ASSIGNMENT INSTRUCTIONS

Assignment 03: 50 points w/ 5 E.C. points
 Due Date & Time: 09-27-2024 at 11:55 PM

WHAT TO SUBMIT

1. Assignment Report in PDF format and Code in 1 ZIP archive

HOW TO SUBMIT AND THE RULES TO FOLLOW

- The Guidelines for All Assignments
- The Course Policy on Student Conduct and Academic Honesty
- The assignment instructions and rubric for this assignment
- The additional instructions provided in class and on Canvas.
- Submit via Canvas, the Assignment Submission section.

PERFORMANCE TRACKER		
ASMT	GRADE	Your Grade
Canvas	15	
DL-Approval-01	COMPLETE	
01	25	
DL-Approval-02	COMPLETE	
02	30	
03-Preparation	25	
03	50	
TOTAL	170	

A: 90-100% B: 80-89% C: 70-79% D: 60-69% F: 0-60% The course grader provides feedback to your assignments on Canvas.

ABOUT

CSC 101, a good foundation in Java introductory programming, is CSC 215's course prerequisite. We were supposed to have a prerequisite exam to demonstrate our knowledge of Java programming.

Instead of a test, this assignment is our opportunity to review (and to learn) many important Java topics and to get us ready for CSC 215. Please study our review materials including PKG 01 to PKG 12 thoroughly, which will help us complete this assignment and succeed in this course. PKG 101, again, is a summary of the important topics covered in PKG 01 to PKG 12.

The **supporting materials** for this assignment are organized under these 2 directories:

- Review CSC 101: https://csc215.ducta.net/ClassMeeting_PACKAGES/CSC101_DucTa/index.php
- Assignment 03: https://csc215.ducta.net/Assignments/Assignment-03/index.php

We want to start doing this assignment early. Allocate enough time for each question. Laser focus and eyes for every detail. Always think about how to give our clients/graders what they expect. *Happy programming!*

REMINDER:

We should start ASMT 03-Preparation and ASMT 03 at the same time. **ASMT 03-Preparation is a team learning experience. Each team should have five members. ASMT 03 is a regular assignment. We can work alone or with 1 classmate on ASMT 03.** Please refer to the Assignment Template and the Guidelines for All Assignments.

Thank you and happy learning!

ABOUT THE CDC'S ADULT BMI CALCULATOR

Body mass index (BMI) is a person's weight in kilograms divided by the square of height in meters. BMI is an inexpensive and easy screening method for weight category—underweight, healthy weight, overweight, and obesity.

BMI does not measure body fat directly, but BMI is moderately correlated with more direct measures of body fat ^{1,2,3}. Furthermore, BMI appears to be as strongly correlated with various metabolic and disease outcome as are these more direct measures of body fatness ^{4,5,6,7,8,9}.



 $Source: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html\#Interpreted$

BMI is calculated the same way for both adults and children. The calculation is based on the following formulas: Measurement Units Formula and Calculation Kilograms and meters Formula: weight (kg) / [height (m)]² (or centimeters) With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Because height is commonly measured in centimeters, divide height in centimeters by 100 to obtain height in meters. Example: Weight = 68 kg, Height = 165 cm (1.65 m) Calculation: $68 \div (1.65)^2 = 24.98$ Pounds and inches Formula: weight (lb) / [height (in)]2 x 703 Calculate BMI by dividing weight in pounds (lbs) by height in inches (in) squared and multiplying by a conversion factor of 703. Example: Weight = 150 lbs, Height = 5'5" (65")

Source: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html#Interpreted

Calculation: $[150 \div (65)^2] \times 703 = 24.96$

Weight Categories:

1. Underweight:BMI below 18.53. Overweight:BMI 25.0 - 29.92. Healthy Weight:BMI 18.5 - 24.94. Obesity:BMI 30.0 and above

Try the CDC's Adult BMI Calculator:

- English Version: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/english_bmi_calculator/bmi_calculator.html
- Metric Version: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/metric_bmi_calculator/bmi_calculator.html

PART A - BMI Calculator CSC 215, English Version, 25 points

- Write an interactive Java program that performs these actions:
 - a. Prompt the user to enter the user's name.
 - b. Prompt the user to enter height in feet and inches (both integers).
 - c. Prompt the user to enter weight in pounds.
 - d. Calculate the BMI of the user and display a summary report.
 - e. Prompt our user to enter a low weight and a high weight in pounds.
 - f. Generate and display a table of BMI information for the entered weight range.
- Your program must use at least 5 methods. Use at least one method to perform each of the following tasks:
 - a. Display the program's welcome message.
 - b. Get inputs.
 - c. Do the calculation(s).
 - d. Display the result(s).
 - e. Display the program's ending message.
- The program must produce outputs identical to the desired outputs, which were screenshotted and organized at the
 end of this document. The author/programmer's name must be your full name. The values for Date and Time are live.
 We want to pay close attention to every detail in the screenshots such as spacing, text alignment, number formatting,
 texting formatting, and indicators.

1. Problem Analysis and Problem-Solving, 3 points

o In half a page or more, explain in detail your understanding of the problem. What is this question asking you to do? What does the client want? What are the requirements of the program? What are the important details you observed from the desired outputs? How do you plan to solve the problem? How do you organize/design the solution? What are the important elements of your program? What will you pay attention to when you code the solution? Think about Interviews and Problem-Solving.

2. Coding, 15 points

- The program's name must be in this format:
 - BMI_CSC215_English_<FirstName><LastName>.java
 - BMI CSC215 English DucTa.java is a proper example.
- o Code the program (your solution) so that it behaves in the desired manner and produces the desired outputs.

3. Methods, 5 points

List the 5 most important methods in this program. For each method, answer these questions in detail:

a. Method header: What is the exact method header? What are the components?

b. Modifier(s): What are the modifiers? What do they mean?

c. Method name: What is the method name? Was it named properly? Why?

d. Method signature: What is the method signature? How do you define a method signature?

e. Parameter list: What is the exact parameter list? What does it contain?

f. Formal parameter(s): What are the formal parameters, if any?

g. Actual parameter(s): What caller(s) call this method? What are the actual parameters, if any?

h. Method body: What is the one main task that the method body does?i. Return value: Does the method return anything? What are they, if any?

j. Return value type: What is the data type of the return value, if any?

Explain in detail why you have this method in the program. Why is it an important method? What does it do?
 What are its callers and callees, if any? Explain the execution order and data flow when this method is used.

4. Result Analysis and Future Development, 2 points

o In half a page or more, analyze your results and plan for future development. Does your program compile? Does it satisfy all the client's requirements? What works and why? What does not work and why? What can be improved and how? What is your plan to improve the program in the future? *Think about Interviews*.

Desired Output 01: Please find this desired output on the last pages of this document. Thank you. Desired Output 02: Please find this desired output on the last pages of this document. Thank you.

PART B - BMI Calculator CSC 215, Metric Version, 15 points

- Write an interactive Java program that performs these actions:
 - a. Prompt the user to enter the user's name.
 - b. Prompt the user to enter height in centimeters (an integer).
 - c. Prompt the user to enter weight in kilograms.
 - d. Calculate the BMI of the user and display a summary report.
 - e. Prompt our user to enter a low weight and a high weight in kilograms.
 - f. Generate and display a table of BMI information for the entered weight range.
- Your program must use at least 5 methods. Use at least one method to perform each of the following tasks:
 - a. Display the program's welcome message.
 - b. Get inputs.
 - c. Do the calculation(s).
 - d. Display the result(s).
 - e. Display the program's ending message.

- The program must produce outputs identical to the desired outputs, which were screenshotted and organized at the end of this document. The author/programmer's name must be your full name. The values for Date and Time are live. We want to pay close attention to every detail in the screenshots such as spacing, text alignment, number formatting, texting formatting, and indicators.

1. Problem Analysis and Problem-Solving, 3 points

In half a page or more, explain in detail your understanding of the problem. **How is this version of the program different from the English version of it?** What does the client want? What is this question asking you to do? What are the requirements of the program? What are the important details you observed from the desired outputs? How do you plan to solve the problem? How do you organize/design the solution? What are the important elements of your program? What will you pay attention to when you code the solution? *Think about Interviews and Problem-Solving*.

2. Coding, **5 points**

- The program's name must be in this format:
 - BMI_CSC215_Metric_<FirstName><LastName>.java
 - BMI CSC215 Metric DucTa.java is a proper example.
- o Code the program (your solution) so that it behaves in the desired manner and produces the desired outputs.

3. Methods, 5 points

List the 5 most important methods in this program. For each method, answer these questions in detail:

a. Method header: What is the exact method header? What are the components?

b. Modifier(s): What are the modifiers? What do they mean?

c. Method name: What is the method name? Was it named properly? Why?

d. Method signature: What is the method signature? How do you define a method signature?

e. Parameter list: What is the exact parameter list? What does it contain?

f. Formal parameter(s): What are the formal parameters, if any?

g. Actual parameter(s): What caller(s) call this method? What are the actual parameters, if any?

h. Method body: What is the one main task that the method body does?i. Return value: Does the method return anything? What are they, if any?

j. Return value type: What is the data type of the return value, if any?

Explain in detail why you have this method in the program. Why is it an important method? What does it do?
 What are its callers and callees, if any? Explain the execution order and data flow when this method is used.

4. Result Analysis and Future Development, 2 points

o In half a page or more, analyze your results and plan for future development. Does your program compile? Does it satisfy all the client's requirements? What works and why? What does not work and why? What can be improved and how? What is your plan to improve the program in the future? *Think about Interviews*.

Desired Output 01: Please find this desired output on the last pages of this document. Thank you. Desired Output 02: Please find this desired output on the last pages of this document. Thank you.

PART C – BMI Calculator Master, Method-Basic, 10 points

Proper Prior Planning Prevents Pitifully Poor Performance

Preparing for an interview! The 7 Ps! --- We created 2 versions of the BMI Calculator: BMI Calculator CSC 215 English and BMI Calculator CSC 215 Metric. We are organizing them in one user-friendly way that makes it easy for our interviewers to access and try them. We are providing a basic menu of choices! We are using methods! This combined version is called BMI Calculator Master.

This Master version

- a. has a method main which contains strictly only 1 statement. This 1 statement is a method call.
- b. It **repeatedly** offers users to pick a version of our BMI program to try.
- c. After users make their choice, the program lets users use that version.
- d. After users finish using a version, the program offers again: "Please enter the version you want to try: "
- e. This Master version handles 2 version choices: the English version and the Metric version.
- f. Users can enter an exclamation mark to end the program.
- g. You must demonstrate that all 3 versions of your BMI program work properly to gain credit. "3 versions" means the Master version, the combined English version, and the combined Metric version.

The following screenshots are only showing how the menu in the Master version works. The program must produce outputs identical to the desired outputs. We want to pay close attention to every detail in the screenshots such as spacing, text alignment, number formatting, texting formatting, and indicators.

Your demonstration must continue and show this version works properly.

Your demonstration must continue and show this version works properly.

• Your demonstration must continue and show this version works properly.

```
My CSC 215 BMI Calculator Projects:

1. BMI, English
2. BMI, Metric

☐ [USER MANUAL] Enter an exclamation mark! to end.
Please enter the version you want to try: Metric

-- Welcome to:
-- BODY MASS INDEX (BMI) Computation, CSC 215, Metric version
-- by Duc Ta
```

Your demonstration must continue and show this version works properly.

• Your demonstration must continue and show this version works properly.

- Your demonstration must continue and show this version works properly.
- 1. Problem Analysis and Problem-Solving, 1.5 points
 - o In half a page or more, explain in detail your understanding of the problem. What is this question asking you to do? What does the client want? What are the requirements of the program? What are the important details you observed from the desired outputs? How do you plan to solve the problem? How do you organize/design the solution? What are the important elements of your program? What will you pay attention to when you code the solution? Think about Interviews and Problem-Solving.

2. Coding, 5 points

- The program's name must be in this format:
 - BMI Master <FirstName><LastName>.java
 - BMI Master DucTa.java is a proper example.
- o If your program contains multiple files, please make sure to submit all of them.
- o Code the program (your solution) so that it behaves in the desired manner and produces the desired outputs.

3. Methods, 2.5 points

List the 5 most important methods in your program. For each method,

o answer these questions in detail:

a. Method header: What is the exact method header? What are the components?

b. Modifier(s): What are the modifiers? What do they mean?

c. Method name: What is the method name? Was it named properly? Why?

d. Method signature: What is the method signature? How do you define a method signature?

e. Parameter list: What is the exact parameter list? What does it contain?

f. Formal parameter(s): What are the formal parameters, if any?

g. Actual parameter(s): What caller(s) call this method? What are the actual parameters, if any?

h. Method body: What is the one main task that the method body does?i. Return value: Does the method return anything? What are they, if any?

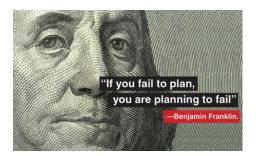
j. Return value type: What is the data type of the return value, if any?

Explain in detail why you have this method in the program. Why is it an important method? What does it do?
 What are its callers and callees, if any? Explain the execution order and data flow when this method is used.

4. Result Analysis and Future Development, **1 points**

o In half a page or more, analyze your results and plan for future development. Does your program compile? Does it satisfy all the client's requirements? What works and why? What does not work and why? What can be improved and how? What is your plan to improve the program in the future? *Think about Interviews*.

PART D – Semester-Completion Plan and Study Plan, Extra Credit, 5 points



1. Semester-Completion Plan --- PLAN --- 3 points

In half a page, please answer the following questions:

- O What are your current goals for this course?
- o How have you been doing in this course? Do you think your goals are feasible?
- What changes do you plan to make? How are you going to implement these changes?
- o Make a plan to see the course advisor or the course instructor to discuss your goals. Share your plan.



It can be 5 minutes per day or 1 project per week. You will commit to this study plan for (at the very least) the rest of the semester. A website such as LeetCode, CodingBat, or Udemy might serve as a good source for study plan samples. This study plan must help you with this class and with programming in general.

 Start working on your plan for a week then provide screenshots and a few short paragraphs to present your study plan and your early progress.

re feasible? ent these changes? iscuss your goals. Share your plan.

Vision without action is a daydream.

Action without vision is a nightmare.

-Japanese proverb-

Please continue to the next pages for the desired outputs.

Thank you.

PART A – BMI Calculator CSC 215, English Version, Desired Output 01:

```
.....
   -- Welcome to:
               BODY MASS INDEX (BMI) Computation, CSC 215, English version
🛍 Please enter your full name: Otto Minion
   Please enter height in feet and inches for Otto Minion: \delta 5
   Please enter weight in pounds for Otto Minion: 253.1
   -- SUMMARY REPORT for OTTO MINION
   -- Date and Time: September 10, 2023 at 8:12:10 PM
                     30.01 (or 30.0 if rounded)
   -- BMI:
   -- Weight Status:
                     Obesity
   Please enter a LOW weight in pounds for Otto Minion: 149.2
   Please enter a HIGH weight in pounds for Otto Minion: 256.41
   | 149.20 | 17.69 | Underweight
                          | Underweight
   | 154.70 | 18.34
           | 18.995 | Healthy Weight
   160.20
   | 165.70 | 19.647 | Healthy Weight
   | 171.20 | 20.299 | Healthy Weight
   | 176.70 | 20.951 | Healthy Weight
   | 182.20 | 21.603 | Healthy Weight
   | 187.70 | 22.256 | Healthy Weight
   | 193.20 | 22.908 | Healthy Weight
   | 198.70 | 23.560 | Healthy Weight
   | 204.20 | 24.212 | Healthy Weight
            | 24.864
     209.70
                          | Healthy Weight
   | 215.20 | 25.5162 | Overweight
   | 220.70 | 26.1683 | Overweight
   | 226.20 | 26.8205 | Overweight
                          | Overweight
            28.1247
                          | Overweight
   237.20
   | 242.70 | 28.7769
                          | Overweight
   | 248.20 | 29.4290 | Overweight
   253.10
              | 30.01000 | Obesity (this)
     253.70
              | 30.08114 | Obesity
   | 256.41 | 30.40247 | Obesity
                                         (HIGH)
   The SFSU Mashouf Wellness Center is at 755 Font Blvd.
   -- Thank you for using my program, Otto Minion!
   -- Poopaye!!!
   Process finished with exit code 0
```

PART A – BMI Calculator CSC 215, English Version, Desired Output 02:

```
-- Welcome to:
               BODY MASS INDEX (BMI) Computation, CSC 215, English version
Please enter your full name: Minnie Mouse
   Please enter height in feet and inches for Minnie Mouse: 6 2
   Please enter weight in pounds for Minnie Mouse: 143
   -- SUMMARY REPORT for MINNIE MOUSE
   -- Date and Time: September 10, 2023 at 8:15:09 PM
   -- BMI:
                      18.358109 (or 18.4 if rounded)
   -- Weight Status: Underweight
   Please enter a LOW weight in pounds for Minnie Mouse: 141.32
   Please enter a HIGH weight in pounds for Minnie Mouse: 261.23
                                            (LOW)
   | 143.00 | 18.36
                          | Underweight (this)
   | 146.82 | 18.849 | Healthy Weight
                           | Healthy Weight
                         | Healthy Weight
            | 20.261
   | 157.82
                         | Healthy Weight
   | 163.32 | 20.967
   | 168.82 | 21.673 | Healthy Weight
   | 174.32 | 22.379 | Healthy Weight
   | 179.82 | 23.085 | Healthy Weight
                          | Healthy Weight
   190.82
                          | Healthy Weight
   | 196.32 | 25.2032 | Overweight
   | 201.82 | 25.9093 | Overweight
   | 207.32 | 26.6154 | Overweight
   | 212.82 | 27.3215 | Overweight
              | 28.0276
   218.32
                          | Overweight
   | 223.82 | 28.7337 | Overweight
   | 229.32 | 29.4397 | Overweight
   | 234.82 | 30.14581 | Obesity
   | 240.32 | 30.85189 | Obesity
   | 245.82 | 31.55797 | Obesity
   251.32
              | 32.26406 | Obesity
   256.82
               | 32.97014 | Obesity
   261.23
              | 33.53629 | Obesity
                                           (HIGH)
   The SFSU Mashouf Wellness Center is at 755 Font Blvd.
   -- Thank you for using my program, Minnie Mouse!
   -- Ear-esistible!!!
   Process finished with exit code 0
```

PART B – BMI Calculator CSC 215, Metric Version, Desired Output 01:

```
-- Welcome to:
              BODY MASS INDEX (BMI) Computation, CSC 215, Metric version
合
  Please enter your full name: Baymax Hamada
   Please enter height in centimeters for Baymax Hamada: 205
   Please enter weight in kilograms for Baymax Hamada: 105.7
   -- SUMMARY REPORT for BAYMAX HAMADA
   -- Date and Time:
                    September 10, 2023 at 8:18:42 PM
                     25.151695 (or 25.2 if rounded)
   -- BMI:
   -- Weight Status: Overweight
   Please enter a LOW weight in kilograms for Baymax Hamada: 71.23
   Please enter a HIGH weight in kilograms for Baymax Hamada: 130.32
             | BMI
                        | WEIGHT STATUS
            | 16.95 | Underweight
| 17.54 | Underweight
     73.73
                        | Underweight
   | 78.73 | 18.734 | Healthy Weight
   81.23
             | 19.329 | Healthy Weight
   83.73
             | 19.924 | Healthy Weight
             20.519
                       | Healthy Weight
   86.23
                         | Healthy Weight
     88.73
      91.23
                         | Healthy Weight
                        | Healthy Weight
   | 96.23 | 22.898 | Healthy Weight
   98.73
             23.493
                        | Healthy Weight
   101.23
             24.088
                        | Healthy Weight
                         | Healthy Weight
              | 25.1517 | Overweight (this)
     105.70
     106.23
             25.2778
                        | Overweight
   108.73
            | 25.8727 | Overweight
   | 111.23 | 26.4676 | Overweight
   113.73
             | 27.0625 | Overweight
   116.23
             | 27.6573 | Overweight
             | 28.2522 | Overweight
   118.73
              28.8471
   121.23
                        | Overweight
   123.73
                         | Overweight
             | 30.03688 | Obesity
   128.73
             | 30.63177 | Obesity
   130.32
             | 31.01012 | Obesity
   The SFSU Mashouf Wellness Center is at 755 Font Blvd.
   -- Thank you for using my program, Baymax Hamada!
   Process finished with exit code 0
```

PART B – BMI Calculator CSC 215, Metric Version, Desired Output 02:

```
-- Welcome to:
               BODY MASS INDEX (BMI) Computation, CSC 215, Metric version
a
  Please enter your full name: Goofy Dog
   Please enter height in centimeters for Goofy Dog: 141
   Please enter weight in kilograms for Goofy Dog: 36.1
   -- SUMMARY REPORT for GOOFY DOG
   -- Date and Time: September 10, 2023 at 8:20:54 PM
   -- BMI:
                     18.158041 (or 18.2 if rounded)
   -- Weight Status: Underweight
   Please enter a LOW weight in kilograms for Goofy Dog: 27.71
   Please enter a HIGH weight in kilograms for Goofy Dog: 74.47
   | 27.71 | 13.94 | Underweight
      30.21 | 15.20
                           | Underweight
                           Underweight
      35.21
                         | Underweight (this)
   | 37.71 | 18.968 | Healthy Weight
   | 40.21 | 20.225 | Healthy Weight
   | 42.71 | 21.483 | Healthy Weight
   | 45.21 | 22.740 | Healthy Weight
     47.71 | 23.998 | Healthy Weight
      50.21 | 25.2553 | Overweight
               26.5128
      52.71
                         | Overweight
                          | Overweight
      55.21
      57.71 | 29.0277
                         | Overweight
   | 60.21 | 30.28520 | Obesity
   | 62.71 | 31.54268 | Obesity
   | 65.21 | 32.80016 | Obesity
   | 67.71 | 34.05764 | Obesity
      70.21 | 35.31512 | Obesity
              | 36.57261 | Obesity
      72.71
   The SFSU Mashouf Wellness Center is at 755 Font Blvd.
   -- Thank you for using my program, Goofy Dog!
   -- Woof Woof!!!
   Process finished with exit code 0
```