**CS217 Object Oriented Programming**

**Week 6- Classes II**

**Task 1**

Design a class **Complex** for handling Complex numbers and include the following **private** data members:

* real: a double
* imaginary: a double

The class has the following member functions.

1. A constructor initializing the number with **default parameters**.
2. Overloaded Constructors.

* Complex(double r, double i)

Note\*:Use member function initialization for all data members.

* Complex(Complex & copy) // copy constructor

1. Getters and Setters of the class data members as given below

* void setReal(double r)
* double getReal()
* void setImaginary(double i)
* double getImaginary()

1. Overload the following member function in the class

* **Complex addComplex( double r)**

It adds r of type double to real part of complex number while imaginary part remains same. And returns newly generated complex number.

* **Complex addComplex(Complex &c1)**

It adds both complex numbers and returns newly generated complex number.

* **Complex subComplex(double r)**

It subtracts r of type double from real part of complex number while imaginary part remains same. And returns newly generated complex number.

* **Complex subComplex(Complex &c1)**

It subtracts both complex numbers and returns newly generated complex number.

* **Complex mulComplex(double n)**

It’s a scalar multiplication. Real and imaginary parts are multiplied by n. and returns newly generated complex number.

* **Complex mulComplex(Complex &c1)**

It multiplies both complex numbers and returns newly generated complex number. (a+bi)(c+di) = (ac−bd) + (ad+bc)i

**Task 2**

Design a class **Holiday** that represents a holiday during the year. This class has three **private** data members:

* **name**: A string that represents the name of holiday.
* **day**: An integer that holds the day of the month of holiday.
* **month**: A string that holds the month the holiday is in.

1. Write a default constructor that initializes each data member of class such that **name** with **NULL**, **day** with **0** and **month** with **NULL**

**Holiday()**

1. Write a constructor that accepts the arguments for each data member such that **string n** assigned to **name**, **int d** to **day** and **string m** to **month**.

**Holiday(string &n, int d, string &m)**

Note\*:Use member function initialization for all data members.

1. Generate getter setter of each member variable: such that **name** should never be greater than 50 characters, **day** should never be negative and **month** should not be greater than 10 characters.

* bool setName(string &s)
* string getName()
* bool setDay(int u)
* int getDay()
* bool setMonth(string &p)
* string getMonth()

1. Write a function **inSameMonth** (outside class) which takes two Holiday objects as arguments, compares two objects of the class Holiday, and returns true if they have the same month otherwise false.

**bool inSameMonth (Holiday &a, Holiday &b)**

1. Write a function **avgDate** (outside class) which takes an **array** of type Holiday and its **size** as its argument and returns a **double** value that is the average of the entire day data member in the Holiday array **arr**. You may assume that the array is full (i.e. does not have any NULL entries).

**double avgDate(Holiday arr[], int size)**