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AMRITA PRE BOARD EXAMINATION 1 - 2018 - '19

Class : XII   Marks : 70
                                                                                                 Time   : 3 hrs

COMPUTER SCIENCE (NO. 083)

1.a)   Find and write the output of the following C++ program code.   **3**
        Note: Assume all required header files are already being included in the program.

```cpp
void main()
{
int A[]={10,12,15,17,20,30};
for(int i = 0; i<6; i++)
{
      if(A[i]%2==0)
            A[i] /= 2;
      else if(A[i]%3==0)
            A[i] /= 3;
      if(A[i]%5==0)
            A[i] /= 5;
}
      for(i = 0; i<6; i++)
            cout<<A[i]<<"#";
}
```

b)   Answer the questions (i) to (iv) based on the following.   **4**

```cpp
class indoor_sports
{
      int i_id;
      char i_name[20];
      char i_coach[20];
      protected:
      int i_rank,i_fee;
      void get_ifee();
      public:
      indoor_sports();
      void iEntry();
      void ishow();
};
class outdoor_sports
{
      int o_id;
      char o_name[20];
      char o_coach[20];
      protected:
      int orank,ofee;
      void get_ofee();
      public:
      outdoor_sports();
      void oEntry();
      void oshow();
};
class sports:public indoor_sports,protected outdoor_sports
{
      char rules[20];
      public:
      sports();
      void registration();
```

```
        void showdata();
};
```
(i) Name the type of inheritance illustrated in the above C++ code.

(ii) Write the names of all the members, which are accessible from the objects belonging to class outdoor_sports.

(iii) Write the names of all the member functions, which are accessible from the member function of class sports.

(iv) What will be the size of the object belonging to class indoor_sports?

c)   Find the output of the following C++ program.   **2**

```
#include<iostream.h>
void repch(char s[])
{
        for (int i=0;s[i]!='\0';i++)
        {
        if(((i%2)!=0) &&(s[i]!=s[i+1]))
        {
        s[i]='@';
        cout<<"Hello";
        }
        else if (s[i]==s[i+1])
        {
        s[i+1]='!';
        i++;
        }
        }
}
void main()
{
        char str[]="SUCCESS";
        cout<<"Original String"<<str
        repch(str);
        cout<<"Changed String"<<str;
}
```

d)   Answer the questions (i) to (iv) based on the following code.   **4**

```
class One
{
int A1;
protected:
float A2;
public:
One();
void Get1(); void Show1();
};
class Two : private One
{
int B1;
protected:
float B2;
public:
Two();
void Get2();
void Show();
};
class Three : public Two
{
int C1;
```

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```
public:
Three();
void Get3();void Show();
};
void main()
{
Three T;     //Statement 1
_____;   //Statement 2
}
```

(i) Which type of Inheritance out of the following is illustrated in the above example?
   Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance
(ii) Write the names of all the member functions, which are directly accessible by the object T of class Three as declared in main() function.
(iii) Write Statement 2 to call function Show() of class Two from the object T of class Three.
(iv) What will be the order of execution of the constructors, when the object T of class Three is declared inside main()?

e)   Find the output of the following program.   **3**

```
#include<iostream.h>
void switchover(int A[ ],int N, int split)
{
for(int K = 0; K<N; K++)
     if(K<split)
     A[K] += K;
     else
     A[K]*= K; }
     void display(int A[ ] ,int N)
{
for(int K = 0; K<N; K++)
     (K%2== 0) ?cout<<A[K]<<"%" : cout<<A[K]<<endl;
}
void main( ){
     { int H[ ] = {30,40,50,20,10,5};
     switchover(H,6,3);
     display(H,6);
}
```

f)   Find and write the output of the following C++ program code.   **4**
       Note: Assume all required header files are already being included in the program.

```
void main()
{
int *Point, Score[]={100,95,150,75,65,120};
Point = Score;
for(int L = 0; L<6; L++)
{
     if((*Point)%10==0)
     *Point /= 2;
     else
     *Point -= 2;
     if((*Point)%5==0)
     *Point /= 5;
     Point++;
}
for(int L = 5; L>=0; L—)
     cout<<Score[L]<<"*";
}
```

2.a)   Write the definition of function named Array_Swap() that will accept an integer array and its size as arguments and the function will interchange / swap elements in such a way that the first element

is swapped with the last element, second element is swapped with the second last element and so on, only if anyone or both the elements are odd.

E.g. if initially array of seven elements is:

5, 16, 4, 7, 19, 8, 2

After execution of the above function, the contents of the array will be:

2, 16, 19, 7, 4, 8, 5 **2**

<div align="center">OR</div>

Write the definition of a function FixSalary(float Salary[], int N) in C++, which should modify each element of the array Salary having N elements, as per the following rules.

Existing Salary Values	Required Modification in Value
If less than 100000	Add 35% in the existing value
If $>= 100000$ and < 20000	Add 30% in the existing value
If $>= 200000$	Add 20% in the existing value

b) Write definition for a function DISPMID (int A[][5], int R, int C) in C++ to display the elements of middle row and middle column from a two dimensional array A having R number of rows and C number of columns.

For example, if the content of array is as follows.

215	912	516	401	515
103	901	921	802	601
285	209	609	360	172

The function should display the following as output.

103 901 921 802 601

516 921 609 **3**

<div align="center">OR</div>

Write a user-defined function swap_row (int ARR[ ][3], int R, int C) in C++ to swap the first row values with the last row values.

For example, if the content of the array is:

10	20	30
40	50	60
70	80	90

Then after function call, the content of the array should be:

70	80	90
40	50	60
10	20	30

c) T[25][30] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 2 bytes, find the address of the element T[10][15], if the element T[5][10] is stored at the memory location 25000. **3**

<div align="center">OR</div>

An integer array A[30][40] is stored along the column in the memory. If the element A[20][25] is stored at 50000, find out the location of A[25][30].

d) Write the definition of a member function Ins_Player() for a class CQUEUE in C++, to add a

Player in a statically allocated circular queue of PLAYERs considering the following code is already written as a part of the program.   **4**

```
struct Player
{
      long Pid;
      char Pname[20];
};
const int size=10;
class CQUEUE
{
      Player Ar[size];
      int Front, Rear;
      public:
      CQUEUE( )
      {
            Front = -1;
            Rear = -1;
      }
      void Ins_Player(); // To add player in a static circular queue
      void Del_Player(); // To remove player from a static circular
      queue void Show_Player(); // To display static circular queue
      };
```

<div align="center">OR</div>

Write the definition of a member function push() for a class Library in C++ to insert a book information in a dynamically allocated stack of books considering the following code is already written as a part of the program.

```
struct book
{
int bookid;
char bookname[20];
book *next;
};
class Library
{
book *top;
public:
Library()
{
top=NULL;
}
void push();
void pop();
void disp();
~Library();
};
```

e)   Evaluate the following POSTFIX expression. Show the status of Stack after execution of each operation separately.   **2**

45, 45, +, 32, 20, 10, /, -,*

<div align="center">OR</div>

Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.

P/(QR)*S+T

3.a)   Write a user defined function word_count() in C++ to count how many words are present in a text file named "opinion.txt".

For example, if the file "opinion.txt" contains following text:

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> Co-education system is necesary for a balanced society. With co-education system, Girls and Boys may develop a feeling of mutual respect towards each other.

The function should display the following:

Total number of words present in the text file are: 24   **4**

<div align="center">OR</div>

Write function definition for DISP3CHAR() in C++ to read the content of a text file KIDINME.TXT, and display all those words, which have three characters in it.

Example:

If the content of the file KIDINME.TXT is as follows:

> When I was a small child, I used to play in the garden with my grand mom. Those days were amazingly funful and I remember all the moments of that time.

The function DISP3CHAR() should display the following:

was the mom and all the

b)   Write a function in C++ to search and display details, whose destination is "Trivandrum" from binary file "Flight.Dat". Assuming the binary file is containing the objects of the following class.   **4**

```
class FLIGHT{
      int Fno; // Flight Number
      char From[20]; // Flight Starting Point
      char To[20]; // Flight Destination
      public:
      char * GetFrom ( ); { return from; }
      char * GetTo( ); { return To; }
      void input() { cin>>Fno>>; gets(From); get(To); }
      void show( ) { cout<<Fno<< ":"<<From << ":" <<To<<endl; }
};
```

<div align="center">OR</div>

Write a function in C++ to add more new objects at the bottom of a binary file "BOOK.dat", assuming the binary file is containing the objects of the following class.

```
class BK
{
      int Bno;
      char Bname[20];
      public: void Enter()
      {
      cin>>Bno;gets(Bname);
      }
      void show()
      {
      count << Bno<<Bname<<endl;
      }
};
```

c)   Find the output of the following C++ code considering that the binary file MEM.DAT exists on the hard disk with a data of 1000 members.   **2**

```
class MEMBER
{
      int Mcode~char MName[20];
      public:
      void Register();void Display();
};
```

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```
void main()
{
    fstream MFile;
    MFile.open("MEM.DAT",ios::binary|ios::in);
    MEMBER M;
    MFile.read((char*)&M, sizeof(M));
    cout<<"Rec:"<<MFile.tellg()/sizeof(M)<<endl;
    MFile.read((char*)&M, sizeof(M));
    MFile.read((char*)&M, sizeof(M));
    cout<<"Rec:"<<MFile.tellg()/sizeof(M)<<endl;
    MFile.close();
}
```

<div align="center">OR</div>

Consider a file F containing objects E of class Emp.

(i) Write statement to position the file pointer to the end of the file.

(ii) Write statement to return the number of bytes from the beginning of the file to the current position of the file pointer.

4.   Consider the following relations MobileMaster and MobileStock.   **8**

<div align="center">MobileMaster</div>

M_Id	M_Company	M_Name	M_Price	M_Mf_Date
MB001	Samsung	Galaxy	4500	2013-02-12
MB003	Nokia	N1100	2250	2011-04-15
MB004	Micromax	Unite3	4500	2016-10-17
MB005	Sony	XperiaM	7500	2017-11-20
MB006	Oppo	SelfieEx	8500	2010-08-21

<div align="center">MobileStock</div>

S_Id	M_Id	M_Qty	M_Supplier
S001	MB004	450	New Vision
S002	MB003	250	Praveen Gallery
S003	MB001	300	Classic Mobile Store
S004	MB006	150	A-one Mobiles
S005	MB003	150	The Mobile
S006	MB006	50	Mobile Centre

Write the SQL query for questions from (i) to (iv) and write the output of SQL command for questions from (v) to (viii) given below.

(i) Display the Mobile company, Mobile name and price in descending order of their manufacturing date.

(ii) List the details of mobile whose name starts with 'S'.

(iii) Display the Mobile supplier and quantity of all mobiles except 'MB003'.

(iv) To display the name of mobile company having price between 3000 & 5000.

(v) SELECT M_Id, SUM(M_Qty) FROM MobileStock GROUP BY M_Id;

(vi) SELECT MAX(M_Mf_Date), MIN(M_Mf_Date) FROM MobileMaster;

(vii) SELECT M1.M_Id, M1.M_Name, M2.M_Qty, M2.M_Supplier FROM MobileMaster M1, MobileStock M2 WHERE M1.M_Id=M2.M_Id AND M2.M_Qty>=300;

(viii) SELECT AVG(M_Price) FROM MobileMaster;

5.a)   State and prove De-Morgan's law using truth table.   **2**

b) Draw the equivalent logic circuit diagram of the following Boolean expression. **2**
   (A' + B).C'

c) Derive a Canonical SOP expression for a Boolean function F, represented by the following truth table. **1**

U	V	W	F (U, V, W)
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

d) Reduce the following Boolean Expression to its simplest form using K Map. **3**
   F(P, Q, R, S) = (0, 4, 5, 8, 9, 10, 11, 12, 13, 15)

6.a) Differentiate between PAN and LAN types of networks. **1**

b) Categorise the following under Client side and Server Side script category. **1**
   (i) Java Script   (ii) ASP   (iii) VB Script   (iv) JSP

c) The following is a 32-bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points.
   140.179.220.200
   What is it? What is its importance? **1**

d) Expand the following acronym. **1**
   (i) VOIP   (ii) SMTP

e) Identify the type of topology on the basis of the following scenarios. **2**
   (i) Since every node is directly connected to the server, a large amount of cable is needed which increases the installation cost of the network.
   (ii) It has a single common data path connecting all the nodes.

f) Radha Medicos Center has set up its new center in Dubai. It has four buildings as shown in the diagram given below. **4**
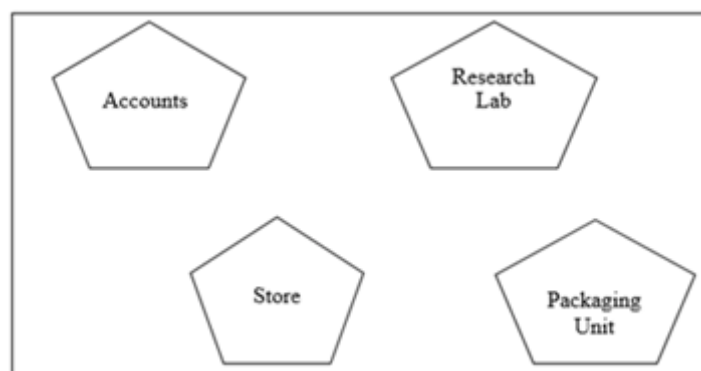
Distances between various buildings are as follows.

Accounts to Research Lab	55 m
Accounts to Store	150 m
Store to Packaging Unit	160 m
Packaging Unit to Research Lab	60 m
Accounts to Packaging Unit	125 m
Store to Research Lab	180 m

Number of Computers

Accounts	25
Research Lab	100
Store	15
Packaging Unit	60

As a network expert, provide the best possible answer for the following queries.

(i) Suggest a cable layout of connections between the buildings.

(ii) Suggest the most suitable place (i.e. buildings) to house the server of this organization.

(iii) Suggest the placement of the following device with justification.

      (a) Repeater   (b) Hub / Switch

(iv) Suggest a system (hardware / software) to prevent unauthorized access to or from the network.