

# Computer Science Questions and Answers

## UNIT-A

### Chapter - 1 Configuring a Computer

#### **I One Mark Question and Answer**

**1. Name the components of CPU**

Ans. a) ALU    b) PC    c) Accumulator    d) MAR    e) IR    f) ID    g) MDR

**2. What is the use of registers in CPU?**

Ans. It is used to store intermediate data and instructions.

**3. What is the function of MAR?**

Ans. It specifies the address of memory location from which data or instruction is to be accessed or to which the data is to be stored.

**4. What is the function of MDR / MBR?**

Ans. It contains the data to be written into or read from memory location addressed by MAR.

**5. What is program counter?**

Ans. It keeps track of the memory address of the instruction that is to be executed next.

**6. What is the function of IR?**

Ans. It contains the instruction that is being executed.

**7. What is the purpose of Instruction Decoder?**

Ans. It decodes the instructions.

**8. What is a data bus?**

Ans. It carries a word to or from memory.

**9. What is an address bus?**

Ans. It carries memory address. The width of address bus equals the number of bits in the MAR.

**10. What is the function of control bus?**

Ans. It carries signals between the units of the computer.

**11. Name different I/O ports.**

Ans. Port is a socket on the back of computer. Different types of ports are serial ports, parallel ports and USB ports.

**12. What is meant by plug and play cards?**

Ans. It enables the user to add devices to computer.

**13. Expand SD RAM.**

Ans. Synchronous Dynamic Random Access Memory.

**14. Expand DDR RAM.**

Ans. Double Data Rate Random Access Memory.

## **II Two Marks Questions.**

### **1. Explain USB Port (Universal Serial Bus).**

Ans. a. It is a high speed serial bus  
b. It is a plug and play interface between computers and add on devices.

### **2. Give the specifications of Laser printer.**

Ans. a. Resolution varies from 600 to 1200 dots per inch.  
b. Speed varies from 4 PPM to 24 PPM.  
c. Buffer size varies from 4MB to 32 MB  
d. Can print color images.

### **3. Give the specifications of dot matrix printer.**

Ans. a. Print head normally has 9 pins to 24 pins.  
b. Speed varies from 30 to 300 characters per second.  
c. Buffer size varies from 1K to 64 K.

### **4. Give the specifications of inkjet printer.**

Ans. a. Resolution is around 300 dots per inch.  
b. Speed varies from 1PPM to 12 PPM  
c. Buffer size varies from 1 MB to 4 MB.

## **III Five Marks Questions:**

### **1) Write a note on computer maintenance.**

Ans: a. Avoid heat dust and noise  
b. Periodic updates and enhancements  
c. Installing fire walls and anti virus.  
d. In house software maintenance  
e. Computer periodic checkup.

### **2) What are the possible threats to a computer system and how to provide security?**

Ans: **Threats**

- a. Privacy
- b. Integrity
- c. Environmental damage
- d. Human threats
- e. Software threats
- f. Unauthorized access
- g. Computer viruses

#### **Security**

- a. Physical protection of machine and media.
- b. Giving passwords and users ID
- c. Using Licensed software
- d. Use of Cryptography
- e. Use of Spike busters and UPS

### **3) Explain the typical causes of computer failures.**

Ans: a. Break down of components.  
b. Excessive dust or humidity  
c. Virus  
d. Voltage fluctuation

e. Corrosion

#### 4) Write a note on Computer virus.

**Ans:** Viruses are collection of coded instructions which are self replicating. When a virus attaches itself to another file it infects it. They are normally inactive until infected program is run.

They are broadly classified into three categories.

- a. Boot infectors
- b. System infectors
- c. Executable program infectors

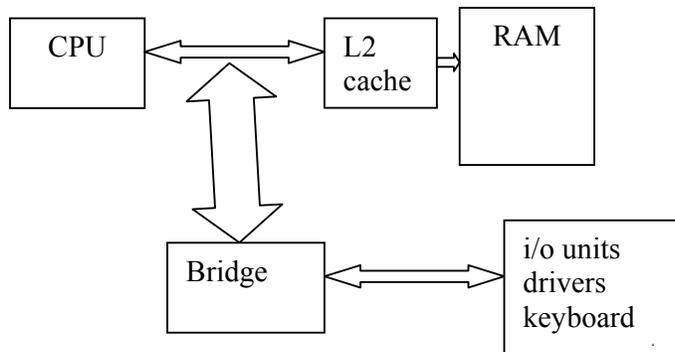
**Boot infectors: Create bad sectors.** They remain in the memory until the system is shutdown.

**System infectors** It infects the hard disk or: bootable floppies which may contain system files.

**Executable program infectors:** These are dangerous and devastating. They spread to almost any executable program attaching themselves to programming files.

#### 5. Explain the cache memory in detail.

**Ans:** Cache memory is a small and fast memory between CPU and main memory. It is extremely fast compared to normal memory. Transferring data between main memory and CPU causes delay because RAM is slower than CPU. Cache memory stores copies of data from most frequently used main memory locations. When processor needs to read from or write to a location in main memory, it first checks whether a copy of data is in the cache. If so processor immediately reads or writes to cache. Computers use multilevels of cache such as Level1(smallest)and Level2 cache.CPU resident cache is known as L1 or primary cache (16 to 32 KB) to 512 KB.Cache is also added to mother board also known as L2 cache (512 KB to 1024 KB). Higher end systems can have as much as 2 MB of L2 cache on mother board.



#### 6. Write a note on components of motherboard.

**Ans: 1) Bus :-**

- a. Address Bus
- b. Data Bus
- c. Control Bus

**2) Expansion slots:** They serve the purpose of adding functionality to the computer.

- a. ISA : Industrial standard architecture.
- b. PCI : Peripheral component interface
- c. AGP : Accelerated Graphic port.

**3) CACHE Memory:** It is a small fast memory that resides between CPU and main memory.

**4) CMOS** (Complementary Metal Oxide Semiconductor Battery )

**5) I-O Ports** ( Input –Output Ports ): Serial , Parallel , USB etc.,

#### 7. Explain the different factors affecting the processing speed of CPU.

- **Ans: CPU Speed/Clock speed:** Speed of CPU also known as clock speed. The clock speed is the number of instructions executed by the CPU in one second It is measured in megahertz(million instructions per second). The average speed of a new CPU is about 1000MHz to 4000 MHz.(1 to 4 giga hertz).
- **Instruction set:** The number of instructions decide the efficiency of a CPU. More the instructions , less efficient is the CPU and less the instructions, More efficient is the CPU.
- **Word size/Register size:** The size of registers determines the amount of data the computer can work with at a time. Normally it is 32 bits. Smaller the size of register, slower will be the computer. . It is also known as Word size. It varies from 16 bits to 128 bits.
- **Data bus capacity:** Width of a data bus determines the largest number of bits that can be transported at one time.
- **Cache Memory size:** Cache memory is a high speed memory. Greater the cache, faster a processor runs. Most modern processors can execute multiple instructions per clock cycle which speeds up a program. Some CPU's have storage for instructions and data built inside the processor chip . This is called internal cache or L1 cache memory.
- **Memory Size:** The amount of PRIMARY STORAGE (RAM) determines the size of program that can be kept in primary storage, which is faster than secondary storage. There by the speed of computer increases. The size of RAM varies from 64 MB to 4 GB.

### 8. Explain the General Structure of CPU.

**Ans: Program counter:** This register stores address of next instruction to be executed.

**Memory address register (MAR):** This register specifies address in memory where information can be found. This register is also used to point to a memory locations where information can be stored.

**Memory buffer register:** This register acts as an interface between CPU and memory. When CPU issues a Read Memory command, instruction is fetched and placed in MB register.

**Instruction register-**This stores a copy of current instruction.

**Instruction decoder (ID):** ID is an electronic hardware, which decodes instructions. The instructions are further broken down into a set of micro operations, so that they can be executed directly.

**General purpose registers:** They are used to store data. There are 6 GP registers. These are used for storage of data as needed by the program.

**Arithmetic logic unit:** The basic arithmetic operations such as addition,subtraction,multiplication and division are carried out here. These operations need atleast two operands, one which is stored in accumulator and the other in the MBR. After the manipulation of data in ALU, the result is transferred to accumulator.

**Accumulator:** During processing the intermediate data needed for future processing is stored in accumulator. The contents of ACC are used by ALU for operations and later by MBR holds the final result for further action.

**Chapter - 2 Problem Solving Techniques**  
**UNIT-B**

**I One Mark Question and Answer**

**1) Define Sorting.**

Ans. Sorting is a method of arranging data items in any order.

**2) What is searching?**

Ans: It is a process of locating an element stored in a file.

**3) Mention the different structured programming constructs.**

Ans: a. Sequence  
b. Selection  
c. Iteration

**4) What is stepwise Refinement?**

Ans: Is a process of breaking down the problem at each stage to obtain a solutions.

**5) Name the different searching methods.**

Ans: a. Linear Search  
b. Binary Search

**6) Define module.**

Ans: It is an independent set of statements, which can be called in another program.

**7) What is the main advantage of linear search method?**

Ans. It is simple and useful when the elements to be searched are not in any definite order.

**8) What is the other name of bubble sort?**

Ans: The bubble sort method is also called as sorting by exchange.

**9) What is structured programming?**

Ans: It is a method of using the concept of sequence , selection , iteration and modularity.

**10) Name the searching technique which requires sorted elements.**

Ans: Binary Search.

**11) What is top-down analysis?**

Ans: Solving a problem by breaking it up into smaller parts is called as top-down analysis.

**12) What is top-down approach called as?**

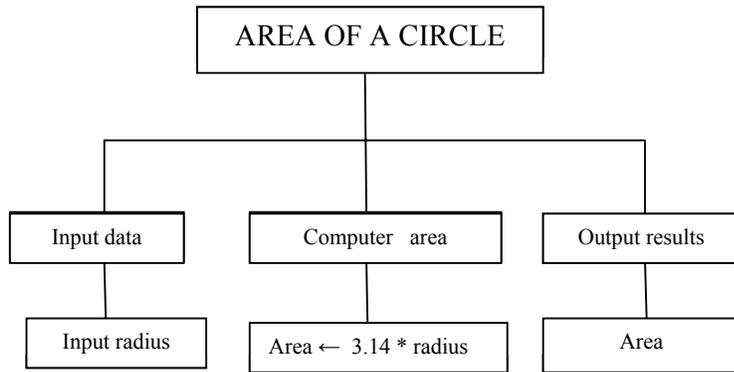
Ans: Top-down analysis is also called as stepwise refinement

**13) What is a module?**

Ans: Each program segment is called a module.

**II Two Marks Questions:**

1) Give an example for top-down analysis.



**2) Write any two characteristics of structured programming.**

- Ans: a) Modifications are limited to module  
b) Increases programmers productivity.

**3) Explain briefly the analysis of insertion sort method.**

- Ans: a. The first pass of the algorithm results in one comparison and in the worst case may result in one exchange also.  
b. The second pass results in two comparisons and in the worst case may result in two exchanges. Continuing the analysis we observe that as the iterations or passes increases the comparisons and exchanges increases. Finally the total number of comparisons will be equal to

$$\begin{aligned} &1 + 2 + 3 + \dots + (N - 3) + (N - 2) + (N - 1) \\ &= (N) * (N - 1) / 2 \\ &= O(N^2) \end{aligned}$$

**4) Explain any two properties of top-down approach**

- Ans: a. Code reusability  
b. Program maintenance

**5) What are the two objectives of sorting process?**

- Ans: a. The movement of data should be as minimum.  
b. The data should be retained in the main memory.

**6) Analyze the bubble sort method of sorting data**

- Ans: a. The first pass results in N-1 comparisons.  
b. The second pass results in N-2 and worst case results in N-2 exchanges. Continuing the analysis we observe that as the iterations increases the comparisons decreases.

$$\begin{aligned} &= (N-1) + (N - 2) + (N - 3) + \dots + 2 + 1 \\ &= N * (N - 1) / 2 \\ &= O(N^2) \end{aligned}$$

**7) Analyze the selection sort method of sorting data**

- Ans: a. The first pass results in N-1 comparisons.  
b. The second pass with N-2 comparisons. We observe that as the iterations or passes increases the comparisons decreases.

$$\begin{aligned} &= (N-1) + (N - 2) + (N - 3) + \dots + 2 + 1 \\ &= N * (N - 1) / 2 \\ &= O(N^2) \end{aligned}$$

**8) What are the advantages of structured programming?**

- Ans: a. Structured programs are easy to write as the programming logic is well organized.

b. Structured programs are easy to test and debug.

### III Five Marks Questions and Answers:

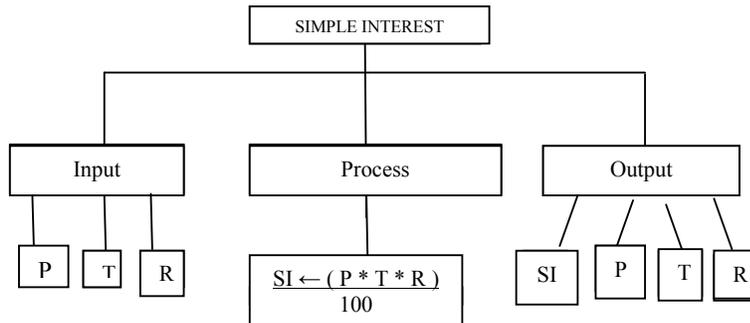
#### 1) **Mention the objectives of structured programming.**

- Ans: a. To produce error free program.  
b. To incorporate basic structured constructs.  
c. To eliminate use of GOTO Statements.  
d. To obtain a disciplined approach towards programming.  
e. To improve the flexibility of a program.

#### 2) **Explain top-down analysis with an example.**

Ans: The approach of dividing a problem into sub problems and dividing the sub problems until a solution is obtained is called top-down analysis.

Ex:



#### 3) **Write an algorithm to sort an elements using Insertion Sort.**

Ans: Algorithm for Insertion sort

- Step 1 : START  
Step 2 : Input N  
Step 3 : for I ← 0 to N -1  
    Read A [ I ]  
    ( end of I for loop )  
Step 4 : For I ← 1 to N -1 Do  
Step 5 : J = I  
Step 6 : While ( J >= 1 ) and ( A[J] < A [ J - 1 ] )  
Step 7 : TEMP = A [ J ]  
Step 8 : A [ J ] = A [ J - 1 ]  
Step 9 : A [ J - 1 ] = TEMP  
Step 10 : J = J - 1  
    [ end of While loop ]  
    [ end of step I For loop ]  
Step 11 : for I ← 0 to N -1  
Step 12 : Print A [ I ]  
Step 13 : Stop

Consider the elements

A[0]	20
A[1]	16
A[2]	4
A[3]	3

**Pass 1:**

A[1],A[0]>16,20,4,3

**Pass 2:**

A[2],A[1]> 16,4,20,3

A[1],A[0]>4,16,20,3

**Pass 3:**

A[3],A[2]> 4,16,3,20

A[2],A[1]>4,3,16,20

A[1],A[0]> 3,4 16,20

Sorted order is 3,4,16,20

**4) Explain bubble sort algorithm with example.**

Ans: Algorithm for bubble sort

Step 1 : START

Step 2 : Input N

Step 3 : for I ← 0 to N -1

Step 4 : Read ( A [ I ] )

( end of for loop )

Step 5 : for I ← 1 to N -1

Step 6 : for J ← 0 to N -I - 1

Step 7 : If (A[J] > A [J +1])

Temp ← A [J]

A [J] ← A [J + 1]

A [J + 1] ← Temp

[ end of if ]

[ end of J loop ]

[ end of I loop ]

Step 8 : for J ← 0 to N -1

Print A [J]

Step 9 : Stop

Consider the following elements: 50 , 20, 10 , 05

Pass 1			Pass 2		Pass 3
50	20	20	20	10	10
20	50	10	10	20	05
10	10	50	05	05	20
05	05	05	50	50	50

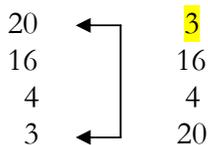
Sorted order is 5, 10, 20 , 50

**5) Explain selection sort with an example.**

Ans: Slection sort is based on finding the smallest element in the list and placing it at the first position. Then the next element is found and placed at the second position and so on.

Consider the elements 20,16,4,3

Pass 1:



**Pass 2 :**    3            3  
                  16   ←      4  
                  4   ←      16  
                  20            20

**Pass 3 :**    3            3  
                  4            4  
                  16   ←      16  
                  20   ←      20

**Sorted order is 3 , 4 , 16 , 20**

**Algorithm for selection sort:**

- Step 1 : START
- Step 2 : Input N
- Step 3 : for I ← 0 to N -1
- Step 4 : Read A [ I ]
- Step 5 : for I ← 0 to N -2
- Step 6 : S ← A [ I ]
- Step 7 : Pos ← I
- Step 8 : for J ← I + 1 to N -1
- Step 9 : If ( A[J] < S )
- Step 10 : S ← A [ J ]
- Step 11 : Pos ← J
- [ end of if ]
- [ end of J for loop ]
- Step 12 : A [ Pos ] ← a[ I ]
- Step 14 : A[ I ] ← S
- [end of I for loop ]
- Step 15: for I = 0 to N – 1
- Step 16: Print A[ I ]
- Step 17: Stop

**6) Explain Binary search algorithm**

Ans: This algorithm is used to search for an element in a sorted list. The value of the element in the middle of the list is compared with the value of the element to be searched for . If the middle element is larger, the desired element has to be in the upper of the list. If the middle element is smaller, the desired element has to be lower half of the list. The number of elements to be searched is reduced by half in every iteration.

**Algorithm for Binary Search:**

- Step 1: Low = 0
- Step 2 : High = N – 1
- Step 3 : Loc = -1
- Step 4 : While ( Low <= High ) Do
- Step 5 : M = ( Low + High ) / 2
- Step 6 : If (ele = A[M ] ) Then
- Step 7: Loc = M goto Step 12
- [ end if ]
- Step 8 : If (ele < A [M ] ) Then

Step 9: High  $\leftarrow$  M - 1  
 Step 10 : Else  
 Step 11 : Low  $\leftarrow$  M + 1  
           [ end of if ]  
           [ end of While loop ]  
 Step 12 : if ( Loc  $\geq$  0 ) Then  
 Step 13: Print “ ele , found , search successful ” , Loc  
 Step 14: else  
 Step 15 : Print “ Item not found , search Unsuccessful ”  
           [ end if ]  
 Step 16 : Stop

7) Write the steps involved in performing binary search operation to search an element 56 in the following numbers.

32	48	56	79	82	99
----	----	----	----	----	----

Ans: a.

32	48	56	67	79	82	99
0	1	2	3	4	5	6

Assuming ‘a’ is the name of the array

**initial values:**

$n = 7$

$low = 0$

$high = n - 1 = 6$

$mid = [ low + high ] / 2 = ( 0 + 6 ) / 2 = 3$

$S = 56$  [ search element ]

$a [ mid ] = 67$

Step 1 : Compare the element in a [ mid ] and search element 56  
67 is not equal to 56

Step 2 : Check whether search element comes after or before the mid index element  
Since  $56 < 67$  [ The search element is lesser than 67 , then the search element lies to the left of mid point ]

Step 3 : Change **high** =  $mid - 1 = 3 - 1 = 2$   
**mid** =  $( low + high ) / 2 = ( 0 + 2 ) / 2 = 1$

Step 4 : Compare a [ mid ] and S for equality

Step 5 : Since 56 is greater than 48 [ If ( S > a [ mid ] ) i.e.  $56 > 48$  ]

Step 6: Change **low** =  $mid + 1 = 1 + 1 = 2$   
**mid** =  $( low + high ) / 2 = ( 2 + 2 ) / 2 = 2$

Step 7: Compare a [ mid ] and S for equality. Since S and a [ mid ] are equal search is successful and the element is found at the location mid i.e. 2

**8) Write an algorithm to find the maximum in an array**

Ans: Step 1 : [Assume 1<sup>st</sup> element is the largest ]  
    large = A [ 0 ]  
Step 2 : POS = 0  
Step 3 : [ Find the largest element in the array and its position]  
    For I = 1 to N – 1 Do  
Step 4 : If ( A [ I ] > large ) Then  
Step 5 : large = A [ I ]  
Step 6 : POS = I  
    [ End if ]  
    [ End of step 3 for loop ]  
Step 7 : [ Print the largest and its position]  
    Print “ Largest = “ , large , “ position = “ , pos  
Step 8: Exit

**9) Write an algorithm to find the minimum in an array**

Ans: Step 1 : [Assume 1<sup>st</sup> element is the smallest]  
    small = A [ 0 ]  
Step 2 : POS = 0  
Step 3 : [ Find the smallest element in the array and its position]  
    For I = 1 to N – 1 Do  
Step 4 : If ( A [ I ] < small ) Then  
Step 5 : small = A [ I ]  
Step 6 : POS = I  
    [ End if ]  
    [ End of step 3 for loop ]  
Step 7 : [ Print the smallest and its position]  
    Print “ smallest = “ , small , “ position = “ , pos  
Step 8: Exit

**10) Explain linear search method with an algorithm.**

Ans: Step 1 : START  
Step 2 : input N  
Step 3 : for I ← 0 to N -1  
    Read A [ I ]  
Step 4 : Loc = -1  
Step 5 : For I = 0 to N- 1 do  
Step 6 : If ( ele = A[I]) Then  
Step 7: Loc = I  
Step 8 : Goto step 9  
    [ end if ]  
    [ end for ]  
Step 9 : If ( Loc > = 0 ) then  
Step 10: Print “ ele Found in location “ , Loc  
Step 11: else  
Step 12: Print “ ele not found ”  
Step 13 Stop

## **UNIT C-CHAPTER 3**

### **C PROGRAMMING**

#### **ARRAYS**

#### **Questions carrying one mark:-**

1) What is an array?

An array is a group of data of the same data type stored in successive storage locations.

2) How are elements of an array accessed?

Elements of an array are accessed using subscripts.

3) What is a subscript?

A subscript or an index is a positive integer value that identifies the storage position of an element in the array.

4) Which is the smallest subscript?

0

5) How many subscripts does a one and two dimensional array have?

one dimensional array has one subscript and a two dimensional array has two subscripts( row and a column subscript).

6) Write the syntax for declaring a one dimensional array.

syntax: datatype arrayname [size];

7) Write the syntax for declaring a two dimensional array.

Syntax: datatype arrayname [row size] [column size];

8) What do you mean by initializing an array?

Initializing of an array means storing data in to an array at the design time.

#### **Questions carrying 2 marks:-**

1) How one dimensional array is initialized?

The initialization can be done two ways –

- Initialization at design level- in this method of initialization the data values are stored in to the array at the time of array declaration. Ex: int a [0]={10,-50,20,300,5};
- Initialization at run time- to initialize an array at run time means to input data values in to the array at the time of execution of the program. Ex: int a[10];  
For (i=0;i<10;i++)  
Scanf(“%d”,&a[i]);

2) How to output the elements of one dimensional array?

To print elements of an array a for loop is used.

```
Ex: int a[10];  
For(i=0;i<10;i++)  
Printf(“%d\n”,a[i]);
```

3) How two dimensional arrays are initialized?

- initialization at design time- the data element are stored in to the array at the time of declaration of the array. The elements of each row and each column are represented within the pair of flower brackets. Ex: `int a[3][3]={1,3,5,3,7,82,5,8};`
- initialization of the array at the time of execution- to input data in to two dimensional array, two for loops are used foe every value of the outer loop index.

The inner loop is executed a specified number of times. Ex: `int a[4][5];`

```
For(i=0;i<4;i++)  
For(j=0;j<5;j++)  
Scanf(“%d”,&a[i][j]);
```

4) How do you print a matrix? Give ex.

A two dimensional array can be printed as follows-

```
Int a[3][4];  
For(i=0;i<3;i++)  
{  
For(j=0;j<4;j++)  
{  
Printf(“%dt”,a[i][j]);  
}  
Printf(“\n”);  
}
```

## STRINGS

### Question carrying one mark:-

1) What is a string?

A string is a sequence of one or more characters.

2) Write the syntax for declaration of a string.

syntax: `char arrayname [size];`

Ex: `char str [100];`

3) State the difference between a null character and a null sting.

A null character indicates the end of the string.

A null string is a string with zero characters or no characters.

4) Which header file is needed to perform string operation?

```
#include<string.h>
```

5) Which header file is needed to perform character operations?

```
#include<ctype.h>
```

6) Write an example for string initialization.

```
char str[100] = {"MYSORE CITY"};
```

7) What is the difference between gets() and scanf() function?

gets() function receives a string input up to the end of the line or a new line character. This means the string may have blank spaces and punctuations.

scanf() function accepts a string only up to the first blank space or punctuation.

### Question carrying 5 marks :-

1) Explain the various string operations with examples.

(note: Write any 5 string operations with syntax and example)

- strupr() – this function converts a string to upper case.

syntax: strupr(str1);

Ex: strupr("hello world")= HELLO WORLD

- strlwr() – this function converts a string to lower case.

Syntax: strlwr(str1)

Ex: strlwr("BANGALORE")=Bangalore

- strlen() – this function returns the length of the string. The function returns the number of characters in the strings.

Syntax: strlen(str1)

Ex: strlen(" hello world")=11

- strcat()- this function concatenates(combines) two or more strings in to a single string.

strcat(str1,str2)

Ex: x="beau" y="tiful" strcat(x, y)=beautiful

- strrev()-this function reverses the string.

Syntax:strrev(str1)

Ex: strrev("hello")=olleh

- strcpy()-this function copies a string to a variable.

Syntax:strcpy(str1,str2)

Ex: strcpy(x,"moonlight") x="moonlight"

- strcmp()- this function compares the two strings and returns the ascii difference between the two strings. This is case sensitive.

Syntax:Strcmp(str1,str2)

Ex: strcmp("their","there")=-9

- `strcmpi()`- this function compares specified number of characters from both the strings and returns a value. This function is case insensitive.

Ex: `strcmpi("There", "there")=0`

2) Explain the various character functions with example.

**(when a question is asked for 5 marks ,write any 5 functions with example)**

- `tolower()`- this function convert a character to lower case. Ex: `tolower('A')=a`
- `toupper()`- this function converts a character to upper case.  
Ex: `toupper('b')=B`
- `toascii()`- this function converts character to its ascii equivalent. The output is an integer.  
Ex: `toascii('a')=65`
- `isalpha()`- this function checks if a given character is an alphabet or not.  
Ex: `isalpha('a')=true isalpha('*')=false`
- `isdigit()`- checks if a given character is a digit or not.  
Ex: `isdigit('8')= true isdigit('I')=false`
- `isspace()`- checks if a given character is a white space or not.  
Ex: `isspace(' ') =true isspace('%')=false`
- `ispunct()`- checks if a given character is a punctuation or not.  
Ex: `ispunct('?')=true ispunct(' ') =false`
- `islower()`-checks if a given character is in lower case or not.  
Ex: `islower('a')=true islower('L')=false`
- `isupper()`-checks if a given character is in uppercase or not.  
Ex: `isupper('M')=true isupper('h')=false`

## FUNCTIONS

### Questions carrying one mark:-

1. What is a function?

A function is a small segment of the program(sub program) designed to perform a specific task and return a result to the main or calling program.

2. What are the different types of functions supported in “C” language?

C supports two types of functions. They are

1. Built-in / Library functions
2. User defined functions

3. What are library functions?

Some of the operations are programmed and stored in C library so that they can be called in the program. These functions are called as **library functions**.

Eg : `printf()`, `sqrt()`, `pow()`

4. What is a user defined function?

A user-defined function is a complete and independent program unit, which can be used(or invoked) by the main program or by other sub-programs.

5. Mention the need for a function

If there are a number of statements that are repeatedly needed in the same program at different locations,then a function may be used.

6. What do you mean by a calling function?

Once the function is created it can be called from the main program or from any other function. This main program or the function which calls another function is called **calling function**.

7. What is a called function?

The user-defined function which is called by the main program or from any other function is known as **called function**.

8. What does the **return-type-specifier** of a function identify?

It identifies the type of value, which will be sent back after the function has performed its task (eg: **int, float**).

9. Why is the return type void used?

The return type **void** is used if the function does not return any value to the calling function.

10. What is an argument?

Information or values are passed to the function through special identifiers are called **arguments**.

11. What are actual parameters?

The arguments (values) which are passed to the function when a function call is made are called **actual parameters**.

12. What are formal parameters?

The arguments which are used in the argument list of the function header to receive the values from the calling program are called **formal parameters** or **dummy parameters**.

13. Give the syntax of a function call?

A function call has the following syntax:

**variable = function\_name(arg1,arg2...);**

where arg1, arg2... are the actual parameters.

14. How is a function invoked?

A function is invoked(or called) through an output statement or through an assignment statement by using the function name followed by the list of arguments.

Ex: `p = prod(x, y);`

15. What is the use of the **return** statement?

The return statement is used in the body of the function which contains the value that has to be sent back to the main program.

16. Give the syntax of return statement?

The return statement can take one of the following forms

`return;`

Or

`return(expression);`

The first form does not return any value, where the second function returns the value of the expression.

17. What are local variables?

Variables declared inside a block or function are said to belong only to that block and these are called as **local variables**. Values of these variables are valid only in that block.

18. What are global variables?

Variables declared before the main function block are called **global variables**. Values of these variables are available in every block of that program.

19. What is function prototype?

A function must be declared before it is actually called. The declaration of a function is known as function prototype.

20. Give the syntax of a function prototype.

**return-type function-name (type1, type2);**

Ex: `float power(float, int);`

21. Define the term recursion.

A function which calls itself directly or indirectly again and again until a condition is satisfied is called as recursive function. This process is called **recursion**.

22. How do we pass an entire array to a function?

To pass an entire array to a called function only the array name without a subscript is used as argument(actual parameter).

Ex: `void main( )`

```
{  
  int a[100], n;
```

```
.....
```

```

    sort(a, n);      (where sort is the function name)
}

```

23 What is meant by scope of a variable?

1. The name of the variable.
2. The amount of space required to store that variable.
3. Address of the memory location.
4. The possible operations, which can be performed with the variable.

24. What are storage classes?

A storage class refers to the scope and life time of a variable i.e., the portion of program where the variable is valid and how long a variable can retain its value is defined in the storage class.

25. What are the different types of storage classes?

- Ans: 1. Automatic storage class  
 2. External storage class  
 3. Static storage class  
 4. Register storage class

26 does Register variable have address?

Ans: No. (CPU registers do not have addresses).

**TWO marks questions**

1. Give the differences between library functions and user-defined functions.

Library functions	User-defined functions
i. Some of the operations are programmed and stored in C library so that they can be called in the program. These functions are called as <b>library functions</b> . ii. Library functions are <b>in-built</b> functions.	i. Large programs can be broken down into smaller sub programs or modules. These sub programs are called <b>user-defined functions</b> . ii. User-defined functions are <b>created</b> by the user.

2 . What is a function call? What is the syntax of a function call?

To execute a function we will have to call the function. A function call establishes a link between the called function and the calling program.

A function call has the following syntax:

**variable = Function\_name (arg1, arg2...);**

where arg1, arg2... are the actual parameters.

3. Why is the return statement is required in a function body?

When a function is called control is transferred from the calling function (main program) to the called function (sub-program). The statements of the called function are executed and finally the called function is terminated and sends the required result back to the calling function. The return statement is used to send the result from the function to the main program, thus terminating the called function.

The syntax is:     return;

Or

return(expression);

The first form does not return any value, where the second function returns the value of the expression.

4. What is a function prototype? When is a function prototype necessary?

The declaration of a function before it is used is called as **function prototype**. A function prototype contains the data type of arguments sent as input to the function and data type of the result sent back from the function

**Syntax: data\_type function\_name(data\_type1,data\_type2,...);**

Ex: float power(float, int);

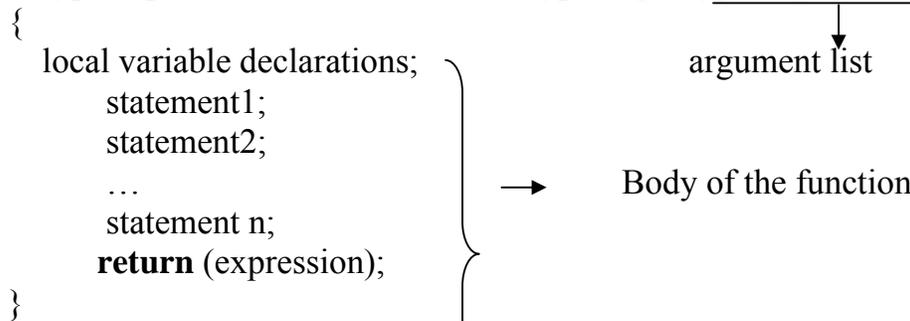
### 5 mark questions

1. Explain user defined function with an example

User defined function is a subprogram that is called by a main() function or any other function.

A user defined function may appear before or after the main() function. The general syntax of function definition is as follows:

**Return\_type\_specifier Function\_name (type arg1, type arg2....)**



Return data type- indicates the data type of variable sent back from called function to calling function

Function name- indicates the name of the function .It is an identifier

Argument list- list of input variables and their datatypes received from calling function

Local variable declaration-list of data that required only for the function block in which they are declared.

Body of the function-It includes declaration part (local variables) and a set of executable statements which will perform the required task.

Return statement- indicates termination of function and transfer of control from called function to calling function

Ex:

```
int sum(int a,int b)
```

```
{  
    int c;  
    c=a+b;  
    return(c);  
}
```

2. Mention different types of functions. Explain any one(or any specific type may be asked)

**Note: The explanation should include syntax and example**

The different types of functions are

1. functions with no input and no return value
2. functions with input and no return value
3. Functions with input and return value
4. Recursive functions

1. functions with no input and no return value- In this type of functions ,the user defined function does not receive any input and does not send back any result to the calling function.

Syntax:

Calling function	ACTION	Called function
<pre>Void main() { .....; F1(); .....; .....; }</pre>	<p>No input</p> <p>→</p> <p>←</p> <p>No return value</p>	<pre>F1() { .....; .....; return; }</pre>

Ex:

```
void main()
{
void msg();
msg();

}
msg()
{
printf("hello world\n");
}
```

2. functions with input and no return value- In this category of functions, the called function receives one or more input values, but does not send any output(return value) to the calling function

Syntax:

Callin function	ACTION	Called function
<pre>Void main() { .....; F1(a,b); .....; .....; }</pre>	<p>Input data</p> <p>→</p> <p>←</p> <p>No return value</p>	<pre>F1(int p,int q) { .....; .....; Return; }</pre>

Ex:

```
void main()
{
    void sum(int,int);
    int a,b;
    scanf(("%d%d",&a,&b);
    sum(a,b);

}
void sum(int p, int q)
{
    int r;
    r=a+b;
    printf("sum of two numbers=%d\n",r);
    return;
}
```

3. functions with input and return value- In this category of functions ,the called function receives one or more inputs and sends a return value to the calling function

Syntax:

Callin function	ACTION	Called function
<pre>Void main() { .....; X=F1(a,b); .....; .....; }</pre>	<p>Input data</p> <p>→</p> <p>←</p> <p>return value</p>	<pre>Int F1(int p,int q) { .....; .....; Return(v1); }</pre>

Ex:

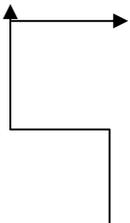
```
void main()
{
    int sum(int,int);
    int a,b,X;
    scanf(("%d%d",&a,&b));
    X=Sum(a,b);
    printf("sum of two numbers=%d\n",X);
}
```

```
int sum(int p, int q)
{
    r=a+b;
    return(r);
}
```

4. Recursive functions- recursion is the process of a function calling itself until a condition is satisfied.

Syntax:

F1()



```

{
................................................................;
................................................................;
................................................................;
}
Return(F1);
}

```

Example:

```

void main()
{
    int fact(int);
    int n;
    scanf("%d",&n);
    printf("factorial=%d\n",fact(n));
    getch();
}
int fact(int m)
{
    if(m==0)
        return(1);
    else
        return(m*fact(m-1));
}

```

3. Define the following a)Actual parameters b)formal parameters c)global variables d)local variables

### Actual parameters

When a function is called from main program(calling function), the **function call** contains a list of data(variables) that are sent as input to the called function. Such data are called as actual parameters or actual arguments.

Ex:

X=test(p,q,r);

p,q,r are actual arguments

### Formal parameters

The function header of a called function contains a list of data along with their data

types. This list of data are known as formal parameters. The formal parameters receive their value from actual parameters.

- The formal parameter values are available only as long as the function is being executed.
- For every actual argument there must be a formal argument of the same data type.
- Any changes made to the formal parameters in the called function do not change the actual parameters. Once the function is terminated the formal parameters are not available any more.

Ex: `Int prod(int m, int n)`       $\longrightarrow$ function header

### **Local variables**

Local variables are the data declared within a user defined function and available only within that function.

Ex:

```
int sum(int a, int b)
{
    int r;
    .....
    .....
}
```

### **Global variables**

Global variables are the data that are declared before the main program and that are available to the main program as well as the functions that are called from the main program.

```
int p,r;
void main()
{

}
}
```

4. What are storage classes? Mention different types of storage classes. Explain  
A storage class refers to the scope of data in a program. Scope of data means the

portion of the program in which the variable is valid(mian() as well as sub programs) and lifetime of the variable.i.e., the length of time to which the variable retains its value.

A variable must belong to any one of the following storage classes.

1. Automatic storage class
2. External storage class
3. Register storage class
4. Static storage class

### **Automatic storage class**

Automatic storage class is similar to local variable declaration

Key word **auto** precedes the declaration

Ex:

```
auto int x,y,z;
```

- Automatic variables are local variables
- The variables are stored in memory(RAM)
- The key word auto is implicit(it means even without the word auto the variable is automatic)
- Initial value stored is junk

### **External storage class**

External storage class is similar to global variables.

Keyword extern precedes the declaration

Ex:

```
Extern int m,n;
```

- Scope of the variable is global
- The variables are stored in memory
- Needs explicit(must use the keyword)declaration
- Initial value stored is junk

### **Register storage class**

Register storage class is used when data is needed in cpu registers

Key word **register** must precede the declaration

Ex:

```
register int x,y;
```

- Scope of the variable is local
- The variables are stored in registers
- Needs explicit declaration
- Initial value is not known

## Static storage class

Static storage class is used in function blocks. The static variable can be initialized exactly once when the function is called for the first time. For subsequent calls to the same function, the static variable stores the most recent value.

Key word static precedes the variable declaration

Ex: static int x,y,z;

- Scope of the variable is local
- The variables are stored in memory
- Needs explicit declaration
- Default Initial value is stored is 0.

## POINTERS

### Questions carrying one mark:-

1) What is a pointer?

A pointer is a dynamic variable that stores address of a data value in a program.

2) How is a pointer declared in a c program?

syntax: datatype \* pointer name;

Ex: int \*p1,x=230;

3) Name the operators used in pointers?

\* and & operators

4) How is a pointer initialized . give an ex.

Initializing a pointer means storing the address of the data variable in to a pointer.

Ex: p1=&x;

5) What is meant by a pointer to an array?

A pointer to an array stores address of the 1<sup>st</sup> data element of the array.

Ex: int \*p1,a[4];

P1=a; or p1=&a[0];

6) If ptr is a pointer to an integer what is the meaning of an expression ptr++; ?

ptr++; will increment the pointer and will make the pointer store address of next data element in the array.

7) What is meant by an array of pointers?

An array of pointer means a pointer array where every individual data is a pointer variable that holds an address.

Ex: int\*p1[10],a[10],b[10],c[10];

P1[0]=&a[0];

P1[1]=&b[0];

P1[2]=&c[0];

8) Is it possible to add two pointers?

no.

### Question carrying two marks:-

1) With an example discuss the operators used with pointers.

- \* indirection operator. This operator is used to declare a pointer.
- &- address operator. This operator is used to locate the address of a pointer.

EX: int x=245,\*ptr;

Ptr=&X;

- Ptr- stores address of X
- X-value stored=245
- &X-address of X
- \*ptr- contents of location whose address is stored in ptr(245)
- 

2) Which operations are not possible with pointers?

It is **not** possible to perform arithmetic operations such as addition(+), subtraction(-), multiplication(\*), division(/) with pointers.

### Questions carrying 5 marks:

1) Explain call by value and call by reference with example.

call by value- when a function call is given, a relationship is established between actual and formal parameters. A temporary storage is created for formal parameters to store the data(actual parameters) received as input from calling function. This process of data transfer from actual parameter to formal parameters is known as call by value.

Ex: void main()

```
{ int a=20,b=30,x;
```

```
Int fl(int,int);
```

```
-----
```

```
X=fl(a,b);
```

```
-----
```

```
Getch();
```

```
}
```

```
Int fl(intp, intq)
```

```
{
```

```
p=p+p;
```

```
q=q+q;
```

```
return(p+q);
```

```
}
```

Call by reference- when a function is called, the address of variables are passed on to the called function. The parameters receiving the address should be pointer variables. This concept of sending the address of data from calling function to pointer variables in the called function is known as call by reference.

```

Ex: void main()
{
int a=10,b=15,c=20;
-----
X=f1(&a,&b,&c);
-----
getch();
}
int f1(int*p1, int *p2, int *p3)
{
*p1=*p1+10;
*p2=*p2+5;
}

```

## STRUCTURES AND UNIONS

### Questions carrying one mark

1) What is a structure?

A structure is a group of data of different data types.

2) What is meant by structure template?

A structure template contains definition of a structure name and a list of members along with datatypes.

3) What is meant by structure declaration?

Declaration of a structure means memory storage is allotted to every structure variable.

4) Which operator is used to access the structure elements?

dot (.) operator

5) Write the syntax for structure definition

syntax:

```

struct structurename
{
    Datatype member1;
    Datatype member2;
    .....
};

```

6) Write the syntax for structure declaration.

syntax: struct structurename v1,v2,v3.....;

7) Which is the reserved word which is used in structure definition ?

struct

8) What are unions?

A union is a group of data of different data types all of which share a common storage location.

9) Write the syntax for union definition declaration.

```
    syntax: union unionname
{
Datatype member1;
Datatype member2;
.....;
};
```

10) Write the syntax for union declaration.

=: syntax: union union name v1,v2,v3,.....;

### Questions carrying 2 marks:

1) How structures are initialized? give ex.

A structure can be initialized at design time as follows

Ex: struct student

```
{
Int reg no;
Int age;
char name[20];
};
Struct student s1={223,17,"sinduma"};
```

2) What are nested structures?

A structure built within another structure is called as nested structure.

Ex: struct dob

```
{
Int day;
Int month;
Int year;
};
Struct student
{
Int reg no;
Char name[20];
Struct dob date;
}s1;
```

3) What is meant by an array of structures?

An array of structures contains data elements of every structure variable stored in to an array.

```
Ex: struct student
{
Int reg no;
Int age;
Char name[20];
}s[15];
```

**Questions carrying 5 marks:-**

1) Write the differences between structures and arrays.

Structures	Arrays
1) Definition and declaration of program in structures are different.	1) Definition and declaration of program in arrays are the same.
2) a structures is a group of data of different data types.	2) An array is a group of data of same data types.
3) Nested structures are also accessed in structures.	3) No nested arrays are used in arrays.
4) Structure members are accessed by using dot (.) operator.	4) Index is used to access data in arrays.
5) In structures, we use a reserved word like struct.	5) In arrays, we do not use any reserved word.

2. Explain structures with an example

A structure is a group of data of different data types. A structure must be defined before it is declared. A structure template is created during structure definition. Once the definition is given, structure may be declared. Memory is allotted to a structure only after declaration.

Syntax for structure definition:

```
struct structurename
{
Datatype member1;
Datatype member2;
.....
};
```

Example for structure definition:

```
Struct student
{
int regno;
Char name[20];
Int age;
};
```

Syntax for structure declaration:

```
Struct <structurename> v1,v2,v3,.....;
```

Ex: struct student s1,s2,s2;

To access the members of a structure .(dot) operator is used

Ex:

```
scanf(“%d%s%d”,&s1.regno,s1.name,s1.age);
```

## FILES

### Questions carrying one mark:-

1) What is a file?

A file is a collection of data that is available in permanent storage.

2) Write the syntax for file declaration.

syntax: FILE \*filepointer;

Ex: FILE \*fp;

3) What are modes in file?

Mode tells about the types operations like read,write or append that can be performed on a file that is being opened.

4) Write the syntax to open a file.

syntax: filepointer=fopen(FILENAME,MODE);

Ex: fp=fopen(“in.dat”,r);

5) What is the significance of fclose() function?

This function closes a file that has been opened for an operation. Syntax:

fclose(filepointer);

Ex: fclose(fp);

### Question carrying 5 marks:-

1) Explain the different modes in which a file can be opened.

**(write any 5 when the question is asked for 5 marks)**

Mode	Action
1)r	1)opens a file for reading
2)w	2) opens/creates a new file for writing
3)a	3) opens a file for appending data or creates a new file
4)r+	4) opens a file for read and write
5)w+	5) creates a new file for read or write
6)a+	6)opens a file for read or write or creates a new file
7)rb	7)opens a file for reading in binary
8)wb	8) creates a new file for writing in binary
9)ab	9) Opens a binary file for read, write or creates a new file.
10)rt	10) opens a text file for reading
11)wt	11) opens a text file for writing
12)at	12) Opens a text file for read, write or creates a text file.

2) Explain the following functions in a c program fscanf(), fprintf(), fgets(), fputs(), fread(),fwrite(), feof()

**fscanf()-** This function is used to read data from a file.

**Syntax:** fscanf(filepointer,"format specifier",&v1,&v2,...);

**Ex:** fscanf(fp,"%d%d%d",&a,&b,&c);

**fprintf()-** this function is used to write data in to a file.

**Syntax:** fprintf(fileprinter,"format specifier",v1,v2,...);

**Ex:** fprintf(fp,"%d\t%d\t%d\t",a,b,c);

**fgets()-** this function reads s string from a file.

**Syntax:** fgets(string variable,size,filepointer);

**Ex:** fgets(str,40,fp);

**fputs()-** this function is used to write a string in to a file.

**Syntax:** fputs(string variable,size,filepointer);

**Ex:** fputs(str,40,fp);

**fread()**- this function is used to read data into a structure from a file.

**Syntax:**

fread(&structure variable,size of(struct structurevariable),1,filepointer);

**Ex:** fread(&s,size of(struct s),1,fp);

**fwrite()**-This function writes a structure in to a file.

**Syntax:**

fwrite(&structure variable,sizeof(struct structure variable),1,filepointer);

**Ex:**fwrite(&s,sizeof(struct s),1,fp);

**feof()**- this function returns a value true or false. When a file is being read, if there is no more data in the file, then feof() function returns a value true. When a file is being read, if there is more data in the file then the function returns a value false.

\*\*\*\*\*

## INFORMATION SYSTEMS AND DATABASE OPERATIONS

### What is Data?

Data is the basic element in any computer processing. Data is a raw (unprocessed) fact or collection of facts and figures or an observation. It may be number, an alphabet, or a sequence of characters.

For example 25, A, Sanjana etc.

### What is Information?

Information is a processed data and has an implicit meaning. Information is a structured data. It is useful for decision making.

Explain types of Information.

1. Strategic information
2. Tactical information
3. Operational information
4. Statutory information

#### 1. Strategic Information:

- It is needed for long-term business goals and objectives.
- This directs the prospects of the business.
- Organizations aim for expanding their business, increasing the sales and profits, enhancing their customer base, building their band, and grabbing the market capital.
- The marketing team observes the trends of the business and collects the sampling data and arrives at strategic information.

#### 2. Tactical Information:

- This type of information is needed for short term business goals and objectives.
- This information helps managers to make valid decisions to run the business efficiently and effectively.
- In a small business organization, information on fast moving goods may be used to make tactical decisions. Tactical information is obtained from the day-to-day transactions.

### 3. Operational information:

- It is required for daily business operations. Such as list of items which is out of stock. This information can be used to trigger the purchase department to purchase those items and fill in the inventory.  
Eg : The information like list of customers who have not paid even after the due date would be used to send the reminders.
- Operational information is obtained from the data processing group in the organization.

### 4. Statutory information:

- This information is provided by the Government as the regulation to be followed by the organizations.
- Organizations must communicate to the government authorities about the results of their revenue, profit and stock holder benefits such as dividend and bonus.
- The data processing system would provide the required information.

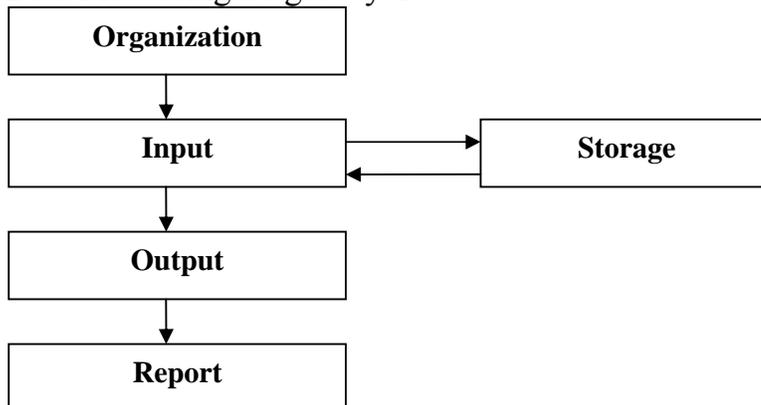
### What is data processing?

- It can be defined as the process of collecting, storing, organizing and manipulating a huge amount of data in a specific transaction.
- The result of data processing is structured information that enables the managers to make valid decisions.
- It helps the organizations in managing the resources effectively and efficiently.
- 

### What is data Processing System?

A system which includes the resources such as people, procedure and devices that are used to accomplish the processing of data for producing desirable output

### Explain Data Processing Stages /cycle:



Different Stages of data processing cycle

It has 3 important stages in producing useful information.

They are

1. Input
2. Processing
3. Output

Input:

- This is the first stage in data processing. It indicates the facts or observations collected, prepared and entered into the computer.
- Once such data is fed into the computer, it performs certain operations as desired and produces the results.

Three steps involved in input stage of data processing.

1. Data collection
2. Data preparation
3. Data entry

Data Collection:

- Is a process of collecting and gathering of data from different sources.
- A survey conducted to gather some important data or observations.

Data Preparation:

- Is a process of creating the documents for further processing. In this step, the data collected is put into a data sheet.

Data entry:

- Is a process of entering data into the computer for data processing. The data may be entered into the computer through various input devices such as keyboard, optical scanners or magnetic character recognizers.
- Eg: To generate marks report of the student, collect roll-no, name, each subject marks

Processing:

The data entered has to be processed. This process involves the following five steps.

1. Storage
2. Retrieval
3. Categorization
4. Organization
5. Updation

1. Storage: is a computer memory where data is stored permanently for future processing. The data may be stored on a magnetic tape, hard disk or optical disks.

2. Retrieval: is a process of getting the desired data from storage. There are a set of commands which will help accessing memory and fetching data for processing.

3. Categorization: is a method, which classifies data into most recent and least recent data. The data can be old or new.

4. Organization: is a process of arranging data in a specific manner. Data can be arranged in an ascending order or in a descending order. This process is also called sorting.

5. Updation: is a process of adding new data or deleting unwanted records.

For example

- i) When a new batch of students get admitted to the course, data pertaining to this batch is added to the student information system and when someone discontinues the course, his/her records are deleted from the system.
- ii) To generate marks report, to calculate total, average, grade etc.

Output:

This is the process of getting the results printed on paper. (Printout)

The printout can be obtained in the following 2 steps.

1. Report generation
2. Inquiry generation

Report generation:

Is a process of providing the hard copy output.

For eg: after the examination, the results can be printed on paper.

Inquiry response:

is a process of providing an individual report on inquiry.

For eg: Inquiry about those students who have got distinction, first class, second class and so on.

.....

Files and File organization:

Files are the backbone of any data processing and database management system. They are used to store business data and records.

Data file: is a collection of logically related records.

Record: is a collection of related data fields.

Field: is a piece of information or data item.

Eg: name, age etc.

What is database?

A database is a collection of logically related data

What are the File Operations?

The following are the types of file operations required to process records stored in the files.

1. File creation
2. Location a record
3. Adding a record
4. Deleting a record
5. Modifying a record

Types of Files:

- Master file
- Transaction file

Write the difference between Master file and Transaction File

Master File	Transaction File
1) The data stored in these files are permanent by nature	1) The data stored in these files are temporary by nature
2) This file is empty while nature	2) This file contains data only for period of time and send to the master file
3) This files are updated only through recent transactions	3) Any data to be modified is done in this file
4) This file stores large amount of data Eg: customer ledgers, student database	4) In this file the data to be modified is stored . Eg: price of the products, customers order for the products, inserting new data to the database etc.

#### FILE ORGANIZATION:

It refers to the way of arranging the records in a file which can be accessed in a faster way.

. The criteria considered in choosing a file organization are:

- 1) Fast access to single record or collection of related records.
- 2) Easy record adding/ update/ removal without disrupting.
- 3) Storage efficiency
- 4) Redundancy as a warranty against data corruption.

The files are generally viewed as

- Logical File organization: The groups of fields which are combined to form logical record, which can perform different operations on the file.
- Physical file organization: The data which is stored in the form of records can be placed in any storage devices, main memory, secondary memory etc.

Explain types of File Organization:

- 1) Sequential Access File Organization
- 2) Direct Access File Organization
- 3) Index Sequential Access File Organization

Sequential Access File Organization:

- 1) All records are stored in a sequential order.
- 2) That is, the records are arranged in the ascending or descending order of a key field.
- 3) Eg: a) In a student information system, the file would contain roll number, name, division, marks obtained in the examination.  
b) In a payroll application, the records are stored with employee number as a key field.
- 4) To locate a particular record in such file organization, we have to start searching from the beginning of the file until it is found in the file.
- 5) It is time consuming process.
- 6) Normally created and maintained on magnetic tapes. Eg: Audio Cassettes.
- 7) There is no need for any storage space identification

Advantages:

- 1) Simple to understand
- 2) Easier to organize, maintain

- 3) Economical
- 4) Error in files remain localized

Disadvantages:

- 1) Entire file has to be processed
- 2) Transactions must be sorted in a particular sequence before processing
- 3) Time consuming searching
- 4) High data redundancy
- 5) Random enquiries are not possible to handle

Direct Access File Organization (Random Access or relative file organization):

- 1) Also known as Random Access or relative file organization.
- 2) Records are stored in Direct Access Storage Device(DASD). Such as magnetic disk(Hard disks).
- 3) For direct access, the file is viewed as numbered sequence of blocks or records.
- 4) These blocks or records are taken as key for accessing the desired information randomly.
- 5) It allows arbitrary (random) blocks to be read or written.
- 6) It is useful for immediate access to large amount of information. They are often used in accessing large databases.
- 7) This technique is called as hashing

Advantages:

- 1) Immediate Access of the desired records.
- 2) No sorting of the records is required.
- 3) Faster updating of several files.
- 4) Helps in online transaction processing system like online reservation systems.

Disadvantages:

- 1) Data may be accidentally erased or over-written unless special precautions are taken
- 2) Backup facility is needed
- 3) Expensive- hard disks are needed to store the records, it is expensive
- 4) Less efficient as compared to sequential file organization in the use of storage space
- 5) Only one key is used
- 6) Cannot be accessed sequentially

Index Sequential access file organization(ISAM)

- 1) This file organization is a synthesis of the above two file organizations.
- 2) It combines the positive features of both the sequential and direct access file organizations.
- 3) Here records are stored randomly on a direct access device such as magnetic disk by a primary key. Hence, we can access data either sequentially or randomly using the index. The index is stored in a file and read into memory when the file is opened.
- 4) It may have multiple keys. These keys can be alphanumeric
- 5) The key upon which the data records are ordered is called the primary key.
- 6) Other keys are called alternate keys

Advantages:

- 1) Multiple keys – are also alphanumeric in nature
- 2) Both sequential and random access is possible
- 3) Accessing of records is fast, if the index table is properly organized

Disadvantages:

- 1) More storage space is needed because of the presence of Index
- 2) Less efficient in the use of storage space as compared to other file organizations
- 3) It requires special software, i.e expensive.



# DBMS

What is DBMS?

DATABASE MANAGEMENT SYSTEM is a software used for management, maintenance and retrieval of data stored in a database.

Eg : Oracle, MS-Access, Sql server etc.

What is primary key?

It is a set of one or more attributes that uniquely identifies tuple within a relation

What is candidate key?

All attribute combinations inside a relation that can serve as primary key are called candidate key

Eg : phone no, regno etc

What is Alternate or secondary key?

A candidate key that is not the primary key is called the secondary key

Or

The attributes apart from primary and candidate keys are called as alternate keys.

Eg : Name

What is foreign key?

A non-key attribute, whose values are derived from the primary key of some other table is known as foreign key.

Write the difference between Manual Data and Electronic Data Processing.

Manual Data Processing	Electronic Data Processing
1) The volume of the data processed is limited in a desirable time	1) The volume of the data processed is unlimited
2) Use of large amount of paper	2) Automation -Eliminates the use of papers to solve problems
3) The speed and accuracy is limited	3) High speed, greater accuracy
4) High cost	4) Reduced cost
5) Repetitive tasks reduces the efficiency of a human being	5) Never gets tired
6) The amount of data, which can be stored, accessed or processed is limited	6) The amount of data, which can be stored, accessed or processed is unlimited

.....

Write any five qualities of information

Quality	Definition
1. Accurate	Ensures correct input and processing rules
2. Complete	Include all data
3. Trustworthy	Do not hide unpleasant information
4. Timely	Give at the right time
5. Up-to-date	Include all data upto the present time

## MS-Excel

Specify any one type of charts available in spreadsheet.

Ans: Bar graph, Column graph, Pie chart, Line graph, etc.,

Give any one built-in function of spread sheet.

Ans: **SUM(range)** : This function returns the sum of all the numbers in the list of arguments.

Example: =SUM(A2:E2)

What are macros in ESS?

Ans: Macro is a small program that carries out pre-defined series of steps by giving a few keyboard shortcuts.

Macro is like a batch file created in dos. It contains a series of commands.

When a macro is called and run, the instructions given in it are executed one by one.

Differentiate between MAX( ) and MIN( ) built-in functions in a spread sheet.

Ans: **MAX(num 1, num 2,.....)** : Returns the largest value in a set of values.

Example: =MAX(15, 25, 8, 14) returns 25

**MIN(num 1,num 2.....)** : Returns the lowest value in a set of values.

Example: =MIN(15, 25, 8, 14) returns 8

Explain briefly any two-built in functions in spreadsheet.

Ans: (Write any two)

**SUM(range)** : this function returns the sum of all the numbers in the list of arguments.

Example: =SUM(A2:E2)

**ABS(number)** : It returns absolute value of a number.

Example: =ABS(-35)=35

**SQRT(number)** : This function returns a positive square root.

Example: =SQRT(5) equals 2.1928.

**AVERAGE(num 1, num 2.....)** : Returns the average of the set of numbers.

Example: =AVERAGE(15, 25, 50) returns 30.

Explain any *two* Arithmetic functions of MS-Excel.

Ans: (Write any two)

**SUM(range)** : this function returns the sum of all the numbers in the list of arguments.

Example: =SUM(A2:E2)

**ABS(number)** : It returns absolute value of a number.

Example: =ABS(-35)=35

**SQRT(number)** : This function returns a positive square root.

Example: =SQRT(5) equals 2.1928.

**PRODUCT(num1, num2...)** : It returns the product of all the

numbers given as arguments.

Example: =PRODUCT(5,8,2)=80

Explain any two DATE functions used in spreadsheets.

Ans: (Write any two)

**DAY(serial number)** : It returns the day of the days corresponding to serial number or date.

Example: DAY ("5-jan")=5

**MONTH(serial number)** : It returns the month corresponding to serial number or date.

Example: MONTH("6-may")=5

**NOW()** : This function returns the serial number of the current date and time.

**DATE(year, month, day)** : Returns the serial number of a particular date.

Example: DATE: (2005,3,23) returns 38434.

Briefly explain any two advantages of spreadsheet.

Ans:

**i. Built-in Functions:** It has rich set of built-in functions to perform all types of calculations such as sum, max, abs, product, etc.,

**ii. Copying formula:** Similar formula can be copied into any number of cells.

**iii. Fill series:** It is used to fill automatically fill numbers or data in a series of cells.

**iv. Sorting:** The data can be arranged in a specific order in a table.

Explain any two Logical functions in Ms-Excel.

Ans:

**1. AND(logical1, logical2.....)** : This function returns TRUE if all its arguments are true, returns FALSE if one or more arguments are FALSE.

Example: =AND(3<5, 8=8) returns TRUE

=AND(3>5, 8=8) returns FALSE

**2. OR(logical, logical 2.....)** : It returns TRUE if one or more arguments are TRUE, returns FALSE if all its arguments are FALSE.

Example: =OR(3<5, 8<>8) returns TRUE

=OR(3>5, 8<>8) returns FALSE

**3. NOT(logical)** : Reverses the value of its arguments.

Example: =NOT(3<5) returns FALSE

=NOT(3>5) returns TRUE

**4. If(logical-test, value1, value2)** : It returns value1 if logical test is true. If logical test is false it returns value2.

Example: =If(85>80, "Dist", "I Class") returns "Dist"

=If(40>50, 100, 200) returns 200

## SQL (Structured Query Language)

### **Expand SQL.**

Ans: SQL stands for Structured Query Language.

### **Expand DDL.**

Ans: DDL stands for Data Definition Language.

### **Expand DML.**

Ans: DML stands for Data Manipulation Language.

### **What is meant by DDL?**

Ans: The DDL is language used to define the conceptual schema which is used to describe the data items in a table and the associated relationships.

### **What is meant by DML?**

Ans: DML is a language used for retrieval of data, insertion of new data and deletion or modification of existing data.

### **What is the SQL command for creating database?**

Ans: **create table;**

This command is used to create a table in the database.

### **Name the SQL command for deleting tuple from the database.**

Ans: **Delete from tablename where condition;**

This command is used to erase certain unwanted rows from the table.

### **Name the SQL command for inserting tuple from the database.**

Ans: The **insert** command is used to insert one or more rows (new records) to an existing table.

### **Mention the different data types available in SQL.**

Ans:

- 1) **Character** : This data types includes letters, spaces and special symbols.
- 2) **Varchar2** : This type is used to store large number(upto 2000) characters.
- 3) **Number** : This data type is used to store numbers.
- 4) **Date** :This data type is used to store date and time in a table.

### **What is structured Query Language? Write the SQL command for deleting tuple(row) from the database.**

Ans: SQL is a relational database language designed and developed

to create a database, delete, update or retrieve data from a database.

The **delete** command is used to erase certain unwanted rows from the table.

**Syntax: Delete from tablename where condition**

**Write the syntax for INSERT command in SQL.**

Ans: **Syntax: Insert into tablename**

**(Columnname, Columnname)  
values(value1, value2,.....);**

**Example:**

**Insert into student values(145, 'Kumar', 'I PUC', 'PCMC', 4500.00)**

Write the syntax and example for deleting a table using DROP.

Ans: **Drop** command is used to remove unwanted tables from the database.

**Syntax: Drop table tablename;**

**Example: Drop table student;**

.....

## UNIT E

### Fundamentals of Network operating system

#### Question carrying 1 marks :-

- 1) What is a computer network?  
It can be defined as interconnection of autonomous computers and terminals together using communication systems to facilitate exchange of information.
- 2) Mention the advantage of networking.  
speed, cost, etc
- 3) Mention the different types of network.  
Local area network(LAN),  
Wide area network(WAN),  
Metropolitan area network(MAN)
- 4) What is a file server?  
It is the main component of the network. It is a very fast computer with a large amount of RAM and storage space. File server stores all the files and application software and operating system.
- 5) What is a work station?  
It is also referred to as nodes, clients are the computers connected to the file server.
- 6) Mention the most widely used interface card.  
Ethernet cards
- 7) What are routers?  
a router translates information from one network to another. Routers select the best path to route a message based on the destination address and origin.
- 8) What are switches?  
it is a device that provides a central connection point to cables from server's workstations and peripherals.
- 9) What are the functions of the bridges in the network?  
It provides link between the older network and the new network.
  
- 10) Mention different network services.  
file service,  
Print and fax services,  
Message services,  
Application services,  
Database services
- 11) Mention different data transmission methods.  
Serial transmission method and parallel transmission method
- 12) Mention the different communication modes.  
1) simplex 2) half-duplex 3) full-duplex

- 13) Mention the different switching techniques.
  - 1) circuit switching
  - 2) message switching
  - 3) packet switching
- 14) What is topology?
 

it can be defined as physical layout of the cables, arrangement of resources and communication facilities.
- 15) Mention the different types of topology.
 

bus, star, ring, tree, mesh
- 16) Mention major network architecture.
  - 1) client-server network
  - 2) Peer-to-peer network
- 17) What is client-server technology?
 

It is a network where one computer acts as the server and another is called client. The server is the most important part of the network system providing access to resources and providing security.
- 18) Mention the advantage of client-server technology.
  - 1) resources and security are directly controlled through the server.
  - 2) New technology can be easily implemented in to the system.
- 19) Mention the disadvantage of client-server technology.
  - 1) investment on the server and networking cost is high.
  - 2) Network administrator is required.
- 20) What is peer-to-peer technology?
 

In this architecture all computers are considered equal because all have the same abilities to use the resources available on the network. Here the resources are shared among the nodes. Each computer acts both as client and server.

## 5 mark questions

### 1. Explain advantages of Computer Network

- Speed: The files can be transferred from one Computer to another instantly.
- Cost: Application software(Network version) can be installed on one Computer and accessed by other Computers on the Network. This makes maintenance and upgrading of software easy.
- Security: The information on the computer can be made available only through password. Further some information can be made available only for reading and not copying.
- Resource sharing: Expensive peripheral devices can be shared by many users in a network.
- Easy access: Users can access information from any computer that is available on the network. They need go to a specific Computer which may be located in a different building or different location to retrieve information from their account.

### 2. Explain different types of Computer networks

The different types of Computer networks are

- LAN-Local area Network is networking of Computers in a network in a smaller physical area like a home, office or small group of buildings. The advantage of LAN is high data transfer rate, sharing of resources like printers, files and other applications. The Computers are connected using cables.
- MAN-A Metropolitan area Network is a network of computers within a city or metropolitan area. It is an extended LAN. They use fibre optic cables for faster data transmission. A MAN supports both data and voice. Cable televisions are examples for MAN.
- Wide area Network-Wide area Networks connect computers in larger geographical areas. The computers are connected using satellite links, under sea cables or long distance telecommunication links. Security of data is high. It supports remote accessing.

Internet services are typical example of WAN

### 3. Explain Network services

- File Services-All the data files of an organisation are stored in one place and can be shared by many users. Files can be organised and updated systematically.
- Print Services- When Printers available on the Network, multiple users can print to the same printer. The network printers are usually faster and more capable. They may have accessories such as envelope readers or multiple paper trays
- Database Services-Multiple users can have access to the database at the same time. The Database software ensures integrity of data and provides multiple access.
- Message Services-The services include Electronic mail, voice mail, remote access, document transfers across the internet.
- Application services- several software applications that are developed using network architecture. The applications can be made available to multiple users. Any upgradation made to these applications is also instantly available to the users.

### 4. Mention different types of Network topologies. Explain

BUS- the linear bus topology connects all the nodes to a common straight cable. All the nodes on the network share the common bus. This topology is very reliable since a failure of one or more nodes does not affect the bus. The disadvantages of the linear bus are the need for minimum distances between nodes to avoid signal interference, and the loss of data caused by the simultaneous transmission by two nodes.



STAR- in star network, each node is connected directly to the central computer. All communications between the nodes have to pass through the central computer. Star networks allow the administrator to give selected nodes higher priority and also allow centralized running of diagnostic programs.



RING- in a ring network, all nodes are connected to a common cable, and the cable starts and ends at the network server. In this type of network, communications are always in one direction, and the data being transmitted is passed through each node in the ring. A major disadvantage of this network is that when a node fails, it can completely halt all communications on the network.



TREE- a tree topology combines characteristics of linear bus and star topologies. It consists of groups of star configured workstations connected to a linear bus backbone cable. Tree topologies allow for the expansion of an existing network, and enable schools to configure a network to meet their needs.

MESH- a pure mesh network has point- to- point connections between every node in the network. Pure mesh architectures are not usually considered practical. One problem is that each device requires an interface for every other device on the network.



## 5. Write short notes on Client-Server networking

Client -server networks consist of servers and clients. Server is a powerful Computer using advanced network operating system and clients(works tation) access data stored in servers. Server can host e-mail, store common data files and other applications needed by the client. The server also validates any user who tries to login and denies access to network resources as well as client software to unauthorised users. Servers are mainly used for centralised management of data and resources.

### Advantages

- Data security and resources are controlled through server.
- Upgrading and replacement of applications are done as needs increase, without changing the existing formats.
- Clients can access the server from remote locations.
- Reduces cost of client's computer
- New technologies(object oriented programming)can be integrated easily ,as and when the need arises.

### Limitations(Disadvantages)

- Initial investment may be expensive
- Maintenance will require staff who must ensure efficient operations
- If the server breaks down , the operations of client processes may stop.

### 6. Explain peer-peer networking

In a peer-peer network ,there are no dedicated servers. All Computers are equal, and therefore termed as peer-peer. Each Computer functions both as a client and a server. No single Computer holds the control of entire network. The users are located in the same area and security is not an important issue. All the users can access data and programs that reside on all the computers across the network without any restrictions.

### Advantages

- There is no need for dedicated server. Therefore less expensive.
- A single user operating system such as windows-XP is sufficient

### Disadvantages(Limitations)

- There can be no security as all computers can be accessed by all users
- A failure of a node in peer-peer network means the network can no longer access data or applications on that node.
- The number of Computers connected are limited to 10 or 12

### 7. Explain features of Windows operating system

- Windows operating system is GUI (graphical user interface)based
- Built in support for multiple users on a single PC
- Plug and play support for hardware
- User friendly interface
- Uses device driver software for easier installation of new hardware and software

**Note : to write the features of windows NT(Network operating system) same features can be highlighted. In addition to this the following points may be added.**

- Supports client-server applications
- Management of networks

### 8. Write functional overview of unix

- More than one user can use the machine at the same time through different terminals
- More than one program can run at a time(multiprogramming)
- Multiple tasks can be carried out at the same time like printing, compiling(multitasking)
- Portability of programs from one computer to another

- Wide range of support tools are available such as debugging tools, compilers and other software.
- Hierarchical directory structure for maintenance of directories and files

#### 9. Discuss functional overview of Linux

Linux operating system is same as unix. But linux is graphical user interface based system. The functions of linux are

- More than one user can use the machine at the same time through different terminals
- More than one program can run at a time (multiprogramming)
- Multiple tasks can be carried out at the same time like printing, compiling (multitasking)
- Portability of programs from one computer to another
- Wide range of support tools are available such as debugging tools, compilers and other software.

\*\*\*\*\*