East West University
Department of Computer Science and Engineering
A/2, Jahurul Islam Avenue, Jahurul Islam City, Aftabnagar, Dhaka

Lab Manual: 02

Lab Topic: Introducing Basics of Elementary Programming in Java

Course Code: CSE110 (Object Oriented Programming)

Course Instructor: Tanni Mittra, Senior Lecturer, CSE

Lab Objective

- **Understand** basic program structure in Java
- **Solve** a few simple problems in Java.
- **Solve** problems using selection statement

Lab Activities

A. Reading inputs from user

- Everything in Java comes in form of a class.
- To read inputs from a user, we need to use *Scanner* class.
- The following program reads name, age and department name of a student and print them accordingly.

```
import java.util.Scanner;
class SampleReadInput{
 public static void main (String[] args){
    Scanner input = new Scanner (System.in);
    System.out.println("Enter your name: ");
    String name = input.next();
    System.out.println("Enter your age: ");
    int age = input.nextInt();
    System.out.println("Enter your CGPA: ");
    double cgpa = input.nextDouble();
    System.out.println("Enter your department: ");
    String department = input.nextLine();
    System.out.printf("Your Name: %s\n", name);
    System.out.printf("Your Age: %d\n", age);
    System.out.printf("Your CGPA: %f\n", cgpa);
    System.out.printf("Your Deparmtent: %s\n", department);
  } // main method ends
} // Main class ends
```

- **Does the program execute as we have wanted? What is the problem? How can you solve it?**

Lab Problems

01: Write a program that reads an integer from the console and determines whether the given number is divisible by either 2 or 3 (but not both). Then the program should print TRUE, otherwise, the program should print FALSE.

02: Write a program that prompts the user to enter the minutes (e.g., 1 billion), and displays the number of years and days for the minutes. For simplicity, assume a year has **365** days. Here is a sample run:

```
Enter the number of minutes: 1000000000 Enter
1000000000 minutes is approximately 1902 years and 214 days
```

03: The two roots of a quadratic equation $ax^2 + bx + c = 0$ can be obtained using the following formula:

$$r_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{and} \quad r_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

$b^2 - 4ac$ is called the discriminant of the quadratic equation. If it is positive, the equation has two real roots. If it is zero, the equation has one root. If it is negative, the equation has no real roots. Write a Java program that prompts the user to enter values for *a*, *b*, and *c* and displays the result based on the discriminant. If the discriminant is positive, display two roots. If the discriminant is **0**, display one root. Otherwise, display "The equation has no real roots".

Note that you can use **Math.pow(x, 0.5)** to compute 2*x*. *Use appropriate JOptionPane dialog boxes to read inputs and write outputs.*

```
Enter a, b, c: 1.0 3 1 Enter
The equation has two roots -0.381966 and -2.61803
```

```
Enter a, b, c: 1.0 3 1 Enter
The equation has two roots -0.381966 and -2.61803
```

04: Write a Java program that prompts the user to enter the exchange rate from currency in U.S. dollars (USD) to Bangladeshi Taka (BDT). Prompt the user to enter **0** to convert from USD to BDT and **1** to convert from BDT to USD. Then, prompt the user to enter the amount in USD or in BDT to convert it to BDT or USD, respectively.

05. Write a Java program that prompts the user to enter the center (**p**,**q**) and the radius (**r**) of a circle. Then, prompts user to enter a point (**x**, **y**) and checks whether the point is within the circle centered at (**p, q**) with radius **r**. For example, (**4**, **5**) is inside the circle centered at (0,0) with radius 10 and (**9**, **9**) is outside the circle, as shown in the following figure.