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Assignment 1

Due at the end of Lab (learn.bcit.ca)

COMP 8042
Hassan S. Shavarani

All work should be done individually.

1. (15 points) Complete the source file named `Rectangle.h` to provide the following:
   (a) A class called `Rectangle` that provides two public methods: `GetLength()` and `GetWidth()`, that return the length and width, respectively, of the rectangle.
   (b) Two comparison functions `AreaCompare()` and `PerimeterCompare()` that are used by the `findMax()` function.
   (c) Two functions `FindMaxByArea()` and `FindMaxByPerim()` that call the `findMax()` function to find the largest rectangle on the basis of area and perimeter, respectively.

   The `COMP8042A1Test.cpp` file contains code that uses `Rectangle.h` and tests the above. This will be used to test your code.

2. (6 points) Write the zero-parameter constructor and `resize` member function of the matrix class provided in `Matrix.h`. The `COMP8042A1Test.cpp` file contains code that uses `Matrix.h` and tests the above. This will be used to test your code.

3. (9 points) The *Josephus* problem is the following game: N people, numbered 1 to N, are sitting in a circle. Starting at person 1, a hot potato is passed. After M passes, the person holding the hot potato is eliminated, the circle closes ranks, and the game continues with the person who was sitting after the eliminated person picking up the hot potato. The last remaining person wins. Thus, if M = 0 and N = 5, players are eliminated in order, and player 5 wins. If M = 1 and N = 5, the order of elimination is 2, 4, 1, 5.

   Implement the `Josephus()` function in the `Josephus.h` file to solve the Josephus problem for general values of M and N. Try to make your program as efficient as possible. Make sure you dispose of cells. The `COMP8042A1Test.cpp` file contains code that uses `Josephus.h` and tests the above. This will be used to test your code.

Submit the completed `Rectangle.h`, `Matrix.h` and `Josephus.h` files in a single ZIP file called A00######.zip to D2L, where A00###### is your A00 number.