University of the East
Manila Campus
College of Engineering
Computer Engineering Department

JAVA LOOPING AND METHODS

Machine Problem No. 3 Worksheet

Course:	**NCP2103 : Object-Oriented Programming**			
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Machine Problems

Instructions: Perform the following tasks. Provide a screenshot of your code and output.

Think Before You Code!
Before coding, understand and analyze the problem requirements and devise solutions to solve the problems.

Tip: Before you ask for help, read and explain the program to yourself, and trace it using several inputs by hand or using an IDE debugger. You learn how to program by debugging your own mistakes.

Java Looping:

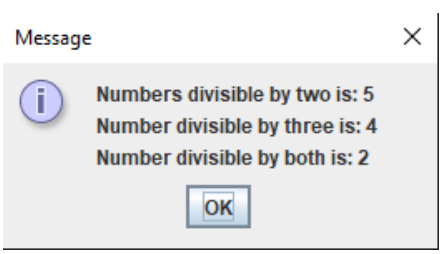
1. Write a program that will accept two integer numbers from the user – the numbers represent the start and end of a number line respectively (e.g. start = 5; end = 10; the loop starts at 5 and ends at 10). The program shall determine the following:
   - Count of numbers divisible by 2
   - Count of numbers divisible by 3
   - Count of numbers divisible by both

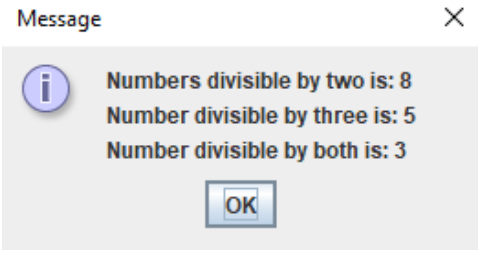
   Display appropriate prompt and output messages.

Source Code

```java
import javax.swing.JOptionPane;
public class DivisibleNumbers {
    public static void main(String[] args){
        int start = Integer.parseInt(JOptionPane.showInputDialog("Enter start number: "));
        int end = Integer.parseInt(JOptionPane.showInputDialog("Enter end number"));

        int divisibleByTwo = 0;
        int divisibleByThree = 0;
        int divisibleByBoth = 0;

        for(int number = start; number <= end; number++){
           if (number % 2 == 0){
               divisibleByTwo++;
           }if(number % 3 == 0){
               divisibleByThree++;
            }if ((number % 2 == 0) && (number % 3 == 0)){
               divisibleByBoth++;
            }
        }
        JOptionPane.showMessageDialog( parentComponent: null, message: "Numbers divisible by two is: " + divisibleByTwo
        + "\nNumber divisible by three is: " + divisibleByThree + "\nNumber divisible by both is: " + divisibleByBoth);
    }
}
```

Sample Outputs





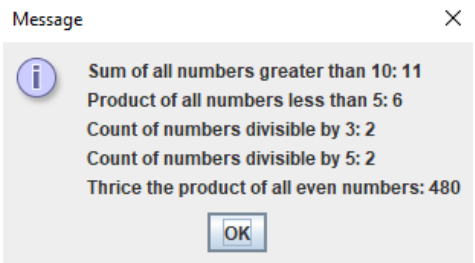
2. Write a program that will accept (positve) integer numbers from the users and display the following:
   - Sum of all numbers greater than 10
   - Product of all numbers less than 5
   - Count of numbers divisible by 3
   - Count of numbers divisible by 5
   - Thrice the product of all even numbers
   - **The iteration will be terminated once the user inputs zero (0) ← Sentinel Value.**

   Display appropriate prompt and output messages.

Source Code

```java
import javax.swing.JOptionPane;
public class NumberCalculator {
    public static void main (String[]args){
        int sumGreater10 = 0;
        int productLess5 = 1;
        int divisibleByThree = 0;
        int divisibleByFive = 0;
        int thriceEvenProduct = 1;

        while (true){
            int number = Integer.parseInt(JOptionPane.showInputDialog("Enter an integer (0 to exit): "));
            if (number == 0){
                break;
            }if (number > 10){
                sumGreater10 += number;
            }if (number < 5){
                productLess5 *= number;
            }if (number % 3 == 0){
                divisibleByThree++;
            }if (number % 5 == 0){
                divisibleByFive++;
            }if (number % 2 == 0){
                thriceEvenProduct *= number;
            }
        }JOptionPane.showMessageDialog( parentComponent: null, message: "Sum of all numbers greater than 10: " + sumGreater10
        + "\nProduct of all numbers less than 5: " + productLess5 + "\nCount of numbers divisible by 3: " + divisibleByThree
        + "\nCount of numbers divisible by 5: " + divisibleByFive + "\nThrice the product of all even numbers: " + (thriceEvenProduct * 3));
```

Sample Outputs



3. Simulate a gaming guess. Allow the user to guess a random number (0 - 10). The program shall continuously ask for the user's guess until the time the user guesses it correctly; and display if the guess is "higher" or "lower". Display the number of tries and their corresponding player rank.

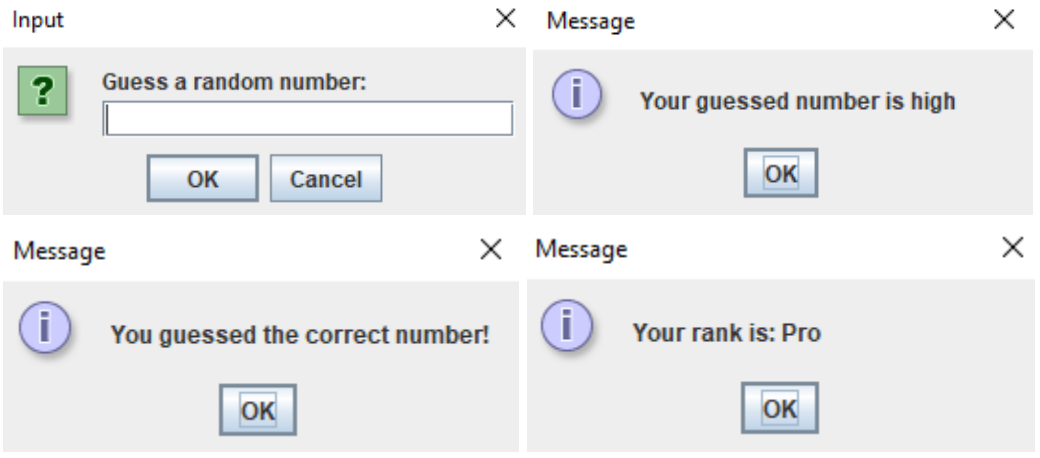
   1 Try : **Pro**
   2 - 4 Tries : **Expert**
   5 - 6 Tries : **Beginner**
   > 7 Ties : **Novice**

   Display appropriate prompt and output messages. Provide interactive user i/o using JOption dialog boxes.

Source Code

```
public class GuessingGame {
    public static void main (String[]args){
        int randomNumber = (int) (Math.random()*11);
        int tries = 0;

        while (true){
            int guess = Integer.parseInt(JOptionPane.showInputDialog("Guess a random number: "));

            if (guess == randomNumber){
                JOptionPane.showMessageDialog( parentComponent: null, message: "You guessed the correct number!");
                break;
            }else if (guess < randomNumber){
                JOptionPane.showMessageDialog( parentComponent: null, message: "Your guessed number is low");
            }else {
                JOptionPane.showMessageDialog( parentComponent: null, message: "Your guessed number is high");
            }
            tries++;
        }
        String rank;
        if(tries == 1){
            rank ="Pro";
        }else if (tries <= 3){
            rank = "Expert";
        }else if (tries <= 6){
            rank = "Beginner";
        }else{
            rank = "Novice";
```

Sample Outputs



4. Suppose that the tuition fee for the University of the East is at PHP 100000.00 this academic year and increases at 3.5% every year. In one year, the tuition fee will be PHP 103500.00. Write a Java program that allows a user to input the tuition fee and the increase rate and calculate the tuition for next N years.

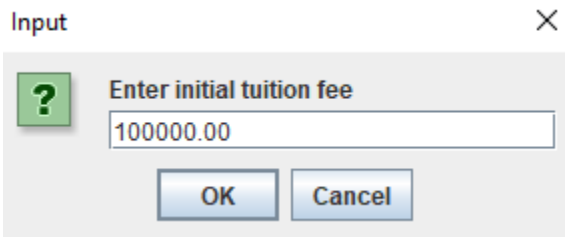
   Here's a sample test run:

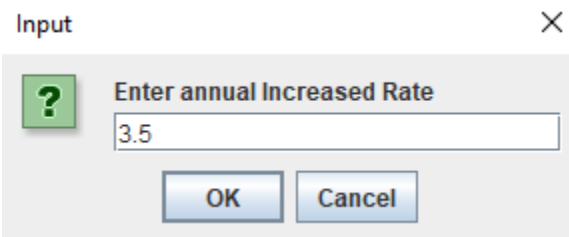
```
Tuition Fee (PHP): 100000.00
Increase Rate (Percentage): 3.5
Number of Years: 10
----------
Year        Est. Tuition Fee at 3.5% IR
1           PHP 103500.00
2           PHP 107122.50
3           PHP 110871.19
4           PHP 114752.30
5           PHP 118768.63
…
10          PHP 141059.88
```

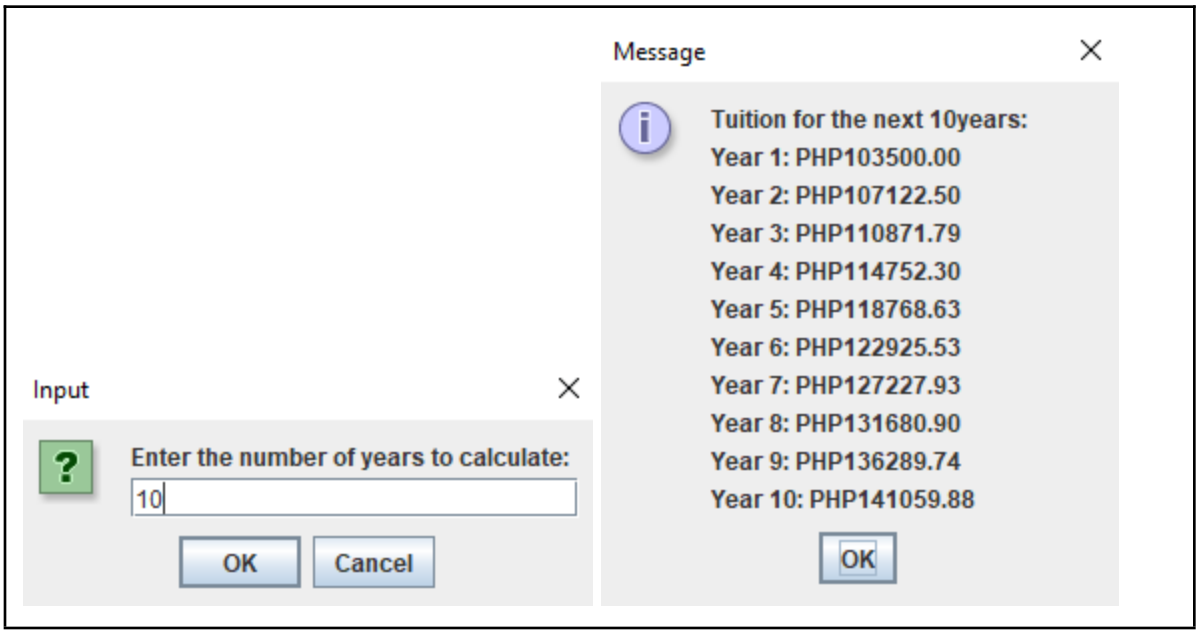
Source Code

```
import javax.swing.JOptionPane;
public class TuitionFee {
    public static void main(String[] args){

        double initialTuition = Double.parseDouble(JOptionPane.showInputDialog("Enter initial tuition fee"));
        double increasedRate = Double.parseDouble(JOptionPane.showInputDialog("Enter annual Increased Rate"))/100;
        int years = Integer.parseInt(JOptionPane.showInputDialog("Enter the number of years to calculate: "));

        String result = "Tuition for the next " + years + "years: \n";

        for ( int i = 1; i <= years;i++){
            initialTuition += initialTuition * increasedRate;
            result += "Year " + i + ": PHP" + String.format("%.2f", initialTuition)+"\n";
        }
        JOptionPane.showMessageDialog( parentComponent: null,result);
    }
}
```

Sample Outputs





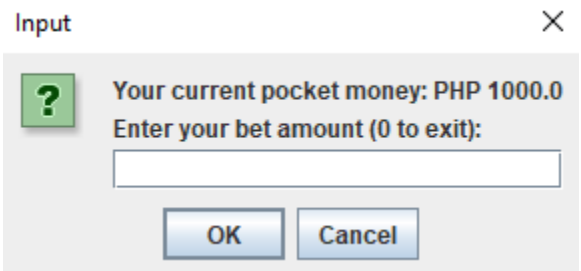


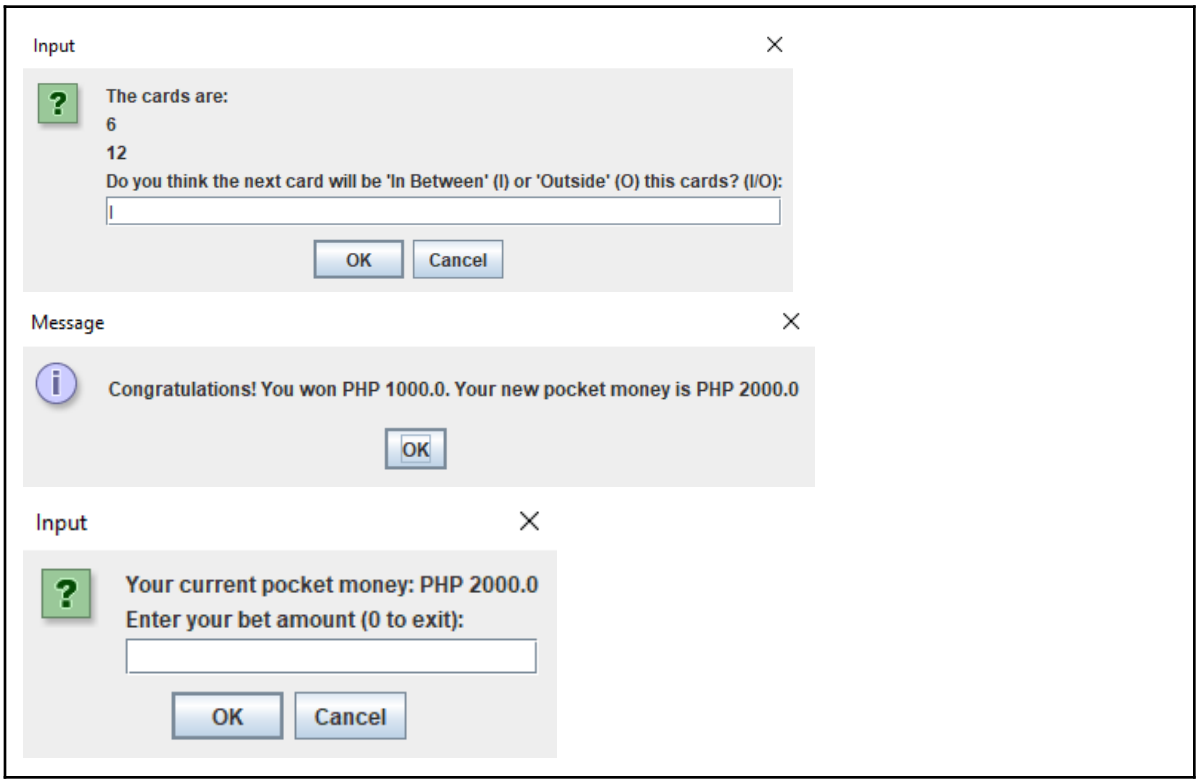
5. Revisited your in-between game. Modify your code by allowing the user to have a default pocket money of 1000.00. Every time the user wins, the amount of bet shall be added to their pocket money. The game shall continue until the user's pocket money becomes zero. Provide interactive user i/o using JOption dialog boxes.

Source Code

```java
import javax.swing.JOptionPane;
import java.util.Random;
public class InBetweenGame {
    public static void main(String[] args) {
        double pocketMoney = 1000.00;
        Random random = new Random ();
        String message;

        while (pocketMoney > 0) {
            String betInput = JOptionPane.showInputDialog("Your current pocket money: PHP " + pocketMoney
                    + "\nEnter your bet amount (0 to exit):");
            double bet = Double.parseDouble(betInput);

            if (bet == 0) {
                break;
            }

            int card1 = random.nextInt( bound: 13) + 1; // Random roll between 1 and 6
            int card2 = random.nextInt( bound: 13) + 1;

            String guessInput = JOptionPane.showInputDialog("The cards are: " + "\n" + card1 + "\n" + card2
                    + "\nDo you think the next card will be 'In Between' (I) or 'Outside' (O) this cards? (I/O):");

            char guess = guessInput.toUpperCase().charAt(0);
            boolean isInBetween = Math.random() < 0.5;

            if ((guess == 'I' && isInBetween) || (guess == 'O' && !isInBetween)) {
                pocketMoney += bet;
                message = "Congratulations! You won PHP " + bet + ". Your new pocket money is PHP " + pocketMoney;
            } else {
                pocketMoney -= bet;
                message = "Sorry, you lost PHP " + bet + ". Your new pocket money is PHP " + pocketMoney;
            }

            JOptionPane.showMessageDialog( parentComponent: null, message);
        }

        JOptionPane.showMessageDialog( parentComponent: null, message: "Game over! Your pocket money is now zero. Thanks for playing!");
    }
}
```

Sample Outputs





Grading Rubric

See the attached grading rubric.