CSE 2102: Introduction to Software Engineering

Conditionals, Loops, Arrays

Assigned: Feb 8, 2022, Due: Feb 22, 2022

Problem A

Write a program `BMIClassification.java` that prompts the user to input their weight (in pounds) and height (in inches). The program then converts the weight to kilograms and height to meters, and calculates the BMI according to the equation:

$$BMI = weight/(height)^2$$

The program prints out the BMI of the user. Further, based on the value of the BMI, the program produces the risk classification of the user according to the following rules.
Underweight – less than 18.5
Normal weight – greater than or equal to 18.5 and less than 25
Overweight – greater than or equal to 25 and less than 30
Obese – greater than or equal to 30.

Input cmd:

```
java BMIClassification
```

Output:

```
Enter your weight in pounds.115
Enter your height in inches.59
Your BMI is 23.275751025138153
Your risk category is Normal weight.
```

Problem B

Write a program `ArrayofTemperatures.java` that reads temperatures from the user. The program prompts the user to input the number of temperatures to be read. Once the temperatures are read, the average is computed. The average is then printed, and the relationship of each temperature to the average (above average, below average, average) is printed.

Input cmd:

```
java ArrayofTemperatures
```

Output:

```
How many temperatures do you have? 3
Enter 3 temperatures:
15
30
45
The average temperature is 30.0
Relative to the average, the temperatures are:
15.0 (below average)
30.0 (the average)
45.0 (above average)
```

Problem C

The transactions at a store are saved in a txt file with the following pre-specified format:

SKU,Quantity,Price,Description
4039,50,0.99,SODA
9100,5,9.50,T-SHIRT
1949,30,110.00,JAVA PROGRAMMING TEXTBOOK
5199,25,1.50,COOKIE

Write a program `TransactionReport.java` that prompts the user for the name of the input file, reads the transactions from the file, after skipping over the first line which is the header. The program then produces a transaction report by first computing the sale amount for each item as a product of the quantity and price, and then computing the total sale across all the items. Thus, the output produced by processing the above file is as follows.

Input cmd:

```
java TransactionReport
```

Output:

```
Please enter the transaction filename: Transactions.txt
Sold 50 of SODA (SKU: 4039) at $0.99 each. Sale is $49.50
Sold 5 of T-SHIRT (SKU: 9100) at $9.50 each. Sale is $47.50
Sold 30 of JAVA PROGRAMMING TEXTBOOK (SKU: 1949) at $110.00 each. Sale is $3300.00
Sold 25 of COOKIE (SKU: 5199) at $1.50 each. Sale is $37.50
Total sales: $3434.50
```

Problem D

In addition to arrays, Java also provides other data structures which can be imported from java.util package. Explore this package using the Java API (https://docs.oracle.com/javase/7/docs/api). Identify two data structures that can be used in place of arrays. For each data structure, in one or two sentences describe one advantage and one disadvantage compared to arrays. For instance, does the data structure allow for searching or inserting elements more efficiently?

Submission

The following deliverables must be submitted on HuskyCT by midnight on February 22, 2022.

a) Well-documented code.
b) At least 2 test cases per problem/part that you used to test the code (submit in a separate document as a txt file or a word document).
c) Please make sure that your code compiles, we will test your code offline with specific test cases (common to all).
d) Response to part D must be submitted in a separate document.
e) Late submissions (without any legitimate excuse) will incur a penalty of 10% per day.