Assignment No. 1

Name: Sakshi Sanjay Rane
Roll no.: 54 Batch S6
Date:

Problem statement: Implement a class Complex which represents the Complex Number data type. Implement the following:
1. Constructor (including a default constructor which creates the complex number 0+0i).
2. Overloaded operator+ to add two complex numbers.
3. Overloaded operator* to multiply two complex numbers.4. Overloaded << and >> to print and read Complex Numbers

Code:

```
#include<iostream>
using namespace std;
class complex
{
float realp,imagep;
public:
        complex()
        {
                realp=0;
                imagep=0;

        }
        complex operator+(complex &);
        complex operator*(complex &);
        complex (float x,float y);
        friend istream &operator>>(istream &,complex &);
        friend ostream &operator<<(ostream &,complex &);
};
complex::complex(float x,float y)
{
        realp=x;
        imagep=y;

}

istream &operator>>(istream &din,complex &c)
{
        cout<<"Enter real part of complex number 2:";
        din>>c.realp;
        cout<<"Enter imaginary part of complex number 2:";
        din>>c.imagep;
        return din;
}
ostream &operator<<(ostream &dout , complex &c)
{
        dout<<c.realp<<" + "<<c.imagep<<"i";
        dout<<endl;
        return dout;
}
complex complex::operator+(complex &c)
{
        complex temp;
        temp.realp=realp + c.realp;
        temp.imagep=imagep + c.imagep;
        return temp;
}
complex complex::operator*(complex &c)
{
        complex mul;
        mul.realp=(realp*c.realp) - (imagep*c.imagep);
        mul.imagep=(imagep*c.realp) + (realp*c.imagep);
        return mul;
}
int main()
{
        complex c2,c3;
        complex c1(1.2,2.2);
        cout<<"Complex no 1 is:"<<c1;
        cout<<"Enter complex no 2:\n";
        cin>>c2;
        cout<<"Complex number 1 is :";
        cout<<c1;
        cout<<"Complex number 2 is :";
        cout<<c2;
        cout<<"complex number 3 is :";
        cout<<c3;
        cout<<"\nAddition of two complex numbers is :";
        c3=c1+c2;
        cout<<c3;
        cout<<"\nMultiplication of two complex numbers is :";
        c3=c1*c2;
        cout<<c3;
        return 0;
}
```

****

Output:

```
Complex no 1 is:1.2 + 2.2i
Enter complex no 2:
Enter real part of complex number 2:2
Enter imaginary part of complex number 2:3
Complex number 1 is :1.2 + 2.2i
Complex number 2 is :2 + 3i
complex number 3 is :0 + 0i

Addition of two complex numbers is :3.2 + 5.2i

Multiplication of two complex numbers is :-4.2 + 8i
```

ASSIGNMENT NO: 2

Name : Sakshi Sanjay Rane

Roll no : 54

Batch : S6

Date :

Develop a program in C++ to create a database of student’s information system containing the following information: Name, Roll number, Class, Division, Date of Birth, Blood group, Contactaddress, Telephone number, Driving license no. and other. Construct the database with suitable member functions. Make use of constructor, default constructor, copy constructor, destructor, static member functions, friend class, this pointer, inline code and dynamic memory allocation operators-new and delete as well as exception handling. */

Code:

```
#include<iostream>
#include<string.h> using
namespace std;

class StudData;

class Student{
string name;     int
roll_no;     string
cls;     char*
division;     string
dob;     char*
bloodgroup;     static
int count;

   public:

   Student()          // Default Constructor
   {         name="";
roll_no=0;         cls="";
division=new char;
dob="dd/mm/yyyy";
bloodgroup=new char[4];
   }

   ~Student()
   {         delete division;
delete[] bloodgroup;
   }

   static int getCount()
   {         return
count;
   }

   void getData(StudData*);
void dispData(StudData*);
};
```

```
class StudData{
string caddress;
long int* telno;     long
int* dlno;     friend
class Student;

    public:

    StudData()
    {
caddress="";
telno=new long;
dlno=new long;
    }

    ~StudData()
    {          delete
telno;          delete
dlno;
    }

    void getStudData()
    {
        cout<<"Enter Contact Address : ";
cin.get();          getline(cin,caddress);
cout<<"Enter Telephone Number : ";
cin>>*telno;
        cout<<"Enter Driving License Number : ";
cin>>*dlno;
    }
    void dispStudData()
    {
        cout<<"Contact Address : "<<caddress<<endl;
cout<<"Telephone Number : "<<*telno<<endl;         cout<<"Driving
License Number : "<<*dlno<<endl;
    }
};

inline void Student::getData(StudData* st)
{
    cout<<"Enter Student Name : ";
getline(cin,name);
cout<<"Enter Roll Number : ";
cin>>roll_no;     cout<<"Enter
Class : ";     cin.get();
getline(cin,cls);     cout<<"Enter
Division : ";     cin>>division;
cout<<"Enter Date of Birth : ";
cin.get();     getline(cin,dob);
cout<<"Enter Blood Group : ";
cin>>bloodgroup;     st-
>getStudData();     count++;
}

inline void Student::dispData(StudData* st1)
{
    cout<<"Student Name : "<<name<<endl;
cout<<"Roll Number : "<<roll_no<<endl;
cout<<"Class : "<<cls<<endl;     cout<<"Division
```

```
: "<<division<<endl;     cout<<"Date of Birth :
"<<dob<<endl;     cout<<"Blood Group :
"<<bloodgroup<<endl;     st1->dispStudData();
}

int Student::count;

int main()
{
   Student* stud1[100];
StudData* stud2[100];
int n=0;     char ch;

   do
   {
      stud1[n]=new Student;
stud2[n]=new StudData;         stud1[n]-
>getData(stud2[n]);         n++;
      cout<<"Do you want to add another student (y/n) : ";
cin>>ch;         cin.get();
   } while (ch=='y' || ch=='Y');

   for(int i=0;i<n;i++)
   {
      cout<<"------------------------------------------------------------"<<endl;
stud1[i]->dispData(stud2[i]);
   }

   cout<<"------------------------------------------------------------"<<endl;
cout<<"Total Students : "<<Student::getCount();
```

```
    cout<<endl<<"-----------------------------------------------------------"<<endl;


    for(int i=0;i<n;i++)
    {
        delete stud1[i];
delete stud2[i];
    }



    return 0;
}
```

Output:

```
Enter Student Name : Renuka Ma'am
Enter Roll Number : 223
Enter Class : Phd
Enter Division : A
Enter Date of Birth : 01/01/1991
Enter Blood Group : O
Enter Contact Address : Talegaon
Enter Telephone Number : 0123456789
Enter Driving License Number : 0147852369
Do you want to add another student (y/n) : n
-----------------------------------------------------------
Student Name : Renuka Ma'am
Roll Number : 223
Class : Phd
Division : A
Date of Birth : 01/01/1991
```

Blood Group : O

Contact Address : Talegaon

Telephone Number : 123456789

Driving License Number : 147852369

ASSIGNMENT NO: 3

Imagine a publishing company which does marketing for book and audio cassette versions. Create a class publication that stores the title (a string) and price (type float) of publications. From this class derive two classes: book which adds a page count (type int) and tape which adds a playing time in minutes (type float). Write a program that instantiates the book and tape class, allows user to enter data and displays the data members. If an exception is caught, replace all the data member values with zero values.

Code:

```
#include <iostream>
#include <string> using
namespace std;

class pub {
private:
string title;
float prices;

public: pub()
 {
title = ""; prices
= 0.0;
```

```
}

void get_data() { cout<<"\nEnter
title : "; cin.ignore(); //clear input
buffer getline(cin,title);
cout<<"\nEnter Price : ";
cin>>prices; } void put_data() {
cout<<"\n"; cout<<"\n
Information : " << endl; cout<<"\n
Title : "<<title; cout<<"\n Price :
"<<prices;

}
};

class book: public pub
{ private: int pages;
public: book() {
pages = 0; }

void get_data() {
pub::get_data(); cout<<endl;
cout<<"Enter Page Count : \n";
cin>>pages;

}

void put_data()
{
```

```
pub::put_data();
try{
if(pages<0)
throw pages;}
catch(int f) {
cout<<"\n error: pages not valid. "<<f;
pages=0; } cout<<"\n Pages Are :
"<<pages;
} }; class tape: public
pub { private: float
playtime;

public: tape() { playtime=0.0; } void
get_data() { pub::get_data();
cout<<"Enter Play Time Of Cassette \n";
cin>>playtime; } void put_data() {
pub::put_data(); try { if(playtime<0.0)
throw playtime; } catch(float r) {
cout<<"\n Error: Invalid Playtime :"<<playtime;
playtime=0.0; }
cout<<"\n Playtime is : "<<playtime;
}
};


int main() //main func
{
book b[10]; //array of object tape t[10];
int choice=0,bookcount=0,tapeCount=0;
cout<<"----------------------------------";
do { cout<<"\n 1. Add Book ";
cout<<"\n 2. Display tape : "; cout<<"\n
```

```
3. Display Book "; cout<<"\n 4. Display
tape "; cout<<"\n 5. Exit : "<<endl;
cout<<"\n Enter Choice : ";
cin>>choice; switch(choice) { case 1: {
cout<<"\n-------------------\n";
cout<<"Add Book : \n";
b[bookcount].get_data(); bookcount++;
break; } case 2: { cout<<"\n--------------
-----\n"; cout<<"Add Tape : \n";
t[tapeCount].get_data(); tapeCount++;
break;

} case 3: { cout<<"\n
(books)"; for(int
j=0;j<bookcount;j++)
{ b[j].put_data(); } break; }
case 4: { cout<<"\n (tape)";
for(int j=0;j<tapeCount;j++)
{
t[j].put_data();
} break; }
case 5:
{
cout<<"***************** Program Exited Successfully
**********************"<<endl;
exit(0); } default: { cout<<"\n
Invalid";
}
}
}
```

```
while(choice!=5);
return 0; }
```

Output:

```
----------------------------------
1. Add Book
2. Display tape :
3. Display Book
4. Display tape
5. Exit :

 Enter Choice : 1
 -------------------
Add Book :

Enter title : Harry Potter
Enter Price : 499
Enter Page Count :
1099
1. Add Book
2. Display tape :
3. Display Book
4. Display tape
5. Exit :

 Enter Choice : 3
 (books)
 Information :


 Title : Harry Potter
 Price : 499
 Pages Are : 1099
1. Add Book
2. Display tape :
3. Display Book
4. Display tape
5. Exit :


 Enter Choice : 5
 ***************** Program Exited Successfully **********************
```

ASSIGNMENT 4

Problem Statement - Write a C++ program that creates an output file, writes information to it, closes the file, openit again as an input file and read the information from the file.

CODE:

```
#include <iostream>
#include <fstream>

using namespace std;

int main()
{
  fstream file; //object of fstream class

  //opening file "sample.txt" in out(write) mode
  file.open("sample.txt",ios::out);

  if(!file)
  {
     cout<<"Error in creating file!!!"<<endl;
     return 0;
  }

  cout<<"File created successfully."<<endl;
  //write text into file
  file<<"hello all";
  //closing the file
  file.close();

  //again open file in read mode
  file.open("sample.txt",ios::in);

  if(!file)
  {
     cout<<"Error in opening file!!!"<<endl;
     return 0;
  }

  //read untill end of file is not found.
  char ch; //to read single character
  cout<<"File content: ";

  while(!file.eof())
  {
     file>>ch; //read single character from file
```

```
        cout<<ch;
    }

    file.close(); //close file

    return 0;
}
```

ASSIGNMENT 5

Name : Sakshi Sanjay Rane
Roll No : 54
Batch : S6
Date :

Problem Statement - Write a function template for selection sort that inputs, sorts and outputs an integer array and a float array.

CODE :

```
#include<iostream>
using namespace std;
int n;
#define size 10
template<class T>
void sel(T A[size])
{
   int i,j,min;
   T temp;
   for(i=0;i<n-1;i++)
   {
      min=i;
      for(j=i+1;j<n;j++)
      {
         if(A[j]<A[min])
         min=j;
      }
      temp=A[i];
      A[i]=A[min];
      A[min]=temp;
   }
   cout<<"\nSorted array:";
   for(i=0;i<n;i++)
   {
      cout<<" "<<A[i];
   }
}

int main()
{
   int A[size];
   float B[size];
   int i;
   int ch;
   do
         {
                   cout<<"\n* * * * * SELECTION SORT SYSTEM * * * * *";
                   cout<<"\n-------------------MENU----------------------";
                   cout<<"\n1. Integer Values";
```

```
            cout<<"\n2. Float Values";
            cout<<"\n3. Exit";
            cout<<"\n\nEnter your choice : ";
            cin>>ch;

            switch(ch)
            {
                  case 1:
                        cout<<"\nEnter total no of int elements:";
        cin>>n;
        cout<<"\nEnter int elements:";
        for(i=0;i<n;i++)
        {
          cin>>A[i];
        }
        sel(A);
                        break;

                  case 2:
                        cout<<"\nEnter total no of float elements:";
        cin>>n;
        cout<<"\nEnter float elements:";
        for(i=0;i<n;i++)
        {
          cin>>B[i];
        }
        sel(B);
                        break;

                  case 3:
                        exit(0);
            }
      }while(ch!=3);



 return 0;

}
```

OUTPUT:

```
* * * * * SELECTION SORT SYSTEM * * * * *
--------------------MENU-----------------------
1. Integer Values
2. Float Values
3. Exit

Enter your choice : 1

Enter total no of int elements:5

Enter int elements:30
37
29
45
39

Sorted array: 29 30 37 39 45
* * * * * SELECTION SORT SYSTEM * * * * *
--------------------MENU-----------------------
1. Integer Values
2. Float Values
3. Exit

Enter your choice : 2

Enter total no of float elements:4

Enter float elements:9.2
7.3
7.9
1.1

Sorted array: 1.1 7.3 7.9 9.2
* * * * * SELECTION SORT SYSTEM * * * * *
--------------------MENU-----------------------
1. Integer Values
2. Float Values
3. Exit

Enter your choice : 3
```

ASSIGNMENT NO. 06

Name: Sakshi Sanjay Rane
Roll no.: 54
Batch:S6
Date:

CODE:

```
#include <iostream>
#include <algorithm>
#include <vector> using
namespace std;
class Item {
 public:  char
name[10];  int
quantity;  int
cost;  int code;
 bool operator==(const Item& i1)
 {
if(code==i1.code)
return 1;  return
0;  }
 bool operator<(const Item& i1)
 {
if(code<i1.code)
return 1;  return
0;
 } }; vector<Item> o1;
void print(Item &i1);
void display(); void
insert(); void
search(); void dlt();
bool compare(const Item &i1, const Item &i2)
{
return i1.cost < i2.cost;
}
int main()
{
 int ch;
do  {
 cout<<"\n* ** * * Menu * * ** *";
cout<<"\n1.Insert";
cout<<"\n2.Display";
cout<<"\n3.Search";  cout<<"\n4.Sort";
cout<<"\n5.Delete";  cout<<"\n6.Exit";
cout<<"\nEnter your choice : ";  cin>>ch;

 switch(ch)
{  case 1:
insert();
break;

 case 2:
display();
break;

 case 3:
search();
break;

 case 4:
sort(o1.begin(),o1.end(),compare);
cout<<"\n\n Sorted on Cost : ";
display();  break;

 case 5:
dlt();
break;

 case 6:
exit(0);  }

 }while(ch!=7);
return 0; }
void insert()
{
 Item i1;  cout<<"\nEnter Item
Name : ";  cin>>i1.name;
cout<<"\nEnter Item Quantity : ";
cin>>i1.quantity;  cout<<"\nEnter
Item Cost : ";  cin>>i1.cost;
cout<<"\nEnter Item Code : ";
cin>>i1.code;  o1.push_back(i1); }
void display()
{
 for_each(o1.begin(),o1.end(),print);
} void print(Item &i1) {  cout<<"\n";
cout<<"\nItem Name : "<<i1.name;
```

```
cout<<"\nItem Quantity : "<<i1.quantity;
cout<<"\nItem Cost : "<<i1.cost;
cout<<"\nItem Code : "<<i1.code;
cout<<"\n\n"; } void search() {
 vector<Item>::iterator p;  Item i1;
cout<<"\nEnter Item Code to search : ";
cin>>i1.code;
p=find(o1.begin(),o1.end(),i1);
if(p==o1.end())  {  cout<<"\nNot
found!!!";
 }  else  {
cout<<"\nFound!!!";
 } }
void dlt() {
 vector<Item>::iterator p;  Item i1;
cout<<"\nEnter Item Code to delete : ";
cin>>i1.code;
p=find(o1.begin(),o1.end(),i1);
if(p==o1.end())  {  cout<<"\nNot
found!!!";
 }  else  {  o1.erase(p);
cout<<"\nDeleted!!!";
 }
}
```

OUTPUT:

```
* ** * * Menu * * ** *
1.Insert
2.Display
3.Search
4.Sort
5.Delete
6.Exit
Enter your choice : 1

Enter Item Name : sugar

Enter Item Quantity : 2

Enter Item Cost : 100

Enter Item Code : 111

* ** * * Menu * * ** *
1.Insert
2.Display
```

```
3.Search
4.Sort
5.Delete
6.Exit
Enter your choice :
```

ASSIGNMENT 7

Name – Sakshi Sanjay Rane
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Batch – S6
Date -

Problem Statement - Write a program in C++ to use map associative container. The keys will be the names of states and the values will be the populations of the states. When the program runs, the user is prompted to type the name of a state. The program then looks in the map, using the state name as an index and returns the population of the state.

CODE :

```
#include <iostream>
#include <map>
#include <string>
#include <utility>

using namespace std;

int main()
{
        typedef map<string,int> mapType;
        mapType populationMap;

        populationMap.insert(pair<string, float>("Maharashtra", 125));
        populationMap.insert(pair<string, float>("Uttar_Pradesh", 225));
        populationMap.insert(mapType::value_type("Bihar", 120));
        populationMap.insert(mapType::value_type("West_Bengal", 100));
        populationMap.insert(make_pair("Madhya_Pradesh", 90));
        populationMap.insert(make_pair("Tamil_Nadu", 80));
        populationMap.insert(make_pair("Rajasthan", 78));
        populationMap.insert(make_pair("Andhra_Pradesh", 53));
        populationMap.insert(make_pair("Odisha", 47));
        populationMap.insert(make_pair("Kerala", 38));
        populationMap.insert(make_pair("Telangana", 37));
        populationMap.insert(make_pair("Assam", 35));
        populationMap.insert(make_pair("Jharkhand", 38));
        populationMap.insert(make_pair("Karnataka", 68));
        populationMap.insert(make_pair("Gujarat", 70));
        populationMap.insert(make_pair("Punjab", 31));
        populationMap.insert(make_pair("Chhattisgarh", 30));
        populationMap.insert(make_pair("Haryana", 29));
        populationMap.insert(make_pair("UT_Delhi", 19));
        populationMap.insert(make_pair("UT_Jammu_and_Kashmir", 14));
        populationMap.insert(make_pair("Uttarakhand", 12));
        populationMap.insert(make_pair("Himachal_Pradesh", 8));
        populationMap.insert(make_pair("Tripura", 04));
        populationMap.insert(make_pair("Meghalaya", 4));
        populationMap.insert(make_pair("Manipur[", 3));
        populationMap.insert(make_pair("Nagaland", 2));
        populationMap.insert(make_pair("Goa", 2));
        populationMap.insert(make_pair("Arunachal_Pradesh", 2));
        populationMap.insert(make_pair("UT_Puducherry", 2));
        populationMap.insert(make_pair("Mizoram", 1));
        populationMap.insert(make_pair("UT_Chandigarh", 1));
        populationMap.insert(make_pair("Sikkim", 1));
        populationMap.insert(make_pair("UT_Dadra_and_Nagar_Haveli_and_Daman_and_Diu",
1));
        populationMap.insert(make_pair("UT_Andaman_and_Nicobar_Islands", 1));
        populationMap.insert(make_pair("UT_Lakshadweep", 0.0003));
        populationMap.insert(make_pair("UT_Ladakh", 0.00006));

        mapType::iterator iter = --populationMap.end();
        populationMap.erase(iter);

        cout << "Total state and UT of India with Size of populationMap: " << populationMap.size()
<< '\n';

        for (iter = populationMap.begin(); iter != populationMap.end(); ++iter)
        {
         cout << iter->first <<":" << iter->second << " million\n";
        }

        char c;
        do
        {
                string state;
                cout<<"\nEnter that state you want to know the population of: ";
                cin>>state;
                iter = populationMap.find(state);
                if( iter != populationMap.end() )
                   cout << state <<"'s populations is "
                      << iter->second << " million\n";
                else
                   cout << "State is not in populationMap" << '\n';

                cout<<"Do you wish to continue?(y/n):";
                cin>>c;
        }while(c=='y'||c=='Y');

        populationMap.clear();

        return 0;
}
```

OUTPUT :

```
pllab0112@pllab0112-ThinkCentre-M70s:~$ g++ shweop7.cpp
pllab0112@pllab0112-ThinkCentre-M70s:~$ ./a.out
Total state and UT of India with Size of populationMap: 35
Andhra_Pradesh:53 million
Arunachal_Pradesh:2 million
```

```
Assam:35 million
Bihar:120 million
Chhattisgarh:30 million
Goa:2 million
Gujarat:70 million
Haryana:29 million
Himachal_Pradesh:8 million
Jharkhand:38 million
Karnataka:68 million
Kerala:38 million
Madhya_Pradesh:90 million
Maharashtra:125 million
Manipur[:3 million
Meghalaya:4 million
Mizoram:1 million
Nagaland:2 million
Odisha:47 million
Punjab:31 million
Rajasthan:78 million
Sikkim:1 million
Tamil_Nadu:80 million
Telangana:37 million
Tripura:4 million
UT_Andaman_and_Nicobar_Islands:1 million
UT_Chandigarh:1 million
UT_Dadra_and_Nagar_Haveli_and_Daman_and_Diu:1 million
UT_Delhi:19 million
UT_Jammu_and_Kashmir:14 million
UT_Ladakh:0 million
UT_Lakshadweep:0 million
UT_Puducherry:2 million
Uttar_Pradesh:225 million
Uttarakhand:12 million

Enter that state you want to know the population of: UT_Jammu_and_Kashmir
UT_Jammu_and_Kashmir's populations is 14 million
Do you wish to continue?(y/n):n
pllab0112@pllab0112-ThinkCentre-M70s:~$
```