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Project Plan: 3.a

Understanding

Description of assignment:
In this assignment, we are to write a program that displays the smallest and largest numbers in a specified set of integers inputted by the user. The first thing the program will do is it will ask the user how many integers they would like to enter. The assumption is being made that the user will enter a non-zero number. After this is entered, the program will prompt the user to enter that many integers. When data entry has terminated, the program will display the minimum value and maximum value entered on the screen.

Techniques to be used:
This assignment requires the usage of new techniques we learned this week: 1) relational operators, 2) looping and 3) *if/else if* statements.

1. **Relational operators** will be used in this program in order to specify the relationships between the different integer values. In this case, the values we must specify relationships for include the numbers inputted by the user as well as the smallest and largest numbers of the set of integers. In order to make the program determine the maximum and minimum values of the set, we must use the relational operators greater than and lesser than. 'If' statements must be set: if (min>a) then min=a; and if (max<a) then max=a. The truth-values of these statements will then determine which inputted integer is the smallest and which is the largest.

2. **Looping** is used to repeat a block of code; in this case, the code is repeated for each integer that the user inputs. In this program, we are allowing the user to control the loop by entering the maximum number of integers they want to input. *While* looping is the type of loop that will be used to write this program. The written expression while ( ) is tested for a true or false value for each integer to determine the max and min numbers in the set.

3. ***If/else if* statements** will be used to write this program. We use *if/else if* instead of two separate 'if' statements because the two conditions are mutually exclusive: one integer is the smallest and another is the largest (one must be true and the other false). The first 'if' statement determines whether or not an integer is the smallest, if false, the second 'if' statement determines whether or not it is the largest. This is repeated in a loop for all numbers inputted by the user until a maximum and minimum value in the set of integers are determined.

Testing Plan

Test Case	Input Values	Expected Outcomes
Input integers	34 -27 98 11 4 -2	Min: -27 Max: 98 Program correctly handles input values and can loop to handle multiple integers
Input only negative integers	-12 -1 -98 -34	Min: -98 Max: -1 Program would correctly display the min and max of the negative values
Input only one integer	5	Min: 5 Max: 5 Program will handle correctly and display the value as both minimum and maximum
Input same number for all integers	10 10 10 10 10	Min: 10 Max: 10 Program will display the same number as both the maximum and the minimum

Program Design: Pseudocode

```
Get number of integers from user
Set increment counter equal to 1
Prompt user to input number of integers
Set minimum and maximum to first input value
While (counter<numberIntegers)
        Input the next value
        If value is less than minimum then
                        Set minimum to value.
                Else if value is greater than maximum then
                                        Set maximum to value.
        Loop once for each integer
Print the minimum value
Print the maximum value
```