RIT | Golisano College of Computing and Information Sciences
School of Information

ISTE-120 - Computational Problem Solving for the Information Domain I Homework Assignment 8 (HW08)

"How Healthy Are You, Again?"

Problem

This is an extension to Homework 7 that calculates health information. In addition this will allow the user to re-enter the correct input when erroneous input is detected. Also, this program will allow the user to enter information for multiple persons. Remember that HW07 had the program terminate if the user entered an invalid input such as a weight less than 100 pounds, an age less than 18, etc.

For Homework 8, if the user enters invalid data to a prompt, print an appropriate error message and prompt the user again to re-enter the information. See the Sample Execution below.

After completing the calculation for one person, prompt if the user wishes to continue. The user must be prompted to enter the word "Yes" or the word "No." In theory, the user must enter only one of these two words, or receive an error message to re-enter one of the two values.

A common programming practice for Yes/No responses is to "short-cut" the response. After the user enters the response of "Yes" or "No" (string), use only the first character to make the decision. If the user enters "Yes," the decision will be based on the letter 'Y'; similarly with "No" and the letter 'N'.

To avoid issues with upper and lower case, change the character to upper case (or lower case if so desired; just be consistent).

This brings up one other question: what if the user does not enter the letter 'Y' or the letter 'N'? The user could be prompted again, but you are to take an easier approach. If the user enters the letter 'Y', the program will do another calculation. Any other input will halt the program with the message "Have a good day."

Programming focus

This program will require the use of loops.

Description

See Homework 7 for all of the formulas and rules for valid input. There is no need to change any of the formulas as Homework 8 focuses on the validation of the input.

Programming Requirements

1. The main method in the class **HowHealthy** accepts all of the user input, then calls an appropriate mutator to validate the user input. If the input is erroneous, the mutator returns false. The main method then prints an appropriate error message and allows the user to re-enter the input.

2. The main method in the class **HowHealthy** allows the user to do calculations for multiple people.

3. The main method in the class **HowHealthy** prompts the user for the following in the order given: name, gender, weight in pounds, height in inches, age in years, and Activity Level. No change from Homework 7.

4. The class **Healthy** must contain the attributes of a person in order to do all of the calculations. No change from Homework 7.

5. The class **Healthy** must have a default constructor. Remove the constructor from Homework 7 that initialized all of the attributes.

6. The class **Healthy** must have an accessor for each attribute, which is used to retrieve the value of an attribute for printing; no change from Homework 7.

7. The class **Healthy** must have a mutator for each attribute. Each of the mutators will validate the value of the parameter, which contains the user input. If the value is valid, store the value of the parameter as the value of the corresponding attribute and return **true**.

   If the value is not valid, do not change the value of the corresponding attribute and return **false**. The Boolean return value will be used by the loop in the main program to determine if the user has entered valid value and to exit the loop. Note: "if" statements in the main method for Homework 7 can form the basis of the mutators.

8. The class **Healthy** must include private methods to do the metric-English conversions. No change from Homework 7.

Design Notes

Note the difference in the class `Healthy` between Homework 7 and 8. In Homework 7, the main program contained the code to validate the input. After all valid input was entered, the constructor created a "full" object, that is, each attribute is assigned a value via a parameter.

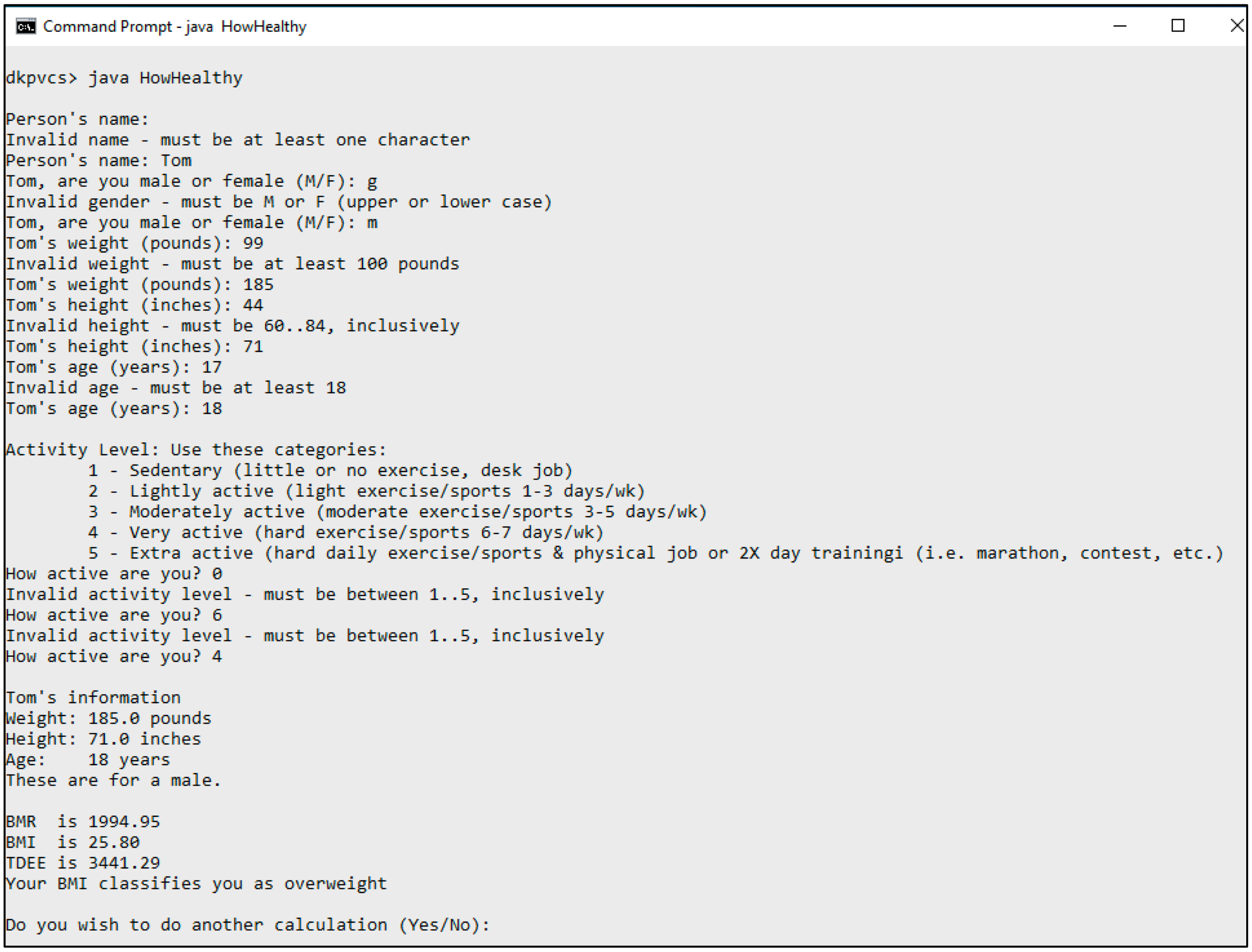
In Homework 8, before any input is entered, the default constructor creates an empty object. Then the appropriate mutator methods are used to validate the input and assign a value to each attribute.

Program Design

Before writing code, design the changes to the program. Do not wait until the last day to start this homework.

Sample Executions

Do two calculations with invalid input.



```
dkpvcs> java HowHealthy

Person's name:
Invalid name - must be at least one character
Person's name: Tom
Tom, are you male or female (M/F): g
Invalid gender - must be M or F (upper or lower case)
Tom, are you male or female (M/F): m
Tom's weight (pounds): 99
Invalid weight - must be at least 100 pounds
Tom's weight (pounds): 185
Tom's height (inches): 44
Invalid height - must be 60..84, inclusively
Tom's height (inches): 71
Tom's age (years): 17
Invalid age - must be at least 18
Tom's age (years): 18

Activity Level: Use these categories:
        1 - Sedentary (little or no exercise, desk job)
        2 - Lightly active (light exercise/sports 1-3 days/wk)
        3 - Moderately active (moderate exercise/sports 3-5 days/wk)
        4 - Very active (hard exercise/sports 6-7 days/wk)
        5 - Extra active (hard daily exercise/sports & physical job or 2X day trainingi (i.e. marathon, contest, etc.)
How active are you? 0
Invalid activity level - must be between 1..5, inclusively
How active are you? 6
Invalid activity level - must be between 1..5, inclusively
How active are you? 4

Tom's information
Weight: 185.0 pounds
Height: 71.0 inches
Age:    18 years
These are for a male.

BMR  is 1994.95
BMI  is 25.80
TDEE is 3441.29
Your BMI classifies you as overweight

Do you wish to do another calculation (Yes/No):
```

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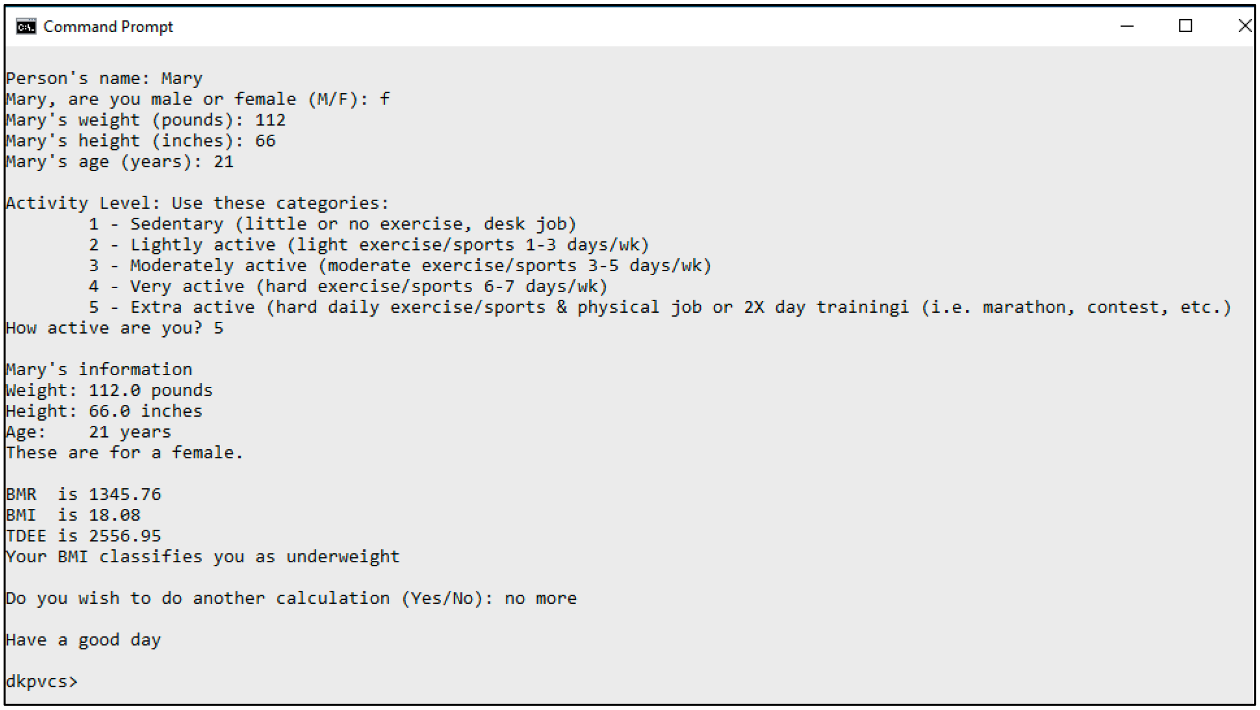
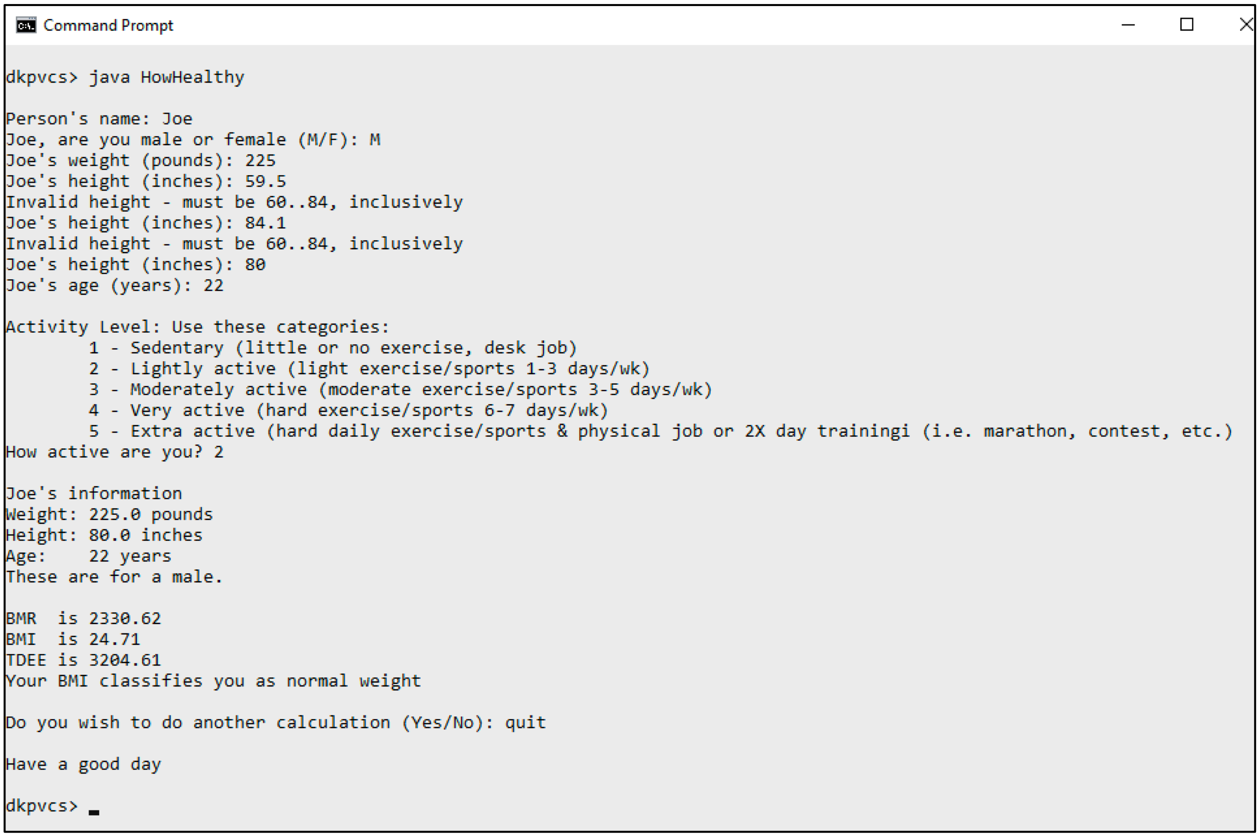


```
Person's name: Mary
Mary, are you male or female (M/F): f
Mary's weight (pounds): 112
Mary's height (inches): 66
Mary's age (years): 21

Activity Level: Use these categories:
        1 - Sedentary (little or no exercise, desk job)
        2 - Lightly active (light exercise/sports 1-3 days/wk)
        3 - Moderately active (moderate exercise/sports 3-5 days/wk)
        4 - Very active (hard exercise/sports 6-7 days/wk)
        5 - Extra active (hard daily exercise/sports & physical job or 2X day trainingi (i.e. marathon, contest, etc.)
How active are you? 5

Mary's information
Weight: 112.0 pounds
Height: 66.0 inches
Age:    21 years
These are for a female.

BMR  is 1345.76
BMI  is 18.08
TDEE is 2556.95
Your BMI classifies you as underweight

Do you wish to do another calculation (Yes/No): no more

Have a good day

dkpvcs>
```

Response to prompt to continue is not “Yes” or “No”.



```
dkpvcs> java HowHealthy

Person's name: Joe
Joe, are you male or female (M/F): M
Joe's weight (pounds): 225
Joe's height (inches): 59.5
Invalid height - must be 60..84, inclusively
Joe's height (inches): 84.1
Invalid height - must be 60..84, inclusively
Joe's height (inches): 80
Joe's age (years): 22

Activity Level: Use these categories:
        1 - Sedentary (little or no exercise, desk job)
        2 - Lightly active (light exercise/sports 1-3 days/wk)
        3 - Moderately active (moderate exercise/sports 3-5 days/wk)
        4 - Very active (hard exercise/sports 6-7 days/wk)
        5 - Extra active (hard daily exercise/sports & physical job or 2X day trainingi (i.e. marathon, contest, etc.)
How active are you? 2

Joe's information
Weight: 225.0 pounds
Height: 80.0 inches
Age:    22 years
These are for a male.

BMR  is 2330.62
BMI  is 24.71
TDEE is 3204.61
Your BMI classifies you as normal weight

Do you wish to do another calculation (Yes/No): quit

Have a good day

dkpvcs> _
```

Submission

Submit a zip file that contains the two java files to the Homework 8 Assignment folder on myCourses. See that folder for submission deadline.

Homework 8 Grade Sheet

Program Design/Requirements	**Point Value**	**Points Earned**
HowHealthy.java		
• Reads all of input	5	
• Validates all the input and prints appropriate error messages for invalid input and prompt user to re-enter input. Uses mutators for validation.	25	
• Prints all of the output using appropriate accessor.	5	
• Calls methods of the Healthy class to do all calculations.	5	
• Allows user to do multiple calculations.	10	
Healthy.java		
• Contains all required attributes.	2	
• Contains default constructor.	5	
• Contains method to calculate BMR.	2	
• Contains a method to calculate BMI.	2	
• Contains a method to calculate TDEE.	2	
• Contains a method to determine weight classification.	2	
• Contains private methods to do imperial-metric conversion.	2	
• “Special” numbers are kept as constants.		
• Contains mutators to validate input.	2	
	6	
Overall:		
• Output matches sample shown	25	
Total Points Earned	100	

Coding Standards: (Points deducted after Program Design/Requirements Points are assigned.)

- Naming Conventions: meaningful; use of capitalization and underscores appropriate for class, method, variables, and constants
  Deduction (0-10 pts) ____

- Code comments: Header for each file; methods, major logic section as needed
  Deduction (0-10 pts) ____

- Alignment & Indentation: This includes class, methods, ifs, switch, and others.
  Deduction (0-10 pts) ____

Coding Standards Deductions: ___________

Grade (Total Points Earned – Coding Standards Deductions): ___________