MSC 1st Sem Aug-2014

Subject – Introduction to Information Technology
Paper code – MSCIT-101

Q.1) Write a short note on following:

(A) Buffer & register:

Answer: To handle the execution of instructions and movement of information between various units of the computer, the CPU uses number of special memory units called registers. It helps to speedup rate of information transfer. It stores information temporarily and are part of CPU.

Buffer in computer science, an intermediate repository of data–a reserved portion of memory in which data is temporarily held pending an opportunity to complete its transfer to or from a storage device or another location in memory. Some devices, such as printers or the adapters supporting them, commonly have their own buffers.

(B) Track & Sector in disk: A magnetic disk's surface has a number of invisible, concentric circles called *tracks*. Tracks are then subdivided into smaller pieces to form SECTORS.

(C) Public cloud: A public cloud is one based on the standard cloud computing model, in which a service provider makes resources, such as applications and storage, available to the general public over the Internet. Public cloud services may be free or offered on a pay-per-usage model.

(D) Distributed OS: With the advent of computer networks, in which many computers are linked together and are able to communicate with one another, distributed computing became feasible. A distributed computation is one that is carried out on more than one machine in a cooperative manner. A group of linked computers working cooperatively on tasks, referred to as a distributed system

(E) Job & objective of OS:

Abswer: jobs:

1. Process management
2. Device management
3. Memory management
4. File management
5. Security
6. Command interpretation.

Objective:

1. Provide an user interface to system hardwares.
2. It should be user convenient.

(F) Optical fiber: It is a type of guided media made of glass or plastic and transmits signals in the form of light.

(G) Application software: Application software is a set of one or more programs, which solves a specific problem, or does a specific task, ie.. Word processing software, database software, graphics software…etc.

(H) Binary Signal: information can also be represented by a digital form. For example, a 1 can be encoded as a positive voltage and a 0 as zero voltage. And the signals represented in this form is called binary signal.

(I) Checksum Bit with an example: Checksum is a type of error correction and detection technique which is based on the redundancy.

Explain the idea using an example.

(J) UDP protocol: In a connectionless service, the packets are sent from one party to another with no need for connection establishment or connection release. The packets are not numbered; they may be delayed or lost or may arrive out of sequence. There is no acknowledgment either. We will see shortly that one of the transport layer protocols in the Internet model, UDP, is connectionless.

Q.2) (a) Explain 1st and 2nd generation of computer with its features?

Answer: Please refer Chapter 1, pp 3, Compute Fundamentals, 6th edition by Pradeep K Sinha & Priti Sinha

(b) What is the use of IT in real world and how data is different from information?

Answer: you have to explain these points.

Use of IT:

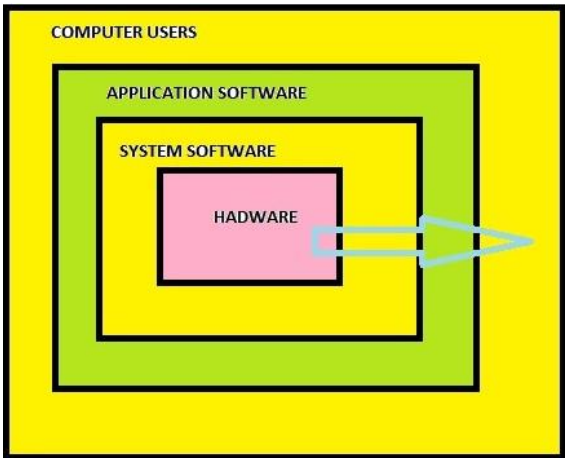
1. business
2. commerce
3. education
4. medicine
5. entertainment
6. research…etc.

Data: Data is raw, unorganized facts that need to be processed. Data can be something simple and seemingly random and useless until it is organized.

Information: When data is processed, organized, structured or presented in a given context so as to make it useful, it is called information.

Q.3) (a) what is the use of software without hardware and explain any two application software?

Answer: For a Computer to produce useful output its **Hardware and Software** must work together. Nothing useful can be done with the Hardware on its own, and Software cannot be utilized without supporting Hardware. To get a job done by a Computer, the corresponding Software has to be loaded in the Hardware first and then executed.



Following important points regarding the relationship between Hardware and Software are brought out by this analogy:-

1. Both Hardware and Software are necessary for a Computer to do useful job. Both are complementary to each other.
2. Same Hardware can be loaded with different Software to make a Computer perform different types of jobs just as different songs can be played using the same cassette player.
3. Except for upgrades (like increasing Main Memory and Hard Disk capacities, or adding Speakers, Modems, etc.) Hardware is normally a one- time expense, whereas Software is a continuing expense.

And give an example of an application software.

(b) What is the difference between translator and interpreter, and write features of 4th generation programming language.

Answer: Interpreters and translators perform similar tasks, but in different settings. While an interpreter converts any spoken material from one language (the source language) into a different language (the target language), a translator converts written material in the same manner.

Translate the Written Word

Translation essentially consists of taking a text in one language and rendering it into another language. Did you catch that word "text"? The key characteristic of translation is the fact that it works in the medium of the written word.

A literary translation might consist of the translation of a novel from German to French, for example, while a technical translation could be the translation of a cellphone owner's manual from Japanese to English.

Interpret Speech

Interpreting, like translation, takes one language and renders it into another. The very important difference is the medium: while you translate a written text, you interpret orally.

For example, a medical interpreter at a hospital could interpret between a Spanish-speaking patient and an English-speaking doctor.
The interpreter acts as a facilitator in this oral communication, relaying the patient's Spanish to the doctor in English — and vice versa.

A fourth generation (programming) language (4GL) is a grouping of programming languages that attempt to get closer than 3GLs to human language, form of thinking and conceptualization.

4GLs are designed to reduce the overall time, effort and cost of software development. The main domains and families of 4GLs are: database queries, report generators, data manipulation, analysis and reporting, screen painters and generators, GUI creators, mathematical optimization, web development and general purpose languages.

Also known as a 4th generation language, a domain specific language, or a high productivity language.

Q.4) (a) Explain half and full duplex mode of communication? Explain twisted pair cable.

Answer: Please refer “Data Communications and Networking by Behrouz A. Forouzan” for modes of communication.

(b) Write the function of Application layer and physical layer?

Answer: Physical layer:

1. Physical characteristics of interfaces and medium
2. Representation of bits
3. Data rate
4. Synchronization of bits
5. Line configuration
6. Physical topology
7. Transmission mode.

Application Layer:

1. Network virtual terminal
2. File transfer, access, and management
3. Mail services
4. Directory services.

Q.5) (a) Explain the error control protocol at data link layer –

(1) Stop and wait, (2) stop and wait with noise.

Answer: Please refer “Data Communications and Networking by Behrouz A. Forouzan”

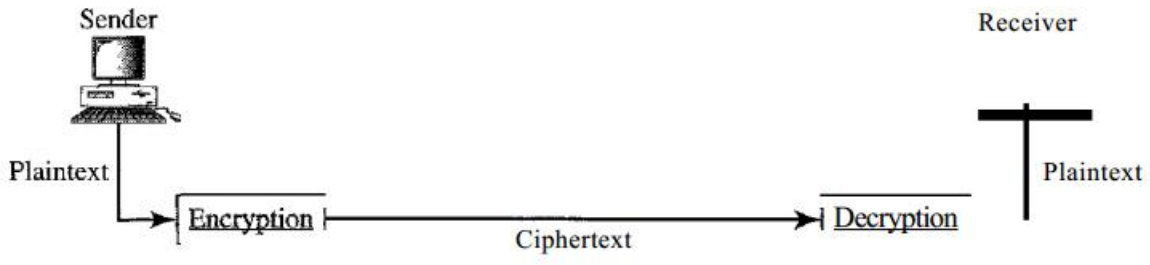
(b) Explain the different IP classes with its range? What is the use of internet addressing?

Answer: Please refer “Data Communications and Networking by Behrouz A. Forouzan”

Q.6) (a) what is encryption and explain any one encryption techniques with an example?

Answer: **Cryptography,** a word with Greek origins, means "secret writing." However, we use the term to refer to the science and art of transforming messages to make them secure and immune to attacks. Components (you have to explain them briefly) involved in cryptography are:

1. Sender
2. Receiver
3. Plaintext
4. Ciphertext
5. Encryption/ decryption Algorithm.



There are two types of techniques:

1. Symmetric key cryptography
2. Asymmetric key cryptography.

(b) Write down the application of IT in business and commerce?

Answer: 1. E-banking

2. e-business.

3. e-commerce

And more…

Q.7) (a) Explain data mining, GIS?

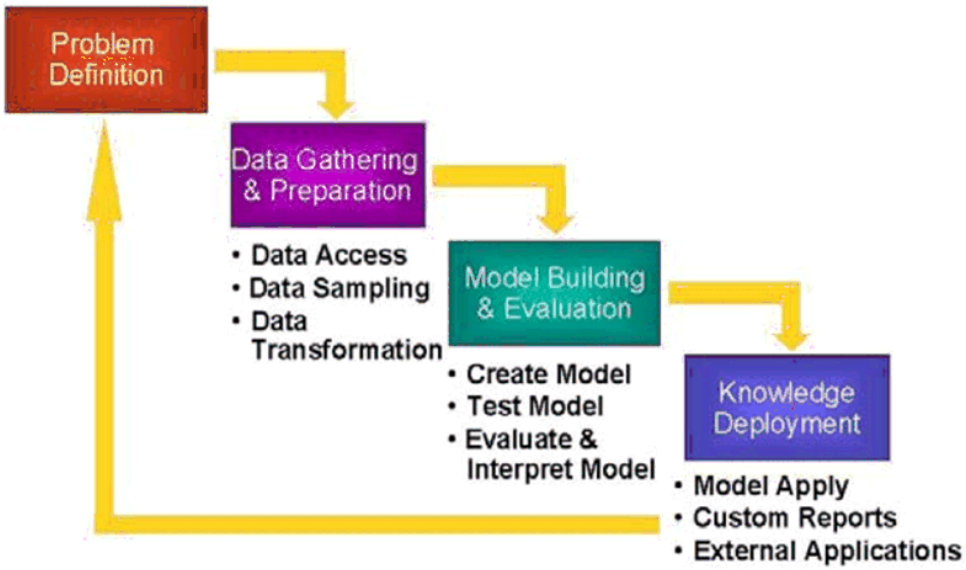
Answer: Data mining is the practice of automatically searching large stores of data to discover patterns and trends that go beyond simple analysis. Data mining uses sophisticated mathematical algorithms to segment the data and evaluate the probability of future events. Data mining is also known as Knowledge Discovery in Data (KDD).

The key properties of data mining are:

- Automatic discovery of patterns
- Prediction of likely outcomes
- Creation of actionable information
- Focus on large data sets and databases

Data mining can answer questions that cannot be addressed through simple query and reporting techniques.

Data mining Process: (explain)



GIS: A **geographic information system** (**GIS**) is a computer system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.

Need:

1. Crime
2. History
3. Hydrology
4. Remote sensing
5. Transportation engineering

Use:

1. Cost saving from greater efficiency
2. Better decision making
3. Improved communication
4. Better record keeping.

Models:

1. Vector models
2. Raster model

Writes about the components also.

(b) What is the difference between Internet service provider and IANA (internet assigned number authority) and explain it with example?

Answer: **IANA** – That's the shortest answer! Now here comes the boring explanation

The assignment of identifiers such as addresses and names, to ensure that they are created and allocated in a way that is acceptable to all is the main factor for the success of the Internet. So some sort of centralized organization is required. The organization originally responsible for this task was Internet Assigned Names and Numbers (IANA). IANA was originally charged with the task of managing which IP address blocks had been assigned to different companies and groups, and maintaining periodically-published lists of Internet parameters such as TCP and UDP Port Numbers. It also was in charge of DNS registrations. As the Internet grew, there was the requirement of a additional authority to manage the growing load. So by the mid 90s the Internet Corporation for Assigned names and Numbers (ICANN) came into existence.

ICANN is now officially in charge of all of the centralized registration tasks including IP address assignment, DNS domain name assignment, and protocol parameters management.

This development would have meant that IANA would have been completely replaced by ICAAN. But that did not happen. Instead, IANA was put under ICANN and is now in charge of IANA. Both organizations are responsible for IP addresses and parameters. Thus there are basically no differences between the two. These two together are at the top level of the Internet's Name and Addresses registration and their delegation process. They also maintain the 13 root servers in the world which are at the top of the DNS tree.

For the functioning of the whole DNS system, 2 factors are to be maintained :

1. **NAMES (Domain Names)**
2. **NUMBERS (IP & TCP-UDP protocol numbers)**

NAMES or DOMAIN NAME SYSTEM (DNS)

The domains at their top level are classified as :

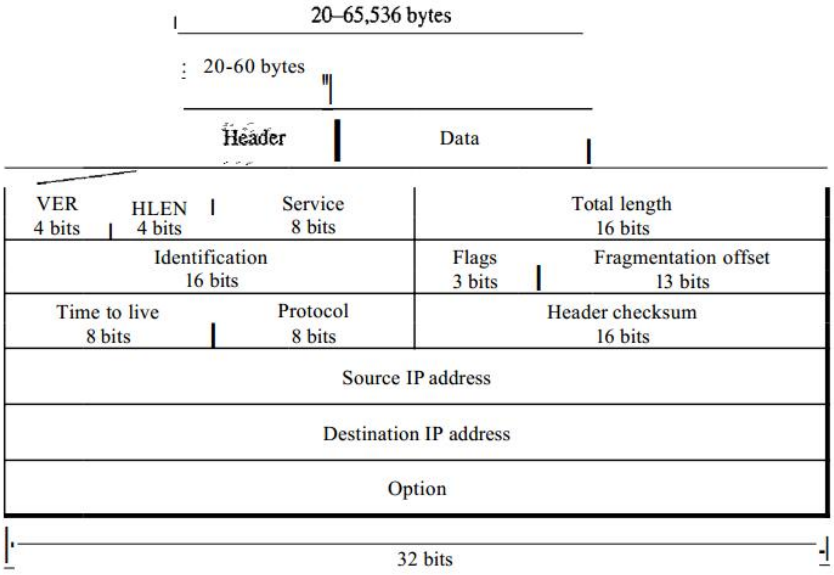
1. **gTLD** (generic Top Level Domain)
2. **ccTLD** (country code Top Level Domain)

For ISP please refer “Data Communications and Networking by Behrouz A. Forouzan”

Q.8) (a) Explain IP datagram format?

Answer: You have to explain all blocks of the IP datagram:

And also refer “Data Communications and Networking by Behrouz A. Forouzan”



(b) Explain Non-procedure oriented programming language, and explain it with a program in C++.

Answer: A computer language that does not require writing traditional programming logic. Also known as a "declarative language," usersconcentrate on defining the input and output rather than the program steps required in a procedural programming language such as C++ or Java. Ex: SQL.

Features:

1. Associative referencing
2. Aggregate operators
3. Elimination of arbitrary sequencing
4. Nondeterministic programming and parallelism
5. Pattern directed structures.

Give an example using C++.