

# Jaypee University of Engineering and Technology, Guna

## Department of Computer Science and Engineering

### Object Oriented Programming Lab (14B17CI371)

#### Lab Exercise-8

Date 13/09/16

[Imp Note: All the programs must be written in C++ with distinguished variable names. If any kind of plagiarism is observed, the punctuality marks (10) will be awarded by zero.] [Imp Note: All the programs must be written in C++ with distinguished variable names. If any kind of plagiarism is observed, the punctuality marks (10) will be awarded by zero.]

1. Design a class Distance that includes following data members: feet, inches. It has the following member function:-
  - Constructor, that initializes the distance to 0,0 by default.
  - Get\_Data function to take input from user
  - Display function
  - Overloaded – operator to subtract 2 distances
  - Overloaded + operator to add 2 distances
  - Overload += and -= operator
  - Overload > and < operators to compare two distances
2. Create a class rational for performing arithmetic with fractions. Use two integer variables to represent the private data of the class-the numerator and denominator. Provide a member function to get input from the user. This function should also check that denominator entered is not 0, if it is zero print invalid input. Provide a function to display the values. Overload +, -, \*, / operators to add, subtract, multiply and divide the objects of this class.
3. Include a function that adds two strings to make a third string. Write a program to do the following tasks:
  - Create uninitialized string objects
  - Creates the objects with string constants.
  - Concatenates two strings properly.
  - Displays a desired string object
4. Create two classes polar and rectangle. Polar class has two data members radius and angle and rectangle has two data members x and y. Write constructors and member functions to get input from user and display the data members in both the classes. Write functions to convert an object of class polar to object of rectangle and vice versa. Also write a function which computes distance between two points represented either in polar or rectangular coordinates.

Hint: formulas to convert **polar** coordinates to **rectangular** coordinates:

$$x = r \cos q, \quad y = r \sin q$$

formulas to convert **rectangular** coordinates to **polar** coordinates:

$$r = \sqrt{x^2 + y^2}, \quad q = \tan^{-1}(y/x)$$