Computer Science 220
Program Assignment 1

Learning objectives:

- Create a Python program on your own.
- Develop a simple Python program that asks for input, does arithmetic, and provides output.
- Apply the Software Development Process

Assignment:

Write a Python program to compute a user's Body Mass Index (BMI), Ideal Body Weight (for male), Lean Body Weight (for female) and Body Surface Area (BSA). The program should compute and display the BSA using three different formulas: Mosteller, DuBois & DuBois, and Boyd. Ask the user to input the weight (in kg) and height (in cm).

These are formulas to do the first three calculations:

$$Body\ Mass\ Index = 10000\frac{Weight}{Height^2}$$

$$Ideal\ Body\ Weight\ (men) = 50 + 2.3(\frac{Height}{2.54} - 60)$$

$$Lean\ Body\ Weight\ (women) = 1.07\ Weight - 148\frac{Weight^2}{Height^2}$$

For calculating the BSA, there are several popular formulas. The Mosteller formula is commonly used and is mathematically the simplest.

$$Mosteller = \sqrt{\frac{Height * Weight}{3600}}$$

$$DuBois\ \&\ DuBois = 0.20247 * \left(\frac{Height}{100}\right)^{0.725} * Weight^{0.425}$$

$$Boyd = 0.0003207 * Height^{0.3} * (1000\ Weight)^{0.6721 - 0.0188\ log_{10}(Weight)}$$

Save your program as `bmi.py`.

Guidance:

While the problem may seem difficult, applying the software development cycle will help. Ask yourself, and write the answers to, the following questions. Add your answers as a comment to your .py file.

1. What will the program do? (purpose statement in header)
2. What will be the inputs and outputs? (input/output statements in header)
3. Provide a step-by-step list of what your program must do, aka an algorithm. (Remember this is in English, not Python! Add these to body of your code as comments.)
4. Implement your code. Remember to use proper Python conventions as detailed in the homework policy, e.g. snake_case variable names.
5. Test your program. You can use this website: http://www.medcalc.com/body.html to check the correctness of your calculations.

6. Please modify your code to round the outputs to the decimal precisions shown in the above website. For example, the BMI should have 1 digit after the decimal point, while the BSA should have 3.

File to be submitted:

`bmi.py`

Policies:

The following policies are in effect for this and all assignments:

- Programming assignment grades will be based on design and style as well as correctness of result.
- Assignments are to be submitted by uploading to OAKS.
- Late assignments will not be accepted.
- Collaboration policy for CSCI 220 assignments:
    1. You may discuss the problem and how to solve it with others, but you may not look at, copy, or use any code that was written by anyone other than yourself. If I have evidence that you have shared program code or used code found anywhere, your grade will be zero, and you will be given a warning.
    2. If you do discuss the problem and how to solve it with others, you must document that in the program code.
    3. Not following these rules is in violation of the Student Honor Code. You will be reported to the Honor Board if you are given three warnings.

Please see the homework policy to review all policies for all homework submissions in CSCI220.

Documentation and formatting within your program:

The following comments should appear in your program as the first lines in the file. Items in angle brackets are either to be removed or replaced with what is specified within the brackets:

```
##
## Name: <your name goes here - first and last minimum>
## <ProgramName>.py
##
## Purpose: <Brief, one or two sentence description of the
##           problem that this program solves, in your own words.>
##
## Certification of Authenticity:
##   <include one of the following>
##   I certify that this lab is entirely my own work.
##   I certify that this lab is my own work, but I
##   discussed it with: <Name(s)>
##
## Input: <what will the inputs to the program be>
## Output: <what information will the program output/return>
```

All identifiers should be meaningful. Include your design (pseudocode) as comments in your program.