NATIONAL UNIVERSITY
COLLEGE OF COMPUTING AND
INFORMATION TECHNOLOGIES

LAB MANUAL

Course Name: Fundamentals of Programming

Course Code: T1 CCPRG1L – COM227

Target Group: INF229 Day of Lab: Saturday

Trimester: 1st Venue:

Academic Year:2022/2023 Time: 9am – 1pm

Instructor Name: Mr. Jay A. Abaleta Hours: 4 Hours

Student Name: Christian D. Caguicla

Student ID : 2022-102758

Irregular Student: Yes (No)

Lab Objective:

- To learn in JAVA JDK programming
- To learn the Object Oriented Programming approach
- To improve the skills in class programming

Instructor's Final Comment and Mark (regarding the student at the end of the course based on his performance-lab continuous assessment)

Comment:

Laboratory Machine Problem:

1. Create a Java program that compute the sum, difference, product, quotient of two input numbers and output the program using JOptionPane class.

```
import javax.swing.JOptionPane;

public class LabManual1 {

	public static void main(String[] args) {
		String cont;
		// Assign variable cont as String
		do
		// Executes once
		{
			JOptionPane.showMessageDialog(null, "Welcome to Fretz's Calculator!");
			// Welcomes the user with a GUI
			String uno, dos, sr, dr, fr, qr, operator;
			int sum, diff, factor, quotient;
			// Assigns variables to String and Integer respectively
			operator = JOptionPane.showInputDialog(
					"Choose the Arithmetic Operation to be used (A-Addition,
S-Subtraction, M-Multiplication, and D-Division): ");
			// Take user input on what they arithmetic operation they want to use
			uno = JOptionPane.showInputDialog("Enter your 1st number: ");
			// Take the first String value from user input
			dos = JOptionPane.showInputDialog("Enter your 2nd number: ");
			// Take the second String value from user input
			int first = Integer.parseInt(uno);
			int second = Integer.parseInt(dos);
			// Converts the given user string value to an Integer value so that it
numerical
			// operators can function properly
			sum = first + second;
			// Adds the first and second integer values



diff = first - second;
			// Subtracts the first and second integer values
			factor = first * second;
			// Multiplies the first and second integer values
			quotient = first / second;
			// Divides the first and second integer values
			sr = Integer.toString(sum);
			dr = Integer.toString(diff);
			fr = Integer.toString(factor);
			qr = Float.toString(quotient);
			// Integers sr, dr, fr, qr are converted to String so that it can be displayed
			// properly later on
			switch (operator)
```

```
// Executes a certain case if the value of variable operator is equal to one of
                        // the cases
                        {
                        case "A", "a":
                                JOptionPane.showMessageDialog(null, "The sum is: " + sr);
                                break;
                        case "S", "s":
                                JOptionPane.showMessageDialog(null, "The difference is: " + dr);
                                break;
                        case "M", "m":
                                JOptionPane.showMessageDialog(null, "The factor is: " + fr);
                                break;
                        case "D", "d":
                                JOptionPane.showMessageDialog(null, "The qoutient is: " + qr);
                        default:
                        }
                        cont = JOptionPane.showInputDialog("Would you like to retry? Type 'Y' if so,
'N' if not. ");
                        // Takes the user input on whether they want to continue using the calculator
                } while (cont.equals("Y") || cont.equals("y"));
                if (!cont.equals("N")||!cont.equals("n")) {
                JOptionPane.showMessageDialog(null, "Thank you for using Fretz's Calculator. <3");}
                // Checks if the user input "Y" or "y"; if true, the loop continues; if not, the
        // loop stops and displays a "Thank you" message.
        }
}
```

2. Create a JAVA Program using switch statement that will calculate the different arithmetic operation, for the choices use do while statement for program loop question “Do you want to continue? Y/N:” the arithmetic operation is based on the menu otherwise print invalid choice.

```
import java.util.Scanner;

public class LabManual2 {

        public static void main(String[] args) {
                Scanner input = new Scanner(System.in);
                char reply;
                do {
                        System.out.println(
                                        "********************** P R O G R A M A R I T H M E T I C
**************************\r\n"
                                                        + "****************************** [ A ]
ADDITION*************************************\r\n"
                                                        + "****************************** [ S ]
SUBTRACTION**********************************\r\n"
                                                        + "****************************** [ M ]
MULTIPLICATION *******************************\r\n"
                                                        + "****************************** [ D ]
DIVISION *************************************\r\n"
                                                        + "****************************** [ E ] EXIT
```

```
****************************************\n");
                        System.out.println("Please enter your choice: ");
                        char arithmetic = input.next().charAt(0);
                        if ((arithmetic == 'A') || (arithmetic == 'a') || (arithmetic == 'S') ||
(arithmetic == 's')
                                        || (arithmetic == 'D') || (arithmetic == 'd')) {
                                System.out.println("Please enter your first number: ");
                                double num1 = input.nextInt();
                                System.out.println("Please enter your second number: ");
                                double num2 = input.nextInt();
                                int sum, diff, product;
                                sum = (int) (num1 + num2);
                                diff = (int) (num1 - num2);
                                product = (int) (num1 * num2);
                                double quotient = num1 / num2;

                                switch (arithmetic) {
                                case 'A', 'a':
                                        System.out.println("The sum is: " + sum);
                                        break;
                                case 'S', 's':
                                        System.out.println("The difference is: " + diff);
                                        break;
                                case 'M', 'm':
                                        System.out.println("The product is: " + product);
                                        break;
                                case 'D', 'd':
                                        System.out.println("The quotient is: " + quotient);
                                        break;
                                default:
                                }
                        } else if ((arithmetic == 'E') || (arithmetic == 'e')) {
                                System.out.println("Exiting...");
                                System.exit(0);
                        } else {
                                System.out.println("Invalid Input!");
                        }
                        System.out.println("Do you want to continue [Y/N]: ");
                        reply = input.next().charAt(0);
                } while (reply == 'Y' || reply == 'y');
                System.out.println("Thank you for using my Program arithmetic\nPress any key to
continue");
                input.close();

        }

}
```

3. Create a JAVA program that uses looping structures to display a multiplication table based on the input coming from the user.

```
import java.util.Scanner;
public class LabManual3 {

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int column;
        int row;
        System.out.println("Input no. of columns: ");
          column = input.nextInt();
        System.out.println("Input no. of rows: ");
        row = input.nextInt();
        for(int i = 1 ;i<=row;i++) {
            System.out.format("%6d ",i);
            for(int j=2;j<=column;j++) {
                System.out.printf("%6d",i*j);
            }
            System.out.println();
        }
    }

}
```

4. Create a JAVA program that displays the given output one by one.
import java.util.Scanner;

```
public class LabManual4 {

        public static void main(String[] args) {
                Scanner input = new Scanner(System.in);
                System.out.println(
                                ">>>>>>>>>>>>>>>>>>>>>>> Output Menu <<<<<<<<<<<<<<<<\r\n" + "
[ A ] Output A\r\n"
                                                + "                        [ B ] Output B\r\n" + "
[ C ] Output C\r\n");

                System.out.println("Please enter your choice: ");
                String choice = input.next();
                int i;
                String oten;
```

```
oten = "9876543210";
                switch (choice) {
                case ("A"), ("a"):
                        for (i = 1; i <= 5; i++) {
                                System.out.println("9876543210");
                        }
                        break;
                case ("B"), ("b"):
                        for (int h = 5; h >= 1; h--) {
                                System.out.print(h);
                                {
                                        for (int i1 = 1; i1 <= h; i1++) {
                                                System.out.print("*");
                                        }
                                }
                                System.out.println("\n");
                        }
                        break;


                case ("C"), ("c"):
                        int a = 4;
                int b;
            for (b = 1; b <= 5; b++) {
            int j = 1;
             {

                 for (i = b; i <= a; i++) {
                         System.out.print(j++ + " * ");
                  }
                 if (i>=4)
                 {
                         System.out.print(j);
                 }
                 System.out.println("\n");
              }
        }
     break;

                default:
                        break;

                }

        }
}
```

5. Create a JAVA program that will input a password test if the password is correct and display the message "Password Accepted" otherwise, display "Invalid Password".

```
import java.util.*;

import javax.swing.JOptionPane;

public class LabManual5 {

	public static void main(String[] args) {

		String password;
		password = JOptionPane.showInputDialog("Enter your password: ");
		switch (password) {
		case "amu", "AMU":
			JOptionPane.showMessageDialog(null, "Password Accepted.");
			break;
		default:
			JOptionPane.showMessageDialog(null, "Invalid Password");
			break;
		}
	}
}
```

6. Create a JAVA program that compute the Employee Salary based on the sample output below:

```
import java.util.Scanner;

public class LabManual6 {

	public static void main(String[] args) {
		Scanner input = new Scanner(System.in);

		String name;
		double d, gpay, npay, dtax, rph, nhw;

		System.out.println("Employee name:");
		name = input.nextLine();

		System.out.println("Employee Rate per Hour:");
		rph = input.nextFloat();

		System.out.println("No. of Hours Work:");
		nhw = input.nextFloat();

		d = .10;
		gpay = nhw * rph;
		dtax = gpay * d;
		npay = gpay - dtax;
```

```
System.out.println("Hi, " + name + " Your employee salary is: " + "PHP" + npay);

        }

}
```

7. Create a java program using Buffered Reader Class that will input a string using a stack object and output its reverse order. Then, determine if the inputted string is a Palindrome or not (i.e. the string is spelled identically backwards and forwards). The program ignores spaces and punctuations.

```
import java.io.*;

public class LabManual7 {

        public static void main(String[] args) {
                BufferedReader dataIn = new BufferedReader(new InputStreamReader(System.in));
                String letters = "";
                String reverse, convert, revorig;
                String palindrome = "";

                System.out.print("Enter a string: ");
                try {
                        letters = dataIn.readLine();
                } catch (IOException e) {
                        e.printStackTrace();
                }
                letters = letters.replace(" ", "");
                revorig = letters;
                revorig = new StringBuilder(revorig).reverse().toString();
                convert = letters.toLowerCase();
                reverse = new StringBuilder(convert).reverse().toString();
                String check = reverse;
                int l = letters.length();
                 for (int i = l -1; i >= 0; i--) {
                          palindrome = palindrome + letters.charAt(i);
                 }
                if (letters.equalsIgnoreCase(palindrome)) {
                        System.out.println("The reverse: " + revorig);
                        System.out.println("That inputted string is a Palindrome... ");
                } else {
                        System.out.println("The reverse: " + revorig);
                        System.out.println("That is not a Palindrome...");
                }
        }
}
```

8. Create a java program that will create a phonebook using the Object and class method, wherein you can add entries in the phonebook, delete entries, view all entries and search for entries. In viewing all entries, the user should have a choice, whether to view the entries in alphabetical order or in increasing order of telephone numbers. In searching for entries, the user should also have an option to search entries by name or by telephone numbers. In searching by name, the user should also have an option if he/she wants to search by first name or last name.

```
import java.util.*;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;

public class LabManual8 {
	public static void main(String[] args) throws IOException {
		int close = 0;
		InputStreamReader inputsr = new InputStreamReader(System.in);
		BufferedReader inputr = new BufferedReader(inputsr);
		Intro opt = new Intro();
		opt.show();
		String reply = inputr.readLine();
		while (close == 0) {

			if (reply.equals("1")) {
				opt.addEntry();
				reply = inputr.readLine();
			} else if (reply.equals("2")) {
				opt.deleteEntry();
				reply = inputr.readLine();
			} else if (reply.equals("3")) {
				opt.viewEntry();
				reply = inputr.readLine();
			} else if (reply.equals("4")) {
				opt.searchEntry();
				reply = inputr.readLine();
			} else if (reply.equals("5")) {
				System.out.println("Closing...");
				close = 1;
			}
		}
	}
}

class Intro {
	ArrayList<String> nameList = new ArrayList<String>();
	ArrayList<String> numList = new ArrayList<String>();
	String name, num, viewEntry, searchEntry;

	void show() {
		System.out.println(
				"  Main Menu\n\t1 - Add phonebook entry\n\t2 - Delete phonebook
entry\n\t3 - View all entries\n\t4 - Search entries\n\t5 - Quit");
```

```
System.out.print("");
        }

        public void addEntry() throws IOException {
                Scanner input = new Scanner(System.in);
                System.out.print("Enter your name: ");
                name = input.nextLine();
                if (nameList.isEmpty()) {
                        System.out.print("Enter your Telephone Number: ");
                        num = input.nextLine();
                        nameList.add(name);
                        numList.add(num);
                        System.out.println("");
                } else if (nameList.contains(name)) {
                        System.out.println("Name already registered.");
                } else {
                        System.out.print("Enter your Telephone Number: ");
                        num = input.nextLine();
                        if (numList.contains(num)) {
                                System.out.println("Number already registered.");
                        } else {
                                nameList.add(name);
                                numList.add(num);
                                System.out.println("Entry Added.");
                        }
                }
                show();
        }

        public void deleteEntry() throws IOException {
                InputStreamReader inputsr = new InputStreamReader(System.in);
                BufferedReader inputr = new BufferedReader(inputsr);
                System.out.println("Enter the name of entry you want to delete: ");
                name = inputr.readLine();
                for (int i = 0; i < nameList.size(); i++) {
                        if (nameList.get(i).equals(name)) {
                                nameList.remove(i);
                                numList.remove(i);
                                System.out.println("The entry has been deleted. ");
                        }
                }
                show();
        }

        public void viewEntry() throws IOException {
                InputStreamReader inputsr = new InputStreamReader(System.in);
                BufferedReader inputr = new BufferedReader(inputsr);
                System.out.println("a - alphabetical order \nb - increasing order of telephone
numbers");
                viewEntry = inputr.readLine();
                if (viewEntry.equals("A") || viewEntry.equals("a")) {
                        if (nameList.isEmpty()) {
                                System.out.println("");
                        } else {
                                for (int i = 0; i < nameList.size(); i++) {
                                        for (int j = i + 1; j < nameList.size(); j++) {
```

```
                                        if (nameList.get(i).compareTo(nameList.get(j)) > 0) {
                                                String temp = nameList.get(i);
                                                nameList.set(i, nameList.get(j));
                                                nameList.set(j, temp);
                                        }
                                }
                                System.out.println("Name:\t" + "Number:\n" + nameList.get(i) +
"\t" + numList.get(i));
                        }
                }
        } else if (viewEntry.equals("B") || viewEntry.equals("b")) {
                if (numList.isEmpty()) {
                        System.out.println("");
                } else {
                        for (int i = 0; i < numList.size(); i++) {
                                for (int j = i + 1; j < numList.size(); j++) {

                                        long iValue = Long.parseLong(numList.get(i));
                                        long jValue = Long.parseLong(numList.get(j));
                                        if (iValue > jValue) {
                                                String store = numList.get(i);
                                                numList.set(i, numList.get(j));
                                                numList.set(j, store);
                                        }
                                }
                                System.out.println("Number\t" + "Name:\n" + numList.get(i) +
"\t" + nameList.get(i));
                        }
                }
        } else {
                System.out.println("Invalid input");
        }
        show();
    }

    public void searchEntry() throws IOException {
        InputStreamReader inputsr = new InputStreamReader(System.in);
        BufferedReader inputr = new BufferedReader(inputsr);
        Scanner input = new Scanner(System.in);

        System.out.println("a - by name \nb - by telephone number");
        searchEntry = inputr.readLine();
        if (searchEntry.equals("A") || searchEntry.equals("a")) {
                System.out.println("Enter name: ");
                String search = input.nextLine();
                if (nameList.isEmpty()) {
                        System.out.println("");
                } else {
                        for (int i = 0; i < nameList.size(); i++) {
                                if (search.equals(nameList.get(i))) {
                                        System.out.println("Name:\t" + "Number:\n" +
nameList.get(i) + "\t" + numList.get(i));
                                }
                        }
                }
        } else if (searchEntry.equals("B") || searchEntry.equals("b")) {
```

```
        System.out.println("Enter number: ");
                        String searchnum = input.nextLine();

                        if (numList.isEmpty()) {
                                System.out.println("");
                        } else {
                                for (int i = 0; i < numList.size(); i++) {
                                        if (searchnum.equals(numList.get(i))) {
                                                System.out.println("Number\t" + "Name:\n" +
numList.get(i) + "\t" + nameList.get(i));
                                        }
                                }
                        }
                }
                show();
        }
}
```

9. Create a Java Buffered Reader Class program for Cell phone pin number using object and class method. If the user entered the correct pin code displays **"Welcome to Ethio Telecom".** The cell phone user will enter his pin code three times; if on the first, second and third trial he failed to enter the correct pin code it will display **"Invalid Pin Number"**, after the third will prompt the user to enter PUK secret code three times also. If the user still failed to enter PUK code will display **"SIM BLOCKED".**

```
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;

public class LabManual9 {
                class first{
                   String reply;
                        public void FirstTry() throws IOException {
                                System.out.print("\nEnter your Pin Number: ");
                                 InputStreamReader inputsr = new InputStreamReader(System.in);
                                 BufferedReader inputr = new BufferedReader(inputsr);
                                 reply = inputr.readLine();
                        }static void asterisks() {

System.out.println("**************************************************");

                        }
                        public void SecondTry() throws IOException {
                                System.out.print("\nEnter your PUK Code: ");
                                 InputStreamReader inputsr1 = new InputStreamReader(System.in);
                                 BufferedReader inputr1 = new BufferedReader(inputsr1);
                                 reply = inputr1.readLine();
                                }
                }
        public static void main(String[] args) throws IOException {
                LabManual9 UI = new LabManual9();
                first redirect = UI.new first();
                String realnum = "0000";
            String puk = "12345678";
```

```
int trials = 0;
         redirect.FirstTry();
        if(redirect.reply.equals(realnum)){
                System.out.println("Welcome to Ethio Telecom");
                first.asterisks();
        }
        else {
                while(trials < 2){
            trials++;
                        System.out.println("Invalid Pin Number");
                        redirect.FirstTry();

                        if(redirect.reply.equals(realnum)){
                                trials = 3;
                                System.out.println("Welcome to Ethio Telecom");
                               first.asterisks();
                        }
                }
                if(trials == 2) {
                        System.out.println("Invalid Pin Number");
                        redirect.SecondTry();
                        trials =0;
            if(redirect.reply.equals(puk)) {
                trials = 3;
                System.out.println("Welcome to Ethio Telocom");
                first.asterisks();
            }
                        while(trials < 2){
                    trials++;
                                System.out.println("Invalid PUK Code");
                                redirect.SecondTry();
                        }
                        if(trials == 2) {
                                System.out.println("SIM BLOCKED");
                        }
                }
         }
      }
       }
```

10. Create your own scientific calculator that will convert the inputted numbers to the four number representations (Decimal, Binary, Octal, Hexadecimal). Your program should output the following menu on screen.

```
import java.util.Scanner;

public class LabManual10 {

        public static void main(String[] args) {
                Scanner input = new Scanner(System.in);
                String choice;
                String s = "-";
                do {
```

```
        System.out.println("MAIN MENU:\nPlease type the number of your choice:\n1 " + s + " Binary to
Decimal\n2 "
                                        + s + " Decimal to Octal\n3 " + s + " Octal to Hexadecimal\n4 "
+ s + " Hexadecimal to Binary\n5 "
                                        + s + " Quit\n");
                        choice = input.nextLine();
                        String num;

                        switch (choice) {
                        case "1":
                                try {
                                        do {
                                                try {
                                                        System.out.println("Enter a binary number: ");
                                                        num = input.nextLine();
                                                        int decimal = Integer.parseInt(num, 2);
                                                        System.out.println(num + " base 2 = " +
decimal + " base 10\n");
                                                } catch (Exception e) {
                                                        System.out.println("Invalid binary
number!\n");
                                                        System.out.println("Enter a binary number: ");
                                                        num = input.nextLine();
                                                        int decimal = Integer.parseInt(num, 2);
                                                        System.out.println(num + " base 2 = " +
decimal + " base 10\n");
                                                }
                                        } while (num == null);
                                } catch (NumberFormatException e) {

                                        e.printStackTrace();
                                }
                                break;

                        case "2":
                                System.out.println("Enter a decimal number: ");
                                num = input.nextLine();
                                int octal = Integer.parseInt(num);
                                System.out.println(num + " base 10 = " + Integer.toOctalString(octal) +
" base 8\n");
                                break;

                        case "3":
                                System.out.println("Enter an octal number: ");
                                num = input.nextLine();
                                int deca = Integer.parseInt(num, 8);
                                String hexa = Integer.toHexString(deca);
                                System.out.println(num + " base 8 = " + hexa + " base 16\n");

                                break;

                        case "4":
                                System.out.println("Enter a hexadecimal number: ");
                                num = input.nextLine();
                                int x = Integer.parseInt(num, 16);
                                String binary = Integer.toBinaryString(x);
                                System.out.println(num + " base 16 = " + binary + " base 2 \n");
```

```
        break;

                        case "5":
                                System.out.println("Goodbye!");
                                System.exit(0);
                                break;

                        default:
                                System.exit(0);
                        }
                } while ((choice != "1") || (choice != "2") || (choice != "3") || (choice != "4") ||
(choice == "5"));

        }

}
```