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1/17/16
CS 161
Assignment 3 (design)

Understanding: The assignment is to create a program that determines from the user how many integers they would like to enter, then asks the user to enter that number of integers indicated, and then displays the largest and smallest of those numbers in the output.

The first step can be determined from a technique we have already used, `cout`, which we can then assign to a variable that we will have already defined. Using this variable, we then will request the user, using the same technique as above, to enter the same amount of integers that they previously stated they would like to enter.

By utilizing a new technique we learned in Chapter 5 this week, we will initialize a new (previously stated) variable begin a loop that will continue to accept integers entered by the user until the max number of integers they want to enter has been reached. After this loop exits, we can then utilize another technique we learned in Chapter 4 this week called the `if/then/else` technique.

We will then use the `if/then/else` to compare the user-inputted numbers and determine which is the minimum and which is the maximum number, using mathematical expressions that we learned this week.

Lastly, we will use `cout` again to display the minimum and maximum numbers that the user has entered, ending the assignment.

Testing: There are a number of tests that we can perform to verify that the program meets the given specifications:

| Description of Test: | Expected Results: |
|--|--|
| When the program asks to enter how many numbers I would like to enter, enter the number 5. This will be testing my formula for asking the user to input the number of integers they would like to enter as well as the loop that should exit after reaching that number. | The program will ask me to input 5 integers, and then I will enter 5 integers and the program will display results (not more or less). |
| When I enter 5 numbers as described (e.g. 1,2,3,4,5), I will test to see if the minimum and maximum number output is correct. This is testing the <code>if/then/else</code> section of the program as well as the mathematical expressions. | I would expect to see the program display that 1 is the minimum number and 5 is the maximum number. |

| | |
|---|--|
| I will enter negative numbers into the program to test whether the program operates as intended. Without properly defining the correct data type, the output will not be correct. I will test -2, 3, -5, 1, and -225 | The program will display -225 as the minimum number and 3 as the maximum number. |
| I will enter decimal (float) numbers into the program to see if it displays them properly. Without properly defining float numbers, the output will not be correct when a user inputs a decimal. I will test 1, 2, 0.5 and 3. | The program will properly display the minimum number is 0.5 (exactly) and the maximum as 3. |
| When entering numbers that I would like to enter, I will put a space instead of pressing enter between numbers. i.e. I will enter "1 2 3 4 5" instead of 1 [Enter] 2 [Enter] 3 [Enter] 4 [Enter] 5 [Enter] | Because of the way the program is designed to calculate the minimum and maximum of each new number, the program will break when numbers are entered in this fashion. |

Design: I am using pseudocode to design my program:

```

Get number of integers from user (set to numIntegers)
Set number to 1 to initialize loop control variable
While number <= numIntegers
    Input number
    Set number to maxnum
    Add 1 to the number
    If number > maxnum, set as maxnum
    Else set as minnum
Repeat until numIntegers has been reached, comparing each new integer to find the
minnum and the maxnum
Print the minimum integer (minnum) and maximum integer (maxnum)

```