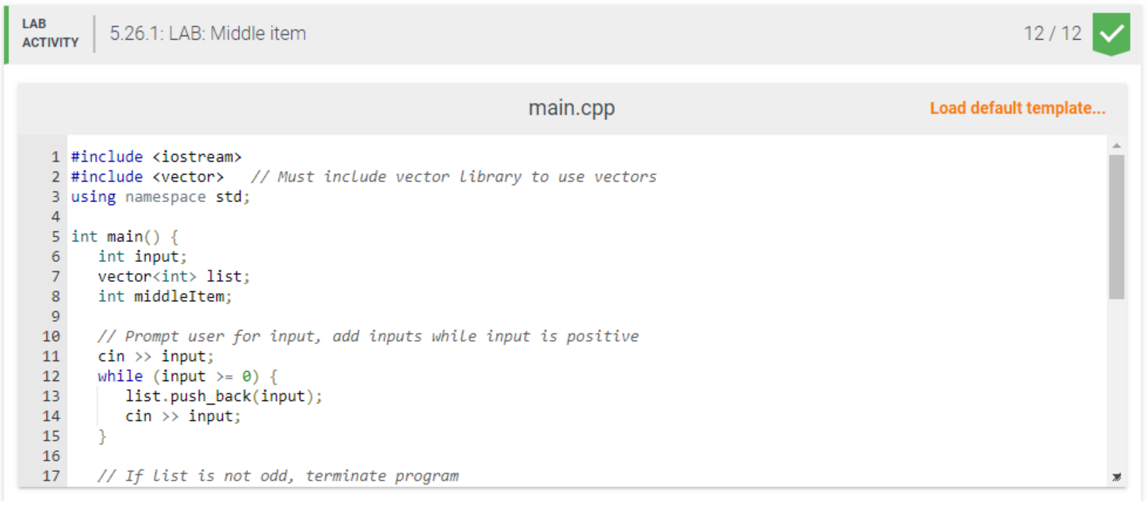
CSCI 140 PA #4 Submission

Due Date: 3/21/23

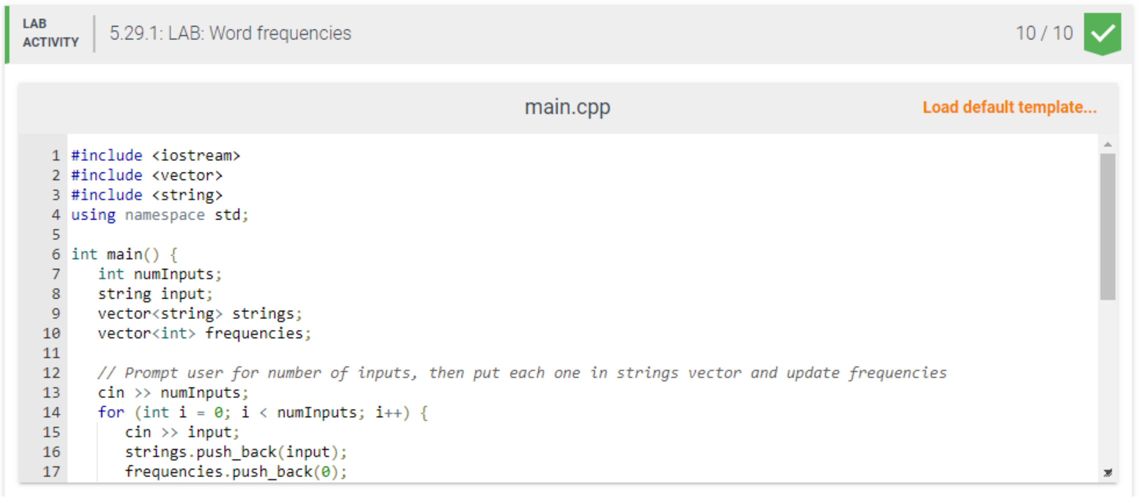
Name: Ali Mortada

Exercise 1 –**zyBook 5.26 LAB: Middle item**
-- check if completely done in zyBook __X__ ; otherwise, discuss issues below
Include a screenshot of current status/score



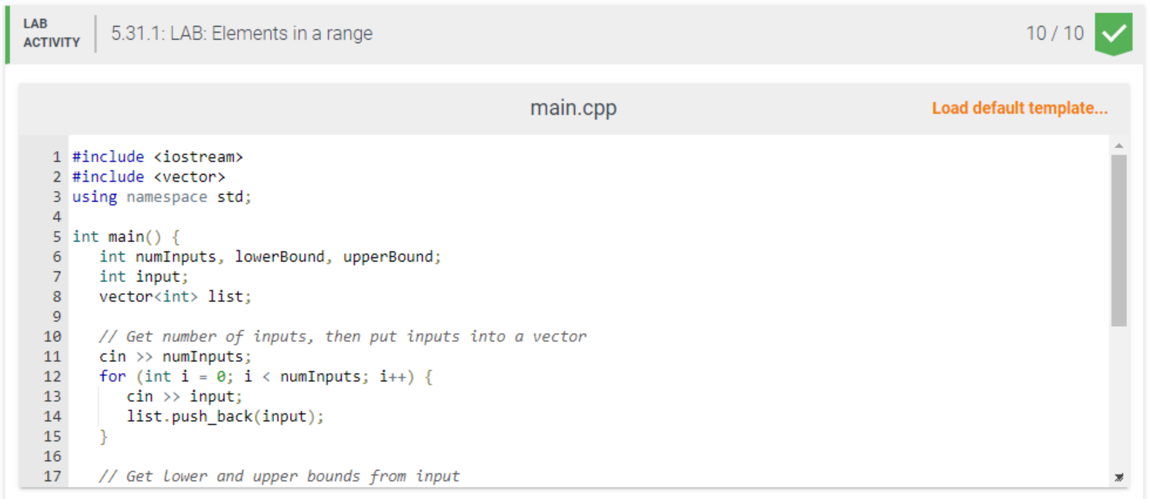
```
#include <iostream>
#include <vector>   // Must include vector library to use vectors
using namespace std;

int main() {
   int input;
   vector<int> list;
   int middleItem;

   // Prompt user for input, add inputs while input is positive
   cin >> input;
   while (input >= 0) {
      list.push_back(input);
      cin >> input;
   }

   // If list is not odd, terminate program
```

Exercise 2 –**zyBook 5.29 LAB: Word frequencies**
-- check if completely done in zyBook __X__ ; otherwise, discuss issues below
Include a screenshot of current status/score



```
#include <iostream>
#include <vector>
#include <string>
using namespace std;

int main() {
   int numInputs;
   string input;
   vector<string> strings;
   vector<int> frequencies;

   // Prompt user for number of inputs, then put each one in strings vector and update frequencies
   cin >> numInputs;
   for (int i = 0; i < numInputs; i++) {
      cin >> input;
      strings.push_back(input);
      frequencies.push_back(0);
```

Exercise 3 –**zyBook 5.31 LAB: Elements in a range**
-- check if completely done in zyBook __X__ ; otherwise, discuss issues below
Include a screenshot of current status/score

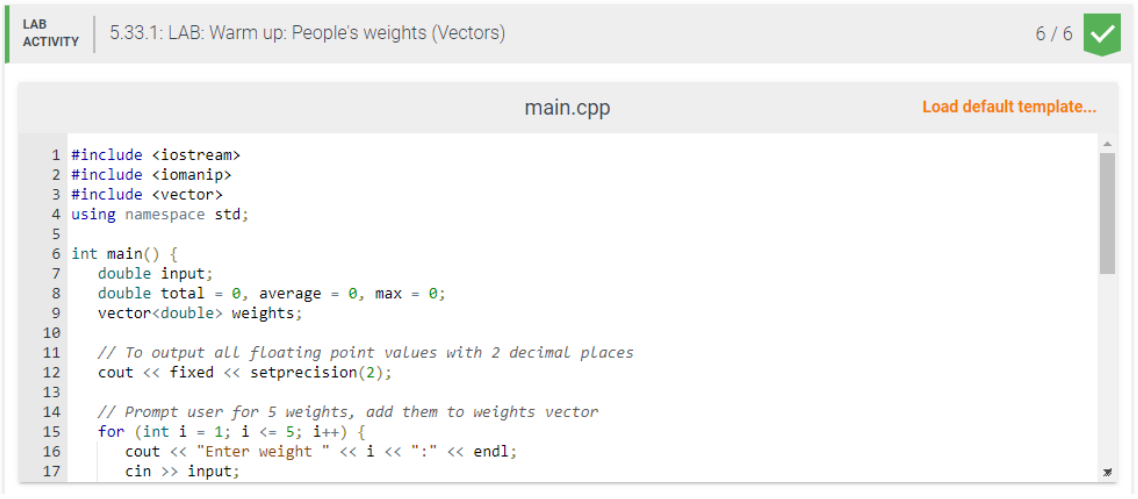


LAB ACTIVITY 5.31.1: LAB: Elements in a range 10 / 10

main.cpp Load default template...

```
#include <iostream>
#include <vector>
using namespace std;

int main() {
   int numInputs, lowerBound, upperBound;
   int input;
   vector<int> list;

   // Get number of inputs, then put inputs into a vector
   cin >> numInputs;
   for (int i = 0; i < numInputs; i++) {
      cin >> input;
      list.push_back(input);
   }

   // Get lower and upper bounds from input
```

Exercise 4 –**zyBook 5.33 LAB: Warm up: People's weights**
-- check if completely done in zyBook __X__ ; otherwise, discuss issues below
Include a screenshot of current status/score



LAB ACTIVITY 5.33.1: LAB: Warm up: People's weights (Vectors) 6 / 6

main.cpp Load default template...

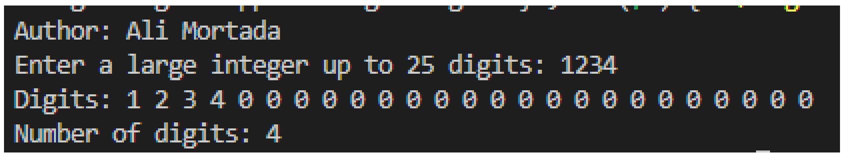
```
#include <iostream>
#include <iomanip>
#include <vector>
using namespace std;

int main() {
   double input;
   double total = 0, average = 0, max = 0;
   vector<double> weights;

   // To output all floating point values with 2 decimal places
   cout << fixed << setprecision(2);

   // Prompt user for 5 weights, add them to weights vector
   for (int i = 1; i <= 5; i++) {
      cout << "Enter weight " << i << ":" << endl;
      cin >> input;
```

Exercise 5 -- **Large Integers**
-- check if completely done __X__ ; otherwise, discuss issues below

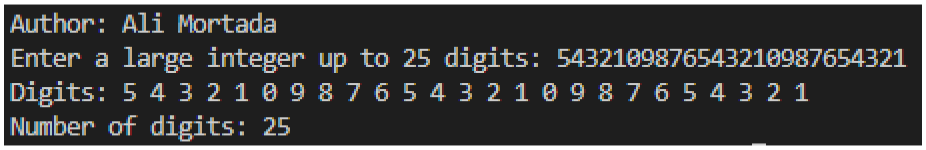
Source code below:

```
/*
    Program: Large Integers
    Author: Ali Mortada
    Class: CSCI 140
    Date: 3/21/23
    Description: Input an integer up to 25 digits long. Program stores
value as an integer in a vector.
    Program outputs digits of integer, filling up the unused digits with
zeroes. Program also outputs
    number of digits in the entered integer and terminates if an integer
greater than 25 digits long
    is entered.
    I certify that the code below is my own work.
    Exception(s): N/A
*/

#include <iostream>
#include <vector>
#include <string>
using namespace std;

int main() {
    const int MAX_DIGITS = 25;
    vector<int> a;
    string input;
    int numDigits;

    cout << "Author: Ali Mortada" << endl;

    // Prompt user to input large integer up to 25 digits
    cout << "Enter a large integer up to 25 digits: ";
    cin >> input;

    // If input is greater than 25 digits, terminate program
    if (input.size() > MAX_DIGITS) {
        cout << "Error: too many digits" << endl;
        return 0;
    }

    // Count number of digits
    for (int i = 0; i < input.size(); i++) {
        numDigits++;
    }

    // Fill in rest of input with zeroes
    for (int i = input.size(); i < MAX_DIGITS; i++) {
        input.push_back('0');
    }

    // Enter each digit as an element in vector a
    for (int i = 0; i < input.size(); i++) {
        a.push_back(input.at(i) - '0');
    }

    // Output digits to user
    cout << "Digits: ";
    for (int i = 0; i < a.size(); i++) {
        cout << a.at(i) << " ";
    }
    cout << endl;

    // Output number of digits to user
    cout << "Number of digits: " << numDigits << endl;

    return 0;
}
```

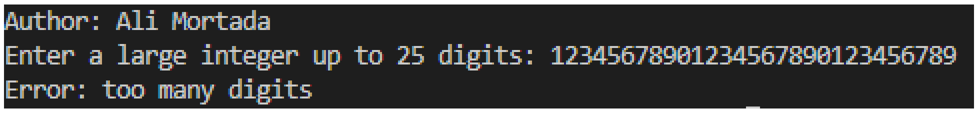
Input/output below:



```
Author: Ali Mortada
Enter a large integer up to 25 digits: 1234
Digits: 1 2 3 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Number of digits: 4
```



```
Author: Ali Mortada
Enter a large integer up to 25 digits: 5432109876543210987654321
Digits: 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1
Number of digits: 25
```



```
Author: Ali Mortada
Enter a large integer up to 25 digits: 123456789012345678901234567890
Error: too many digits
```

Answer for Question 1

One reason for learning how to use arrays is because they teach you how you can treat objects like strings as arrays of characters instead of just as a standalone string. Arrays also take up less memory than vectors, which is useful when writing a program that uses the least amount of memory possible. Arrays also cannot be resized, which may be useful in certain situations (like how constant variables cannot be changed but are very useful).

Answer for Question 2

Trying to copy one array to another simply by operator assignment won’t work, as it is a syntax error and would prevent the program from compiling. The solution would be to create a for loop that iterates through arrX and assigns each element of that array to the corresponding value in arrY.

Sample code:

```
for (int i = 0; i < arrX.size(); i++) {

        arrX.at(i) = arrY.at(i);

}
```

Extra Credit – provide if applicable.