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Final Term Assignment

Spring Semester, Date: 25/June/2020

Course Title: INTRODUCTION TO ICT

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Total Marks: 50

Q1) What are the relation between hardware and software. And types of software with Logical system architecture.

Relationship Between Hardware and Software Essentially, computer software controls computer hardware. These two components are complementary and cannot act independently of one another. In order for a computer to effectively manipulate data and produce useful output, its hardware and software must work together. Essentially, computer software controls computer hardware. These two components are complementary and cannot act independently of one another. In order for a computer to effectively manipulate data and produce useful output, its hardware and software must work together. Without software, computer hardware is useless. Conversely, computer software cannot be used without supporting hardware. Similarly, computer software has to first be loaded into the computer's hardware and then executed. There are several categories of software, with the two main categories being operating-system software, which makes the hardware usable, and application software, which does something useful. Examples of operating systems include Microsoft Windows on a personal computer and Google's Android on a mobile phone. Examples of application software are Microsoft Excel and Angry Birds.

One Tier Architecture: One tier architecture has all the layers such as Presentation, Business, Data Access layers in a single software package. Applications which handles all the three tiers such as MP3 player, MS Office are come under one tier application. The data is stored in the local system or a shared drive.Two-**twoTier Architecture:** Client Application (Client Tier)
2. Database (Data Tier)Client system handles both Presentation and Application layers and
Server system handles Database layer. It is also known as client server application. The communication takes place between the Client and the Server. Client system sends the request to the Server system and the Server system processes the request and sends back the data to the Client System

Three-Tier Architecture: Presentation layer (Client Tier)
2. Application layer (Business Tier)
2. Database layer (Data Tier)

Client system handles Presentation layer, Application server handles Application layer and
Server system handles Database layer.

Note: Another layer is N-Tier application. N-Tier application AKA Distributed application. It is similar to three tier architecture but number of application servers are increased and represented in individual tiers in order to distributed the business logic so that the logic will be distributed.

1. **Q 2) Write a note on Multimedia and its type with common media for storage access and transmission in details.**
2.
3. **Multimedia:** Multimedia technology allows storing data and information for further reference. CD-ROM is a cheap, durable and portable storage media used to store data and information in
   the multimedia technology. Advantages of multimedia. It can be used to help the student and teacher to teach as well as to learn the given topics easily.
   Multimedia Types: The 5 main elements of multimedia are **audio**, **video**, **tex**t, **graphics** and animation. If interactivity is added, this is known as hypermedia. The most common form of hypermedia is Hypertext. A highlighted word on a web page that links to another destination is known as Hypertext.
   4. **Transmission and storage**: are core parts of multimedia communication systems. Before multimedia content can be consumed, it has to be made available to theuser either via a transmission network or locally from a storage medium. Digital techniques firstly are advantageous compared to traditional (analog) solutions, as they can provide better quality, consuming less transmission channel bandwidth. In contrast to analog technology, where transmission channels and storage media were designed f

Q3) Write a note on each of the following in details.

- **(a) Modulation Techniques** Modulation is an important step
  of communication system. Modulation is defined as the process whereby some characteristic (line amplitude, frequency, phase of a high frequency signal wave (carrier wave) is varied in accordance with instantaneous value intensity of low frequency signal wave (modulating wave

- **Digital Modulation Techniques:** Digital Modulation provides more information capacity, high data security, quicker...

- **Amplitude Shift Keying:** The amplitude of the resultant output depends upon the input data whether it should be a zero...

- **Frequency Shift Keying:** The frequency of the output signal will

(b) Multiplexing:

      Multiplexing (or muxing) is a way of sending multiple signals or streams of information over a communications link at the same time in the form of a single, complex signal; the receiver recovers the separate signals, a process called DE multiplexing (or demuxing).

- **(c) Switching Techniques**
- **Circuit Switching**. In Circuit switching, two nodes communicate with each other over a dedicated communication path. In...
- **Message Switching.** In message switching, the whole message is treated as a data unit. The data is transferred in its...
- **Packet Switching**. The packet switching technique is derived from message switching where the message is.

(d) Optical Fiber Communication System : Fiber-optic communication system is a method of transmitting information from one place to another by sending pulses of infrared light[1] through an optical fiber. The light forms an electromagnetic carrier wave that is modulated to carry information.[2] Fiber is preferred over electrical cabling when high bandwidth, long distance, or immunity to electromagnetic interference are required.[3] This type of communication can transmit voice, video, and telemetry through local area networks, computer networks, or across long distances.[4]

Optical fiber is used by many telecommunications companies to transmit telephone signals, Internet communication, and cable television signals. Researchers at Bell Labs have reached internet speeds of over 100 petabit×kilometer per second using fiber-optic communication.[5]

  fiber-optic communication system has traditionally been limited by fiber attenuation and by fiber distortion. By using opto-electronic repeaters, these problems have been eliminated. These repeaters convert the signal into an electrical signal, and then use a transmitter to send the signal again at a higher intensity than was received, thus counteracting the loss incurred in the previous segment. Because of the high complexity with modern wavelength-division multiplexed signals. including the fact that they had to be installed about once every 20 km (12 mi), the cost of these repeaters is very high.

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Q 4 What is OSI reference model explain each layer of OSI model in details.

The OSI model (Open System Interconnection) model defines a computer networking framework to implement protocols in seven layers. A protocol in the networking terms is a kind of negotiation and rule in between two networking entities.OSI (Open Systems Interconnection) is a reference model for how applications communicate over a network. A reference model is a conceptual framework for understanding relationships. The purpose of the OSI reference model is to guide vendors and developers so the digital

communication products and software programs they create can interoperate, and to facilitate a clear framework that describes the functions of a networking or telecommunication system.

layer of OSI model:

Physical layer: Responsible for electrical signals, light signal, radio signals etc.
- Hardware layer of the OSI layer
- Devices like repeater, hub, cables, Ethernet work on this layer
- Protocols like RS232, ATM, FDDI, Ethernet work on this layer

Data Link layer: Responsible for encoding and decoding of the electrical signals into bits.
- Manages data errors from the physical layer
- Convers electrical signals into frames
- The data link layer is divided into two sub-layers
- The Media Access Control (MAC) layer
- Logical Link Control (LLC) layer.
- The MAC sublayer controls how a computer on the network gains access to the data and permission to transmit it.
- The LLC layer controls frame synchronization, flow control and error checking.
- MAC address is a part of the layer 2.
- Devices like Switch work at this layer

Network Layer: Switching and routing technologies work here
- Creates logical paths between two hosts across the world wide web called as virtual circuits
- Routes the data packet to destination
- Routing and forwarding of the data packets.
- Internetworking, error handling, congestion control and packet sequencing work at this layer
- Router works at layer three
- Different network protocols like TCP/ IP, IPX, AppleTalk work at this layer

Transport layer: Responsible for establishment, management and termination of connections between applications.
- The session layer sets up, coordinates, and terminates conversations, exchanges, and dialogues between the applications at each end.
- It deals with session and connection coordination.
- Protocols like NFS, NetBios names, RPC, SQL work at this layer.

Presentation layer: Application layer supports application, apps, and end-user processes.
- Quality of service
- This layer is responsible for application services for file transfers, e-mail, and other network software services.
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