CSCI 270 Homework #4 (Programming)

Due Date: Wednesday, October 7th, 4pm

You will need to make two submissions for this assignment. This file outlines the programming part of the assignment. Both submissions are due at the same time.

A partial .cpp file is provided for you on Blackboard under Assignments. Download this and fill it out with your answer to the following question.

Ian wants to buy Ice Cream for the whole class, but he has a limited budget (specified by the parameter **budget**). The options for ice cream are specified by the parameter **ic**, which is an array of type **IceCream**. The size of the array is indicated by the parameter **n**. **IceCream** is a struct consisting of two integer member variables: **value** and **price**.

You must implement the function:

```
int buyIceCream(int budget, IceCream ic[], int n);
```

Ian needs to determine which types of Ice Cream to buy. Either he buys a type of Ice Cream or he doesn't (you don't have to determine how much of each type he buys). The function should use dynamic programming to efficiently return the maximum possible value of Ice Cream he can buy under the constraints of his budget.

You do not need to include any error-checking: you may assume that **ic** is of the appropriate size, and that both **budget** and **n** are ≥ 2.

The runtime of your algorithm should be $O(\mathbf{n} \cdot \mathbf{budget})$.

- Fill out the name and email fields in the .cpp file correctly.
- To differentiate submissions, please use your name to name your .cpp file: "<firstname><lastname>.cpp"
- Do not edit anything in the "DO NOT EDIT" areas, or you may lose a large number of points.
- Your file will be compiled with "g++ <file.cpp> -o file" using the MinGW (a GCC port for windows) compiler. If compilation fails on Ian's machine you will receive a 0, but you will be able to come to his office hours and demonstrate compilation with the same code to receive credit.
- Do not use any STL data structures or algorithms.
- While you can and should test your program, make sure to comment out your main function and/or test functions before submitting.
- You should submit your completed .cpp file through Blackboard.