1 – Requirements

The goal of program 3.a is to find the highest and lowest number from a list of integers from the user. For the program to be successful, the following goals will need to be met by the program:

1. The user will need to be prompted to first enter the number of total integers that they want to enter.
2. The user will then need to enter their integers.
3. Once the user has entered their list of integers the program will then display the highest and lowest number from their list of numbers that were entered.

2 – Design

A - Techniques

Program 3.a will use both cin and cout to prompt the user for what they need to enter and gather their input from the command line. The program will also need to initialize a for loop which is a new item for this weeks module. The condition of the for loop will need to use the integer first entered by the user to determine when to stop taking input from the user.

B – Pseudocode

Initialize min and max.

Prompt user to input number of integers they will enter

Min equals first integer entered. Max equals first integer entered.

While the total amount of numbers entered is less than the total integers planned on being entered

Input next integer

If the integer entered is less than min

Set input as new min

Else if integer is greater than max

Set input as new max

Print min and max variable .

3 – Testing

The following tests are proposed to test the validity of the program and the final output displayed:

Test Cases	**Expected Output**

All positive integers – 1,2,3,4,5	Min: 1, Max: 5
All negative integers - -1,-2,-3,-4,-5	Min: -5, Max: -1
Mix of positive and negative numbers: -2,-1,1,2,3	Min: -2, Max: 3
Mix of positive and negative numbers including zero: -2,-1,0,1,2,3,4	Min: -2, Max: 4
List of integers with repeated numbers: 5,9,4,5,-1,-2,-1,3	Min: -2, Max: 9
Large Numbers (e.x. greater than 1000): 10000, 50000,-2000, 3456,-2584, 7000	Min:-2584, Max: 50000
Large List of Numbers (e.x. list of integers with more than 100 entries) : 1,2,3,4,5...120	Min: 1, Max: 120

Test cases were designed with the following items in mind to verify the output of the min and max output:

- Positive numbers
- Negative numbers
- List with zero included
- Mix of positive and negative integers
- Repeated numbers in the list of integers
- Large list of integers with more than 100 entries
- Large numbers with 4 digits or more

A list of random numbers generated from www.random.org was generated for testing purposes as well.