Computer Science - 1 Most Likely Questions

1. (A) Select correct options and rewrite the following :

(a) If the page size for 2MB memory is 2KB then the number of higher order bits on address bus used to denote page number is_____.

(i) 11   (ii) 10   (iii) 9   (iv) 8

Ans. (ii) 10

(b) Data items are divided into sub item is called as _____.

(i) Group Item   (ii) Elementary Item   (iii) Nodes   (iv) Arrays

Ans. (i) Group Item

(c) Object is a are _____.

(i) Variable   (ii) Data type   (iii) Run Time Entity   (iv) Both (i) and (iii)

Ans. (iv) Both (i) and (iii)

(d) In HTML, for Red colour, RGB code is _____.

(i) # 00 00 00   (ii) # ff 00 00   (iii) # 00 ff 00   (iv) # 00 00 ff

Ans. (ii) # ff 00 00

(B) Answer any two of the following :

(a) What is File System ? Explain tape based and disk based file system.

Ans.

(a) The file system allows the user to define files and directories so that disk space can be allocated and de-allocated to each file.

(b) Operating system uses files for information storage. Files are mapped by the operating system onto physical devices.

(c) A file is a collection of related information. Each file is having name and extension depending upon file type.

(d) There are two types of file systems:

- **Tape based systems: -** It is of sequential type.

  (a) Tape - based systems are simple but inefficient.

  (b) In these systems, files are stored on to reels of physical tapes. Generally one or more files are stored on to one tape.

  (c) Tapes are used for transport of data from one computer to another.

- **Disk based systems:-** It is direct access through physical address.

  (a) Each disk is divided into tracks and each track is further divided into number of sectors.

  (b) Number of tracks and size of sectors is variable. It varies from one drive to another.

  (c) A disk has a device directory, indicating, which files are on the disk. The directory lists the file name, starting address, file length, type of file, time of creation, and time of last update etc.

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(b) What is VDU ? Explain following terms of VDU :
(i) Dumb Terminal
(ii) Intelligent Terminal

Ans. **Visual Display Unit** : Terminal hardware is divided into two parts,

(i) Keyboard: It is used a input medium.

(ii) Video Screen: It is used as output medium.

The combination of above two is called as VDU

(a) **Dumb Terminal :** It is responsible for basic input and output of data. It does not perform any processing on input data so it is called as dumb terminal.

(b) **Intelligent Terminal :** It has powerful hardware and software. It also performs processing on the data, So it is known as intelligent terminal.

(c) What is Array ? Write an algorithm for Traversing Linear Array.

Ans. A linear array is the data structure which consists of finite ordered set of homogeneous data elements The elements of the array are referenced respectively by an index set (subscript) consisting 'n' consecutive number. The elements of array are stored in successive memory locations. The number 'n' of the elements is called length or size of array.

1) **Traversing:** Traversing an array means accessing each element of an array only at once so that it can be processed.

2) **Algorithm for traversing a linear array:**
LA = linear array
LB = lower bound of array
UB = upper bound of array
PROCESS – operation to each element of LA.
1. [Initialize [counter]]
   Set K: = LB
2. Repeat steps 3 and 4 while K<=UB
3. [Visit element]
   Apply PROCESS to LA [K]
4. [Increase Counter]
   Set K: = K+1 [End of step 2 loop]
5. Exit

2. **(A)** **Answer any two of the following :**

(a) Define OOP. Write its features.

Ans. Object oriented programming is an approach that provides a way of modularizing programs by creating partitioned memory area for both data and functions that can be used as templates for creating copies of such modules on demand.

FEATURES :

a) Programs are divided into **objects**, and different objects communicate with each other through messages, called **methods.**

b) Emphasis is given **on data** rather than procedure.

c) Data is **hidden** and can't be accessed or altered by external functions.

d) Functions operating on data of an object are **encapsulated**

e) New data and functions can be easily added whenever necessary.

f) Follows **bottom–up approach** in program design.

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(b) Explain <OL> and <UL> tag used in HTML with example.

Ans. **HTML supports** ordered, unordered and definition **lists.**

Different List Tags are:

<OL>   Defines an ordered list

<UL>   Defines An Unordered List

<LI>   Defines a list item

<DL>   Defines a definition list

<DT>   Defines a definition term

<DD>   Defines a definition description

- **Unordered Lists**

  An unordered list is a list of items. The list items are **marked with bullets** (typically small black circles).

  To make an unnumbered, bulleted list,

  1. Start with an opening list <UL> (for unnumbered list) tag Enter the <LI> (list item) tag followed by the individual item; no closing </LI> tag is needed

  2. End the entire list with a closing list </UL> tag

  Inside a list item you can put paragraphs, line breaks, images, links, other lists, etc.

  e.g. <HTML>

      <BODY>

     <H4>This is Unordered List</H4>

           <UL type = "circle">

           <LI>Sunday</LI>

           <LI>Monday</LI>

           <LI>Tuesday</LI>

           </UL>

      </BODY>

      </HTML>

so output given by browser is:

This is Unordered List:

-     Sunday
-     Monday
-     Tuesday

By specifying type attribute in the <UL> tag you can change shape of the bullet. The standard shapes provided are "disk", "circle", and "square"

- **Ordered Lists**

  An ordered list is also a **list of items**.

  The list items are **marked with numbers**.

  A ordered list also called an *numbered* is identical to an unnumbered list, except it uses <OL> instead of <UL>.

Inside a list item you can put paragraphs, line breaks, images, links, other lists, etc. You can specify style of numbering for the list items by giving type attribute in <OL> tag and it can take values "I" for uppercase roman, "i" for lower case roman, "A" for uppercase letters, "a" for lower case alpha numeric letter.

The start attribute in <OL> tag is used to start the list from the required number. e.g. <OL start = "6"> will start the list items from number 6.

e.g. <HTML>

    <BODY>

        <H4><B>This is an Ordered List</B></H4>

        <OL type = "i">

        <LI>Sunday</LI>

        <LI>Monday</LI>

        <LI>Tuesday</LI>

      </OL>

    </BODY>

    </HTML>

so output given by browser is:

This is an Ordered List:

i)   Sunday

ii)   Monday

iii)   Tuesday

(c) Explain how member functions of class can be defined outside the class definition and inside class definition with example in C++.

Ans. Member functions of class can be defined at two places

(i) Outside the class definition. (ii) Inside the class definition.

Irrespective of the place of definition, the function performs same operation. Hence, code for the function body is identical in both the cases. Only function header is changed.

(i) **Outside the class definition**

(a) The general form of member function definition outside the class definition is

```
return-type class-name : : function-name (Argument declaration)
{
    function body
}
```

(b) The member function incorporates an identity label or membership label (**i.e.,** class-name : :).

(c) This label tells compiler the class to which the function belongs and restricts the scope of that function the objects of the class 'class-name' specified in header line.

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e.g.,   //class definition

class try 1

{

      public:

      void display (void);

} ;

      //member function definition outside class

      void try 1 : : display (void)

{

      cout<<"Programming is func";

}

(ii) **Inside the class definition**

   (a) Another method for defining a member function is to replace the function declaration by the actual function definition.

     e.g.

         class try 1

         {

            public:

            void display (void)

            {   }

         } ;

   (b) When a function is defined inside a class, it is treated as an **inline function.** Normally, only small

(B) Answer any one of the following :

(a) Write the use of following file pointers with example :

   (i)   seekg( )

   (ii)   seekp( )

   (iii)   tellg( )

   (iv)   tellp( )

Ans.   (i)   **Seekg( ):** This function is used to search the data byte in a file when the file is opened in read mode.

      (ii)   **Seekp( ):** This function is used to search the data byte in a file when the file is opened in write mode.

      (iii) **Tellg( ):** This function is used to tell the current file pointer position in the file when the file opened in read mode.

      (iv) **Tellp( ):** This function is used to tell the current file pointer position in the file when the file opened in write mode.

(b) What is GUI ? Explain the following components of GUI :
   (i) Menu Bar
   (ii) Title Bar
   (iii) Scroll Bar

Ans. **GUI :** The interface which replaces cryptic commands by their graphical representation are called **Graphical User Interface (GUI)**.

Windows operating system is GUI based operating system.

(i) Menu bar :

- A menu bar appears normally at the top of window under window title. It consists of different main menus, which can be used in program.

- The main menu consists of different sub menus options . When one of these menu options is selected, a pull down menu appears on the screen. A pull down menu will have an action on the left side and keyboard combination on the right side.

(ii) Title Bar :

It helps to identify each window separately and the program name is displayed in title bar.

(iii) Scroll Bar :

- A scroll bar consists of a horizontal or vertical scroll area with a slider box and an arrow in a box at each end.

- They allow the user to scroll window horizontally and vertically. They are generally used to look at information which is not currently visible on screen , by scrolling horizontally and vertically.

3 (A) Answer any two of the following :
(a) Explain the following process states :
   (i) Running State
   (ii) Ready State
   (iii) Blocked State

Ans. **(i) Running:** A process which is executing is termed as running process.
(ii) Ready: A process which is not waiting for any external event such as I/O operation is said to be in ready state.
(iii) Blocked: Process which is waiting for an external event such as an I/O operation is said to be in a blocked state.

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(b)   Explain Constructor and Destructor with example in C++.

Ans.   **Constructor** :

   a.   Constructor is a function whose task is to initialize the objects of its class .

   b.   It is a special function as the class name and the constructor name is same.

   c.   It is called automatically when the object of the class is created.

Destructor :

   a.   Destructor is a function that is used to destroy the objects that have been created by a constructor.

   b.   Destructor function name is the same as constructor name with tilde sign (~) .

   c.   Destructor is called as the end of program execution.

Example:

```
class circle
{   private:
      int rad;
    public:
    circle( ){ rad=5;}   // constructor declared and defined
    ~circle( ) {  delete rad; }     // Destructor declared and defined
    };
```

(c)   What is Data Structure ? Explain Linear data Structure and Non-linear Data Structure.

Ans.   •   Data may be organized in many different ways. Data structure is the way in which different data elements are logically related.

•   Collection of data elements forming an organisation characterized by the accessing funtions is called data structure.

•   The data structure should be simple and it should show the relationship between data elements.

•   **Types :**

(i) Linear data structure   (ii) Non-Linear data structure

In linear data structure, data elements are stored in consecutive memory locations or by using linked representation e.g. arrays, linked list.

In non-linear data structures, the linear order cannot be maintained between data elements. Generally data elements have hierachical relationship between them. e.g. trees.

•   Computer language provides different data structures like arrays, stack, queue, tree etc.

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(B) Answer any one of the following :

(a) Write any eight basic rules for virtual function that satisfies the compiler requirements.

Ans. **Rules for Virtual Functions**

(a) The virtual functions must be members of some class.

(b) They cannot be static members.

(c) They are accessed by using object Pointers.

(d) A virtual function can be a friend of another class.

(e) A virtual function in a base class must be defined, even though it may not be used.

(f) The prototypes of the base class version of a virtual function and all the derived class versions must be identical. If two functions with the same name have different prototypes, C++ considers them as overloaded functions, and the virtual function mechanism is ignored.

(g) We cannot have virtual constructors, but we can have virtual destructors.

(h) While a base pointer can point to any type of the derived object, the reverse is not true. That is to say, we cannot use a pointer to a derived class to access an object of the base type.

(i) When a base pointer points to a derived class, incrementing or decrementing it will not make it to point to the next object of the derived class. It is incremented or decremented only relative to its base type. Therefore, we should not use this method to move the pointer to the next object.

(j) If a virtual function is defined in the base class, it need not be necessarily redefined in the derived class. In such cases, calls will invoke the base function.

(b) Define Security. Explain the different elements of security.

Ans. **Security :** It is concerned with the ability of operating system to enforce control over the storage and transportation of data in and between the objects that the operating system supports. In multi-user environment security concepts are very important.

• **Elements of security :**

(i) **Confidentiality:-**Information is not accessed in an unauthorized manner.(Read) i.e., by controlling read operations.

(ii) **Integrity:-**Information is not deleted in an unauthorized manner (Write) i.e., by controlling write operations.

(iii) **Availability:-** Information is available to authorized users at right time

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4. (A) Answer any two of the following :

(a) Differentiate between Traditional Procedural Programming Approach and Object Oriented Programming Approach.

Ans.

Traditional Procedural Programming Approach	Object Oriented Programming Approach
1 In this approach, the problem is viewed as a sequence of things to be done	1 In this approach, the problem is decomposed into a number of entities called objects and then builds data and function around these entities.
2 Emphasis is on doing things.	2 Emphasis is on the data rather than procedure.
3 Large programs are divided into smaller programs known as functions.	3 Programs are divided into entities known as objects.
4 Data move openly around the system from function to function.	4 Data is hidden and cannot be accessed by external functions.
5 Employs top-down approach in program design.	5 Follows bottom-up approach in program design.

(b) Define following Terms :

(i) Group Item

(ii) Elementary Item

(iii) Entity

Ans. (i) **Group Items: -** Data items are divided into sub items are called as group items.

(ii) **Elementary items: -** Data items which are not divided into sub items are called as elementary items.

(iii) **Entity:-** An entity is something that has certain attributes or properties which may be assigned values.

The values themselves may be numeric or nonnumeric.

Attributes	Name	Age	Sex	Education
Values	ABC	25	F	B.E.(ELECT)

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(c) What is Binary Tree ? With suitable example show the relationship between Total Number of Nodes and Depth of Binary Tree.

Ans. ● **Binary Tree**:-A binary tree is defined as a set of finite set of elements called nodes such that
 a. Tree is empty
 b. Tree contains a root node and remaining nodes of tree form an ordered pair of disjoint binary trees (left and right).

● Each node in a tree is assigned a level number. Generally the level number of root R of the tree is zero and every other node is assigned to level number which is one more than the level number of its parent. It is the distance from the root.
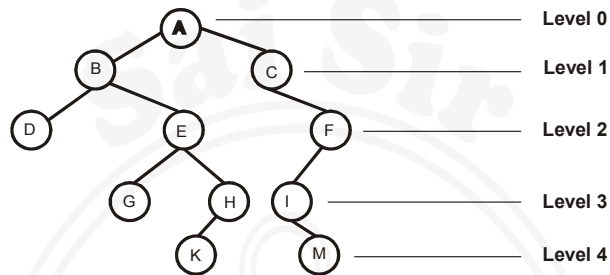
● **Depth of a binary tree:-**Depth of a binary tree is defined as maximum level of any nodes in the tree. The depth of binary tree is equal to 1+ largest level number.

● The maximum number of nodes of a symmetric binary tree with depth n are $2^n - 1$.
   E.g. The depth of above binary tree =1+largest level number =1+4=5
   Maximum number of nodes=$2^5 - 1$=32-1=31.
   (In above diagram all the nodes are not shown.)

(B) Answer any one of the following :

(a) What is Record ? Explain how records are represented in memory using array ?

Ans. ● **Record:-**
A record is collection of related data items. Each data item is termed as field. File is collection of similar records. Each data item may be a group item composed of sub items.

● Consider a record, whose structure is given below.
   1. Employee
   2. Name
   3. First name
   3. Last name
   2. sex
   2. Address
   3. City
   3. Pincode
   2. Phone no.

● To present this record in memory, linear arrays are used.

● One separate linear array is used for each elementary item of recod such as First name, Last name, Sex, City, Pincode, Phone no.

Following figure shows representation of above record using parallel linear arrays.

First name Last name Sex City Pincode Phone No.
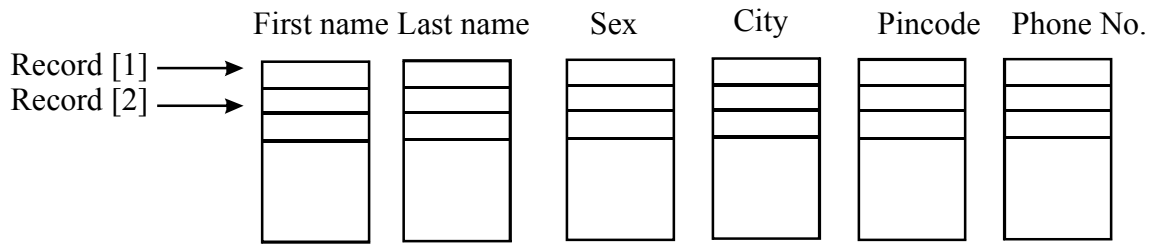
Record [1] →
Record [2] →

- The records are stored in memory using parallel linear arrays, such that for an index K of all records, First name [K], Last name [K], Sex [K], ... belong to the same record in a file.
(i.e. Kth record in the file)

(b) Explain following terms in case of Process Scheduling :

(i) Turn-around Time

(ii) Waiting Time

(iii) Terminal Response Time

(iv) Event Response Time

Ans. **(i) Turnaround time :** Turnaround time is the elapsed time between the time a program or a job is submitted and the time when it is job completed.

(ii) Waiting time : It is the time job spends in waiting queue before execution.

(iii) Terminal Response time : In the time -sharing system, Terminal response time is the time to respond with an answer or result to a question and it depends on degree of multiprogramming, the efficiency of hardware with OS and policy of OS to allocate resources.

(iv) Event Response time: In the real - time system , event response time is the time to respond with an event.

5. (A) Answer any two of the following :

(a) Write a C++ program to accept an integer number and test whether it is prime or not.

Ans.
```cpp
#include <iostream.h>
void main ( )
{
        int prime, C = 0;
        cout << "Enter the number";
        cin >> prime;
        for (int i = 2; i < prime; i++)
{
        if (prime % i == 0)
            C = 1;
}
if (C == 0)
        cout << "The number" << prime << "is prime number" ;
else
        cout << "The number" << prime << "is not a prime number" ;
}
```

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(b)   Write a program in C++ using OOP technique to compute cirumference of circle.

Ans.

```
#include <iostream.h>
class circle
{
   public : float r, c ;
    public : void accept ( )
    {
        cout << "Enter radius" ;
        cin >> r ;
    }
    void compute ( )
    {
    c = 2 * 3.14 * r;
    }
    void print ( )
    {
        cout << "circumference is : " << c;
    }
};
void main ( )
{
circle obj;
obj . accept ( );
obj . compute ( );
obj . print ( );
getch ( );
}
```

(c)   Write HTML code for following output :

Cricket Analysis

Country	Played	Won	Lose
INDIA	30	27	03
PAKISTAN	30	03	27

Ans.

```
<HTML>
<HEAD>
<TITLE> CRICKET. HTML </TITLE>
</HEAD>
<BODY>
<TABLE BORDER = "3">
<CAPTION ALIGN = "TOP">
CRICKET ANALYSIS
```

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```
                    </CAPTION>
            <TR>
                    <TH> COUNTRY </TH>
                    <TH> PLAYED </TH>
                    <TH> WON </TH>
                    <TH> LOSE </TH>
            </TR>
            <TR>
                    <TD> INDIA </TD>
                    <TD> 30 </TD>
                    <TD> 27 </TD>
                    <TD> 03 </TD>
            </TR>
            <TR>
                    <TD> PAKISTAN </TD>
                    <TD> 30 </TD>
                    <TD> 03 </TD>
                    <TD> 27 </TD>
            </TR>
        </TABLE>
        </BODY>
        </HTML>
```

OR

5. **Solve any two of the following :**

(a) Write a C++ program to find the smallest off four given integers using function min( ) that returns the smallest of four given integers. The function prototype is as below int min (int, int, int, int).

Ans.

```
# include <iostream.h>
# include <conio.h>
int min(int, int, int, int);
void main ( )
{
int w, x, y, z;
cout <<"Enter four integers";
cin >> w >> x >> y >> z;
cout <<"The minimum no' = <<min (w, x, y, z) << endl;
}
int  min(int n1, int n2, int n3, int n4)
{
    int min = n1;
    if (n2 < min) min = n2;
```
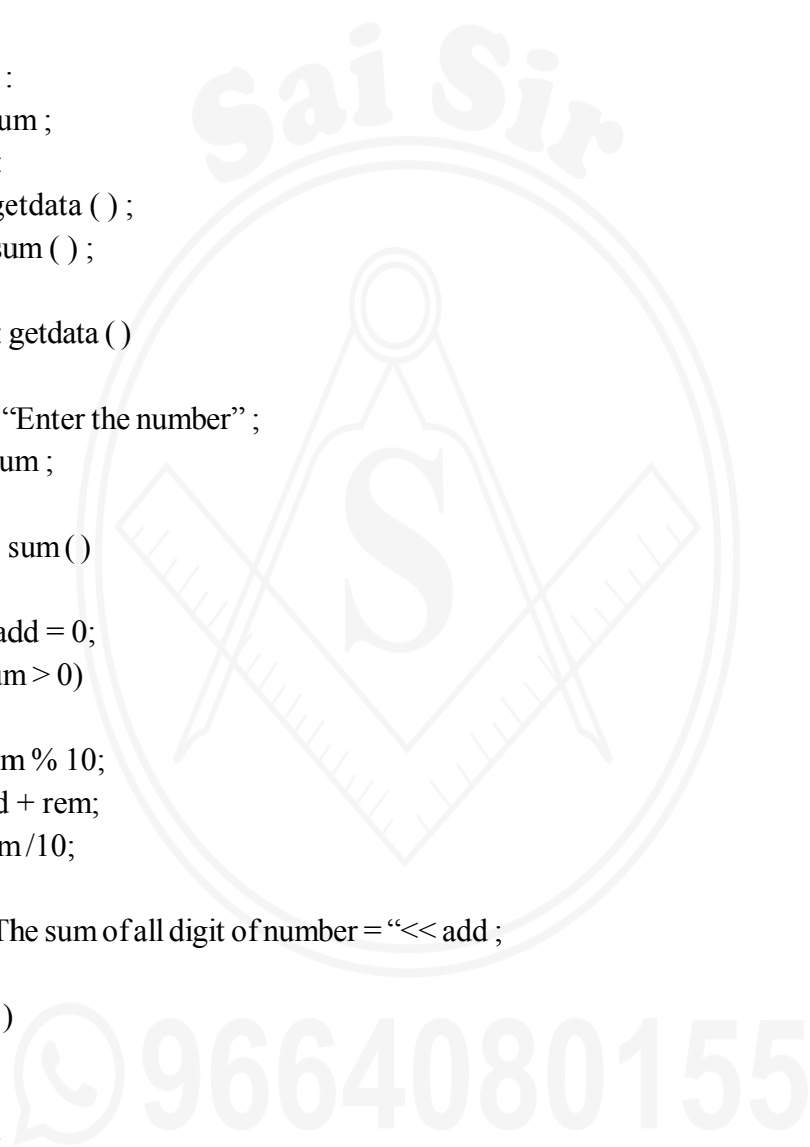
```
        if (n3 < min) min = n3;
        if (n4 < min) min = n4;
        return min;
    }
```

(b) Write an object oriented program in C++ to read an integer number and find the sum of digits of integer
[Hint : input 125 output 8 i.e. 1 + 2 + 5 = 8]

Ans.
```
# include <iostream.h>
class digit
{
    private :
        int num ;
    public :
        void getdata ( ) ;
        void sum ( ) ;
} ;
void digit : : getdata ( )
{
    cout << "Enter the number" ;
    cin >> num ;
}
void digit : : sum ( )
{
    int rem, add = 0;
    while (num > 0)
    {
    rem = num % 10;
    add = add + rem;
    num = num /10;
    }
    cout << "The sum of all digit of number = "<< add ;
}
void main ( )

{
    digit S ;
    S.getdata ( ) ;
    S. sum ( ) ;
}
```

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(c)   Write the output of the following HTML code :

```
<html>
   <body>
       <UL type = "circle">
           <li> One
           <li> Two
           <li> Three
       <UL type = "square">
           <li> Monday
           <li> Tuesday
           <li> Wednesday
       </UL>
       </UL>
   <body>
</html>
```

Ans.
- One
- Two
- Three
  - Monday
  - Tuesday
  - Wednesday

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