OST (OPEN SOURCE TECHNOLOGY]

- ## Open Source Software :-

Open source software whose source code is available for modification or enhancement by anyone. "Source code" is the part of software that most computer users don't ever see.

Open source software is very often developed in a public, collaborative manner. The open source definition is used by the open source institute to determine whether or not a software license can be considered Open source.

History :-

Open source software was launched in the year 1983. In 1983, a group of individuals advocates that the term free software should be replaced by open source software (OSS) as an expenssion which is less ambigious and more comfortable for the corporate world.

Properties of OSS:-

(1) Security
(2) Affordability
(3) Transparency
(4) Perpetuity
(5) Interoperability
(6) Localization

Advantages of open source software :-

Open source software can have a major impact on your entire organization. There are several advantages of using open source software are as follows :-

(1) Laser Hardware costs :-

Since Linux and open source solutions are easily portable and compressed, it takes lesser hardware power to carry out the same tasks when compared to the hardware power it takes on servers, such as solaris.

(2) High Quality Software :-

Open source software is mostly high quality software. When you use the open source software, the source code is available. Most open source software are well designed.

(3) No-vendor Lock-in :-

IT mangers in organizations face constant frustation when dealing with vendor Lock-ins. Lack of portability and expensive license free and etc disadvantages. Using OOS gives you more freedom and you can effitively address all these disadvantages.

(4) Simple license Management :-

When you use OOS, you would not need longer to worry about license. OOS enables you to install it several times and also use it from any location. You will be free monitoring.

(6) **Lower Software Costs:-** By using OSS, you can minimize your expenses. You can save on licensing fees and maintenance fees.

(7) **Scaling and Consolidating :-** Linux and OOS can be easily scaled. With varied options for clustering.

Difference b/w OOS and proprietory software

open source software	proprietory software
(1) OOS consists of source code.	(1) It does not consists of source code along with it.
(2) OOS can be modified and redistributed by anyone.	(2) It can't be modified and redistributed without permission.
(3) Debugging or error finding in open source is easy.	(3) Debugging or error finding can't be done.
(4) OOS are not secure.	(4) Proprietory software are more secure as compare to open source.
(5) Linux, Apache, My SQL, PHP are the examples of open source.	(5) Windows (98, xp etc), MS office, oracle are few examples of proprietary software.
(6) user can add new functionality in the software by adding the new code into the software.	(6) user can't add few functionality in the slw because code is not available fo the user.

- Comparision of freeware software and Open source S/w.

Open source Software	freeware software
(1) OOS is development methodology.	(1) freeware s/w is social movement.
(2) OOS may need to pay to get them under license.	(2) It is freely available on trial basis.
(3) OOS are unsecure.	(3) freeware S/w are more secure than OS.
(4) In Open source S/w, source code is available.	(4) In free s/w source code is not available.
(5) Users can add new features in the s/w by adding new code into s/w.	(5) Users can't add new features in the source code.

• Legal Issues

Copyright :- copyright is a set of exclusive rights for creators which allows them to copy, adopt and distribute their works.

copyright allows the owner or creator an opportunity to exploit their work for a period of time before they become categorized as being in the public domain' and freely available to everyone.

A simple definition of copyright is that it is a bunch of rights in certain creative works such as text, artistic works, music, computer programs, sound, recording and films.

• Copyright does not protect ideas, concepts, styles. or techniques.

• Copyright is a separate right to the property right in an object.

- ## Intellectual Property Right: (IPR) :-

Intellectual property (IP) refers to creation of the mind, such as inventions; literary and artistic works; design; and symbols; names and images used in commerce.

Intellectual property divided into following Categories:-
Patent; Copyright, industrial designs, trademarks.

IPR:-

Intellectual property is the product of human intellect including creativity concepts; inventions, industrial models, trademarks; songs; literature, symbols, names, brand etc.

Intellectual property rights do not differ from other property rights. They allow their owner to completly benefit from his/her product which was intially an idea that developed and crystallized.

Intellectual property is devided into two categories:-

(i) Industrial property. which includes; inventions (patents), trademarks, industrial designs, and models and geographic indications of source.

(ii) Copyright which includes ; inventions, and artistic works, namely novels, poems, plays, films, musical, cartoons paintings, photographs, status and architecture designs.

(i) Patent :- A patent is a form of right granted by the government to an inventor, giving the owner the right to exclude other from making, using, selling, offering to sell and importing an invention for a limited period of time, in exchange for the public disclosure of the inventions.

(ii) Copyright :- Copyright is IPR a form of IPR concerned with protecting works of human intellect.

(iii) Industrial Design Right :- An Industrial Design right (sometimes called "Design Right") protects the visual design of objects that are not purely utilitarian.

(iv) Trademark :- A tradmark is a sign that individualizes the goods and services of given enterprise and distinguishes them from those of competitors.

(v) Trade Name :- A trade name or business name is a name that uniquely distinguish a business from others.

(vi) tradesheet :- A trade sheet is any information of commercial value concerning production or sales operations which is not generally known.

Linux

Linux is a UNIX-based operating system originally developed as for Intel-compatible PCs.

It is now available for most types of hardware platfroms, rangeing from PDAs to mainframes. Linux is a modern OS. meaneing it has such features as virtuel memory, memory protection and preemptive multi-tasking.

Linus torvalds invented linune itself. In the year 1991, torvalds was a student at the university of Helsinki in finland where he had beed useing Minix, a non-free using Unix-like system and began writing his own Kernel.

17 Sep.

features of linux:

The various features of linune are as follows :-

(1) Low Cost :-

(2) Stabifity :- Linune is highly stable as compere to other os.

(3) Performence :- High performence on Various networks.

(4) Networking :- Linux ~~support~~ provide a strong support for network functionality.

(5) feleoibility :- Linuxo can used for high performence servek applications, desktop applicatior and embaced oystem.

(6) **Compatibility:-** It runs all common unix s/w packages and can process all common file formats.

(7) **Fast and Easy Installation:-** provides user friendly installation.

(8) **Multitasking:-** It is a multitasking OS. It can handle multiple things on the same time.

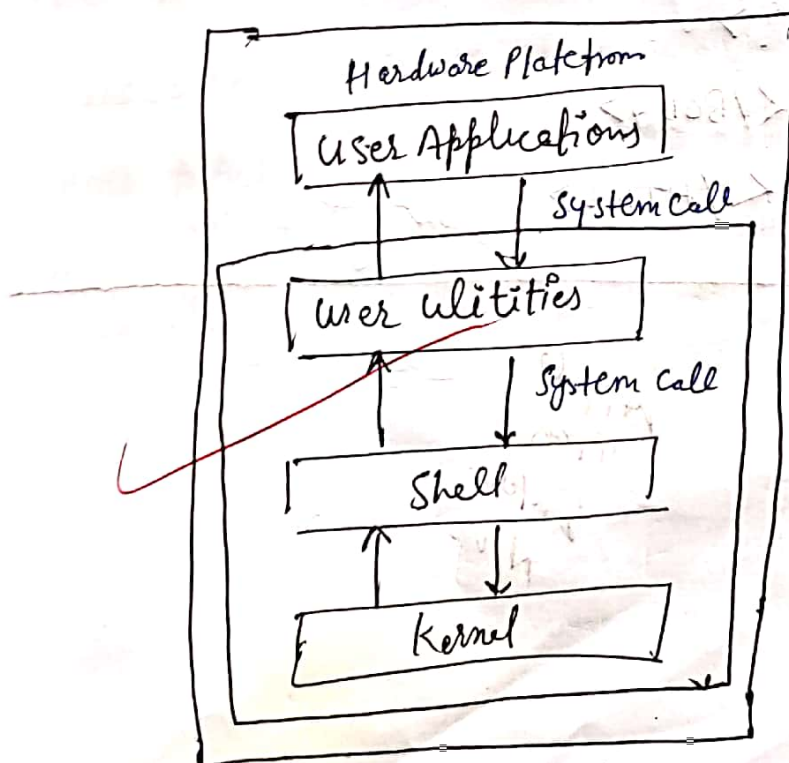(9) **Security:-** It the most secure OS. file ownership and permissions make linux more secure.

(10) **Open source:-** It is a - open source Operation System.

Linux Architecture:-

The operating system architecture is generally organized into two parts:-

(a) **Kernel mode** - It executes the OS processes.

(b) **User Mode** - It executes Application program of the user like MS word, MS paint etc.

Hardware Platform

```
┌─────────────────────────┐
│  [User Applications]     │
│        ↑    ↓ system call│
│  [user ulitities]        │
│        ↑    ↓ System call│
│     [Shell]              │
│        ↑    ↓            │
│     [Kernel]             │
└─────────────────────────┘
```

A system can enter from user to kernel mode using system call.

• UNIX

Unix is an operating system which was first developed in the 1960s, and has been under constant developed ever since. By operating system, we mean the suite of programs which make the computer work. It is a stable, multi user, multi tasking system for servers.

UNIX system also have a graphical user interface (GUI) similar to microsoft windows which provides an easy to use environment or for when there is no windows interface available — in a telnet session.

Types of UNIX :-

There are many different versions of UNIX. The most popular varieties of UNIX are Sun Solars, GNU/LINUX, and MacOSX.

- **Kernal :-** A kernal is a central component of an operating system. It acts as an interface between the user applications and the hardware. The role communication between The aim of the kernal is to manage the communication between the ~~interface~~ software and the hardware (CPU, disk, memory etc).

Types of Kernal:-

There are mainly two types of Kernal:-

(i) Micro Kernal

(ii) Monolithic Kernal

Micro Kernal :-

which only contains basic functionality.

Monolithic Kernal :-

which contains many devices.

LINUX commands :-

(1) **Man Command :-** Man command displays informations from the online reference manuals. man [options] [section] [title]

(2) **Date command :-** Date commands tells us the current date and time.

Syntax -

date [options] [+ format] [date]

(3) **who command -** It shows who is logged into the systems-

Syntax - $who.

(4) **who ami command :-** It prints the current user Id. Equivalent to id -un.

Syntax - $ who ami

(5) **Pwd Command :-** Pwd - Print working directory. It print the full pathname of the current working.

Syntax - $ pwd.

(6) **Touch Command :-** Touch command is used to create empty file.

Syntax - $ touch filename.

(7) Cat command :- Cat command is used to create and add contents to the file.

Syntax :- $ cat [options] filename

(8) Rm Command :- Rm Command is used for remaining files & directories.

Syntax :- $ rm [options] filename

OST :-

Open Source Technology is a growing trend in GIS (Geographic information system).

(9) Mkdir Command :- Mkdir command is used to create directories. It creates one or more directories.

Syntax :-

$ mkdir [options] directoryname.

(10) Cp Command : Cp command is used for to copy the contents of the one file into another.

Syntax : $ cp [options] file 1 & file2 cp [options] files directory

(11) Cd Command :- is used to change the current directory.

Syntax :- $ cd [options] [directory]

{OPEN SOURCE TECHNOLOGY}

- The open source definition defines the terms of usage, modification and redistribution of open source software.

- The open source definition is used by the open source Initiative to determine whether a software license can be considered open source.

- Software license grant rights to users which would otherwise be reserved by copyright laws to the copyright holder.

- Several open source software license have qualified within the boundaries of the open source definition,

The most prominent and popular example is the GNU {General public license (GPL).

PRINCIPALS OF OPEN SOURCE

The main principles of open source development are as under:-

(1) **<u>Free means Freedom. Not 'Free stuff'</u>:-**

open source is not free. In the year 1978 the term 'open source' was coined to replace the term 'free software' because may people assumed 'free' to mean 'zero cost', whereas it was always intended to mean 'freedom'. If you consider the barriers to adoption of open source listed above it becomes clear that the notation of 'free stuff' is false.

(2) **<u>Principle of 'openness'</u>:-**

Accepting feedback through a web page and providing mechanism for people to report defects is one thing. Allowing everyone else to see that feedback and all those defects is another, much more uncomfortable step.

Allowing everyone to see the source code so they can review it and try it is also an act of faith. Providing a public forum where people can openly criticize and contribute to the design and implementation of the software is another act of faith.

(3) Principle of 'Transparency' :-

Transparency is the ability of the community to see what is going on. This involves :-

(i) A published road map so they know where the administrators plan to take the project.

(ii) A public defect traking system so they can report and review defects.

(iii) Published design documentation.

(iv) Communication about schedules and hurdles.

without transparency, it is hard to grow a community. Transparency and openness are not the same thing.

(4) Principles of 'Early and Often' :-

This is the philosophy of making information available in its earliest drafts and updating in often. This includes, but is not limited to, the source code of the Software Zipped archives of the source code are available for every open source project. Many projects go further and have a public repository where the current code is always available.

(5) Expectation of 'Community':-

Every generation grows up with a new set of expectations. When it comes to open source, the web site, source code, roadmap, defect tracking systems and forums are the 'project' and the community participates in the project.

- The fact that the source code and roadmap are available is a result of 'openness'.

- The fact that the defect tracking system and forums are available is a result of 'transparency'.

- The fact that the design and initial code is available is a result of 'early and often'.

It is these principles and the results of using them that ultimately attract and retain the community.

- **Techniques of open source development:-**

(1) Sendmail:-

Sendmail is an open source mail transfer agent (MTA) used for routing and delivary of e-mail.

The original version of sendmail was written by Eric Allman in the early 1980's. It is estimated that sendmail is installed on 60 to 80 percent of the Internet's mail server computers.

(2) Apache Web-Server:-

often referred to as simply Apache, a public-domain open source web server developed by a loosely knit group of programmers.

The first version of Apache, based on the NCSA httpd web server, was developed in year 1995.

Core development of the Apache web server is performed by a group of about 20 volunteer programmers, called the Apache group.

However, because the source code is freely available, anyone can adapt the server for specific needs and there is a large public library of apache add-ons.

(3) Linux :-

A freely distributed open source operating systems that runs on a number of hardware plateforms. The Linux kernal was developed mainely by Linus Torvalds. Because it's free and because it runs on many plateforms including PCs and Macintoshes, Linux has become an extremely popular alternative to proprietary operating systems.

(4) GNOME :-

Acronym for GNU Network object Model Environment. GNOME is a part of the GNU project and part of the free software or open source, movement. GNOME is a windows-like desktop systems that works on UNIX and UNIX-like systems and is not dependent on any one windows manager. The current version runs on Linux, FreeBSD, IRIX and Solaris. The main objective of GNOME is to provide a user-friendly suite of applications and an easy-to-use desktop.

- ISSUES IN OPEN SOURCE SOFTWARE DEVELOPEMENT:-

Many s/w developers are already switching from proprietary to open source software due to the latter's numerous benefits. Such software is incredibly flexible and can be developed at a lower than the former. ~~as it sounds~~. There are several problems you may encounter as you develop you own software. The main issues in open source developmen are listed as under:-

(1) Platfrom Compalitility :-

most of the applications platforms are only compatible with proprietary software. Only few platefroms are flexible enough to run both proprietary and open source software.

This presents a problem in testing and launching ~~platefroms~~ ~~before~~ your open source software.

(2) Pre-Release Review :-

One of the most fundamental stages of software development is the pre-release Review. The software has to be released to some users and reviewed before the official release date.

Unlike proprietary software, open source software usually has quite a small number of users who are willing to review it prior to it release.

(3) Inadequate Reports :-

open source s/w development largely relies on the input and reports from the enduidual users. users significantly contribute in the parallel development of open source s/w versions.

However, recieving the contribution itself is a problem. Most users simply download the s/w and leave it at that. Most of them don't bother providing any reports on it.

(4) Competition between Developers :-

Parallel open source s/w development usually encourages competition between the endividual developers. Each of your developers has a different viewpoint of the s/w and will consequently clash with the other just to get some features incorporated into the s/w. This may finally result ento a final product which doesn't actually meet your organisations goal.

(5) Security Threats :-

open source s/w is accessible to a wide range of developers and users. who can further develop it or integrate it to many platforms. That means that it's relatively easy for malicious programmers to develop malicious codes to attack the s/w.

- ## PROPRIETARY SOFTWARE :-

Proprietary software or closed source software is computer software licensed under exclusive legal rights of the copyright holder with the intent that the licensee is given the right to use the software only under certain conditions and restricted from other uses, such as modification, sharing, studying, redistribution or reverse engineering. Usually the source code of proprietary software is not made available.

{MySQL}

MySQL is a powerful Relational Database Management Systems (RDBMS) which we will use to learn the basic principles of database and data manipulation using structured Query language (SQL) statements.

MySQL is an open source database system with which we can do the following things :-

(i) Design the structure of the tables (called schema) and how they relate to one another.

(ii) Add, edit and delete data.

(iii) Sort and manipulate data.

(iv) Query the database (that is, ask questions about the data).

(v) Produce listings based on queries.

To interact with MySQL, we enter commands on a command line. These commands, such as CREATE, INSERT, UPDATE etc. are based on a more general language called SQL.

FEATURES OF MYSQL :-

The following list shows the most important properties of MYSQL :-

(1) **Relational Database System :-**
Like almost all other database systems on the market, MySQL is a relational database system.

(2) **Client / Server Architecture :-**
MySQL is a client / server system. There is a database server (MySQL) and arbitrarily many client (application programs), which communicate with the server; that is, they query data, save changes etc. The clients can run on the same computers as the server or on another computer (communication via a local network or the internet).

(3) **SQL compatibility :-**
MySQL supports as its database language - as its name suggests - SQL. SQL is a standerdized language for querying and updating data and for the administration of a database.

4) views :-   Put simply , views relate to an SQL query that is viewed as a distinct database object and makes possible a particular view of the database . MySQL has supported views since Version 5.0.

(5) Stored procedures :-
Here, we are dealing with SQL code that is stored in the database system.
Stored procedures are generally used to simplify certain steps , such as inserting or deleting a data record.

(6) Triggers :-
Triggers are SQL commands that are automatically executed by the server in certain database operations (INSERT, UPDATE and DELETE). MySQL has supported triggers in a limited form from version 5.0 and additional functionali is promised for version 5.1.

(7) Unicode :-   MySQL has supported all conceivable character sets since version 4.1, including Latin-1 , Latin-2 and unicode.

8) User Interface :-
There are a number of convenient user interfaces for administering a MySQL server.

(9) **GIS functions :-**

Since version 4.1, MySQL has supported the storing and processing of two-dimensional geographical data. Thus MySQL is well suited for GIS (Geographic Information System) applications.
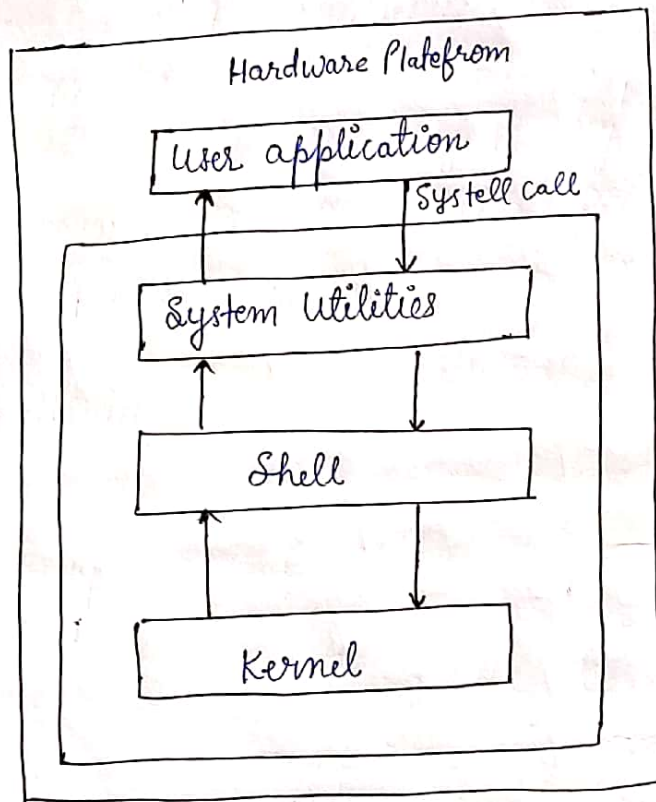
(10) **Speed :-** MySQL is considered a very fast database program. This is speed has been backed up by a large number of benchmark tests.
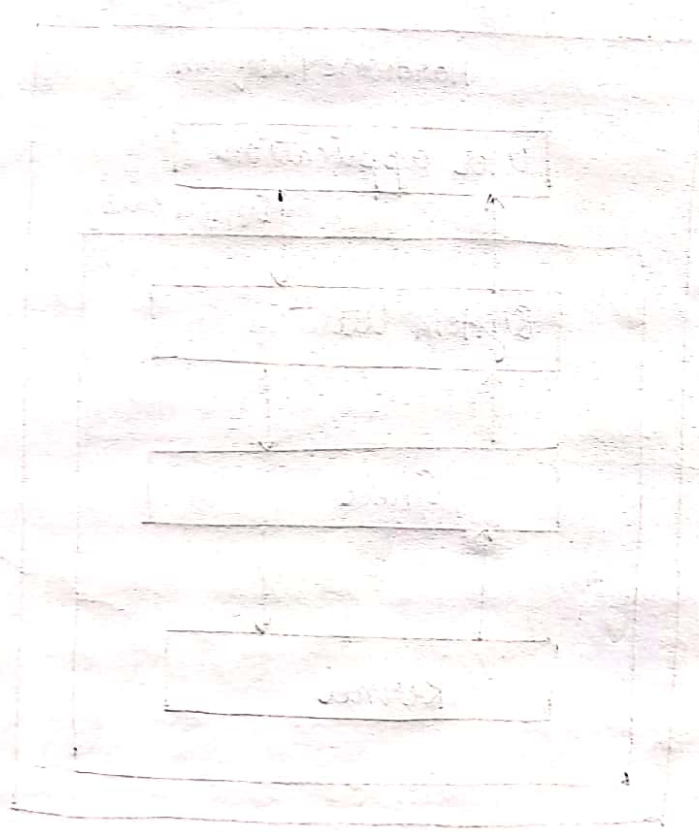
Linux Architecture :-

The architecture of operating system consists of five parts which are explained as under :-

(1) Kernel
(2) Shell
(3) System utilities
(4) User applications
(5) Hardware platfrom

A System can enter from user to Kernel mode using a system call. This is important as Kernel mode generates a process to support a user mode.

(1) Kernel :-

It acts as an interface between operating system and other hardware resources. It is the main part of the OS that loads first and remains in the main memory. It is the bridge between the application and actual data processing to support the application.

It is responsible for task management, memory management and disk management. Its primary function is to manage the computer resources and support other programs who wants to use these resources.

(2) Shell :-

It acts as an interface between user and the operating system. It is a software that provides an interface for user of an operation system which needs services of a kernel.

An operating system shell is divided into two parts :-

(i) Command line

(ii) GUI

(i) **Command line shell :-**

It is the part of an operating system which receives and executes the operating system command by the user.

The commands are then sends to the kernel for execution. If the command is valid the kernel starts the execution else error will be produced.

(ii) **GUI (Graphical User Interface) :-**

This provides a user friendly environment. user can't remember the syntax of all the commands thus it helps to simply point towards the object by the means of mouse or some other pointing device which a user required for its execution.

3. **System Utilities :-**

The system utilities consist of various system interrupts and system calls which are to transfer the control for the user mode to the kernel mode containing the kernel and shell for further execution of the commands. The control can be transferred using system calls.

System calls are of different types as the following :-

(i) File management System Call
(ii) Process management System Call
(iii) Management System Call
(iv) Communication System Call

(4) User Applications :-

The application which a user requires to perform its task. Linux and other OS come up with various applications in them like g++, gcc, office suits etc.

Kernel is used to generate processes to support these applications.

(5) Hardware Platform :-

The resources of the system such as keyboard, monitor, printer, etc with which user can input/output the request are supported by the linux.

• PIPES

A pipe is a means by which the output from one process becomes the input to a second.

In technical terms, the standard output (stout) of one command is sent to the standard input (stdin) of a second command.

One of the fundamental features that makes linux and other unices useful is the 'pipe'. Pipes allow seprate processes to communicate without having been designed explicitly to work together. This allows tools quite narrow in their function to be combined in complex ways:-

A simple example of using a pipe is the command:-
Is | grep x

OPEN STANDARDS

Open standards ~~means~~ are standards made available to the general public and are developed and maintained via a collaborative and consensus driven process. Open standard facilitate interoperability and data exchange among different products or services and are intented for widespread adoption.

The term open and standard have a wide range of meanings associated with their usage.

- **Elements of open standard :-**

→ There are following elements of open standard :-

(i) **Collaborative Process :-**

It is voluntary and market driven development following a transparent consensus driven process is reasonably open to all intersted parties.

(ii) **Resonably balanced :-**

It is ensures that the process is not dominated by any one interest group.

(iii) **Due process :-**

It includes consideration of an response to comments by interested parties.

(iv) **IPR:-**

IPRs essential to implement the standard to be licensed to all applicants on a worldwide, non-discriminatory basis, either

(1) for free and under resonable terms and conditions

or (2) on resonable terms and conditions

(v) **Quality level of detail:-**

It is sufficient to permit the development of a variety of competing implementations of interoperable products or services. Standardized interfaces are not hidden.

(vi) **Publicaly available:-** It is easily available for implementation and use at a resonable price.

(vii) **Ongoing support:-** It is maintained and supported over a long period of time.