**Object Oriented Programming**

**LAB 8 (Mid-Term)**

**Start Time: 8:15 am End Time: 10:00 am**

**Problem 1: [Marks: 10]**

Create a class called **Fraction**. Write a driver program to test your class. Rational for performing arithmetic with use integer variables to represent the private data of the class—the numerator and the denominator. Provide a constructor function that enables an object of this class to be initialized when it is declared. The constructor should contain default values in case no initializers  
are provided and should store the fraction in the form (i.e., the fraction 2/4 would be stored in the object as 2 in the numerator and 4 in the denominator). Provide public member functions for each of the following:

1. Getter and Setter function for fraction class
2. Multiplication of two Rational numbers using **multiplication operator overloading**.
3. Printing Rational numbers in the form a/b where a is the numerator and b is the denominator using **extraction operator overloading**.

**Problem 2: [Marks: 10]**

Create a SavingsAccount class. Use a static data member annualInterestRate to store the annual interest rate for each of the savers. Each member of the class contains a private data member savingsBalance indicating the amount the saver currently has on deposit. Provide member function calculateMonthlyInterest that calculates the monthly interest by multiplying the balance by annualInterestRate divided by 12; this interest should be added to savingsBalance. Provide a static member function modifyInterestRate that sets the static annualInterestRate to a new value.  
Write a driver program to test class SavingsAccount. Instantiate two different objects of class SavingsAccount, saver1 and saver2, with balances of 2000.00 Rs and 3000.00 Rs, respectively. Set the annualInterestRate to 3 percent. Then calculate the monthly interest and print the new balances for each of the savers. Then set the annualInterestRate to 4 percent, calculate the next  
month’s interest and print the new balances for each of the savers. Make full use of constructors, getter setters.

**Problem 3: [Marks: 10]**

Create a class ArrayList that contain the dynamic array of integer and its size. You have to provide the definition of following functions.

1. Parameterized constructor that takes size as parameter and then initialize default array.
2. Overload insertion operator to input array.
3. Display function to show the array data.
4. Copy constructor to copy the data of ArrayList object.
5. Overload the subscript operator.