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***Question 1a***

**Software and its types**

A computer cannot do anything on its own. We need to give programs to it to make it do a job desired by us.

The term software refers to a set of computer programs that solves different problems or a specific type of job. For example, MS-Word, Excel etc.

**Types of Software:**

We classify most software into two categories:

1. System Software
2. Application Software

**Difference between Open source software and application software**

**Open source software** (OSS) refers to the software which uses the code freely available on the Internet.  The code can be copied, modified or deleted by other users and organizations. As the software is open to the public, the result is that it constantly updates, improves and expands as more people can work on its improvement.

**Application Software:**

Application software is a set of one or more programs, which solves a specific problem or does a specific task. For example, payroll processing software, photo editing software, Graphic designing software etc.

We can obtain the desired software in one or more ways, which are described below:

**Pre-written software:**

Thousands of pre-written software packages are available today. If we can find a software package that meets our requirements, purchasing it is the best option.

* Pre-written software packages usually cost less
* Pre-written software packages are usually general purpose.
* Pre-written software packages usually satisfy the needs of many individuals.

**Customized Software:**

If none of the available pre-written software packages meet the specific requirements of a user, it becomes necessary for the user to create a customized software package. The user might get the required software created by another organization or can create the software if he/she has knowledge of software development.

***Question 1b***

**System Software** is a set of programs that control and manage the operations of computer hardware. It also helps application programs to execute correctly.

**different features of system software**

An important feature of System Software are:

* System Software is closer to the system
* Generally written in a low-level language
* The system software is difficult to design and understand
* Fast in speed
* Less interactive
* Smaller in size
* Hard to manipulate.

They are designed to manage the resources of the system, like memory and process management, security, etc.

Installed on the computer system at the time when the operating system is installed. The System Software starts running when the system is powered on and runs until the system is powered off. It is written in a low-level language like a machine or assembly language.

**Q2. (a) Different functions of operating system.**

* **Operating system** is an integrated set of programs that controls the resources. (CPU, memory, I/O devices, etc.) of a computer system and provide its users with an interface that is easier to use.
* The two primary objectives of an operation system are:
1. Make a computer system easier to use
2. Manage the resources of a computer system

**Functions of an Operating System**

1. **Process Management:**

Process management module takes care of creation and deletion of processes, scheduling of system resources to different processes requesting them, and providing mechanisms for synchronization and communication among processes.

1. **Memory Management:**

Memory management module takes care of allocation and de-allocation of memory space to programs in need of this resource.

1. **File Management:**

File management module takes care of file-related activities such as organizations, storage, retrieval, naming, sharing and protection of files.

1. **Device Management:**

The device management module of an operating system controls all I/O devices. It keeps track of I/O requests from processes, issues commands to I/O devices, and ensures correct data transmission to/ from an I/O device.

1. **Security:**

Security module protects the resources and information of a computer system against destruction and unauthorized access.

**Q2(b) Explain the use of File Transfer Protocol and TelNet services.**

 **File Transfer Protocol (FTP):**

FTP service enables an internet user to move a file from one computer to another on the internet. A file may contain any type of digital information, text document, image, artwork, movie, sound, software etc. FTP has two basic services

1. Downloading

The process of moving a file from remote computer to one’s own computer.

1. Uploading

The process of moving a file from one’s own computer to a remote computer.

In FTP service, a file transfer takes place in following manner:

1. A user executes ftp command on his/her local computer, specifying address of the remote computer.
2. An FTP process running on user’s computer establishes a connection with an FTP process running on remote computer.
3. The system then asks the user to enter his/her login name and password on the remote computer to ensure that the user possess permission to access the remote computer.
4. After successful login, the user downloads or uploads the desired file(s).

Note that a user needs access rights for a remote computer to transfer files to/from it. With this restriction, it is almost impossible to provide access rights to the large number of users on the internet to a computer that contains sharable information. The concept of anonymous FTP site solves this problem.

Telnet

Telnet service enables an internet user to log in to another computer on the internet from his/her local computer. That is, a user can execute the telnet command on his/her local computer to start a login session on a remote computer. This action is also called “remote login”.

To start a remote login session, a user types telnet command and address of the remote computer on his/her local computer. The remote computer then authenticates the user by asking him/her to enter a login name and password. If the user specifies a correct login name and password, the remote computer logs in the user and telnet command then enters input mode. From now onwards, anything that the user types on the local computer is sent to the remote computer for processing.

Some common uses of telnet service are:

1. For using computing power of a remote computer.
2. For using some software on a remote computer, which is not available on user’s local computer.
3. For logging in to one’s own computer from another computer.

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

**Metropolitan Area Network**

A metropolitan area network (MAN) is a network that interconnects users with computer resources in a geographic area or region larger than that covered by even a large local area network ([LAN](https://searchnetworking.techtarget.com/definition/local-area-network-LAN)) but smaller than the area covered by a [wide area network (WAN)](https://searchnetworking.techtarget.com/definition/WAN-wide-area-network).

Designed to extend over a district, council or even an entire city.

It may be a single network such as a cable television network, or it may be a means of connecting a number of LANs into a larger network so that resources may be shared LAN-to-LAN as well as device-to-device.

* For example, a company can use a MAN to connect the LANs in all of its offices throughout a city.



**Wide Area Network**

* provides long-distance transmission of data, voice, image, and video information over large geographical areas that may comprise a country, a continent, or even the whole world.



**Q3(B) Define topology? Which topology would you choose to setup a local area network and why?**

 **Define Topology**

Network topology is the interconnected pattern of network elements. A network topology may be physical, mapping hardware configuration, or logical, mapping the path that the data must take in order to travel around the network.

There are many identified topologies but they are not strict, which means that any of them can be combined. However, each topology has a different standard and may use different hardware methods so they are not interchangeable.

#  **Why Star Topology is Best.**

* Each device has a dedicated point-to-point link only to a central controller, usually called a hub.
* The devices are not directly linked to each other.
* The controller(HUB) acts as an exchange.

The main objective of this project is to discuss the advantages, star network topology. A topology is a physical structure of a network. Star topology is a network structure comprising a central node to which all other devices attached directly and through which all other devices intercommunicate. The hub, leaf nodes and the transmission lines between them form a graph with the topology of a star.

**Advantages of STAR Topology**

**Isolation of devices:**each device is isolated by the link that connects it to the hub. By so doing it makes the isolation of the individual devices simple.

**Simplicity:** The topology is easy to understand, establish, and navigate. The simple topology obviates the need for complex routing or message passing protocols.

**If any cable is not working then the whole network will not be affected:** in a star topology, each network device has a home run of cabling back to a network hub, giving each device a separate connection to the network.

**Better performance:**star network prevents unnecessary passing of the data packet through nodes. At most 3 devices and 2 links are involved in any communication between any two devices which are part of this topology.

A star network is a local area network in which all computers are directly connected to a common central computer. Every workstation is indirectly connected to every other through the central computer. In some star networks, the central computer can also operate as a workstation.

**Q4) what are the different types of common media used for storage, access and transmission of information?**

**Common media for storage, access, and transmission of information are**:

Text (alphanumeric characters)

Graphics (line drawings and images)

Animation (moving images)

Audio (sound)

Video (Videographer real-life events)

Multimedia in information technology refers to use of more than one of these media for information presentation to users

Multimedia computer system is a computer having capability to integrate two or more types of media (text, graphics, animation, audio, and video)

In general, size for multimedia information is much larger than plain text information

Multimedia computer systems require:

Faster CPU

Larger storage devices (for storing large data files)

Larger main memory (for large data size)

Good graphics terminals

I/O devices to play any multimedia.

**Text Media**

Alphanumeric characters are used to present information in text form. Computers are widely used for text processing.

Keyboards, OCRs, computer screens, and printers are some commonly used hardware devices for processing text media.

Text editing, text searching, hypertext, and text importing/exporting are some highly desirable features of a multimedia computer system for better presentation and use of text information.

**Graphics Media**

*Computer graphics* deals with generation, representation, manipulation, and display of pictures (line drawings and images) with a computer

Locating devices (such as a mouse, a joystick, or a stylus), digitizers, scanners, digital cameras, computer screens with graphics display capability, laser printers, and plotters are some common hardware devices for processing graphics media

Some desirable features of a multimedia computer system are painting or drawing software, screen capture software, clip art, graphics importing, and software support for high resolution.

**Animation Media**

*Computer animation* deals with generation, sequencing, and display (at a specified rate) of a set of images (called frames) to create an effect of visual change or motion, similar to a movie film (video).

Animation is commonly used in those instances where videography is not possible or animation can better illustrate the concept than video

Animation deals with displaying a sequence of images at a reasonable speed to create an impression of movement. For a jerk-free full motion animation, 25 to 30 frames per second is required.

**Virtual reality.**

Virtual reality is a relatively new technology using which the user can put a pair of goggles and a glove and tour a three-dimensional world that exists only in the computer, but appears realistic to the user.

**Audio Media**

Computer audio deals with synthesizing, recording, and playback of audio or sound with a computer

Sound board, microphone, speaker, MIDI devices, sound synthesizer, sound editor and audio mixer are some commonly used hardware devices for processing audio media

Some desirable features of a multimedia computer system are audio clips, audio file importing, software support for high quality sound, recording and playback capabilities, text-to-speech conversion software, speech-to-text conversion software, and voice recognition software.

**Video Media**

Computer *video* deals with recording and display of a sequence of images at a reasonable speed to create an impression of movement. Each individual image of such a sequence is called a frame

Video camera, video monitor, video board, and video editor are some of the commonly used hardware devices for processing video media

Some desirable features of a multimedia computer system with video facility are video clips and recording and playback capabilities.