CSCI 145 PA _____ Submission

Due Date:_Mar 8 2023_ Late (date and time):_____

Name(s):__Ivan Leung__ & _____

Exercise 1 -- need to submit source code and I/O
 -- check if completely done _x_ ; otherwise, discuss issues below

Pseudocode below if applicable:

Source code below:

```
package broken_code.csci_145.hw.pa.pa2;

/*  Java Class: CSCI 145
    Author: Ivan Leung
    Class: Mon/Wed
    Date: Mar 1 2023
    Description:

    I certify that the code below is my own work.

    Exception(s): N/A

*/

//*************************************************************
//File: Paint.java
//
//Purpose: Determine how much paint is needed to paint the walls
//of a room given its length, width, and height
//*************************************************************
import java.util.Scanner;

public class Paint {
    public static void main(String[] args) {
        final int COVERAGE = 350; // paint covers 350 sq ft/gal
        int length, width, height, numberOfDoor, numberOfWindow; //
declare integers length, width, and height;
        double totalSqft; // declare double totalSqFt;
```

```
        double paintNeeded; // declare double paintNeeded;
        Scanner scan = new Scanner(System.in); // declare and initialize
Scanner object
        System.out.println("Enter the length of the room: ");// Prompt for
and read in the length of the room
        length = scan.nextInt();
        System.out.println("Enter the width of the room: ");// Prompt for
and read in the width of the room
        width = scan.nextInt();
        System.out.println("Enter the height of the room: ");// Prompt for
and read in the height of the room
        height = scan.nextInt();
        System.out.println("Enter the number of the door(s) in the room:
");// Compute the total square feet to be painted--think
        numberOfDoor = scan.nextInt();
        System.out.println("Enter the number of the window(s) in the room:
");// Compute the total square feet to be painted--think
        numberOfWindow = scan.nextInt();
        scan.close();
        totalSqft = 2 * ((length * height) + (width * height));
        totalSqft -= (numberOfDoor * 20);
        totalSqft -= (numberOfWindow * 15);
        paintNeeded = totalSqft / COVERAGE;
        // about the dimensions of each wall
        // Compute the amount of paint needed
        // Print the length, width, and height of the room and the
        // number of gallons of paint needed.
        System.out.println("\tLength - " + length + " ft");
        System.out.println("\tWidth - " + width + " ft");
        System.out.println("\tHeight - " + height + " ft");
        System.out.println("\t" + numberOfDoor + " door(s)" + " and " +
numberOfWindow + " window(s)");
        System.out.println(paintNeeded + " gallons -- amount of paint");
    }
}
```

Input/output below:

$ java Paint.java

Enter the length of the room:

20

Enter the width of the room:

15

Enter the height of the room:

10

Enter the number of the door(s) in the room:

1

Enter the number of the window(s) in the room:

2

Length - 20 ft

Width - 15 ft

Height - 10 ft

1 door(s) and 2 window(s)

1.8571428571428572 gallons -- amount of paint

Exercise 2 -- need to submit source code and I/O
-- check if completely done _x_ ; otherwise, discuss issues below

Pseudocode below if applicable:

Source code below:

```
package broken_code.csci_145.hw.pa.pa2;

import java.util.Scanner;

public class IdealWeight {
    public static void main(String[] args) {
        final int FEMALE_WEIGHT_INTERVAL = 5;
        final int MALE_WEIGHT_INTERVAL = 6;
        int feet, inches, heightInInches;
        int femaleIdealWeight = 100, maleIdealWeight = 106;
```

```
        final double idealRange = 0.15;
        Scanner scan = new Scanner(System.in);
        System.out.println("Please enter your height in feet and inches
format");
        System.out.print("Enter your height in feet: ");
        feet = scan.nextInt();
        System.out.print("Enter your height in inches: ");
        inches = scan.nextInt();
        scan.close();
        heightInInches = feet * 12;
        heightInInches += inches;
        femaleIdealWeight += ((heightInInches - 60) *
FEMALE_WEIGHT_INTERVAL);
        maleIdealWeight += ((heightInInches - 60) * MALE_WEIGHT_INTERVAL);
        System.out.println();
        System.out.println("\tYour female ideal weight is: " +
femaleIdealWeight + " pounds");
        System.out.println("\tYour male ideal weight is: " +
maleIdealWeight + " pounds");
        System.out.print("\tYour female ideal weight range is between ");
        System.out.print((double)femaleIdealWeight - (femaleIdealWeight *
idealRange) + " and ");
        System.out.println((double)femaleIdealWeight + (femaleIdealWeight
* idealRange) + " pounds");
        System.out.print("\tYour male ideal weight range is between ");
        System.out.print((double)maleIdealWeight - (maleIdealWeight *
idealRange) + " and ");
        System.out.println((double)maleIdealWeight + (maleIdealWeight *
idealRange) + " pounds");
    }
}
```

Input/output below:

$ java IdealWeight.java

Please enter your height in feet and inches format

Enter your height in feet: 5

Enter your height in inches: 8

Your female ideal weight is: 140 pounds

Your male ideal weight is: 154 pounds

Your female ideal weight range is between 119.0 and 161.0 pounds

Your male ideal weight range is between 130.9 and 177.1 pounds

Exercise 3 -- need to submit source code and I/O
-- check if completely done _x_ ; otherwise, discuss issues below

Pseudocode below if applicable:

Source code below:

```
package broken_code.csci_145.hw.pa.pa2;

import java.util.Scanner;

/*  Java Class: CSCI 145
    Author: Ivan Leung
    Class: Mon/Wed
    Date: Mar 1 2023
    Description:

    I certify that the code below is my own work.

    Exception(s): N/A

*/

public class LabGrade {
    public static void main(String[] args) {
        double inClassWeight;
        double outClassWeight;
        int preLabPts;
        int preLabMax;
        int labPts;
        int labMax;
        int postLabPts;
        int postLabMax;
        double outClassAvg;
```

```
        double inClassAvg;
        double labGrade;
        Scanner scan = new Scanner(System.in);

        System.out.println("\nWelcome to the Lab Grade Calculator\n");
        System.out.print("Enter the number of points you earned on the
pre-lab assignment: ");
        preLabPts = scan.nextInt();
        System.out.print("What was the maximum number of points you could
have earned? ");
        preLabMax = scan.nextInt();
        System.out.print("Enter the number of points you earned on the lab
assignment: ");
        labPts = scan.nextInt();
        System.out.print("What was the maximum number of points for the
lab assignement? ");
        labMax = scan.nextInt();
        System.out.print("Enter the number of points you earned on the
post-lab assignment: ");
        postLabPts = scan.nextInt();
        System.out.print("What was the maximum number of points for the
post-lab assignment? ");
        postLabMax = scan.nextInt();
        System.out.println("Enter the weight for in-class and out-of-class
works in decimal: ");
        System.out.println("For example, you shoubld enter 0.3 for 30%");
        System.out.print("What is the weight of the in-class work? ");
        inClassWeight = scan.nextDouble();
        System.out.print("What is the weight of the out-of-class work? ");
        outClassWeight = scan.nextDouble();
        scan.close();
        System.out.println();

        outClassAvg = (((double)preLabPts + postLabPts) /
((double)preLabMax + postLabMax) * 100);
        inClassAvg = (((double)labPts / labMax) * 100);
        labGrade = ((outClassAvg * outClassWeight) + (inClassAvg *
inClassWeight));

        System.out.println("Your average on out-of-class work is " +
outClassAvg + "%");
        System.out.println("Your average on in-class work is " +
inClassAvg + "%");
        System.out.println("Your lab grade is " + labGrade + "%");
        System.out.println();
```

```
    }
}
```

Input/output below:

$ java LabGrade.java

Welcome to the Lab Grade Calculator

Enter the number of points you earned on the pre-lab assignment: 20

What was the maximum number of points you could have earned? 20

Enter the number of points you earned on the lab assignment: 23

What was the maximum number of points for the lab assignement? 25

Enter the number of points you earned on the post-lab assignment: 9

What was the maximum number of points for the post-lab assignment? 15

Enter the weight for in-class and out-of-class works in decimal:

For example, you shoubld enter 0.3 for 30%

What is the weight of the in-class work? .6

What is the weight of the out-of-class work? .4

Your average on out-of-class work is 82.85714285714286%

Your average on in-class work is 92.0%

Your lab grade is 88.34285714285714%

Add more exercises as needed

Exercise 4 -- need to submit source code and I/O
 -- check if completely done _x_ ; otherwise, discuss issues below

Pseudocode below if applicable:

Source code below:

```java
package broken_code.csci_145.hw.pa.pa2;

/*  Java Class: CSCI 145
Author: Ivan Leung
Class: Mon/Wed
Date: Mar 1 2023
Description:

I certify that the code below is my own work.

Exception(s): N/A

*/
import java.util.Scanner;
import java.text.NumberFormat;

public class Coins {
    public static void main(String[] args) {
        final double quarter = 0.25;
        final double dime = 0.10;
        final double nickel = 0.05;
        final double penny = 0.01;
        int quarterQty = 0;
        int dimeQty = 0;
        int nickelQty = 0;
        int pennyQty = 0;
        double amount;
        double actualAmount;

        Scanner scan = new Scanner(System.in);
        NumberFormat currency = NumberFormat.getCurrencyInstance();

        System.out.print("Enter an amount between 0.00 to 0.99 --> ");
        amount = scan.nextDouble();
        scan.close();
        actualAmount = amount;
```

```
        while (actualAmount >= quarter) {
            actualAmount -= quarter;
            ++quarterQty;
        }
        while (actualAmount >= dime) {
            actualAmount -= dime;
            ++dimeQty;
        }
        while (actualAmount >= nickel) {
            actualAmount -= nickel;
            ++nickelQty;
        }
        while (actualAmount > 0) {
            actualAmount -= penny;
            ++pennyQty;
        }

        actualAmount += (quarterQty * quarter) + (dimeQty * dime) +
(nickel * nickelQty) + (penny * pennyQty);
        System.out.println("The amount " + currency.format(amount) + " is
converted to:");
        System.out.println("\t" + quarterQty + " quarters");
        System.out.println("\t" + dimeQty + " dimes");
        System.out.println("\t" + nickelQty + " nickels");
        System.out.println("\t" + pennyQty + " pennies");
        System.out.println();
        System.out.println("Actual conversion amount: " +
currency.format(actualAmount));
        if (Math.abs(actualAmount - amount) <= 0.01)
            System.out.println("The two amounts are the same!");
        else
            System.out.println("The two amounts are not the same!");
    }
}
```

Input/output below:

$ java Coins.java

Enter an amount between 0.00 to 0.99 --> 0.82

The amount $0.82 is converted to:

3 quarters

0 dimes

1 nickels

2 pennies

Actual conversion amount: $0.82

The two amounts are the same!

Answer for Question 1

The main difference between a variable and a named constant is that a variable's value can be changed while a named constant cannot be changed. One reason for using named constants is that you do not want a value to be changed such as PI which is always equal to 3.14. Another reason is that it prevents other programmers to accidentally change the value of a named value.

Answer for Question 2

An example of widening conversion is converting a byte into a short. An example of narrowing conversion is converting an int to a short. Narrowing conversion should be avoided because information or part of the data may be lost after the conversion.

Extra Credit – provide if applicable

Pseudocode below if applicable:

Source code below:

```
package broken_code.csci_145.hw.pa.pa2;

/*  Java Class: CSCI 145
Author: Ivan Leung
Class: Mon/Wed
Date: Mar 1 2023
Description:
```

```
I certify that the code below is my own work.

Exception(s): N/A

*/
import java.util.Scanner;

public class BaseConvert {
    public static void main(String[] args) {
        int newBase;
        int baseTenNumber;
        int quotient;
        int maxNumber;
        int index = 3;
        int[] newBaseNumbers = new int[4];
        Scanner scan = new Scanner(System.in);

        System.out.print("Enter the number for the new base: ");
        newBase = scan.nextInt();
        maxNumber = (int)Math.pow(newBase, 4) - 1;
        System.out.println();

        System.out.println("The base 10 number to be converted cannot
exceed " + maxNumber);
        System.out.print("Enter the number in base 10 to be converted: ");
        baseTenNumber = scan.nextInt();
        scan.close();
        System.out.println();

        quotient = baseTenNumber;

        while (index >= 0) {
            newBaseNumbers[index] = quotient % newBase;
            quotient /= newBase;
            --index;
        }

        System.out.println("Base 10 number: " + baseTenNumber);
        System.out.print("Base " + newBase + " number: ");
        for (int i = 0; i < newBaseNumbers.length; ++i) {
            System.out.print(newBaseNumbers[i]);
        }
    }
}
```

Input/output below:

$ java BaseConvert.java

Enter the number for the new base: 2

The base 10 number to be converted cannot exceed 15

Enter the number in base 10 to be converted: 13

Base 10 number: 13

Base 2 number: 1101

Enter the number for the new base: 8

The base 10 number to be converted cannot exceed 4095

Enter the number in base 10 to be converted: 1878

Base 10 number: 1878

Base 8 number: 3526

Enter the number for the new base: 3

The base 10 number to be converted cannot exceed 80

Enter the number in base 10 to be converted: 50

Base 10 number: 50

Base 3 number: 1212