

CSE 2102: Introduction to Software Engineering
String Data Type, Scanner, File I/O
Assigned: September 14, 2022, Due: September 21, 2022

Problem A (25 pts.)

The Harris-Benedict equation estimates the number of calories a person needs to maintain their weight if they do not exercise. This is called your basal metabolic rate, or BMR.

The calories needed for a woman to maintain her weight is:

$$\text{BMR} = 655 + (4.3 \times \text{weight in pounds}) + (4.7 \times \text{height in inches}) - (4.7 \times \text{age in years})$$

The calories needed for a man to maintain his weight is:

$$\text{BMR} = 66 + (6.3 \times \text{weight in pounds}) + (12.9 \times \text{height in inches}) - (6.8 \times \text{age in years})$$

A typical chocolate bar will contain about 230 calories. Write a program `ChocolateBars.java` that allows the user to input their weight in pounds, height in inches, and age in years (all these inputs can be real numbers). The program should then output the number of whole chocolate bars that should be consumed to maintain one's weight for both a woman and a man of the given input weight, height, and age. The number of chocolate bars should be rounded down to the nearest whole number.

Input cmd:

```
java ChocolateBars
```

Output:

```
Enter the weight in pounds: 115
Enter the height in inches: 59
Enter the age in years: 50

Number of chocolate bars for woman is 5
Number of chocolate bars for man is 5
```

Submit two test cases in a separate txt or doc file. One of your test cases should represent a combination of height, weight, and age where the number of chocolate bars is the same for both genders, and one test case should represent a combination where the number of chocolate bars is different for both genders.

Problem B (25 pts.)

A DNA sequence is a specific order of four basic building chemical building blocks "A", "C", "G", "T". Write a program `ManipulateDNA.java` that prompts a user and accepts a DNA sequence as input. It prints the length of the sequence, and computes and prints the reverse of the input DNA sequence.

Input cmd:

```
java ManipulateDNA
```

Output:

```
Enter the DNA Sequence: ACTG
Length of the input sequence is: 4

Reverse sequence is: GTCA
```

Problem C (25 pts.)

Write a program `PrintOdd.java` that reads every line in a text file and writes the line to the output file after deleting the first word. The program must prompt the user for both the input and output files. It should include code to throw exceptions for any erroneous conditions that may arise with respect to both input and output files. For example, assume that the input file `in.txt` contains the following lines:

The term happiness is used in the context of mental or emotional states, including positive or pleasant emotions ranging from contentment to intense joy. It is also used in the context of life satisfaction, subjective well-being, eudaimonia, flourishing and well-being.

Input cmd:

```
java PrintOdd
```

Output:

```
Enter the name of the input file: in.txt
Enter the name of the output file: out.txt
```

The contents of the output file `out.txt` will be:

term happiness is used in the context of mental or states, including positive or pleasant emotions from contentment to intense joy. It is also used the context of life satisfaction, subjective well-being, flourishing and well-being.

Problem D (25 pts.)

Write a Java program `CompareStrings.java` that prompts the user for two input strings, and compares the two strings. The program should first compare whether these two strings are equal considering case. If they are equal, considering case, then the program should print a message and exit. If the two strings are not equal considering case, then the program should compare them ignoring case. If the two strings are equal ignoring case, then the program should print another message. Otherwise, the program should print an appropriate error message.

Input cmd:

```
java CompareStrings
```

Output:

Use Case #1:

```
Enter the first string: Java is Coffee
Enter the second string: Java is Coffee

The two strings are equal
```

Use Case #2:

```
Enter the first string: Java is COFFEE
Enter the second string: Java is coffee

The two strings are not equal
But the two strings are equal, ignoring case
```

Use Case #3:

```
Enter the first string: Java is Coffee
Enter the second string: Java is not Coffee

The two strings are not equal
The two strings are not equal, even ignoring case
```

Submission

The following deliverables must be submitted on HuskyCT by midnight on September 21, 2022.

- a) Well-documented code.
- b) At least 2 test cases for Problems A through C, and 3 test cases for Problem D that you used to test the code (submit in a separate document as a txt file or a word document). Specific instructions for test cases for each problem are also supplied with the problem itself.
- c) Please make sure that your code compiles, we will test your code offline with specific test cases (common to all).
- d) Late submissions (without any legitimate excuse) will incur a penalty of 10% per day.