

## EEE 210: Software Engineering

### Lab 1 Exercises for Week 2 (15 Jan. – 21 Jan.), Spring 2018

#### Note:

- Project folder nomenclature: Lab1\_*yourname*
- Create a new project for each exercise and name them as ExerciseX\_*yourname*, where X denotes the exercise number.
- After completion, zip your project folder and upload it to your Moodle account.
- Any queries during the lab should be discussed merely with the Instructor/TAs.
- The output of each exercise you complete should be included (as screenshots) in the report named Report1\_*yourname*. **Print and submit your report to the TA by the specified deadline.**

**Sample Code:** Print out "This is my first program in Java".

```
public class FirstJavaProgram {
    public static void main(String[] args){
        System.out.println("This is my first program in Java");
    } //End of main
} //End of FirstJavaProgram Class
```

#### Exercise 1:

Write a program to read an integer number entered by the user using the Scanner class and display it on the monitor. This class is in `java.util` package.

(Hint: In order to read the input provided by user, we first import and create the object of Scanner by passing `System.in` as parameter. Then we are using `nextInt()` method of Scanner class to read the integer.)

Begin like this:

```
import java.util.Scanner;

public class GetInteger {
    public static void main(String[] args) {

        // your code goes here

    }
}
```

Your output should look as follows:

```
Enter any integer number: 99
The number entered by the user: 99
```

#### Exercise 2:

Modify the code in Exercise 1 to check whether the number provided by the user is positive/negative AND odd/even. The output should look as follows:

```
Enter any integer number: -18
-18 is negative and even.
```

**Exercise 3:**

Finally, change Exercise 2 such that the program asks the user to input two decimal numbers, sums the two numbers and prints it out in the following format:

```
Enter two decimal numbers: -3 41
The sum of -3 and 41 is 38.
38 is positive and even.
```

**Exercise 4:**

Write a program to calculate the value of  $\pi$  using the following formula:

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} - \dots$$

The output of the program should print the approximated value for  $\pi$  when you run the `for` loop for 100, 500, 1000, 5000, and 10000 times.

**Exercise 5:**

Write a program that implements Collatz Conjecture, i.e. take any natural number  $n$  from the user. If  $n$  is even, divide it by 2 to get  $n / 2$ . If  $n$  is odd, multiply it by 3 and add 1 to obtain  $3n + 1$ . Repeat the process indefinitely. The conjecture is that no matter what number you start with, you will always eventually reach 1. To write a recursive program, begin as follows:

```
public class Collatz {

    public static void main(String[] args) {
        int n = Integer.parseInt(args[0]);
        collatz(n);
        System.out.println();
    }

    public static void collatz(int n) {
        // your code goes here
    }
}
```

The output should look as follows:

```
Enter an integer n : 25
25 76 38 19 58 29 88 44 22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1
```