MECH 105: Homework 4

Problem 1

Write a function that creates an `nxm` matrix with elements that have the following values.

- The value of each element in the first row, is the number of the column
- The value of each element in the first column is the number of the row
- The remaining elements have a value equal to the sum of the element above it and the element to the left.

The input variables should include the integers `m` and `n`. If your user does not type in an integer for 'm' or 'n', it should throw an error.

This is a little contrived but the third input variable should be a string and should be optional. When the user specifies a value for the third variable, the function should open that file and write the matrix to it.

Extra Credit - 3 Points (all or nothing)

The following are forumlas for calculation the training heart rate THR for men and women.

Karvonen Formula:

$$THR_{men} = [(220 - AGE) - RHR] * INTEN + RHR$$

$$THR_{women} = [206 - 0.88 * AGE) - RHR] * INTEN + RHR$$

Where AGE is the person's age in years, RHR is their resting heart rate, and $INTEN$ is the fitness level (0.55 for low, 0.65 for medium, 0.8 for high fitness).

Write a program that determines the THR.

Program Specifications

- The program should ask the user to enter their gender, age (in years), resting heart rate (in beats per minute), and fitness level (1 for low, 2 for medium, and 3 for high).
- The program should warn the user when they have entered in an invalid value and ask them to enter a valid value to proceed.
- Once the user has input valid values, the program displays the training heart rate to the command window using an appropriately formatted `fprintf()` statement.