Database Management System

Database is a collection of related data and data is a collection of facts and figures that can be processed to produce information.

One-to-many − One entity from entity set A can be associated with more than one entity of entity set B however an entity from entity set B, can be associated with at most one entity.

Many-to-one − More than one entity from entity set A can be associated with at most one entity of entity set B, however an entity from entity set B can be associated with more than one entity from entity set A.

Many-to-many − One entity from A can be associated with more than one entity from B and vice versa.

Participation Constraints

- **Total Participation** − Each entity is involved in the relationship. Total participation is represented by double lines.

- **Partial participation** − Not all entities are involved in the relationship. Partial participation is represented by single lines.

SQL is a programming language for Relational Databases. It is designed over relational algebra and tuple relational calculus. SQL comes as a package with all major distributions of RDBMS.

SQL comprises both data definition and data manipulation languages. Using the data definition properties of SQL, one can design and modify database schema, whereas data manipulation properties allows SQL to store and retrieve data from database.

Data Definition Language

SQL uses the following set of commands to define database schema −

CREATE

Creates new databases, tables and views from RDBMS.

For example −

```
Create database tutorialspoint;
```

```
Create table article;
Create view for_students;
```

DROP

Drops commands, views, tables, and databases from RDBMS.

For example−

```
Drop object_type object_name;
Drop database tutorialspoint;
Drop table article;
Drop view for_students;
```

ALTER

Modifies database schema.

```
Alter object_type object_name parameters;
```

For example−

```
Alter table article add subject varchar;
```

This command adds an attribute in the relation **article** with the name **subject**of string type.

Data Manipulation Language

SQL is equipped with data manipulation language (DML). DML modifies the database instance by inserting, updating and deleting its data. DML is responsible for all forms data modification in a database. SQL contains the following set of commands in its DML section −

- SELECT/FROM/WHERE
- INSERT INTO/VALUES
- UPDATE/SET/WHERE
- DELETE FROM/WHERE

These basic constructs allow database programmers and users to enter data and information into the database and retrieve efficiently using a number of filter options.

SELECT/FROM/WHERE

- **SELECT** − This is one of the fundamental query command of SQL. It is similar to the projection operation of relational algebra. It selects the attributes based on the condition described by WHERE clause.

- **FROM** − This clause takes a relation name as an argument from which attributes are to be selected/projected. In case more than one relation names are given, this clause corresponds to Cartesian product.

- **WHERE** − This clause defines predicate or conditions, which must match in order to qualify the attributes to be projected.

For example −

```
Select author_name
From book_author
Where age > 50;
```

This command will yield the names of authors from the relation **book_author**whose age is greater than 50.

INSERT INTO/VALUES

This command is used for inserting values into the rows of a table (relation).

Syntax−

```
INSERT INTO table (column1 [, column2, column3 ... ]) VALUES (value1 [, value2, value3 ... ])
```

Or

```
INSERT INTO table VALUES (value1, [value2, ... ])
```

For example −

```
INSERT INTO tutorialspoint (Author, Subject) VALUES ("anonymous", "computers");
```

UPDATE/SET/WHERE

This command is used for updating or modifying the values of columns in a table (relation).

Syntax −

```
UPDATE table_name SET column_name = value [, column_name = value ...] [WHERE condition]
```

For example −

```
UPDATE tutorialspoint SET Author="webmaster" WHERE Author="anonymous";
```

DELETE/FROM/WHERE

This command is used for removing one or more rows from a table (relation).

Syntax −

```
DELETE FROM table_name [WHERE condition];
```

For example −

```
DELETE FROM tutorialspoints
  WHERE Author="unknown";
```

C-Programming

1) What is Operating System (OS)?

An operating system is a collection of programs used to connect the user with the hardware it has the set of programs which controls the operations of the hardware components such as CPU, main memory, keyboard, monitor, and printer and so on.

2) What is an Algorithm?

Algorithms refer to the step by step instructions written to solve any problem.

3) What is Flowchart?

A flowchart is a diagrammatic or symbolic representation of algorithms. It uses various symbols to represent the operations to be performed.

4) What is preprocessor?

The preprocessor is a program which is executed before the compilation of a source program written by the user. The preprocessor directives begins with hash (#) followed by the command. e.g #includes – it is a directive to include file.

5) What exactly is a 'variable scope', 'local variables' and 'global variables'?

The extent to which a variable is accessible in a program is called the 'variable scope'. Variables declared internally inside a function are known as 'local' variables. Variables declared externally outside a function are known as 'global' variables.

6) reserved word

C programs are constructed from a set of reserved words which provide control and from libraries which perform special functions. The basic instructions are built up using a reserved set of words, such as main, for, if, while, default, double, extern, for, and int, to name just a few.

7) What is identifier?

An identifier is a name used to identify a variable, function, symbolic constant and so on.

8) Loop

Loop control structures are used to execute and repeat a block of statements depending on the value of a condition. There are 3 types of loop control statements in C

- for loop
- while loop
- do – while loop
-

9) While Loop.

A while loop has one control expression, and executes as long as that expression is true. The general syntax of a while loop is

```
while (expression) {
    Statements;
}
```

We use a while loop when a statement or group of statements which may have to be executed a number of times to complete their task. The controlling expression represents the condition

10) for loop.

A for loop is used to execute and repeat a block of statements depending on a condition. The syntax of a for loop is

```
for( ; ; )
{
    Statements;
}
```

11) What is an array?

An array is a collection of values of the same data type. Values in array are accessed using array name with subscripts in brackets []. Syntax of array declaration is

Data type array_ name [size];

12) What is Multidimensional Arrays?

An array with more than one index value is called a multidimensional array. To declare a multidimensional array you can do follow syntax

data type array_ name[] [] []....;

13) Define function

A function is a module or block of program code which deals with a particular task. Each function has a name or identifier by which is used to refer to it in a program. A function can accept a number of parameters or values which pass information from outside, and consists of a number of statements and declarations, enclosed by curly braces { }, which make up the doing part of the object

14) Explain the concept and use of type void.

A function which does not return a value directly to the calling program is referred as a void function. The void functions are commonly used to perform a task and they can return many values through global variable declaration.

15) What is recursion?

A function calling itself again and again to compute a value is referred to as recursive function or recursion. Recursion is useful for branching processes and is effective where terms are generated successively to compute a value.

16) Mention the types of network.

A simple network consist of computers connected using network interface cards, networking software and network cables. There are two main networking arrangements

- client / server – a powerful computer is used as the server which works as the interpreter between the clients and helps sharing files.
- peer to peer – there is no server and all the workstations are treated equally.

17) What are Library functions?

Library functions are built in programs available along with the compiler which perform some standard mathematical operations.

18) How does the type float differ from double in C language?

Float data type refers real number in single precision and has 6 decimal digits. It takes 4 bytes in memory to refer values ranging from 3.4e-38 to 3.4e+38

double data type also refers to real number but in double precision and has 12 decimal digits. It takes 8 bytes of memory to refer values ranging from 1.7e-308 to 1.7e+308

19) When should we use pointers in a C program?

- To get address of a variable
- For achieving pass by reference in C: Pointers allow different functions to share and modify their local variables.
- To pass large structures so that complete copy of the structure can be avoided.
- To implement "linked" data structures like linked lists and binary trees.

C++

1. What is a class?

Class is a blue print which reflects the entities attributes and actions. Technically defining a class is designing a user defined data type.

2. What is an object?

An instance of the class is called as object.

3. List the types of inheritance supported in C++.

Single, Multilevel, Multiple, Hierarchical and Hybrid.

4. Boolean

bool, is the new primitive data type introduced in C++ language.

5. Function Overloading

Defining several functions with the same name with unique list of parameters is called as function overloading.

6. Operator overloading

Defining a new job for the existing operator w.r.t the class objects is called as operator overloading.

7. Which access specifier/s can help to achieve data hiding in C++?

Private & Protected.

8. When a class member is defined outside the class, which operator can be used to associate the function definition to a particular class?

Scope resolution operator (::)

9. What is a destructor? Can it be overloaded?

A destructor is the member function of the class which is having the same name as the class name and prefixed with tilde (~) symbol. It gets executed automatically w.r.t the object as soon as the object loses its scope. It cannot be overloaded and the only form is without the parameters.

10. What is a constructor?

A constructor is the member function of the class which is having the same as the class name and gets executed automatically as soon as the object for the respective class is created.

11. What is a default constructor? Can we provide one for our class?

Every class does have a constructor provided by the compiler if the programmer doesn't provides one and known as default constructor. A programmer provided constructor with no parameters is called as default constructor. In such case compiler doesn't provides the constructor.

12. What is the difference between the keywords struct and class in C++?

By default the members of struct are public and by default the members of the class are private.

13. What is the block scope variable in C++?

A variable whose scope is applicable only within a block is said so. Also a variable in C++ can be declared anywhere within the block.

14. What is the scope resolution operator?

The scope resolution operator is used to

- Resolve the scope of global variables.
- To associate function definition to a class if the function is defined outside the class.

15. What is a namespace?

A namespace is the logical division of the code which can be used to resolve the name conflict of the identifiers by placing them under different name space.

16. What are command line arguments?

The arguments/parameters which are sent to the main() function while executing from the command line/console are called so. All the arguments sent are the strings only.

17. Can a program be compiled without main() function?

Yes, it can be but cannot be executed, as the execution requires main() function definition.

18. What is a token?

A C++ program consists of various tokens and a token is either a keyword, an identifier, a constant, a string literal, or a symbol.

19. What is a preprocessor?

Preprocessor is a directive to the compiler to perform certain things before the actual compilation process begins.

20. What is recursion?

Function calling itself is called as recursion.

21. What is the first string in the argument vector w.r.t command line arguments?

Program name.

22. What is the maximum length of an identifier?

Ideally it is 32 characters and also implementation dependent.

23. What is the default function call method?

By default the functions are called by value.

24. What are available modes of inheritance to inherit one class from another?

Public, private & protected

25. Does an abstract class in C++ need to hold all pure virtual functions?

Not necessarily, a class having at least one pure virtual function is abstract class too.

26. What is function overriding?

Defining the functions within the base and derived class with the same signature and name where the base class's function is virtual.

27. What is 'std'?

Default namespace defined by C++.

28. What is the full form of STL?

Standard template library

29. What is 'cout'?

cout is the object of ostream class. The stream 'cout' is by default connected to console output device.

30. What is 'cin'?

cin is the object of istream class. The stream 'cin' is by default connected to console input device.

31. What is the use of the keyword 'using'?

It is used to specify the namespace being used in.

32. What is a friend class?

A class member can gain accessibility over other class member by placing the class declaration prefixed with the keyword 'friend' in the destination class.

Java

1. Does Java Use Pointers?

No. Java doesn't use pointers. It has a tough security. Instead of pointers, references are used in Java as they are safer and more secure when compared to a pointer.

2. What Is the Difference Between Overloading and Overriding?

When there are two methods of the same name but different properties, it is overloading. Overriding occurs when there are two methods of the same name and properties, one is in the child class and the other is in the parent class. Check out this post for a more in-depth analysis.

3. What Is a Package?

A package is a collection of related classes and interfaces.

4. What Is the Difference Between equals() **and** $==$ **?**

Equals() method is used for checking the equality of two objects defined by business logic.

$==$ or the equality operator is used to compare primitives and objects.

5. State Two Differences Between an Inner Class and a Subclass

While Inner classes are in the same file, subclasses can be in another file. With that in mind, while subclasses have the methods of their parent class, inner classes get the methods they want.

6. How Are Destructors Defined in Java?

Since Java has its own garbage collection, no destructors are required to be defined.   Destruction of objects is automatically carried by the garbage collection mechanism.

Assembly Language

1. Supporting number system by processors

The processor supports the following data sizes −

Word: a 2-byte data item

Double word: a 4-byte (32 bit) data item

Quad word: an 8-byte (64 bit) data item

Paragraph: a 16-byte (128 bit) area

Kilobyte: 1024 bytes

Megabyte: 1,048,576 bytes

2. Processor Registers

There are ten 32-bit and six 16-bit processor registers in IA-32 architecture. The registers are grouped into three categories −

General registers,

Control registers, and
Segment registers.

The general registers are further divided into the following groups −

Data registers,

Pointer registers,
and Index registers.

3. What are Data Registers?

AX is the primary accumulator; it is used in input/output and most arithmetic instructions. For example, in multiplication operation, one operand is stored in EAX or AX or AL register according to the size of the operand.

BX is known as the base register, as it could be used in indexed addressing.

CX is known as the count register, as the ECX, CX registers store the loop count in iterative operations.

DX is known as the data register. It is also used in input/output operations. It is also used with AX register along with DX for multiply and divides operations involving large values.

4. What are Pointer Registers?

The pointer registers are 32-bit EIP, ESP, and EBP registers and corresponding 16-bit right portions IP, SP, and BP. There are three categories of pointer registers −

Instruction Pointer (IP) − The 16-bit IP register stores the offset address of the next instruction to be executed. IP in association with the CS register (as CS:IP) gives the complete address of the current instruction in the code segment.

Stack Pointer (SP) − The 16-bit SP register provides the offset value within the program stack. SP in association with the SS register (SS:SP) refers to be current position of data or address within the program stack.

Base Pointer (BP) − The 16-bit BP register mainly helps in referencing the parameter variables passed to a subroutine. The address in SS register is combined with the offset in BP to get the location of the parameter. BP can also be combined with DI and SI as base register for special addressing.

5. What are Index Registers?

The 32-bit index registers, ESI and EDI, and their 16-bit rightmost portions. SI and DI, are used for indexed addressing and sometimes used in addition and subtraction. There are two sets of index pointers −

Source Index (SI) − It is used as source index for string operations.

Destination Index (DI) − It is used as destination index for string operations.

6. What are Segment Registers?

Segments are specific areas defined in a program for containing data, code and stack. There are three main segments −

Code Segment − It contains all the instructions to be executed. A 16-bit Code Segment register or CS register stores the starting address of the code segment.

Data Segment − It contains data, constants and work areas. A 16-bit Data Segment register or DS register stores the starting address of the data segment.

Stack Segment − It contains data and return addresses of procedures or subroutines. It is implemented as a 'stack' data structure. The Stack Segment register or SS register stores the starting address of the stack.

7. Simply Describe Common Flags.

The common flag bits are:

Overflow Flag (OF) − It indicates the overflow of a high-order bit (leftmost bit) of data after a signed arithmetic operation.

Direction Flag (DF) − It determines left or right direction for moving or comparing string data. When the DF value is 0, the string operation takes left-to-right direction and when the value is set to 1, the string operation takes right-to-left direction.

Interrupt Flag (IF) − It determines whether the external interrupts like keyboard entry, etc., are to be ignored or processed. It disables the external interrupt when the value is 0 and enables interrupts when set to 1.

Trap Flag (TF) − It allows setting the operation of the processor in single-step mode. The DEBUG program we used sets the trap flag, so we could step through the execution one instruction at a time.

Sign Flag (SF) − It shows the sign of the result of an arithmetic operation. This flag is set according to the sign of a data item following the arithmetic operation. The sign is indicated by the high-order of leftmost bit. A positive result clears the value of SF to 0 and negative result sets it to 1.

Zero Flag (ZF) − It indicates the result of an arithmetic or comparison operation. A nonzero result clears the zero flag to 0, and a zero result sets it to 1.

Auxiliary Carry Flag (AF) − It contains the carry from bit 3 to bit 4 following an arithmetic operation; used for specialized arithmetic. The AF is set when a 1-byte arithmetic operation causes a carry from bit 3 into bit 4.

Parity Flag (PF) − It indicates the total number of 1-bits in the result obtained from an arithmetic operation. An even number of 1-bits clears the parity flag to 0 and an odd number of 1-bits sets the parity flag to 1.

Carry Flag (CF) − It contains the carry of 0 or 1 from a high-order bit (leftmost) after an arithmetic operation. It also stores the contents of last bit of a *shift* or *rotate* operation.

Computer Organization and Architecture

Major structural components of CPU:

- Control unit: Controls the operation of the CPU and hence the computer

- Arithmetic and logic unit (ALU):Performs the computer's data processing functions

- Registers: Provides storage internal to the CPU

- CPU interconnection: Some mechanism that provides for communication among the control unit, ALU, and registers

PCI

The peripheral component interconnect (PCI) is a popular high-bandwidth, processor-independent bus that can function as a peripheral bus.

PCI delivers better system performance for high-speed I/O subsystems

PCI is specifically designed to meet economically the I/O requirements of modern systems; it requires very few chips to implement and supports other buses attached to the PCI bus.

RAM

- Random-access memory(RAM)

- It is possible both to read data from the memory and to write new data into the memory easily and rapidly.

- RAM is volatile, it must be provided with a constant power supply. If the power is interrupted, then the data are lost. Thus, RAM can be used only as temporary storage.

- The two traditional forms of RAM used in computers are DRAM and SRAM.

DYNAMIC RAM

- A dynamic RAM (DRAM) is made with cells that store data as charge on capacitors. The presence or absence of charge in a capacitor is interpreted as a binary 1 or 0. Because capacitors have a natural tendency to discharge, dynamic RAMs require periodic charge refreshing to maintain data storage. The term dynamic refers to this tendency of the stored charge to leak away, even with power continuously applied.

- Although the DRAM cell is used to store a single bit (0 or 1), it is essentially an analog device. The capacitor can store any charge value within a range; a threshold value determines whether the charge is interpreted as 1 or 0.

STATIC RAM

- Static RAM (SRAM) is a digital device that uses the same logic elements used in the processor. In a SRAM, binary values are stored using traditional flip-flop logic-gate configurations. A static RAM will hold its data as long as power is supplied to it.

SRAM VERSUS DRAM

- Both static and dynamic RAMs are volatile; that is, power must be continuously supplied to the memory to preserve the bit values.

- A dynamic memory cell is simpler and smaller than a static memory cell. Thus, a DRAM is more dense (smaller cells more cells per unit area) and less expensive than a corresponding SRAM.

- On the other hand, a DRAM requires the supporting refresh circuitry. For larger memories, the fixed cost of the refresh circuitry is more. Thus, DRAMs tend to be favored for large memory requirements.

- A final point is that SRAMs are generally somewhat faster than DRAMs. Because of these relative characteristics, SRAM is used for cache memory (both on and off chip), and DRAM is used for main memory.

ROM

- Read-only memory (ROM) contains a permanent pattern of data that cannot be changed. A ROM is nonvolatile; that is, no power source is required to maintain the bit values in memory. While it is possible to read a ROM, it is not possible to write new data into it.

- Important applications of ROMs:

    - microprogramming

    - Library subroutines for frequently wanted functions

    - System programs

    - Function tables

PROM

- Programmable ROM (PROM) is nonvolatile and may be written into only once. For the PROM, the writing process is performed electrically and may be performed by a supplier or customer at a time later than the original chip fabrication. Special equipment is required for the writing or

  "programming" process. PROMs provide flexibility and convenience. The ROM remains attractive for high-volume production runs.

- Also called read-mostly memory

- There are three common forms of read-mostly memory: EPROM, EEPROM, and flash memory.

EPROM

- Erasable programmable read-only memory (EPROM) is read and written electrically, as with PROM. However, before a write operation, all the storage cells must be erased to the same initial state by exposure of the packaged chip to ultraviolet radiation. Erasure is performed by shining an intense ultraviolet light through a window that is designed into the memory chip. This erasure process can be performed repeatedly. The EPROM is more expensive than PROM, but it has the advantage of the multiple update capability.

EEPROM

- Electrically erasable programmable read-only memory (EEPROM). This is a read-mostly memory that can be written into at any time without erasing prior contents; only the byte or bytes addressed are updated. The write operation takes considerably longer than the read operation, on the order of several hundred microseconds per byte. The EEPROM combines the advantage of non-volatility with the flexibility of being updatable in place, using ordinary bus control, address, and data lines. EEPROM is more expensive than EPROM and also is less dense, supporting fewer bits per chip.

FLASH memory

- Flash memory is intermediate between EPROM and EEPROM in both cost and functionality. Like EEPROM, flash memory uses an electrical erasing technology. An entire flash memory can be erased in one or a few seconds, which is much faster than EPROM. In addition, it is possible to erase just blocks of memory rather than an entire chip. Flash memory gets its name because the microchip is organized so that a section of memory cells are erased in a single action or

  "Flash." Flash memory uses only one transistor per bit, and so achieves the high density of

  EPROM.

Advantages of using a glass substrate for a magnetic disk:

The glass substrate has a number of benefits, including the following

- Improvement in the uniformity of the magnetic film surface to increase disk Reliability

- A significant reduction in overall surface defects to help reduce read-write errors

- Ability to support lower fly heights (described subsequently)

- Better stiffness to reduce disk dynamics

- Greater ability to withstand shock and damage.

RAID (Redundant Array of Independent Disks)

3 common characteristics:

- RAID is a set of physical disk drives viewed by the operating system as a single logical drive.

- Data are distributed across the physical drives of an array in a scheme known as striping, described subsequently.

- Redundant disk capacity is used to store parity information, which guarantees data recoverability in case of a disk failure.

- The details of the second and third characteristics differ for the different RAID levels. RAID 0 and RAID 1 do not support the third characteristic.

Compact Disk

- A compact disc [sometimes spelled disk] (CD) is a small, portable, round medium made of molded polymer (close in size to the floppy disk) for electronically recording, storing, and playing back audio, video, text, and other information in digital form.

Logic Design and Switching Circuit

.

Make differences between analog and digital signal

Difference between Digital and Analog signal:

Digital	Analog
Digital signals are discrete time generated by digital modulation.	Analog signals are continuous signal which represents physical measurements.
Waves denoted by square waves.	Waves denoted by sine wave.
Use discrete discontinuous values to represent information.	Use continuous range of values to represent information.
Samples analog waveforms into a limited set of numbers and records them.	Analog technology records waveforms as they are.
Can be noise-immune without deterioration during transmission and write/read cycle.	Subjected to deterioration by noise during transmission and write/read cycle.
Digital hardware is flexible in implementation.	Analog hardware is not flexible.
There is no guarantee that digital signal processing can be done in real time and consumes more bandwidth to carry out the same information.	Analog signal processing can be done in real time and consumes less bandwidth.

Digital instrument draws only negligible power.	Analog instrument draws large power.
Digital instruments are free from observational errors like parallax and approximation errors.	Analog instruments usually have a scale which is cramped at lower end and give considerable observational errors.

What is Gate?

Gate: A logic gate is an elementary building block of a digital circuit.

Types of Gate: Mainly there are two types of logic gate. Those are:

      I.   Basic Logic Gate

     II.   Universal Logic Gate

.

Fundamentals of Electronics and Digital System

What is Electronics?

The branch of engineering which deals with current conduction through a vacuum or gas or semiconductor is known as electronics.

Conductor, Insulator and Semiconductor

Conductors

- Have low resistance allowing electrical current flow

- A material is usually a metal and a conductor if the number of valence electrons is less than 4 Insulators

- Have very high resistance suppressing electrical current flow

- A material is usually a non-metal and an insulator if the number of valence electrons is more than 4

Semiconductors

- Has both metal and non-metal properties

- A material is usually a semiconductor if the number of valence electrons is 4

Transformer

- Used to transfer alternating signal from one circuit to another

- The principle on which transformer action is based on is called as electromagnetic mutual inductance.

- Can be used to step-up or step-down the signals

Bridge Rectifier

- Converts the transformer secondary AC voltage into pulsating DC voltage

- Consists of four diodes arranged so that current can flow in only one direction through the load

- To get a smooth and constant supply voltage, the rectifier circuit is followed immediately by a filter

4.17 What is Filter?

Used to convert the pulsating DC provided by the rectifier into the steady DC voltage required for electronic circuits.

4.18 What is Regulator

Maintains the output voltage of an ordinary power supply constant irrespective of load variations or changes in input AC voltage

4.19 Types of Digital Integrated Circuits (ICs)

The following are the different types of digital integrated circuits:

- SSI (Small-Scale Integration)

- MSI (Medium-Scale Integration)

- LSI (Large-Scale Integration)

- VLSI (Very Large-Scale Integration)

4.20 Basic Logic Gates

  – NOT

  – AND

  – OR

4.21 Applications of Logic Gates

The following are some of the applications of Logic gates:

- Build complex systems that can be used to different fields such as

    – Genetic engineering,

    – Nanotechnology,

    – Industrial Fermentation,

    – Metabolic engineering and

    – Medicine

- Construct multiplexers, adders and multipliers.

- Perform several parallel logical operations

- Used for a simple house alarm or fire alarm or in the circuit of automated machine manufacturing industry

Microprocessor Viva Questions

What is microprocessor?

Ans: Microprocessor is a program-controlled device, which fetches the instructions from memory, decodes and executes the instructions. Most Micro Processor is single- chip devices

What are the flags in 8086?

Ans: In 8086 carry flag, Parity flag, Auxiliary carry flag, Zero flag, Overflow flag, Trace flag, Interrupt flag, Direction flag, and Sign flag

What are the various Registers in 8085?

Ans: Accumulator register, Temporary register, Instruction register, Stack Pointer, Program Counter are the various registers in 8085.

What are the various falgs in 8085?

Ans: Sign flag, Zero flag, Auxiliary flag, Parity flag, Carry flag.

What is Stack pointer?

Ans: Stack pointer is a special purpose 16-bit register in the Microprocessor, which holds the address of the top of the stack.

What is Program Counter?

Ans: Program counter holds the address of either the first byte of the next instruction to be fetched for execution or the address of the next byte of a multi byte instruction, which has not been completely fetched.

In both the cases it gets incremented automatically one by one as the instruction bytes get fetched. Also Program register keeps the address of the next instruction.

Compiler

What is Compiler?

Ans: A compiler is a program that reads a program written in one language –the source language and translates it into an equivalent program in another language-the target language. The compiler reports to its user the presence of errors in the source program.

Operating System Viva Questions

1. **What is Operating System?**
A program that, after being initially loaded into the computer by a boot program, manages all software that communicates with the hardware and allows other programs to run. e.g: Windows, Mac OS X and Linux.

2. **Describe about Central Processing Unit (CPU)**

CPU is responsible for activating and controlling the operations of other units of a computer system. It is also referred to as the brain of computer. CPU consists of two main parts:

Control Unit (CU): Control Unit is responsible for coordinating various operations of a computer. It uses time signals to do that. The control unit determines the sequence in which computer programs and instructions are executed. It also acts as a switch board operator when several users access the computer simultaneously. In simple words, it acts like the supervisor seeing that things are done in proper fashion.

Arithmetic and Logic Unit: The actual processing of the data and instruction are performed by Arithmetic Logical Unit. ALU takes care of various calculations. The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison. Data is transferred to ALU from storage unit when required. After processing the output is returned back to storage unit for further processing or getting stored.

Networking Viva Questions

2- Sender

A device that is used for sending messages (or data) is called *sender*. It is also called *transmitter* or *source*. The sender can be a computer, telephone, or a video camera etc. Usually, a computer is used as sender in data communication system.

3- Receiver

A device that is used for receiving messages is called *receiver*. It is also known as *sink*. The receiver can be a computer, telephone set, printer, or a fax machine etc. Usually, a computer is also used as receiver in data communication system.

4- Medium

The path through which data is transmitted (or sent) from one location to another is called transmission medium. It is also called communication channel. It may be a wire, or fiber optic cable, or telephone line etc. If the sender and receiver are within a building, a wire is used as the medium. If they are located at different locations, the medium may be telephone line, fiber optics, microwave or satellite system.

5-Encoder: The encoder is an electronic device. It receives data from sender in the form of digital signals. It converts digital signals into a form that can be transmitted through transmission medium.

6-Decoder: The decoder is an electronic device. It receives data from transmission medium. It converts encoded signals (i.e. analog signals) into digital form.

7-Multiplexing: Multiplexing is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link. As data and telecommunications use increases, so does traffic.

1. **Describe About Connecting Devices:**

   Hub: A hub connects multiple wires coming from different branches, for example, the connector in star topology which connects different stations.

   Bridge A bridge operates at data link layer. A bridge is a repeater, with add on functionality of filtering content by reading the MAC addresses of source and destination. It is also used for interconnecting two LANs working on the same protocol. It has a single input and single output port, thus making it a 2-port device.

   Switch: A switch is a multi-port bridge with a buffer and a design that can boost its efficiency (large number of ports imply less traffic) and performance. Switch is data link layer device. Switch can perform error checking before forwarding data, that makes it very efficient as it does not forward packets that have errors and forward good packets selectively to correct port only.

   Router: A router is a device like a switch that routes data packets based on their IP addresses. Router is mainly a Network Layer device. Routers normally connect LANs and WANs together and have a dynamically updating routing table based on which they make decisions on routing the data packets. Router divide broadcast domains of hosts connected through it.

2. **What is Gateway?**
   A gateway is a passage to connect two networks together that may work upon different networking models. They basically work as the messenger agents that take data from one system, interpret it, and transfer it to another system. Gateways are also called protocol converters and can operate at any network layer. Gateways are generally more complex than switch or router.

3. **What is NIC?**
    Network Interface Card(NIC) receives data and convert it into electrical signals. Determine if the data received for a particular computer. Control the flow of data through the cable.
4. **What is Firewall?**
    A firewall is a hardware or software system that prevents unauthorized access to or from a network. All data entering or leaving the intranet pass through the firewall, which examines each packet and blocks those that do not meet the specified security criteria.
5. **What is Bandwidth?**
    The bandwidth of a composite signal is the difference between the highest and the lowest frequencies contained in that signal.
6. **What is Protocol?**
    A network protocol defines rules and convention for communication between network devices.
7. **What is a network?**
    A network is a collection of computers, servers, mainframes, network devices, peripherals, or other devices connected to one another to allow the sharing of data. An excellent example of a network is the Internet, which connects millions of people all over the world.

Management Information System

1. What is the concept of MIS?

Answer: Management Information System, MIS is a collection of systems, hardware, procedures and people that all work together to process, store, and produce information that is useful to the organization.

2. What are the types of Information Systems?

Answer:

- Transaction Processing Systems (TPS)
- Management Information Systems (MIS)
- Decision Support Systems (DSS)

3. What is Management?

Answer:

- Effective utilization of human and material resources to achieve the enterprise objective
- It is a process consisting of the five basic functions:

- ❖ Planning
- ❖ Organizing
- ❖ Staffing
- ❖ Directing
- ❖ Controlling

4. What are the Functional Areas of Management?

Answer:

- ❖ Production management
- ❖ Marketing management
- ❖ Financial management
- ❖ Personnel or human resource management

5. What are the features of MIS?

Answer:

- ❖ Data Collection
- ❖ Report Generation
- ❖ Accessibility and Integration

6. What is Information Technology?

Answer: Information technology (IT) is the use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all forms of electronic data.

System Analysis

2. What is System development life cycle (SDLC)?

Answer: A System development life cycle (SDLC) is a process by which systems analysts, software engineers, programmers, and end users build information systems and computer applications. It consists of 5 stages.

- ❖ Problem Identification
- ❖ System Analysis
- ❖ System Design
- ❖ System Implementation
- ❖ System Support & Maintenance

Software Engineering

1. What is feasibility study?

Answer: It is a measure to assess how practical and beneficial the software project development will be for an organization. The software analyzer conducts a thorough study to understand economic, technical and operational feasibility of the project.

- ❖ Economic - Resource transportation, cost for training, cost of additional utilities and tools and overall estimation of costs and benefits of the project.
- ❖ Technical - Is it possible to develop this system? Assessing suitability of machine(s) and operating system(s) on which software will execute, existing developers' knowledge and skills, training, utilities or tools for project.
- ❖ Operational - Can the organization adjust smoothly to the changes done as per the demand of project?

2. What is verification and validation?

Answer: **Verification** refers to the set of activities that ensure that software correctly implements a specific function.

   Validation refers to the set of activities that ensure that the software that has been built is traceable to customer requirements.

3. What are the advantages and disadvantages of white box testing?

Answer: Advantages: Software's structure logic can be tested.

        Disadvantages: Doesn't ensure that user requirements are met.

        Its test may not mimic real world situations

4. What are function points?

Answer: Function points are the features which are provided by the software product. It is considered as a most important measurement for software size.

5. What are functional and non-functional requirements?

Answer: Functional requirements are functional features which are expected by users from the proposed software product.

Non-functional requirements are related to security, performance, look, and feel of the user interface.