Ojashwi College

BCA – 3rd Semester

OOP in Java

Lab 2: Class, Object, Recursion, Method overloading

1. Create a class Point, with variables x &y, and with member method distanceTo(Point p2) which returns the distance between current object and method parameter p2 and another member method getMidPoint(Point p2) which returns Point object containing mid point between current object and p2.

Create two instances point1 and point2 and show distance between them calling the method distanceTo(). Similarly create third instance point3 which represents the mid_point between them.

2. Create a class Currency with member variable Rupee and Paisa (int). Create two objects of Currency and store their sum in another currency object. The addition of currency should be done is such a way that if paisa > 99 rupees should be incremented by 1 and paisa should be decremented by 100. In same way class should perform decrement as well.

3. (Complex Numbers) Create a class called Complex for performing arithmetic with complex numbers. Complex numbers have the form

realPart + imaginaryPart * i

where i is sqrt(-1)

Write a program to test your class. Use floating-point variables to represent the private data of the class. Provide a constructor that enables an object of this class to be initialized when it's declared. Provide a no-argument constructor with default values in case no initializers are provided. Provide public methods that perform the following operations:

a) Add two Complex numbers: The real parts are added together and the imaginary parts are added together.

b) Subtract two Complex numbers: The real part of the right operand is subtracted from the real part of the left operand, and the imaginary part of the right operand is subtracted from the imaginary part of the left operand.

c) Print Complex numbers in the form (realPart, imageinaryPart)

d) Overload a method called add:

Method 1: add (Complex c)

Method 2: add (double realValue, double imaginaryValue)

4. Write a program to calculate x^n (x^n) using multiplication operation only. The method should be recursive.

5. Write a program to get the factorial of a given number.

The Fibonacci series,

0, 1, 1, 2, 3, 5, 8, 13, 21....

begins with 0 and 1 and has the property that each subsequent Fibonacci number is the sum of the previous two. This series occurs in nature and describes a form of spiral.

The Fibonacci series may be defined recursively as follows:

There are two base cases for the Fibonacci calculation:

fibonacci(0) = 0

fibonacci(1) = 1

fibonacci(n) = fibonacci(n-1) + fibonacci(n-2)

Write a program to calculate a Fibonacci number for given n. Eg; fibonacci(7) = 13, fibonacci(8) = 21

6. Write a program that counts the number of objects created.(hint: use static)

7. Write a class called Date with data variables: year, month and day. Also add a method **isBefore(Date d)** that returns 1 if the current date is before than specified date, 0 if date are same and -1 if current date is after the supplied date.