## 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:

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