## Long Questions

1. Explain how the CPU and memory work with suitable diagram. Compare between CISC and RISC architecture in brief.

The CPU is the heart of the entire computer system. It performs computations, executes instructions and transfer information to all the parts of a computer. The functions of the processor are listed below:

- It controls the main memory for storing intermediate data and instructions.
- It controls the sequence of operations.
- It gives commands to all parts of the computer system and hence controls all the components.
- It carries out processing i.e. computations on data.

Central Processing Unit (CPU) consists of main memory, control unit and arithmetic and logic unit. It performs operations on data input and returns the result to the output devices. The control unit fetches instructions from main storage, interprets them, and issues the necessary signals to the components. It controls all the hardware operations. The ALU performs all the arithmetic and logic operations. The main memory holds the program instructions for the program to be executed, the input date to be processed and the intermediate results of any processing. Ram is an example of Main memory.
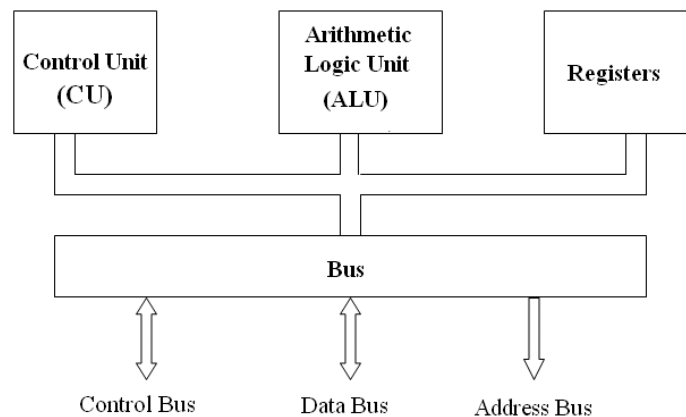
An instruction is fetched from primary storage by the Control Unit; The Control Unit decodes the instruction; The ALU receives the data and the instruction and performs the calculation or comparison; the result is stored in primary storage which is sent to the proper output device.

Control Unit:

- Access program instructions
- Decode (interpret) instructions
- Control flow of data throughout system
- Data flows through paths called buses

Arithmetic-Logic Unit:

- Perform computations on data
- Perform comparisons on data

Registers:

- High speed storage areas

- Hold data and instructions

Primary Storage (Main Memory):

- Stores instructions from programs
- Stores data to be processed

RISC (Reduced Instruction Set Computer) processors are designed for speeding up the processing power of the computer making the chip as simple as possible so that it uses less space and shorter design cycle. It is possible to use the technique of pipelining using RISC processors which gives the immense processing power. CISC (Complex Instruction Set Computer) processors use microcode, build rich instruction sets and build high-level instruction sets and these were the building blocks until the late 1980s and are still in major use today.

- CISC instructions utilize more cycles than RISC
- CISC has way more complex instructions than RISC
- CISC typically has fewer instructions than RISC
- CISC implementations tend to be slower than RISC implementations
- Computers typically use CISC while tablets, smartphones and other devices use RISC

2. Differentiate between centralized data processing system and distributed data processing system. State advantages and disadvantages of distributed systems.

Centralized data processing is a Computer data processing architecture where data processing support is provided by one or a cluster of computers, generally large dedicated computers, located in a central data processing facility. In a centralized architecture, each person is provided with a local terminal that is connected by a communications facility to the central data processing facility. A fully centralized data processing has following features:

- Centralized computers
- Centralized processing
- Centralized Data
- Centralized Control
- Centralized Staff Support.

A Distributed data processing facility is one in which computers, usually smaller computers, are dispersed throughout the organization. The objective of such disperse is to process information in a way that is most effective based on operational. Therefore, Distributed Data Processing features:

- A collection of terminals link together by some kind of communication link and has no main central computer or not fully (minimal) depend on central computer.
- Processing of information is happening on each terminal and sends results to a main server for store and retrieval purposes.
- Data may duplicate as data may store in locally or in remote server.

- Local computer operator can control the machine in his premises.
- Separate staff will maintain central computer (if there any) where other terminals may control by one or few other members.

The major advantages of distributed data processing are listed here below:

- Local control of local data
- Lower cost
- Modularity
- Better response time
- Ability to share data
- Greater reliability
- Direct user interaction
- Can drastically increase processing speed
- Can be infinitely expandable - just keep adding computers
- Security through redundancy
- Collaborative processing
- Distributed Database

The major disadvantages of distributed data processing are listed here below:

- Technical problems of connecting dissimilar machines
- Need for sophisticated communication systems
- Lack of professional support
- Data integrity and security problems
- Not all situations are suitable for distributed computing
- A lot of extra programming is required to set up a distributed system since distributed system will be connected through network and in case of network failure none of the systems will work.
- The information need to be passed between the networks. And it can be tracked and can be used for illegal purpose.

3. Explain about Internet and Intranet. List some activities that you can do on the internet. Describe how the World Wide Web is different from the internet?

The term Internet refers to the global network of public computers running Internet Protocol. In other words, the Internet, sometimes called simply "the Net," is a worldwide system of computer networks that allows users to send and receive information from other computers.

Commonly used in different types of organizations, an intranet is very similar to an Internet, but the difference is that an intranet is local, while the Internet is global. In other words, an intranet (a secure information-sharing system) uses data stored on an internal corporate network, while the Internet uses data stored on the servers all around the world. The purpose of an intranet differs according to the type of organization where it is implemented. An intranet implements

many technologies known from the Internet, such as file transfer protocols, chat rooms, browser interfaces, and many others. Furthermore, not all users have access to all the data stored on a central server; this depends on the privileges and rank of each employee within the organization. It's also relevant that many organizations have a number of computers and routers already implemented. Therefore, an intranet can be considered as an extension to a network infrastructure that already exists within the organization.

Some most popular internet activities are: E-mail, Games, Social Networking, Shopping, News, Weather info, Travel, Health info, Hobbies, Entertainment, etc.

Many people use the terms Internet and World Wide Web (aka. the Web) interchangeably, but in fact the two terms are not synonymous. The Internet and the Web are two separate but related things. The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet. Information that travels over the Internet does so via a variety of languages known as protocols. The World Wide Web, or simply Web, is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. The Web uses the HTTP protocol, only one of the languages spoken over the Internet, to transmit data. Web services, which use HTTP to allow applications to communicate in order to exchange business logic, use the Web to share information. The Web also utilizes browsers, such as Internet Explorer or Firefox, to access Web documents called Web pages that are linked to each other via hyperlinks. Web documents also contain graphics, sounds, text and video. The Web is just one of the ways that information can be disseminated over the Internet. The Internet, not the Web, is also used for e-mail, which relies on SMTP, Usenet news groups, instant messaging and FTP. So the Web is just a portion of the Internet, albeit a large portion, but the two terms are not synonymous and should not be confused.

Short Questions

4. Distinguish among the four kinds of computer systems.

A supercomputer can handle gigantic amounts of scientific computation. It's maintained in a special room or environment, may be about 50,000 times faster than a microcomputer, and may cost as much as $20 million. A mainframe computer is a large computer usually housed in a controlled environment that can support the processing requirements of hundreds and often thousands of users and computer professionals. It may cost from several hundred thousand dollars up to $10 million. A minicomputer, also known as a midsize or low-end mainframe computer is similar to but less powerful than a mainframe computer. It can support from 2 to about 50 users and computer professionals. Minicomputers and mainframe computers can work much faster than microcomputers and have many more storage locations in the main memory. Minicomputers cost from about $10,000 to several hundred thousand dollars. The microcomputer, also known as a personal computer, is the type of a computer that you undoubtedly will be dealing with as a user. Microcomputers cost between $200 and about $15,000. They vary in size from small portables, such as laptop computers (LT computers) that

you can carry around like a briefcase, to powerful desktop workstations, such as those used by engineers and scientists. A microcomputer – generally used by only one person at a time – uses a microprocessor chip as its CPU.

5. Define RAM, ROM, PROM, and EPROM.

Random-access memory (RAM) is a form of computer data storage which allows stored data to be accessed directly in any random order. In contrast, other data storage media such as hard disks, CDs, DVDs and magnetic tape, as well as early primary memory types such as drum memory, read and write data only in a predetermined order, consecutively, because of mechanical design limitations. Therefore the time to access a given data location varies significantly depending on its physical location.

Read-only memory (ROM) is a class of storage medium used in computers and other electronic devices. Data stored in ROM cannot be modified, or can be modified only slowly or with difficulty, so it is mainly used to distribute firmware (software that is very closely tied to specific hardware and unlikely to need frequent updates).

Programmable Read Only Memory (PROM) is similar to ROM except that you, the consumer, can program it. You can buy a blank chip and have a PROM programmer program it with your stuff. But, once you program it, you can never change it.

Erasable Programmable Read Only Memory (EPROM), or erasable programmable read only memory, is a type of memory chip that retains its data when its power supply is switched off. In other words, it is non-volatile. It is an array of floating-gate transistors individually programmed by an electronic device that supplies higher voltages than those normally used in digital circuits. Once programmed, an EPROM can be erased by exposing it to strong ultraviolet light source (such as from a mercury-vapor light).

6. What are the features of today's software applications? Explain.

Now a days software projects are becoming more and more complex – in size, sophistication, and technologies used. Most software products are used by huge number of people, not only that, these software support different national languages and come in different sizes and shapes – desktop, standard, professional, Enterprise Resource Planning (ERP) packages and so on. Almost all application software products (like word processors, ERP packages) support more than on hardware and/or software platform. For example, we have web browsers for the PC and Mac; we have database management systems that run on MVS, UNIX, Windows NT, Linux and so on. The competition and the advancements in technology are driving software vendors to include additional functionality and new features to their products– just to stay in business.

The Information Technology is revolutionizing the way we live and work. The digital technology has given mankind the ability to treat information with mathematical precision, to transmit it at very high accuracy and to manipulate it at will.

The following are the features for new software applications:

Ease of use

Graphical User Interface (GUI)
Requirement of more powerful hardware
Multi-platform capability
Network Capabilities
Compatibility with other software
Object Linking and Embedding
Groupwork capabilities
Mail Enabling
Web Enabling

7. What is the difference between sequential and direct-access file processing?

- In sequential access, data is stored at random locations whereas in direct access, data is stored at sequential locations.
- In sequential access, addition of data is fast but retrieval of data is slow whereas in direct access, addition of data is slow as reordering of data blocks may be needed to put current data block after the last used data block for the file. But retrieval of data is fast.
- Data structure implementing Sequential access is linked list whereas data structure implementing direct access is an Array.
- A situation where rate of addition of data is much larger compared to retrieval of data Sequential access is preferred; in opposite situation direct access is more suitable.

8. Explain the meaning of up-link, down-link and cross-link.

An uplink is the portion of a communications link used for the transmission of signals from an Earth terminal to a satellite or to an airborne platform. An uplink is the inverse of a downlink.

Concerning to GSM and cellular networks, the radio uplink is the transmission path from the mobile station (cell phone) to a base station (cell site). Similarly in computer networks, an uplink is a connection from data communications equipment toward the network core. This is also known as an upstream connection.

A downlink is the link from a satellite to a ground station. In case of cellular networks, the radio downlink is the transmission path from a cell site to the cell phone. In a computer networks, a downlink is a connection from data communications equipment towards data terminal equipment. This is also known as a downstream connection.

Cross-link is the communication path among the satellites. It is the way several satellites contribute the data communication.

## 9. How will you compose, reply and forward an e-mail message?

We use the services like compose, reply and forwarding an e-mail message using any of the different sites like gmail, Hotmail, yahoo e.t.c. The compose feature lets us write email message every time we are using the internet services. We have to type the receiver's email address for this and of course the message to send. The reply is usually after reading one's email. We do not

need to type the receiver's address here because it is automatically mentioned there after we click the reply button. On the other hand we don't even need to type the message when we are using forward service because it means we are forwarding one's message to another receiver. For this we need to type the receiver's email address.

10. What is GIS? What are the components of GIS? How GIS works?

A geographic information system (GIS) may be defined as a computer-based Information system which attempts to capture, store, manipulate, analyze and display spatially referenced and associated tabular attribute data, for solving complex research, planning and management problems

Components of GIS
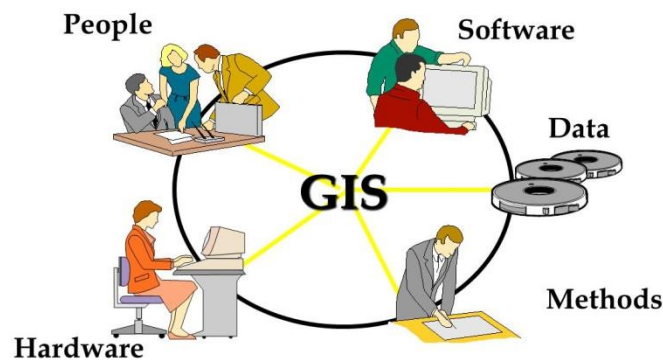
GIS works in three stages :
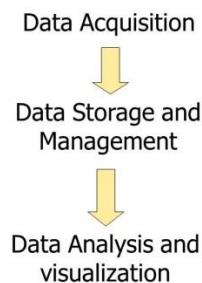
Data Acquisition: It involves capturing the data from real world through any acquisition techniques such as field survey, aerial survey, space survey. Digitized and scanned maps if data exists in analogue form.

Data storage and Management: It involves representing the real world objects in computers, store them and manage properly. There are different data storage and management options.

Data Analysis and Visualization: In this stage, data stored in the computers are analyzed and the results are visualized

11. Explain CAD and CAM system.

Computer-aided design (CAD) is the use of computer systems to assist in the creation, modification, analysis, or optimization of a design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing.

Computer-aided manufacturing (CAM) is the use of computer software to control machine tools and related machinery in the manufacturing of workpieces. Its primary purpose is to create a faster production process and components and tooling with more precise dimensions and material consistency, which in some cases, uses only the required amount of raw material (thus minimizing waste), while simultaneously reducing energy consumption

12. Highlight on Computers in Education and Training in brief.

Do yourself

13. Write short notes on: (a) Compiler and Interpreters (b) MICR, OCR and OMR

Compiler and Interpreters: Compiler is a program that translates source code into object code. The compiler takes the entire piece of source code and collects and recognizes the instructions. In contrast, the interpreter analyzes and executes each line of source code in succession, without looking at the entire program. The advantage of interpreters is that they can execute a program immediately but a compiler requires some time before an executable program emerges. However, programs produced by compilers run much faster than the same programs executed by an interpreter.

MICR, OCR and OMR: