

INTELLECTUAL PROPERTY RIGHTS IN COMPUTER SOFTWARE

(Text of speech delivered by Justice Yatindra Singh Judge Allahabad High Court on 31st July 2005 at Judges' Round Table Conference on IPR held at Kolkata)

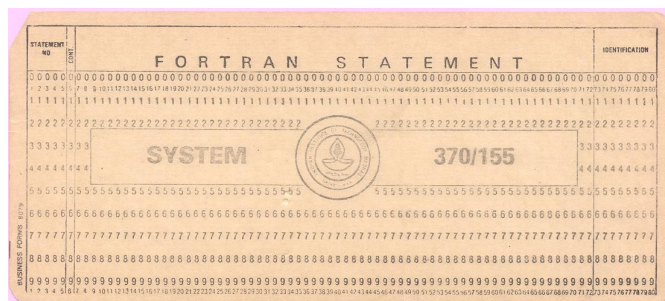
1. IPRs in computer industry are affected by the following areas:
 - (i) Copyright
 - (ii) Undisclosed Information or Trade Secret
 - (iii) Patents
 - (iv) Contract
 - (v) Trademarks
 - (vi) Layout - designs (Topographies) of Integrated Circuits

The first four have an impact on computer software. The fifth one (trademarks) and the sixth one (layout-designs) are more relevant to the Internet and to computer hardware respectively rather than to computer software.

COPYRIGHT

Source Code and Object Code

2. Computers do not understand our language. They only understand 'machine language' or 'machine code' i.e. instructions which consist of a series of 0s and 1s. In the earlier days a computer program used to be written in machine code or by punching a punchcard. The punched slot or unpunched slot indicated requisite information to the computer. This process was slow and tedious. Such a programme, although intelligible to the computer, was virtually unintelligible to any one except an equally skilled programmer.



(Computer Punch Card)

3. From earlier days, the Computer scientists also devised an alternative

language for writing programmes, known as 'assembler language'. These assembler languages had advantages over writing a programme in machine code but they still required many instructions to be written in order to achieve the simplest tasks. A number of high-level languages—such as Basic, Fortran, Cobol, Pascal etc—have been devised in order to simplify the work of a programmer. The use of these high level languages enables a programmer to write a programme in terms that nearly resembles ordinary English unlike those used in the lower level languages. They also permit complex operations for the computer to be directed by a relatively compact command. The programmes as written by a programmer are known as the source code. It is compiled by a compiler converting it into the programme that can be understood by a computer, it is then known as the object code or machine code or binary code, machine language.

4. GAIM is popular program that loads different instant messengers (MSN or Yahoo) together.



(Logo of GAIM)

5. Source code of GAIN is disclosed; it is known to everyone. It is written in C++. A small part is follows.

```
#include "proxy.h"
#include "signals.h"
#include "sslconn.h"
#include "sound.h"

struct GaimCore
{
    char *ui;
```

```

void *reserved;

};

static GaimCoreUiOps *_ops = NULL;
static GaimCore *_core = NULL;

```

6. If you read it then you can understand a few words mentioned therein and what it is trying to say. It is kind of description of something. The source code of a computer program, if it is available or disclosed, is a literary work within the Copyright Act and is so protected. The question, whether object code is also so protected was debateable but before it could be raised in our country Copyright Act was amended by two amending Acts namely Act no. 38 of 1994 and Act no. 49 of 1999. The definition of the 'literary work' in section 2(o) of the Copyright Act was amended to include computer programme as well as computer database. The result is that not only the computer programmes (subject code as well as object code) but computer database is also protected as a copyright.

TRADE SECRET

7. A work must be published before it can be protected as a copyright. The object code of every software is available; it runs the computer or the application therein: it is protected as a copyright. However source code may or may not be available. In case it is available or published it is protected as copyright. In proprietary software, the source code is generally never available; it is secret. In such an event it is protected as a trade secret or undisclosed information.

COPYLEFTED AND OPEN SOURCE SOFTWARE

8. Everyone is not using copyright to preserve their rights or prevent others from using it without their permission; some are using it in such a way that it does not become the exclusive property of anyone: they are not copyrighting it but copylefting it. It is a new word, a new concept. In order to copyleft a software, the copyright holder has to publish the source code with the declaration that everyone has the right to copy, distribute, and modify the software without any payment of royalty or fee provided in case of redistribution of the same software or distribution of the modified software, the source code is also disclosed and similar freedom—as given by the original copyright holder—is given to the others. Copylefted software is also

called free software as there is freedom to modify it. It is also called GPLed software as general public license (GPL) has a condition that copyleft a software.

9. Software where the source code is disclosed may or may not be copylefted and there can be degrees of copyleftness: it all depends on the terms of the licence under which it is released. In 1997 free software enthusiast got together to start 'Open Source Initiative' a non profit public organisation. It has come out with ten guidelines. These guidelines ensure that software is copylefted to some degree. Software satisfying the guidelines is known as 'Open Source Software'.

PATENTS

10. Patentability of computer software is controversial as well as debatable. Patents can be granted for inventions. The word 'invention' {section 2(1)(j) of the Patents Act} read with the word 'inventive step' {Section (1)(ga) of the Patents Act} means a new product or process that is capable of industrial application. Invention must be novel and useful. It should not be obvious to a person skilled in the art. It must be a significant advance in the state of the art and should not be an obvious change from what is already known. Generally this is the global law but is being applied differently in different countries.¹

Law - US

11. Section 3 of the Indian Patents Act explains what are not inventions. Patents cannot be granted for discoveries and inventions mentioned in section 3 of the Patent Act. There is no such limitation in the US law as the Congress intended to include anything under the sun that is made by man, but the US Supreme Court in the Chakrabarty case (for details see below)² held,

¹ Clause 27 of the TRIPS defines patentable subject matters. The relevant part of sub-clause (1) of clause 27 is as follows

1. Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application.

A footnote is inserted here in the TRIPS states,

For the purposes of this Article, the terms "inventive step" and "capable of industrial application" may be deemed by a Member to be synonymous with the terms "non-obvious" and "useful" respectively.

²This case is reported in *Diamond vs. Chakrabarty*, 447 US 303: 65 L Ed 2d 144. Plasmids are hereditary units physically separate from the chromosomes of the cell. In a prior research, Chakrabarty and an associate discovered that plasmids control the oil degradation abilities of certain bacteria. In particular, the two researchers discovered plasmids capable of degrading camphor and octane, two components of crude oil. In the work represented by the patent application at issue here, Chakrabarty discovered a process by which four different plasmids, capable of degrading four different oil

‘This is not to suggest that ... [law] has no limits or that it embraces every discovery. The laws of nature, physical phenomena, and abstract ideas have been held not patentable. Thus a new mineral discovered in the earth or a new plant found in the wild is not a patentable subject matter. Likewise, Einstein could not patent his celebrated law that $E=mc^2$; nor could Newton have patented the law of gravity. Such discoveries are manifestation of nature, free to all men and reserved exclusively to none.’

12. The US Supreme Court in *Parker v. Flook* (437 US 584: 57 L Ed 2d 451) also held that a method for updating alarm limits during catalytic conversion, which is a mathematical formula, is not patentable.

13. The US Patents Act neither specifically refers to programmes for computers, nor to the business methods. The US Supreme Court in the *Gottschalk* case (for citation see below)³ held that a computer program - involving a method to convert binary-coded-decimal numerals into pure binary numerals - cannot be patented for the reason,

- The method was so abstract as to cover both known and unknown uses of the binary-coded-decimal to pure binary conversion;
- The end use could vary and could be performed through any existing machinery or future-devised machinery or without any apparatus;
- The mathematical formula involved had no substantial practical application except in connection with a digital computer; and
- The result of granting a patent would be to improperly issue a patent for an idea.

In short, algorithm cannot be patented. A computer program - standing alone or by itself - cannot be patented in the US, but what would be the position if it were a part of an industrial or business process?

components, could be transferred to and be maintained stably in a single *Pseudomonas* bacterium, which itself has no capacity for degrading oil. The new bacteria were not ‘products of nature’, because *Pseudomonas* bacteria containing two or more different energy generating plasmids are not naturally occurring.

At present, biological control of oil spills requires the use of a mixture of naturally occurring bacteria, each capable of degrading one component of the oil complex. In this way, oil is decomposed into simpler substances which can serve as food for aquatic life. However, for various reasons, only a portion of any such mixed culture survives to attack the oil spill. By breaking down multiple components of oil, Chakrabarty’s micro-organism promises more efficient and rapid oil-spill control and his patent application was allowed.

³*Gottschalk v. Benson*, 409 US 63: 34 L Ed 2d 273.

Industrial Process

14. The Diehr case (for citation see below)⁴ was a case involving a process for curing rubber that included a computer programme. Rubber in a mould is to be heated for a given time according to the Arrhenius equation, named after its discoverer Svante Arrhenius. The inventor had found a process for constantly measuring temperature inside the mould, which was fed to a computer that opened the mould at the right time. The court by a five to four decision held that a patentable claim does not become unpatentable merely if it uses a mathematical formula, or a computer programme, or a computer. In short, a computer programme may not be patentable as such but may be patentable as a part of an industrial process.

Business Methods

15. Traditionally, the processes concerned with technology only could be patented. Many other activities including business methods, or data analysis which one would consider processes, were excluded from patents. However, since the Diehr case, there has been a shift in the US. US Patent and Trade Office (USPTO) has issued a Manual of Patent Examining Procedures containing guidelines for patenting inventions. Its earlier policy for computer related inventions {Paragraph 706.03(a)} was as follows:⁵

‘Though seemingly within the category of a process or method, a method of doing business can be rejected as not being within the statutory classes.’

This was deleted and a new paragraph {706.03(a)} was added,

‘Office personnel have had difficulty in properly treating claims directed to methods of doing business. Claims should not be categorized as methods of doing business. Instead such claims should be treated like any other process claims’.

16. The aforesaid change was noticed by the US court of appeal in the State Street case (for citation see below)⁶ and the court held that,

‘Whether the claims are [patentable or not] should not turn on whether the claimed subject matter does “business” instead of something else.’

The court also held that,

⁴*Diamond v. Diehr*, (1981) 450 US 175: 67 L Ed 2d 155.

⁵See *Hotel Security Checking Co. v. Lorraine Co.*, 160 F. 467 (2nd Cir. 1908) and *Wait (in re:)*, 24 USPQ 88, 22 CCPA 822 (1934).

⁶*State Street Bank v. Signature Financial Group*, 149 F. 3d 1352. Text is also available at <http://www.ll.georgetown.edu/Fed-Ct/Circuit/fed/opinions/97-1327.html>

‘To be patentable an algorithm must be applied in a “useful“ way.

...

We hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces a useful, concrete and tangible result’

17. In short the law in the US is that, ‘an abstract idea by itself never satisfies the requirements of the Patents law. However an abstract idea when practically applied to produce a useful, concrete and tangible result satisfies it. Today, USPTO has one chapter on Patent Business Methods and is granting patents to software techniques for business methods and data analysis, if they are useful. Australia and Japan have also followed suit. Some examples of patents of business methods granted in the US are:

- Single click to order goods in an on-line transaction;
- An on-line system of accounting;
- In-line rewards incentive system;
- On-line frequent buyer programme; and
- Programmes letting customers set their own prices for hotel booking etc.

18. The law whether a computer programme is patentable per se or in conjunction of business methods is still in flux. In the US ‘Business Method Patent Improvement Act of 2000’⁷ was introduced in the Congress on October 3, 2000 and would apply to all pending applications as well as to all patents issued. It will restrict the ability of the USPTO to issue business method patents. Among the others it would create a presumption of obviousness where a computer has been used primarily to implement a known business method. It has not yet been passed and many feel that it may never be passed.

Law – Europe

19. Article 52(2)(2) of the European Patent Convention 1973 (EPC) specifically states that ‘schemes, rules and methods for performing mental acts, playing games or doing business, and programmes for computers’ will not be regarded as inventions. This is also the law of the member countries of the European Patent convention: computer programmes and business methods cannot be patented there.

⁷The text of the bill is available at http://www.techlawjournal.com/cong106/patent/bus_method/berman.asp

However, in practice, the approach has changed. The application for patents is now considered if presented as producing technical effects (i.e. programme for speeding up image enhancement) rather than as claiming abstract programmes or business methods.⁸ Patenibility of computer software was being introduced through patent Software directive but it was defeated in the European Parliament on 6th July 2005.

Law – India

20. Section 3 of the Patents Act provides what are not invention and cannot be patented. Section 3(k) provides that a mathematical or business method or computer programme *per se* or algorithms is not invention for purposes of the Patents Act. The word 'computer programme' is modified by the word 'per se'. This word means standing alone, or by itself, or in itself. It shows that under section 3(k) a computer programme standing alone or by itself can not be patented. Nevertheless it also means that if a computer programme is not standing alone then it may be patented; it leaves doubts regarding its scope. The courts may interpret it in the same manner as the Europeans are doing or could do all the way as is being done in the US: of course its finer boundaries will be determined when courts actually interpret these words⁹.

REVERSE ENGINEERING

21. Reverse engineering means 'starting with the known product and working backward to derive the process which aided in its development or manufacture.' In other words reverse engineering is taking apart an object to see how it works in order to duplicate or enhance the object.

22. Reverse Engineering in the context of a computer programme is also referred

⁸An informative study on Article 52 of the EPC regarding computer programme titled 'Art 52 EPC: Interpretation and Revision' is available at <http://swpat.ffii.org/analysis/epc52/index.en.html>

⁹ Section 3(k) as it stands today was substituted by the 2002 Amendment. It was replaced by section 3(k) and 3(ka) by the Patents Amendment Ordinance 2004 (the 2004 Ordinance). Section 3(ka) as substituted by the 2004 Ordinance excluded mathematical method or business method or algorithms from the field of invention. It was the same as was provided by the 2002 Amendment in Section 3(k). However, the law regarding computer programme was further clarified in section 3(k) by the 2004 Ordinance. After the 2004 Ordinance, computer programme *per se* was further qualified by the phrase 'other than its technical application to industry or a combination with hardware'. It showed that the computer programme in its technical application to industry or a combination with hardware only could be patented: a scope narrower than US approach but perhaps wider than European approach. The 2004 ordinance has been repealed by the Patents Amendment Act 2005 (Act 15 of 2005) (the 2005 Amendment) however it left the section 3(k) as was substituted by the 2002 Amendment intact; it did not incorporate the amendments in 3(k) or substitution of 3 (ka) as proposed by the 2004 Ordinance.

to as decompilation or disassembly. There is some difference among the three but the word reverse engineering is a general word and is broader than the other two: this is my reason for using it.

23. The reasons for reverse engineering in the software industry could be to,
- Retrieve the source code of a programme because the source code was lost; or
 - Study how the programme performs certain operations; or
 - Improve the performance of a programme; or
 - Fix a bug (correct an error in the programme when the source code is not available); or
 - Identify malicious content in a programme such as a virus; or
 - Adapt a programme written for use with one microprocessor for use with a differently designed microprocessor; or
 - Achieve interoperability.

24. The last reason of the preceding paragraph is the most debatable; some countries have declared the terms of the license, prohibiting reverse engineering to achieve interoperability to be void (see below).¹⁰ The question is when is reverse engineering legal? When does it amount to infringement of IPRs? In case it is not illegal then can it be prohibited by the terms of a contract?

Copyrighted Software

25. The leading case¹¹ on the aforesaid point is the Sega case (for details see below).¹² Accolade, a computer game company, reverse engineered Sega game programmes in order to get information necessary to make its games compatible with the Sega Genesis console. Accolade then sold its independently developed games. These games were in competition with those made by Sega and third-party developers, who had been given a license by Sega. In the suit filed by Sega for

¹⁰ The European Union has declared anti-decompilation clauses in software contracts prohibiting reverse engineering to achieve interoperability to be void. See Council Directive 91/250 on Legal Protection of Computer 1991 O.J. (L122) 42. A few other countries, notably Australia, have followed suit. See Jonathan Band, Software Reverse Engineering Amendments in Singapore and Australia, J. Internet L. 17, 20 (Jan. 2000).

¹¹ Another case though prior in time is *Atari Games Corp. v. Nintendo of America Inc.*, 975 F.2d 832, 24 U.S.P.Q.2D (BNA) 1015. The text of the judgement is also available at, <http://cyber.law.harvard.edu/openlaw/DVD/cases/atarivntendo.html>

¹² *Sega Enterprises Ltd. v. Accolade, Inc.*, 977 F2d 15; 93 Daily Journal DAR 304. The text of the judgement is also available at, http://www.eff.org/Legal/Cases/sega_v_accolade_977f2d1510_decision.html

infringement of its IPRs, Accolade raised the defence of fair use. One of the points involved in the case was,

‘Whether the [US] Copyright Act permits persons who are neither copyright holders nor licensees to disassemble [reverse engineer] a copyrighted computer programme in order to gain an understanding of the unprotected functional elements of the programme.’

The Court, in the light of the public policies underlying the US Copyright Act, held that,

‘When the person seeking the understanding has a legitimate reason for doing so and when no other means of access to the unprotected elements exists, such disassembly is, as a matter of law, a fair use of the copyrighted work.’

This case has been followed in almost all subsequent cases in the US.¹³

26. The law in India regarding permissibility of reverse engineering in respect of copyrighted computer software is similar to the law laid down in the Sega case. Section 52 of the Copyrights Act defines acts that do not constitute an infringement of copyright. Sub-sections (aa) to (ad) to Section 52 of the Copyright Act (see below)¹⁴ relate to computer software. This section broadly protects acts (including those of reverse engineering) in order,

¹³ See, e.g., *DSC Communications Corp. v. DCI Techs., Inc.*, 81 F.3d 597, 601 (5th Cir. 1996); *Bateman v. Mnemonics, Inc.*, 79 F. 3d 1532, 1539 n.18 (11th Cir. 1996); *Mitel, Inc. v. Iqtel, Inc.*, 896 F. Supp. 1050, 1056-57 (D. Colo. 1995), 124 F.3d 1366 (10th Cir. 1997); *Sony Computer Entertainment, Inc. v. Connectix Corp.*, 203 F.3d 596.

¹⁴ Section 52(1)(aa) was substituted by Act number 38 of 1994 and section 52(1)(ab) to (ad) were substituted by Act number 49 of 1999. The relevant part of Section 52 of the Copyrights Act is as follows:

52. Certain acts not to be infringement of copyright.—(1) The following acts shall not constitute an infringement of copyright, namely:—

(aa) the making of copies or adaptation of a computer programme by the lawful possessor of a copy of such a computer programme, from such copy—

(i) in order to utilise the computer programme for the purpose for which it was supplied; or

(ii) to make back-up copies purely as a temporary protection against loss, destruction or damage in order only to utilise the computer programme for the purpose for which it was supplied.

(ab) the doing of any act necessary to obtain information essential for operating interoperability of an independently created computer programme with other programmes by a lawful possessor of a computer programme provided that such information is not otherwise readily available;

(ac) the observation, study or test of functioning of the computer programme in order to determine the ideas and principles which underline any elements of the programme while performing such acts necessary for the functions for which the computer programme was supplied;

(ad) the making of copies or adaptation of the computer programme from a personally legally obtained copy for non-commercial personal use.

- To obtain information essential for operating inter-operability of an independently created computer programme with other programmes if such information is not otherwise readily available and
- To determine the ideas and principles which underline any element of the programme for which the computer programme was supplied;
- To make copies or adaptations of legally obtained copy of the computer programme for non-commercial personal use.

27. In our country contractual rights are dealt with under the Indian Contract Act. Section 23 of the Indian Contract Act declares a contract to be void if it is against public policy. Public policy has been declared under section 52 of the Copyright Act. Reverse engineering has been permitted in a limited way. A contract, prohibiting reverse engineering in software to the extent permitted by the Copyright Act, may not stand in a court of law.

Patented Software

28. Unlike in the US copyright law, there is no clause in the US Patent Law to permit fair use of Patents. In India also there is no provision in the Patents Act, similar to section 52 of the Copyrights Act. What would be the position if reverse engineering - even to achieve interoperability or for fair use - is prohibited by a contract?

29. The law - as to when a patented software may be reverse engineered - is not clear. Some legal commentators in the US (see below)¹⁵ have recommended that there should be similar clauses in the US protecting the fair use of patented computer programmes. This may not be necessary.

30. A Computer Software/programme consists of two parts: source code and object Code. It is the source code that will help in achieving interoperability of other computer programmes. Sometimes it is disclosed in the patent application. However, generally it is not disclosed and in a patent application only flow charts are given showing how the device works¹⁶. In such a situation, the computer programme only

¹⁵ Reverse Engineering and the Rise of Electronic Vigilantism: Intellectual Property Implications of 'Lock-Out' Programmes by Julie E. Cohen 68 S. Cal. L. Rev. 1091 (1995). It is available at <http://www.law.cornell.edu/commentary/intelpro/chn95int.htm>
The Law of economics of Reverse Engineering by Pamela Samuelson & Suzanne Scotchmer. It is available at <http://www.sims.berkeley.edu/~pam/papers/l&e%20reveng3.pdf>

¹⁶At present, this practise is generally followed while filing patent applications in different

will be protected as a trade secret or copyright. The US Supreme Court in the Kewanee case (for details see below)¹⁷ held that trade secret does not prohibit any one to find it out or develop it by fair and honest means including reverse engineering. A condition in a contract prohibiting reverse engineering to find out source code which is protected as trade secret may also amount to creating monopoly in an idea forever without getting it patented and such a condition may run foul of section 23 of the Contract Act. In this connection one may also refer to the U.S. Supreme Court decision in *Bonito Boats v. Thunder Craft Boats*, 489 US 141¹⁸. In case the computer programme is protected as a copyright then the same principles as I have discussed earlier should apply.

CONCLUSION

31. Michael Lewis wrote a book in 1999 on the success story of the Silicon Valley entitled 'The new new thing: a Silicon Valley story'. The most quoted line from this book is, 'The definitive smell inside a Silicon Valley start-up was of curry.' Let's hope that—with a better understanding of role of IPRs in cyber laws—not only inside a Silicon Valley start-up, but also inside the operating system of e-commerce and cyberspace will there be the smell of curry.

countries. Patent requires that everything should be disclosed. It is doubtful whether this practise of non-disclosure of source code is valid or not. In a suitable case this question has to be gone into.

¹⁷ The case is reported in *Kewanee Oil Co. v. Bicron Corp.*, 416 US 470. The plaintiff company was engaged in making synthetic crystal useful in the detection of ionizing radiation. It developed a novel 17-inch crystal as a result of processes that were considered trade secrets. Some of its employees—who had entered into an agreement to maintain secrecy—joined the defendant company. The defendant also started manufacturing 17-inch crystals. The plaintiff filed a suit for injunction and damages for misappropriation of trade secrets. The trial court applied the Ohio trade secret law and granted permanent injunction. The appellate court reversed the decision on the ground that the Ohio trade secret law was in conflict with the patent law of the US. The US Supreme Court allowed the appeal and upheld the Ohio trade secret law. The Supreme Court also held,

'The protection accorded to the trade secret holder is against the disclosure or unauthorized use of the trade secret by those to whom the secret has been confided under the express or implied restriction of non-disclosure or non-use. The law also protects the holder of a trade secret against disclosure or use when the knowledge is gained, not by the owner's volition, but by some improper means ..., which may include theft, wiretapping, or even aerial reconnaissance. A trade secret, however, does not offer protection against discovery by fair and honest means, such as by independent invention, accidental disclosure, or by so-called reverse engineering.'

¹⁸ In the Bonito case, Bonito Boats developed a hull design for a fibreglass recreational board. It wasn't patented. Florida legislature enacted a statute that prohibited the use of a direct moulding process to duplicate the unpatented boat hulls and forbade the knowing sale of such hulls. Bonito Boats filed a suit against Thunder Craft Boats for violation of this statute. The US Supreme Court held the statute to be against the US Patent Law and as creating a monopoly in an unpatented item.

Justice Yatindra Singh
Judge, Allahabad High Court, Allahabad-211001.
Phone: 0532-2420462
Email: ysingh@allahabadhighcourt.in