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**Submitted: To Sir Zakir Rahim**

**Summers (Final Term)**

**Q1. (a) Differentiate between open source software and applications software?**

**Ans. Open Source Software:**

The term open source refers to something that people can change and share because its design is widely available.

The term came within the framework of software development to define a specific method for creating computer programs. Today still, "open source" describes a wider set of values - what we call the "open source mode." Open source projects, products or initiatives embrace and celebrate the principles of open exchange, collaboration, fast prototyping business, transparency, meritocratic and public development.

Open source software is source code software that anyone can inspect, transform and improve.

"Source code" is the part of software that most computer users never see; is the code that developers can manipulate to change the operation of software "program" or "application". Developers who have access to the source code of a computer program can improve that program by adding features or correcting parts that don't always work correctly.

**Application software:**

Application software is often called productivity software or end-user applications because they allow the user to complete tasks, such as producing documents, spread sheets, databases and publications, doing online research, sending emails, designing graphics, running businesses, and even games! The application software is specific to the project for which it is intended and can be as simple as a computer application or as complex as a word processing application. When you start creating a document, the text editor has already set the margins, font styles, and size and leadership for you. However, you can change these settings and have several formatting options available. For example, word processing software makes it easy to add colours, titles, and pictures, or delete, copy, move, and change the layout of your document to your needs.

## Differences:

- ❖ Open source software is designed to manage the resources of the system, like memory and process management, security, etc. whereas Application software is designed to fulfill the requirements of the user for performing specific tasks.
- ❖ The open source Software is general-purpose software while the Application Software is specific purpose software.
- ❖ Open source Software is written in a low-level language like a machine or assembly language but Application software is a high-level language is used to write Application Software.
- ❖ Open source Software is capable of running independently while Application software can't run independently.
- ❖ Open source Software starts running when the system is powered on and runs until the system is powered off while the Application Software starts when the user begins, and it ends when the user stops it.
- ❖ Open source software is independent of the application software while Application software needs system software to run.

## (b) Write different features of system software?

### ANS. Features of System Software:

There are some important features of system software which are given below:

- ❖ **System Software is closer to the system**
- ❖ **Generally written in a low-level language**
- ❖ **The system software is tough to design and understand**
- ❖ **Fast in speed**
- ❖ **Less interactive**
- ❖ **Minor in size**
- ❖ **Difficult to manipulate**

## Q2. (a) Discuss different functions of operating system?

### ANS. Function of Operating System:

Following are some of important functions of an operating System.

### Memory Management:

Memory management refers to primary or main memory management. Main memory is a wide range of words or bytes where each word or byte has its own address. Primary memory provides fast storage that you can access directly from the CPU. To run an application, it must be in primary memory. An operating system performs the following tasks to manage memory.

- It keeps traces of primary memory, that is apart, what part of it is in use by whom, which part is not used.
- In multiprogramming, the operating system decides which process will have memory when and how much.
- Assigns memory when a process requests it.

### **Processor Management:**

In a multi-application environment, the operating system determines which process gets the processor when and for how long. This action is called process scheduling. An operating system performs the following tasks to manage processors.

- Retains tracks of processor and status of process. The program accountable for this task is known as **traffic controller**.
- Assigns the processor (CPU) to a process.
- De-allocates processor when a process is no longer essential.

### **Device Management:**

An operating system handles device communication through the corresponding drivers. It performs the following device management tasks. Keeps track of all devices connected to the system. Specifies a program that is responsible for each device called an I/O controller. Specifies which process accesses a particular device and for how long. It has units efficiently and efficiently. Device allocation is no longer necessary.

### **File Management:**

A file management is organized in directories for effectual or easy navigation and use. These directories may contain other directories and other files. An operating system performs the following file management tasks. Monitors where information is stored, user access settings, and the status of each file, and more. These installations are collectively called the file management.

### **Security:**

The operating system uses password protection to protect user data and similar technologies. It also prevents unauthorized access to applications and user data.

### **Job accounting:**

Operating system monitors the time and resources used by different tasks and users, this information can be used to monitor resource utilization for a particular user or group of users.

### **Error detecting aids:**

The operating system continuously monitors the system to debug and prevent errors in the computer system.

### **Control over system performance:**

Monitor the overall health of your system to improve performance. It Logs the response time between service requests and system responses to get a complete picture of system health. This improves performance by providing important information needed to troubleshoot issues.

### **(b) Explain the use of File Transfer Protocol and TelNet services?**

**ANS.** FTP and Telnet are two very old protocols used on networks to add certain features. FTP is a file transfer protocol, and its only concern is to facilitate the transfer of files from one point to another, along with certain administrative features, would be to create and delete directories. Telnet is a bit more like an "all transaction slot" because it is simply a login protocol that allows the user to connect to a remote server listening to Telnet commands. Once the connection is established, the user can then send commands to the server computer and review the replies sent.

Although both began as command-line tools, the GUI later seemed to greatly simplify the use of FTP. Instead of knowing all the commands and typing all file names, some dedicated apps allow you to navigate to a local drive and remote device, just as you would use a file explorer. It keeps all commands invisible to the user, reducing the learning curve. This is not really possible with Telnet because there is a wide range of commands and parameters that can be issued to the server.

1. FTP is a protocol specifically used to transfer files to a remote location, while Telnet allows the user to issue remote commands.
2. FTP can be used with a command line, a special program, but also with most browsers, while Telnet is limited to the command line.
3. There are ways to use FTP in a safe environment, while Telnet will always be unsafe.
4. FTP is a known and reliable method for sending files to web servers, while Telnet is now widely used in diagnosing network services.

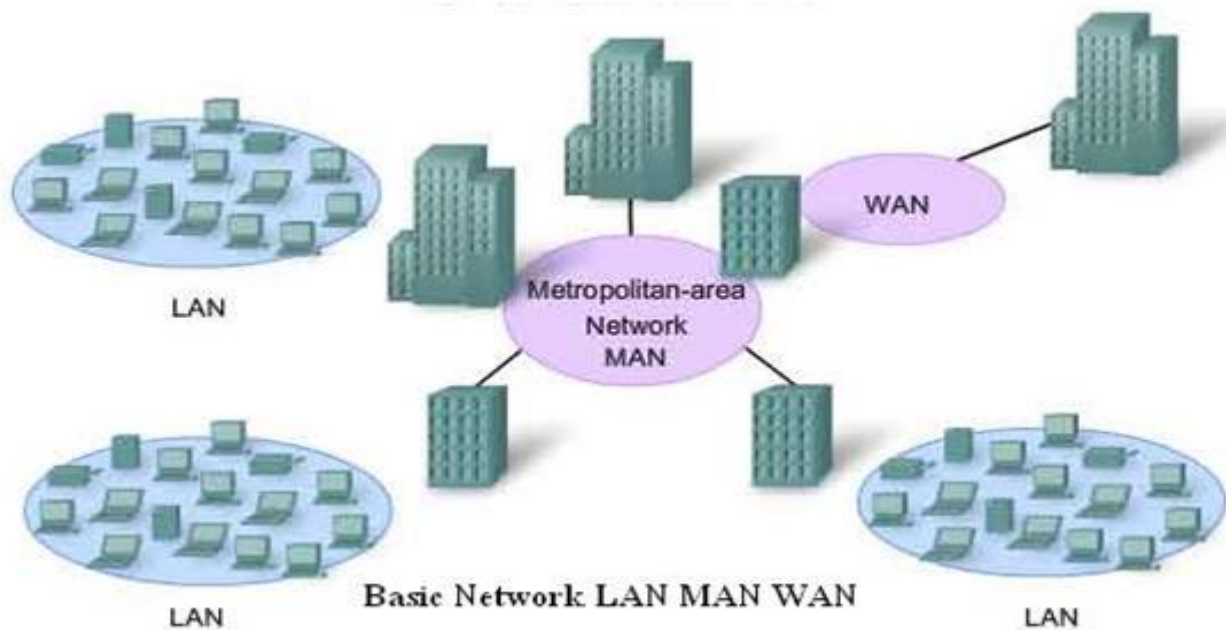
### **Q3. (a) Explain Metropolitan Area Network (MAN) with a suitable example?**

#### **ANS. Metropolitan Area Network (MAN):**

A metropolitan area network (MAN) is a network that connects users with computing resources in a geographic area or region larger than that covered even by a large local network (LAN), but smaller than the area covered by a wide area network (WAN). The term applies to networking in a city on a single larger network (which can also provide an efficient connection to a wide area network). It is also used to mean the interconnection of several local networks by connecting them with trunk lines. The last use is also sometimes referred to as a campus network.

The main purpose of MAN is to link two LANs together. It also uses routers and switches to transmit data. The network speeds in the metropolitan area is about 1000 Mbps and have range over 50km.

Examples of metropolitan networks of different sizes can be found in metropolitan areas of London, England; Lodz, Poland; Geneva, Switzerland. Large universities sometimes use this term to describe their networks. A modern trend is the installation of wireless MANs. The best example that is shown in picture is given below:



**(b) Define topology? Which topology would you chose to setup a local area network and why?**

**ANS. Topology:**

Network topologies describe the methods by which all components of a network are mapped. The term topology refers to both the physical and logical layout of a network. Network topologies are categorized into the following basic types.

- **Bus Topology**

The bus topology uses a single cable that connects all included nodes. The main cable acts as a backbone for the entire network. One of the computers on the network functions as the computer server. When it has two endpoints, it is known as linear bus topology.

- **Ring Topology**

In a ring topology, each device has exactly two adjacent devices for communication purposes. This is called ring topology because its formation is like a ring. In this topology, each computer is connected to another computer. Here, the last node is combined with a first.

- **Star Topology**

In star topology, all computers are connected using a hub. This cable is called a central node, and all other nodes are connected using this central node. It is more popular on LAN networks since they are cheap and easy to install.

- **Tree Topology**

In tree topology, there is a root node, and all other nodes are bound and form a hierarchy. Thus, it is also called a hierarchical topology. This topology contains several star topologies together as one bus, so it is known as a star bus topology.

- **Mesh Topology**

Mesh topology has a unique network design in which each computer on the network connects to each of them. Develops a P2P (peer) connection between all devices on the network. It offers a high level of redundancy, so even if a network cable fails, the data still has an alternative path to reach its destination.

- **Hybrid Topology**

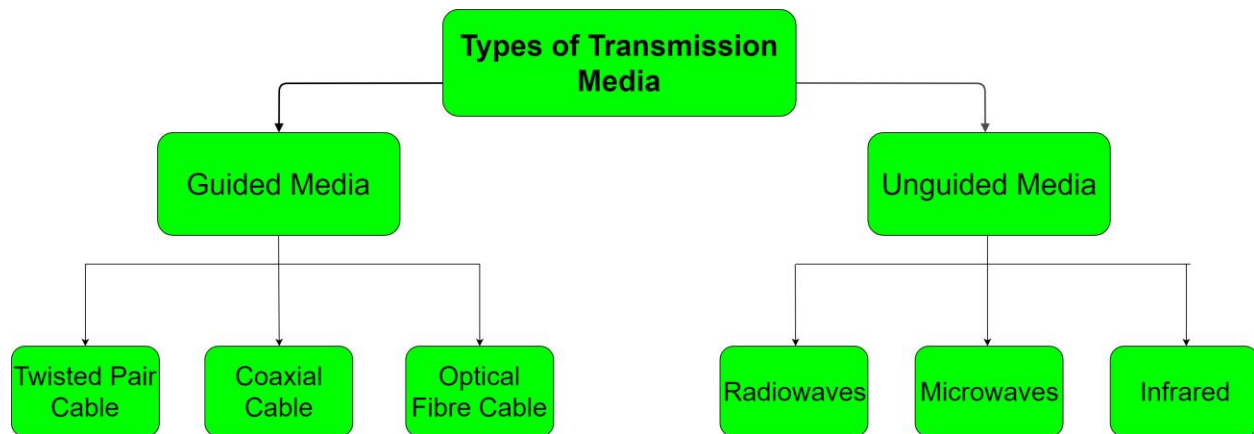
Hybrid topology combines two or more topologies. You can see in the above architecture in such a way that the resulting network does not display one of the default topologies.

For example, as you can see in the image above as in an office in a department, star topology and P2P are used. A hybrid topology is always produced when two different basic topologies are linked.

➤ **Among all these I will use Mesh topology because it is reliable, Even if one link fails, it will not affect the other links and connections of the other devices.**

**Q4. In your opinion, what are the different types of common media used for storage, access and transmission of information? Explain each type in detail?**

**ANS.** In data communication terminology, a means of transmission is a physical means between the transmitter and the receiver, that is, it is the channel through which the data is sent from one location to another. The means of transmission are classified largely in the following types:



### 1. Guided Media:

It is also referred to as Wired or Bounded transmission media. Signals being transmitted are directed and confined in a narrow pathway by using physical links.

Features:

- High Speed
- Secure
- Used for comparatively shorter distances

Pair contraction cable -

It consists of 2 separate insulated duct cables, damaged to each other. Generally, many pairs of this type are grouped into a protective housing. It is the most widely used means of transmission. The twisted pair are of two types:

Twisted pair without shield (UTP):

This type of cable has the ability to block interference and does not depend on a physical shield for this purpose. Used for phone applications.

Benefits:

- Cheaper
- Easy installation
- High-speed capability
- Vulnerable to external disturbances
- Lower capacity and performance compared to srp
- Short-range transmission due to depreciation

Armored twisted pair (STC):

This type of cable consists of a special jacket to prevent external interference. It is used at a fast Ethernet rate and on voice and data channels on telephone lines.

Benefits:

Better performance with a higher percentage of data compared to UTP

Eliminates cross-discussion

Comparatively faster

Comparatively difficult to install and manufacture

More expensive

Bulky

(ii) Coaxial cable -

It has an external plastic cover containing 2 parallel ducts each with a separate insulated protective cover. The coaxial cable transmits information in two ways: base zone mode (exclusive cable zone) and broadband mode (cable bandwidth is divided into separate areas). Cable TV and analogue TV networks widely use coaxial cables.

### **Optical Fibre Cable –**

It uses the concept of reflection of light through a core made up of glass or plastic. The core is surrounded by a less dense glass or plastic covering called the cladding. It is used for transmission of large volumes of data

The cable can be unidirectional or bidirectional. The WDM (Wavelength Division Multiplexer) supports two modes, namely unidirectional and bidirectional mode.

## **2. Unguided Media:**

It is also referred to as a wireless or unbound transmission medium. No physical means are required for the transmission of electromagnetic signals.

Features:

The signal is transmitted through the air

Less safe

Used for longer distances

There are 3 main types of non-guided media:

(i) Radio waves -

These are easy to produce and can penetrate buildings. Sending and receiving antennas does not need to be aligned. Frequency range: 3KHz - 1 GHz. AM and FM radios and wireless phones use radio waves for transmission.

Further categorized as (i) Terrestrial and (ii) Satellite.

(ii) Microwaves —

It is a line of transmission of vision, ie the transmitting and receiving antennas must be directed correctly with each other. The distance covered by the signal is directly proportional to the height of the antenna. Frequency range: 1 GHz - 300GHz. These are mainly used for mobile communications and TV distribution.

(iii) Infrared -



Infrared waves are used for very short-range communication. They can't penetrate obstacles. This prevents interference between systems. Frequency range: 300 GHz - 400THz. Used in TV remotes, wireless mouse, keyboard, printer, etc.

