the product from others.

e.g., Microsoft, IBM, AOL, PowerPoint, Norton Utilities, Myst

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A Brief History of Software Patents

From 1972 to Present....



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The View in the 70's

- 1972 - *Gottschalk v. Benson*
- 1978 - *Parker v. Flook*
- 1978 - *In re Freeman*



Software technologies not patentable
since patent would preempt
mathematical algorithm

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The View in the 80's

- 1980 - *In re Walter*
- 1981 - *Diamond v. Diehr*
- 1982 - *In re Abele*
- 1989 - *In re Iwahashi*



Software is patentable as a
process, if it does not preempt
mathematical algorithm

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The View in the Early 90's

- 1994 - In re Alappat, In re Schrader, In re Lowry, In re Trovato, In re Warmerdam, In re Beauregard
- 1996 – PTO's Examination Guidelines for Computer Related Inventions

(90's test for patentability of software:

1. Specific machine for performing a process
2. Series of steps which performs independent physical acts (postcomputer process activity)
3. Manipulates data to achieve a practical application

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The View in the Late 90's

- 1998 – *State Street Bank v. Signature Financial Group* (apparatus claims)
- 1999 – *AT&T v. Excel* (method claims)

Software is patentable provided it produces a “useful, concrete, tangible result”

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Patentability of Software Today

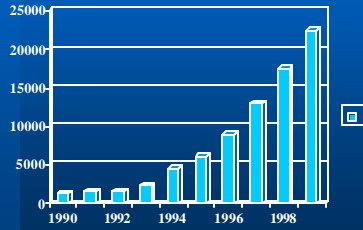
- **Produces a useful, concrete, and tangible result, is applied in a useful way, or is reduced to a practical application**
- **Physical transformation not required**
- **No exception to patentability for business methods**

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Software Patent Statistics



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Who are getting software patents?*

- United States 60%
- Japan 25%
- Europe 9%
- Asia 3%
- Others 3%



*as of 1999

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Software Patents by Companies in 1998

- 1200 IBM
- 360 Motorola
- 330 Fujitsu
- 330 Canon
- 310 Microsoft
- 300 Lucent / BellCore
- 280 NEC
- 260 Sun
- 260 HP
- 250 Sony
- 250 Hitachi
- 240 Xerox/Fuji Xerox
- 240 Mitsubishi
- 230 Intel
- 220 Toshiba
- 190 Apple Computer

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Searching Software Technology



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Search Resources and Databases

- Variation of a known technology – search U.S. or foreign patents by keyword and class/subclass (LEXIS, INPADOC, JAPIO, USPTO.GOV, etc.)
- Cutting edge technology – search literature databases and the Internet in addition to patents (LEXIS/NEXIS, SPI, DIALOG; COMPENDEX, INSPEC, MATHSCI, SOFT, Micro Computer INDEX, etc.)

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Drafting Software Patents

Patent applications for computer-related inventions (software) generally are best described as a process or method (i.e., a series of steps to perform a function)

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Format of Application

- **Title** -- Method, System, Apparatus for...
- **Background** (Field of Invention) – identify the problems and why there is a need for a better method
- **Summary** – Mirrors independent claims (Method, System, Media, GUI)
- **Brief Description of Drawings**
- **Detailed Description**
- **Claims**

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Written Description Requirement

1. **Written description of the invention and the manner and process of making and using it**
2. **Enable reproduction of the invention by one skilled in the art without undue experimentation**
3. **Provide the best mode of practicing the invention, including any necessary drawings**

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Organization of Description

1. Describe the static physical structure of the invention (hardware)
2. Describe the operation or function of the invention (software)
3. Provide specific examples and/or results of operation of the invention
4. Provide alternate embodiments for drafting claims of sufficient scope

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Disclosure of Computer Code

- Disclosure of source code is not necessary
- If you choose to include code, new guidelines allow you to include the code on a CD as an appendix (rather than microfiche)
- Disclosing code will satisfy the enablement and best mode requirement
- Copyright protection may be retained but trade secret protection is obviously lost

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Copyright Notification in Patent

COPYRIGHT NOTIFICATION

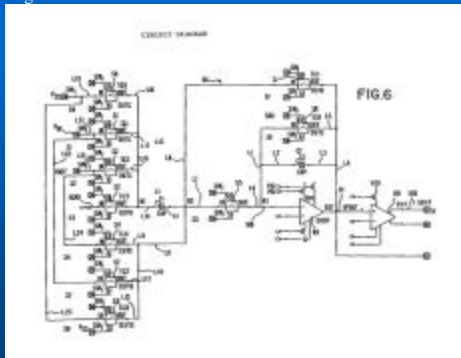
“Portions of this patent application contain materials that are subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document, or the patent disclosure, as it appears in the Patent and Trademark Office.”

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Circuit Diagram



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Types of Software Drawings

Flowcharts

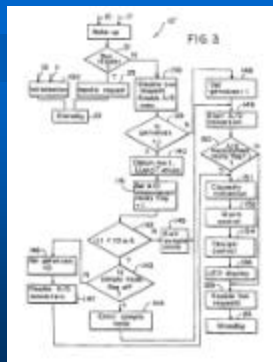
In an application describing a software process, one or more flowcharts should be included that correspond to the process claims (each of the blocks is a step in a specific sequence)

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Flow Chart



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Types of Software Drawings

Functional Block Diagrams

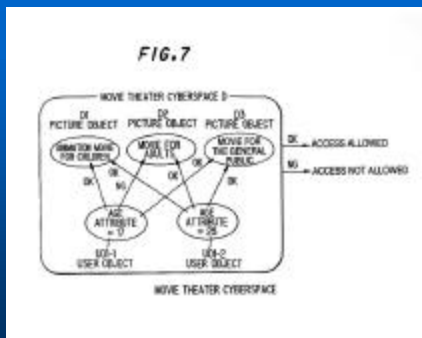
For object-oriented programs, functional block diagrams should be used to show essential connections between processes and relevant data structures (show connectivity not process flow)

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Object Diagram



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Other Types of Drawings

- Database Tables
- Graphical Displays
- Source Code Listings

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Method/Process Claims

- Used to define an invention as a series of steps for a process
- Usually the easiest to write since software is, in essence, a series of steps for a process
- Broadest type of claim available

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Apparatus/Machine Claims

- Used to define a device/system with active components (processor, memory, database, printer, etc.)
- May be drafted in 2 ways:
 - Structural components, and
 - Means -plus -function language

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Article of Manufacture Claims

- Used to define a device with no active components (e.g., computer-readable medium, data structure claims)
- Advantage is that the software manufacturer or distributor can be the infringer

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Other Types of Claims

- GUI – Graphical User Interface claim
- API – Application Program Interface claim
- Signal Processing Claim – electronic circuits

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Priceline's Method Claim

(simplified) U.S. Pat. No. 5,794,207

A method for facilitating transactions between a buyer and a plurality of sellers comprising:

1. inputting an offer price
2. inputting a credit card
3. outputting the offer to sellers
4. inputting acceptance by seller
5. paying the seller

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Sample Apparatus/Machine Claim

A system for facilitating transactions between a buyer and a plurality of sellers comprising:
a storage device, a processor, an input device, etc.

the processor programmed to

1. receive an offer price
2. receive a credit card
3. output the offer to sellers
4. receive acceptance by seller
5. pay the seller

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Sample Article of Manufacture Claim

A computer readable media containing program instructions for facilitating transactions between a buyer and a plurality of sellers comprising program instructions for:

1. receiving an offer price
2. receiving a credit card
3. outputting the offer to sellers
4. receiving acceptance by seller
5. paying the seller

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Sample “Means Plus Function”

A system for facilitating transactions between a buyer and a plurality of sellers comprising:

1. means for receiving an offer price
2. means for receiving a credit card
3. means for outputting the offer to sellers
4. means for receiving acceptance
5. means for paying the seller

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Sample Data Structure Claim

A computer-readable medium having stored thereon a data structure comprising:

1. a first field containing data representing identification of a buyer;
2. a second field containing data representing an offer price of a buyer in said first field;
3. a third field containing data representing identification of a seller;
4. a fourth field containing data representing acceptance by a seller in said third field of an offer in said second field; etc.

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Sample GUI claim

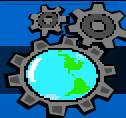
- A graphical user interface (GUI) having windowing capability comprising
 - first windowing means for inputting an offer price
 - second windowing means for displaying an acceptance of the offer by a seller
 - etc.

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International Patents



- More than half of the 176 countries in the world that grant patents permit the patenting of software-related inventions, at least to some degree.
- The most widely followed doctrine governing the scope of patent protection for software-related inventions is the "technical effects" doctrine that was first promulgated by the European Patent Office ("EPO").

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Software Patents in the EPO

- The EPO law regarding patentability of software is more liberal than the individual laws of EPO member countries Spain, Switzerland, and the U.K.
- Better to file EPO application designating those countries rather than filing separate patents applications

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Software Patents in Japan

- Japan is similar to Europe and the US
- A computer program that simply performs a mathematical algorithm is not patentable
- If software is used as a means for materializing a law of nature and is linked to appropriate hardware elements, it may be patentable (i.e., claim the computer)

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Software Patent in Canada

- 1994 Guidelines: Mere scientific principles are not patentable and presence of computer does not lend to or subtract from patentability
- New and useful process incorporating computer program, if integrated with another practical system is patentable
- Claims should have sufficient precomputer and postcomputer steps to create a novel system

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Foreign Protection of Software (2001 Update)

Country	Copyright?	Patent?
Argentina	Yes	No
Australia	Yes	Yes
Bosnia	Yes	No
Brazil	Yes	Maybe
Canada	Yes	Yes
Chile	Yes	No
China	Yes	Maybe
France	Yes	Yes
Germany	Yes	Yes

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Foreign Protection of Software (2001 Update)

Country	Copyright?	Patent?
Japan	Yes	Yes
Malaysia	Yes	No
Mexico	Yes	Maybe
Panama	Yes	No
Russia	Yes	No
Saudi Arabia	Yes	No
South Africa	Yes	No
Taiwan	Yes	Yes
UK	Yes	Yes

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Examples of Software Patents



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Operating Systems

- Intercepting calls to a network operating system by replacing the first few instructions of an entry point by a call to an intercept routine. [#5,257,381].
- Statically allocating an initial amount of memory when a program is first loaded according to a size value contained in the program header. [#5,247,674].

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Graphics and Windowing Systems

- Use of different colors to distinguish the nesting level of nested expressions in computer programs. [#4,965,765].
- The computer graphics representation of a surface using an array of dots, rather than the more traditional wire frame model. [#5,257,347].
- A calendar tool that includes a bar graph of the duration of each meeting and a composite bar graph of all meetings. [#5,247,438].

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Cryptography and Data Compression

- Diffie/Hellman secret key exchange patent. [#4,200,770].
- Hellman/Merkle public key cryptography patent. [#4,218,582].
- Compressing a font by detecting rows and columns that are entirely blank and encoding them separately. [#5,272,768].
- LZW compression patent. [#4,558,302].

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Multimedia

- A document storage system that has a digital camera to scan in documents, stores the documents on an optical disk, and uses character recognition software to construct an index. [#4,941,125].
- Compton's famous multimedia search patent. [#5,241,671].

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Word Processors

- A word processor that monitors the sequence of keys you type and tries to teach you about new features. [#4,947,346].
- Any word processor with a separate mode that the user selects when they wish to type in a mathematical formula. [#5,122,953].
- A word processor which marks and makes correction to a document using two additional different colors. [#5,021,972].

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Spreadsheets

- A spreadsheet that has an outline mode to automatically collapse rows that are hierarchically subordinate to another row. [#5,255,356].
- A spreadsheet in which each cell has a "next cell" attribute defining the next cell to advance to after having entering data into the current cell. [#5,121,499].
- Combining two or more spreadsheet tables together to produce a new table in accordance with the indicated row and column headings. [#5,272,628].

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