Sample Paper – 2014
Class – XII
Subject – Computer Science

Duration: 3 hours Max marks: 70

General Instructions:

- ***All*** the questions are compulsory. Write comments whenever necessary.
- Programming language: C++.
- Put the proper question number before writng any of the questions.

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1. (a) Which feature of OOP is implemented by function overloading? Explain. 2

(b) Name the header files to which the following functions belong to: 1
(i) eof() (ii) isalpha()

(c) Identify the error(s), if any, in the following program: 2

```
#include<iostream.h>
#include<stdio.h>
class MyStudent
{
        int studentId = 1001;
        char name[20];
    public
        MyStudent( ){ }
        void register( ) { cin >> studentID; gets(name);}
        void display( ) { cout << studentId << ":" << name << endl;}
}
void main()
{
        MyStudent ms(1002, "XYZ");
        register.ms( );
        ms.display( );
}
```

(d) Give the output of the following: 2

```
#include <iostream>
int main()
{
```

```
        int n = 5;
        if ( n++ = = 6 )
           cout << "six";
        else if ( --n = = 5 )
            cout << "five";
        else if ( ++n = = 5 )
             cout << "still five";
        return 0;
}
```

(e) What will be the output of the following: 3

```
#include <iostream>
#include <cstring>
int main()
{
        char text[] = "Word";
        char word[] = "Word";
        if ( strcmp( text,word ) )
           cout << "\nYes";
        else cout << "\nNo";
        return 0;
}
```

(f) Study the following program and select the posible output. 2

```
const int MAX = 3;
void main( )
{
        randomize( );
        int number;
        number = 50 + random(MAX);
        for(int p = number; p >= 50; p--) cout << p << "#";
        cout << endl;
}
```

(i) 53#52#51#50#
(ii) 50#51#52#
(iii) 50#51#
(iv) 51#50#

2. (a) Rewrite the following code to generate the desired output as given below without changing the main() 2

```
int main()
{
```

```
        cout << "Hello world!";
        return 0;
}
```

The desired output is:

```
I have been initialized.
Hello world!
I am signing off!
```

(b) Study the following code segment and the answer the qustions that follow. [1x2=2]

```
class Mathematics
{
        char topic[20];
        int weightage;
    public:
        Mathematics()          //Function 1
        {
                strcpy(topic,"Algebra");
                weightage = 25;
                cout << "Topic activated.";
        }
        ~Mathematics()         //Function 2
        {
                cout << "Topic deactivated.";
        }
};
```

i) What are the technical names of the two functions marked as "Function 1" and "Function 2" ?

ii) Write a statement that invokes "Function 1".

(c) Define a class named **"Housing"** in with the following specifications: 4

Private members:

regNo	integer(ranges 10 – 100)
name	String
type	character
cost	float

Public members:

function readData() to read an object of Housing type.
Function display() to display the details of the object.
Funstion drawNumbers() to choose and display the details of 2 houses selected randomly from an array of 10 objects of type Housing.

Use random function to generate the registration numbers to match with regNo from the array.

(d) Consider the following class and answer the questions that follow: [1x4=4]

```
class School
{
        int a;
    protected:
        int b,c;
    public:
        void input(int);
        void output();
};
class Dept: protected School
{
        int x,y;
    protected:
        void in(int, int);
    public:
        void out();
};
class Teacher: protected Dept
{
        int p;
    public:
        void enter();
};
```

(i) Can the function input() and output() access the data member p in class **"Teacher"**. Justify your answer.

(ii) What will be the size of the object Teacher?

(iii) What are the data members that are/is accessible from the member function enter() in class Teacher?

(iv) Write the names of all the members that are accessible from the objects of class Dept.

3 (a) Write a function qDel() to display and delete a element from a dynamically allocated queue containing nodes of the following given structure: 3

```
struct node
{
        int no;
        char itemNo[20];
        node *link;
```

```
};
```

(b) A 2-dimensional array X[5][4] is stored row wise in the memory. The first element of the array is stored at location 80.Find the memory location (row wise and column wise) of X[3][2] if each element of array requires 4 byte. 2

(c) Write a user-defined function that reads a 1-d array and converts it into a 2-d array as shown below: 3

1-D array: 1, 2, 3, 4 2-D array:

```
1 2 3 4
1 2 3 0
1 2 0 0
1 0 0 0
```

(d) Evaluate the following postfix expression using a stack showing the contents of the stack after each operation: True, False, Not, And, True, True, And, Or 2

(e) Arrays A[m] and B[n] are arranged in ascending and descending order respectively. Copy all the elements of both A and B into another array C in ascending order & display it. 4

4. (a) Observe the program segment given below carefully and fill in the blanks marked as Statement 1 and Statement 2 using seekg() and seekp() functions. 1

```
class Item
{
        int ino; char name[20];
      public:
        //function to search and display the content from a particular record number
        void search(int);
        //function to modify the content of a particular record number
        void modify(int);
};
void Item::search(int recNo)
{
        fstream file;
        file.open("Stock.dat",ios::binary|ios::in);
        _____;     //Statement 1
        file.read((char*)this, sizeof(Item));
        cout << ino << "==>" << name << endl;
        file.close();
}
void Item::modify(int recNo)
{
        fstream dile;
        file.open("Stock.dat",ios::binary|ios::out|ios::in);
        cin >> ino;
        cin.getline(name,20);
```

```
        _____;      //Statement 2
        file.write((char*)this,sizeof(Item));
        file.close();
}
```

(b) Write a function in C++ to count the number of lines present in a text file "Story.txt". 2

(c) Write a function in C++ to search for a bookNo from binary file "Book.dat" assuming the binary file is containing the objets of the following class. 3

```
class Book
{
        int bookNo;
        char title[20];
    public:
        int getBookNo() { return bookNo;}
        void enter() { cin >> bookNo; gets(title);}
        void display() { cout << bookNo << title << endl;}
};
```

5. (a) What do you understand by selection & projection operation in relational algebra? 2

Consider the following tables Employee and SalGrade and answer (b) and (c) parts of the question:

Employee

Ecode	*Name*	*Desig*	*SGrade*	*DOJ*	*DOB*
11	Amit	Executive	S003	23-Mar-2003	13-Jan-1980
12	Ram	IT Head	S002	12-Feb-2010	22-Aug-1987
13	Chitra	Receptionist	S003	24-Jun-2009	24-Jul-1983
14	Naresh	GM	S002	11-Aug-2006	03-Mar-1984
18	Priya	CEO	S001	29-Dec-2004	19-Jan-1982

SalGrade

SGrade	*Salary*	*HRA*
S001	56000	18000
S002	32000	12000
S003	24000	8000

(b) Write SQL commands for the following: 4

(i) Display name and desig of those employees whose sgrade is either S002 or S003.

(ii) Display the details of all employees in descending order of DOJ.

(iii) Display the details of those employee(s) whose DOJ is betwen 9th February 2006 and 08th August 2009.

(iv) Add a new row to the Employee table with the following:

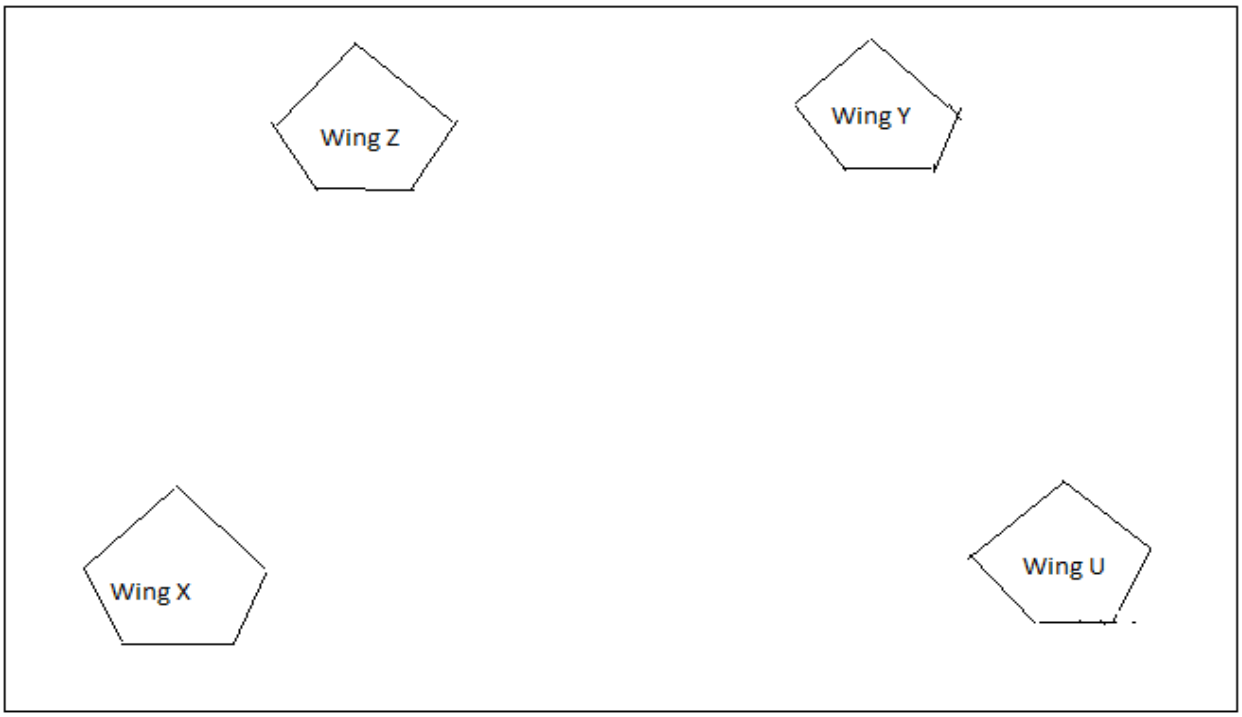
19, 'Harish', 'Programmer', 'S002', '09-Sep-2007', '21-Apr-1983'.

(c) Give the output of the following SQL queries: 2
(i) select count(sgrade),sgrade from employee group by sgrade;
(ii) select name,salary from employee e, salgrade s where e.sgrade = s.sgrade and e.ecode<13;
(iii) select sgrade, salary+HRA from salgrade where sgrade='S002';
(iv) select min(dob), max(doj) from employee;

6. (a) Verify the following using truth table: 2
X + YZ = (X+Y)(X+Z)
(b) Write the equivalent Bolean expression for the following logic circuit: 2

(c) Four members of a family(father,mother,son and daughter) are palnning a holiday trip to Goa. They decided to take votes from each member of the family and if there is more than 50% of votes casted as "yes" then only the trip will happen, otherwise not. Give the simplified boolean equation for this in POS form. Consider "yes" as 1 and "no" as 0. 4

7. (a) Compare any two switching techniques. 1
(b) Expand the following terms with respect to networking: 2
(i) SIM
(ii) MAC
(iii) TDMA
(iv) VoIP
(c) Give two properties of open source softwares. 2
(d) The Great Brain Organization has set up its new branch at Srinagar for its office and web based activities. It has 4 wings of buildings as shown below: 4



Center to center distance between various blocks:

Wing X to Wing Z	50m.
Wing Z to Wing Y	70m.
Wing Y to Wing X	125m
Wing Y to Wing U	80m.
Wing X to Wing U	175m.
Wing Z to Wing U	90m.

Number of computers

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

(i) Suggest a suitable cable layout of connection between the Wing and name the

topology.

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

(iii) Suggest the placement of the following devices with justification:

- Repeater
- Hub/Switch

(iv) The organization is planning to link its head office situated in Delhi with the offices at Srinagar. Suggest an economic way to connect it; the company is not ready to compromise on the bandwidth. Justify your answer.

(e) Give two examples of cyber crime. 1

Name Sandip Nath
Email : techsandip@gmail.com
Phone No. 9038850954