Model Answer

MCA Ist semester Dec-2013

Subject- Introduction to information Technology

No.1. Choose the correct answer

- ASCII Stand for
    - American Specific Code for Information Interchange
    - American Standard Code for Information Interchange
    - American Standard Code for Interchanging Information
    - American Standard Code for Informatics Interchange

  Ans:- B

- Which operating system allow more than one programme to run concurrently
    - Multitasking
    - Multiuser
    - Multithreading
    - Multiprocessing

  Ans:-A,D

- Which of the following is Logic & Constraints based Language
    - COBOL
    - LISP
    - C++
    - BASIC

  Ans:-B

- A cable break in which topology stops all transmission
    - Mesh
    - Ring
    - Star
    - Bus

  Ans:- B,D

- Encryption and decryption of the data is responsibility of which layer
    - Datalink layer
    - Physical Layer
    - Presentation Layer
    - Session Layer

  Ans:-C

- ISP stands for
    - Internet Service Provider
    - Information Security Provider
    - Information Service Providers
    - None of the above

  Ans:-A

- Which of the following will trigger at specified time or at occurrence of specified event?
    - Trojan Horse
    - Bomb
    - Worm
    - All of the above

  Ans:- B

- GPS stands for
    - Global Positioning System
    - Geosynchronous Positioning System
    - Global Post System
    - None of above

  Ans:- A

- The purpose of UA is
    - Message Preparation
    - Envelop Creation
    - Transfer of Message across the internet
    - A and B

  Ans:- D

- In public key encryption , Public key is used for
    - Encryption
    - Decryption
    - Hashing
    - A and B

  Ans:- A

Q.no.2 (A) Explain fourth generation languages?

The term fourth-generation programming language (1970s-1990) (abbreviated 4GL) is better understood to be a fourth generation environment; packages of systems

development software including very high level programming languages.[1] A very high level programming language and a development environment or 'Analyst Workbench' designed with a central data dictionary system, a library of loosely coupled design patterns, a CRUD generator, report generator, end-user query language, DBMS, visual design tool and integration API.

Types

A number of different types of 4GLs exist:

- Table-driven (codeless) programming, usually running with a runtime framework and libraries. Instead of using code, the developer defines his logic by selecting an operation in a pre-defined list of memory or data table manipulation commands. In other words, instead of coding, the developer uses Table-driven algorithm programming (See also control tables that can be used for this purpose). A good example of this type of 4GL language is PowerBuilder. These types of tools can be used for business application development usually consisting in a package allowing for both business data manipulation and reporting, therefore they come with GUI screens and report editors. They usually offer integration with lower level DLLs generated from a typical 3GL for when the need arise for more hardware/OS specific operations.
- Report-generator programming languages take a description of the data format and the report to generate and from that they either generate the required report directly or they generate a program to generate the report. See also RPG
- Similarly, forms generators manage online interactions with the application system users or generate programs to do so.
- More ambitious 4GLs (sometimes termed *fourth generation environments*) attempt to automatically generate whole systems from the outputs of CASE tools, specifications of screens and reports, and possibly also the specification of some additional processing logic.
- Data management 4GLs such as SAS, SPSS and Stata provide sophisticated coding commands for data manipulation, file reshaping, case selection and data documentation in the preparation of data for statistical analysis and reporting.

(B) What is difference between Object oriented and Procedure Oriented Programming?

Ans:-

- In POP, importance is given to the sequence of things to be done i.e. algorithms and

in OOP, importance is given to the data.

- In POP, larger programs are divided into functions and in OOP, larger programs are divided into objects.
- In POP, most functions share global data i.e data move freely around the system from function to function. In OOP mostly the data is private and only functions inside the object can access the data.
- POP follows a top down approach in problem solving while OOP follows a bottom up approach.
- In POP, adding of data and function is difficult and in OOP it is easy.
- In POP, there is no access specifier and in OOP there are public, private and protected specifier.
- In POP, operator cannot be overloaded and in OOP operator can be overloaded.
- In POP, Data moves openly around the system from function to function, In OOP objects communicate with each other through member functions

Q.No. 3 What are the different Functions performed by following Layers of OSI

model? Explain

1. Physical Layer –

Encapsulation

Figure 2.3 reveals another aspect of data communications in the OSI model: encapsulation. A packet (header and data) at level 7 is encapsulated in a packet at level 6. The whole packet at level 6 is encapsulated in a packet at level 5, and so on.

In other words, the data portion of a packet at level $N-1$ carries the whole packet (data and header and maybe trailer) from level N. The concept is called *encapsulation;* level $N-1$ is not aware of which part of the encapsulated packet is data and which part is the header or trailer. For level $N-1$, the whole packet coming from level N is treated as one integral unit.

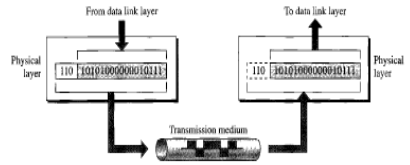
2.3 LAYERS IN THE OSI MODEL

In this section we briefly describe the functions of each layer in the OSI model.

Physical Layer

The **physical layer** coordinates the functions required to carry a bit stream over a physical medium. It deals with the mechanical and electrical specifications of the interface and transmission medium. It also defines the procedures and functions that physical devices and interfaces have to perform for transmission to occur. Figure 2.5 shows the position of the physical layer with respect to the transmission medium and the data link layer.

Figure 2.5 *Physical layer*



The physical layer is responsible for movements of individual bits from one hop (node) to the next.

The physical layer is also concerned with the following:

- **Physical characteristics of interfaces and medium.** The physical layer defines the characteristics of the interface between the devices and the transmission medium. It also defines the type of transmission medium.
- **Representation of bits.** The physical layer data consists of a stream of **bits** (sequence of 0s or 1s) with no interpretation. To be transmitted, bits must be

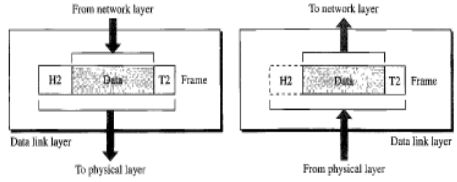
encoded into signals—electrical or optical. The physical layer defines the type of **encoding** (how 0s and 1s are changed to signals).

- **Data rate.** The **transmission rate**—the number of bits sent each second—is also defined by the physical layer. In other words, the physical layer defines the duration of a bit, which is how long it lasts.
- **Synchronization of bits.** The sender and receiver not only must use the same bit rate but also must be synchronized at the bit level. In other words, the sender and the receiver clocks must be synchronized.
- **Line configuration.** The physical layer is concerned with the connection of devices to the media. In a point-to-point configuration, two devices are connected through a dedicated link. In a multipoint configuration, a link is shared among several devices.
- **Physical topology.** The physical topology defines how devices are connected to make a network. Devices can be connected by using a mesh topology (every device is connected to every other device), a star topology (devices are connected through a central device), a ring topology (each device is connected to the next, forming a ring), a bus topology (every device is on a common link), or a hybrid topology (this is a combination of two or more topologies).
- **Transmission mode.** The physical layer also defines the direction of transmission between two devices: simplex, half-duplex, or full-duplex. In simplex mode, only one device can send; the other can only receive. The simplex mode is a one-way communication. In the half-duplex mode, two devices can send and receive, but not at the same time. In a full-duplex (or simply duplex) mode, two devices can send and receive at the same time.

Data Link Layer

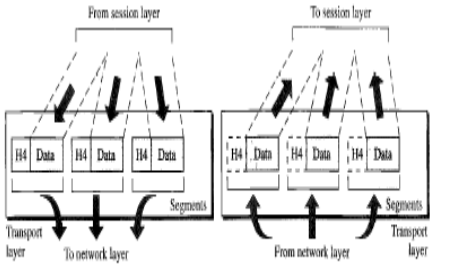
The **data link layer** transforms the physical layer, a raw transmission facility, to a reliable link. It makes the physical layer appear error-free to the upper layer (network layer). Figure 2.6 shows the relationship of the data link layer to the network and physical layers.

Figure 2.6 *Data link layer*



Transport Layer

Figure 2.10 *Transport layer*



The transport layer is responsible for the delivery of a message from one process to another.

Other responsibilities of the transport layer include the following:

- **Service-point addressing.** Computers often run several programs at the same time. For this reason, source-to-destination delivery means delivery not only from one computer to the next but also from a specific process (running program) on one computer to a specific process (running program) on the other. The transport layer header must therefore include a type of address called a *service-point address* (or port address). The network layer gets each packet to the correct computer; the transport layer gets the entire message to the correct process on that computer.
- **Segmentation and reassembly.** A message is divided into transmittable segments, with each segment containing a sequence number. These numbers enable the transport layer to reassemble the message correctly upon arriving at the destination and to identify and replace packets that were lost in transmission.
- **Connection control.** The transport layer can be either connectionless or connection-oriented. A connectionless transport layer treats each segment as an independent packet and delivers it to the transport layer at the destination machine. A connection-oriented transport layer makes a connection with the transport layer at the destination machine first before delivering the packets. After all the data are transferred, the connection is terminated.
- **Flow control.** Like the data link layer, the transport layer is responsible for **flow control.** However, flow control at this layer is performed end to end rather than across a single link.
- **Error control.** Like the data link layer, the transport layer is responsible for **error control.** However, error control at this layer is performed process-to-process rather than across a single link. The sending transport layer makes sure that the entire message arrives at the receiving transport layer without **error** (damage, loss, or duplication). Error correction is usually achieved through retransmission.

Q. NO. 4 What is the maximum number of subnet of class C network using the following mask?

a. 255.255.192.0
Ans- Not a valid mask for class C Address
b.255.192.0.0
Ans- Not a valid mask for class C Address
c.255.255.254.0
Ans- Not a valid mask for class C Address
d.255.255.255.0
Ans- 1

Q. NO. 6. (A) What are the Application of IT in the field of Science and Engineering?

In field of Science

Today, computers are being used in every field of life. Here we discuss Uses of Computers in Science:

Data Collection

Scientists use computers to collect data and make hypotheses on the basis of collected data.

Analysis and Testing Of Data

Scientists use computers to analyze collected data and test their hypotheses.

Exchanging Information

Scientists use computers to exchange information with their colleagues. Different Researches all over the world can share their research with one another. This will be helpful for research because this will increase the rate of completion of research projects.

Simulation of Different Events

Scientists may use computers for simulation of complex events. For example, they can use computer simulation to predict about the affects of earthquake on buildings in a particular area. They may use computer simulation to know the effects of rapid population increase on weather conditions. In fact, computer simulation of such complex events will save time as well as cost. Computer simulation can also provide a feasible solution to many problems.

Use Of Computer in Medical Science

Computers may also be used to simulate the functions of parts of human body. For example, computers may simulate cell division, internal structure of molecules, a virus or bacteria attack etc.

Uses of Computer in Space Science

Computers are playing an important role to explore the outer space. The computers are

mostly used to collect space data, perform experiments and prepare results. Computers are used to operate certain machines and robots to collect information from space and send it back on earth.

In field of engineering

The engineering field uses computers a lot for aiding the type of detailed and precise processes used to perform various tasks. The primary software for engineering computers is called computer-aided engineering software or CAD software. Computer-aided software assists engineers when analyzing fluid for hydraulic equipment, stress analysis, optimizing certain engineering processes, and for analyzing the safety of certain processes. CAD is also used in the automotive industry for similar purposes. To learn more about using CAD software, there are many books and tutorials available to educate yourself.

(B) Explain Following

(1) Artificial Intelligence

Artificial intelligence (**AI**) is the intelligence exhibited by machines or software, and the branch of computer science that develops machines and software with intelligence. Major AI researchers and textbooks define the field as "the study and design of intelligent agents", where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success. John McCarthy, who coined the term in 1955,defines it as "the science and engineering of making intelligent machines.

Fields of artificial intelligence

1. Robotics
2. Natural Language Processing
3. Pattern Recognition
4. Expert system
5. Neural network

6. Computer Vision

7. Virtual reality

(2) Grid Computing

Grid computing is the collection of computer resources from multiple locations to reach a common goal. The **grid** can be thought of as a distributed system with non-interactive workloads that involve a large number of files. What distinguishes grid computing from conventional high performance computing systems such as cluster computing is that grids tend to be more loosely coupled, heterogeneous, and geographically dispersed. Although a single grid can be dedicated to a particular application, commonly a grid is used for a variety of purposes. Grids are often constructed with general-purpose grid middleware software libraries.

Q.No. 7 (A) What is Data Cleaning Process to prepare data for Data Mining?

Data cleansing, **data cleaning** or **data scrubbing** is the process of detecting and correcting (or removing) corrupt or inaccuraterecords from a record set, table, or database. Used mainly in databases, the term refers to identifying incomplete, incorrect, inaccurate, irrelevant, etc. parts of the data and then replacing, modifying, or deleting this dirty data.

After cleansing, a data set will be consistent with other similar data sets in the system. The inconsistencies detected or removed may have been originally caused by user entry errors, by corruption in transmission or storage, or by different data dictionary definitions of similar entities in different stores.

Data cleansing differs from data validation in that validation almost invariably means data is rejected from the system at entry and is performed at entry time, rather than on batches of data.

The actual process of data cleansing may involve removing typographical errors or validating and correcting values against a known list of entities. The validation may be strict (such as rejecting any address that does not have a valid postal code) or fuzzy (such as correcting records that partially match existing, known records).

Some data cleansing solutions will clean data by cross checking with a validated data set. Also data enhancement, where data is made more complete by adding related information, is a common data cleansing practice. For example, appending addresses with phone numbers related to that address.

Data cleansing may also involve activities like, harmonization of data, and standardization of data. For example, harmonization of short codes (St, rd etc.) to actual words (street, road). Standardization of data is a means of changing a reference data set to a new standard, ex, use of standard codes.

(B) What is Virtual Machine?

A **virtual machine** (**VM**) is a software based, fictive computer. Virtual machines may be based on specifications of a hypothetical computer or emulate the computer architecture and functions of a real world computer.

A virtual machine (VM) is a software implementation of a machine (i.e. a computer) that executes programs like a physical machine. Virtual machines are separated into two major classifications, based on their use and degree of correspondence to any real machine:

- A system virtual machine provides a complete system platform which supports the execution of a complete operating system(OS). These usually emulate an existing architecture, and are built with the purpose of either providing a platform to run programs where the real hardware is not available for use (for example, executing software on otherwise obsolete platforms), or of having multiple instances of virtual machines leading to more efficient use of computing resources, both in terms of energy consumption and cost effectiveness (known as hardware virtualization, the key to a cloud computing environment), or both.
- A process virtual machine (also, language virtual machine) is designed to run a single program, which means that it supports a single process. Such virtual machines are usually closely suited to one or more programming languages and built with the purpose of providing program portability and flexibility (amongst other things). An essential characteristic of a virtual machine is that the software running inside is limited to the resources and abstractions provided by the virtual machine—it cannot break out of its virtual environment.