

MAHARAJA AGRASEN MODEL SCHOOL
PREBOARD SAMPLE PAPER - 2014
SUBJECT – COMPUTER SCIENCE
CLASS XII
SET - I

Time: 3 Hrs

MM: 70

- All questions are compulsory & Programming Language: C++

Q1.

- a) What is the difference between a default parameter and a reference parameter? Explain giving suitable examples. (2)
- b) Name the header file(s) (three header files) that shall be needed for successful compilation of the following C++ code : (1)

```
void main() {
    float number=-1234;
    cout<<fabs(number);
    if(number>1500)
        exit(0);
    else
        cout<<"Number less than or equal to 1500";
}
```

- c) Rewrite the following program after removing the syntax error(s), if any. Underline each correction made: (2)

```
#include<iostream.h>
struct Garment{
    int Size;
    char Style[40]; }
void ShowDetails(int P) {
    cout<<P.Size, P.Style<<endl;
}
void main() {
    Garment Gar1=(5, "loose fit");
    ShowDetails(Gar1);
    Garment Gar2=Gar1;
    Gar1.Size+=2;
    ShowDetails(Gar2);
}
```

- d) Find the output for the following: (3)

```
#include<iostream.h>
void Indirect(int Temp=70){
    for (int I=10; I<=Temp; I+=5)
        cout<<I<<" , " ;
    cout<<endl; }
void Direct (int *Num){
    *Num+=10;
    Indirect(*Num);
}
void main(){
    int Number[] = { 10, 20, 30};
    Direct(Number+1) ;
    Indirect();
    cout<< " Numbers= " <<Number[0]<<" : " <<Number[1]<<" : " <<Number[2] ;}
```

- e) Find the output for the following: (2)

```
#include <iostream.h>
#include <ctype.h>
void manipulate(char *s) {
for(int j=0; *(s+j)!='\0';j++)
    if(isdigit(s[j] ))
        s[j]=*s+3;
    else if(islower(s[j]))
        s[j]=toupper(s[j])-2;
    else if(!(j%3!=0))
        s[j]='a';
else
s[j]='-';
}
void main() {
char * str= "AlumniMeet7th";
manipulate(str);
cout<<str;
}
```

- f) Study the following program and find the possible output (2)

```
#include<iostream.h>
#include<conio.h>
void main() {
    randomize();
    int val2, chance=random(3)+1;
    for(int c=1; c<=chance; c++) {
        val2=random(5)-2+chance;
        cout<<"**"<<val2<<"**";
    }
}
```

- i) **4**
- ii) **4**1**
- iii) **0****1**
- iv) **1****0****2**

Q2.

- a) What is a copy constructor? What happens when the programmer does not write a copy constructor in the class? (2)
- b) Answer questions (i) and (ii) after going through the following class (2)

```
class Donor {
    char name[50];
    int dno;
    char bgroup[2];
public:
    Donor() { //FUNCTION 1
        dno=0;
    }
    Donor(char a[], char b[]) { //FUNCTION 2
        strcpy(name, a);
        strcpy(bgroup, b);    }
```

```

Donor(char a[], char b, int c) {           //FUNCTION 3
    strcpy(name, a);
    Strcpy(bgroup, b);
    dno = c;}
~Donor( ) {                               //FUNCTION 4
    }
};

```

- (i) Which feature is illustrated by function1, function2 and function3? Write a statement that results in the invocation of function 3.
- (ii) How many times would function 4 be invoked in the following code:

```

void f1() {
    Donor d;
}
void main() {
    Donor d1;
    f1();
}

```

- c) Define a class named Faculty in C++ with the following description: (4)

Private Members

FNO Integer
Name String
Salary Float
Designation String

A function Allocate() to assign the salary depending upon the designation

<u>Designation</u>	<u>Salary</u>
Lecturer	18500
Reader	16500
Professor	14500
For other values	13000

Public Members

- A constructor to assign initial values of FNO and Salary to 0 and Name and Designation to “NOT ASSIGNED”
- A function Enter() to input the values of data members FNO, Name and Designation and then invoke the function Allocate()
- A function Show() which displays all the data members on screen.

- d) Answer the questions (i) to (iv) based on the following code : (4)

```

class Chairperson {
    long CID;
    char CName[20];
protected:
    char Description[40];
    void Allocate();
public:
    Chairperson();
    void Assign();
    void Show();
};

```

```

class Director {
    int DID;
    char DName[20];
protected:
    char profile[30];
public:
    Director();
    void Input();
    void Output();
};
class Company: private Chairperson, public Director {
    int COID;
    char City[20];
public:
    Company();
    void Enter();
    void Display();
};

```

- i) Which type of inheritance out of the following is illustrated in the above code?
- ii) What is the order of constructor invocation when an object of class Company is created?
- iii) Write the names of all member functions which are accessible by objects of class Company.
- iv) Write the names of all members which are accessible from member functions of class Company.

Q3.

- a) An integer array P containing elements of data type long integer is arranged in ascending order. Write a user defined function in C++ to search for the given value using binary search method. The function should return 0 to show absence of the number and 1 to show the presence of the number. The function should take 3 arguments array P, the number to be searched and the number of elements in the array. (3)
- b) An array Arr[40][10] is stored in the memory along the column with each element occupying 4 bytes. Find out the address of the location Arr[3][6] if the location Arr[30][10] is stored at the address 9000. (3)
- c) Write functions to Insert_elem() and Remove_elem() to insert and remove elements in a dynamically allocated queue containing elements of the following type: (4)

```

struct Node{
    int code;
    char game[50];
    Node *Next;
};

```

- d) Write a function ModifyDiagonals() in C++ that multiplies the left diagonal elements by 3 and right diagonal elements by 2 for a two dimensional 4x4 array passed to it as argument.

(2)

For example if the array contains:

```
2   4   3   8
1   5   7   6
2   6   9   1
4   5   2   8
```

Then the function should change the array as:

```
6   4   6   16
1   15  14  6
4   12  27  1
8   5   2   24
```

- e) Convert the following infix expression into its equivalent postfix form using a stack.

$A/(B+C)*D$

(2)

Q4.

- a) Observe the program segment given below carefully and fill the blanks using seekg(), seekp(), tellp(), tellg() functions for performing the required task.

(1)

```
class inventory{
    int ano,qty;
    char article[20];
public:
    void input() {cin>>ano; gets(article);cin>>qty;}
    void issue(int q){qty+=q;}
    void procure(int q) {qty-=q;}
    int getano(){return ano; }
};

void procurearticle(int tano, int tqty) {
    fstream file;
    file.open("stock.dat", ios::binary|ios::in|ios::out);
    inventory i;
    int found=0;
    while(found==0 && file.read((char*)&i, sizeof(i))){

        if(tano==s.getano()){
            i.procure(tqty);
            _____
            _____
            found++;
        }
    }

    if(found==1)
        cout<<"procurement updated"<<endl;
    else
        cout<<"wrong article number"<<endl;
    file.close();
}
```

//Statement 1

//Statement 2

- i. Write statement 1 to position the file pointer at the appropriate place, so that data updation is done for the required article.

- ii. Write statement 2 to perform the write operation so that the updation is done in the binary file.
- b) Write a function showwords() in C++ to display the words which start with upper case or lower case vowel from the file "INFO.TXT". The words should be displayed with their first character in upper case. (2)
- c) Following is the structure of each record in a data file named "COLONY.DAT" (3)
- ```

struct COLONY {
 char Colony_code[10];
 char Colony_name[10];
 int No_of_People;
};

```

Write a function in C++ to update the file with a new value of No\_of\_People for the colony whose code has been entered by the user. (The new value of No\_of\_People is to be taken from the user)

Q5.

- a) What are Selection and Projection operations of relational algebra? How are these implemented through the SQL select statement? (2)
- b) Study the following tables FLIGHTS and PASSENGERS and write SQL commands for the questions (i) to (v) and give output for SQL commands (vi) and (vii)

**FLIGHT**

| FL_NO | AIRLINE         | STARTING | ENDING     | FARE  | TAX |
|-------|-----------------|----------|------------|-------|-----|
| IC301 | Indian Airlines | Delhi    | Mumbai     | 5000  | 500 |
| S304  | Sahara          | Delhi    | Bangalore  | 7000  | 600 |
| K112  | KingFisher      | Kochi    | Bangalore  | 10000 | 500 |
| IC321 | Indian Airlines | Delhi    | Coimbatore | 8500  | 700 |
| S677  | Sahara          | Mumbai   | Calcutta   | 8000  | 750 |
| IC988 | Indian Airlines | Delhi    | Bagdogra   | 6700  | 400 |

**PASSENGER**

| P_NO | PNAME   | TRAVELDATE | FL_NO |
|------|---------|------------|-------|
| P1   | Ravi    | 11-Jan-07  | IC988 |
| P2   | Harish  | 10-Dec-06  | S304  |
| P15  | Satish  | 15-Feb-07  | K112  |
| P20  | Kaushik | 10-Jan-07  | K112  |
| P35  | Narmada | 20-Mar-07  | S677  |
| P15  | Gautam  | 25-Apr-07  | IC988 |

- i) Display the Airline name that have a flight starting from Delhi where fare lies between 6500 and 7000. (1)
- ii) Display Flight Details of all flights where the fare is not less than 5000 in descending order of fare. (1)
- iii) Display the passenger name and the name of the airlines by which they have traveled. (1)
- iv) Display the airline name and count of the number of flights by that airline. (1)
- v) Display the passenger name and the total fare paid by them (total fare=fare+tax) (1)
- vi) Select count(\*) from FLIGHT where FARE BETWEEN 7000 and 8000; (1/2)
- vii) Select PNAME from PASSENGER order by PNAME. (1/2)

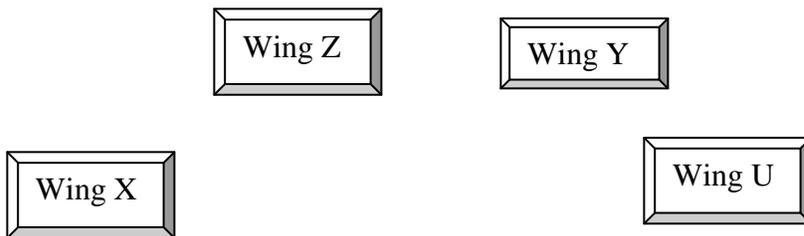
Q6.

- a) State and verify the Distributive Law of Boolean Algebra. (2)

- b) Convert the following expression into its equivalent canonical POS form. (1)  
 $F(u, v, w) = u'v w + uv'w' + uvw'$
- c) Draw a logic circuit diagram for the following expression using NOR gates only (1)  
 $(A') \cdot (A + B' + C)$ .
- d) Which gates are called Universal Gates and why? (1)
- e) Reduce the following Boolean expression using a K-Map. (3)  
 $F(A, B, C, D) = \sum (0, 1, 2, 4, 5, 8, 9, 10, 11)$

Q7.

- a) Write the full form for the following: (1)  
 i. CDMA  
 ii. FLOSS
- b) Write a note on Microwave communication. (1)
- c) Give any two advantages of bus topology. (1)
- d) What is the use of VoIP protocol? (1)
- e) Compare freeware and shareware. (1)
- f) What is a web browser? (1)
- g) Tech Point organization has set up its branch office at Delhi for its office and web based activities. It has 4 wings of buildings as shown in the diagram:



Center to center distances between various wings are

|                  |      |
|------------------|------|
| Wing X to Wing Z | 50m  |
| Wing Z to Wing Y | 70m  |
| Wing Y to Wing X | 145m |
| Wing Y to Wing U | 90m  |
| Wing X to Wing U | 175m |
| Wing Z to Wing U | 80m  |

Number of computers

|        |     |
|--------|-----|
| Wing X | 50  |
| Wing Z | 30  |
| Wing Y | 150 |
| Wing U | 15  |

- i) Suggest a suitable cable layout of connections between various wings. (1)
- ii) Suggest the most suitable place (i.e. wing) to house the server of this organization with a suitable reason. (1)
- iii) Suggest the placement of a Repeater with justification: (1)
- iv) The organization is planning to link its head office situated in Delhi with the office at Srinagar. Suggest various ways to establish the connectivity. (1)