

## Chapter 7 Homework – Single Dimensional Arrays

### Reading Assignment:

Read Chapter 7 in Introduction to Programming with C++, 3<sup>rd</sup> Edition by Liang

### Problem Assignment:

1. (10 points) Work Checkpoint Exercise 7.10 on p. 273. Write the directions and the given code, and then show the output of the program.
2. (42 points – 14 points per part) Write a C++ main program that calls each function listed below. Load values into each array using a list to test each function. Print out results to show original array contents and contents after using the functions. All printing should be done in the main programs – do not print from the functions. Turn in copies of the program and all results.

Output: The output should clearly show original array contents, new array contents (if modified), and the result. For example, the output for part B might look as follows:

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Contents of array A before swap: 1  2  3  4  5  6  7
Contents of array B before swap: 8  9 10 11 12 13 14
Contents of array A after swap: 8  9 10 11 12 13 14
Contents of array B after swap: 1  2  3  4  5  6  7

```

- A) Include a function to find the length of a vector stored in an array where the length of an N-dimensional vector L is: 
$$\text{Length} = \sqrt{(L_0)^2 + (L_1)^2 + (L_2)^2 + \dots + (L_{N-1})^2}$$

**Form of function call: Result = Length(A, Size)**
- B) Include a function to swap the contents of two equal size arrays named A and B.
 

**Form of function call: Swap(A, B, Size)**
- C) Include a function to reverse the contents of an array. For example, an array that originally contained the elements 1,2,3,4 would contain 4,3,2,1 after the function call.
 

**Form of function call: Reverse(A, Size)**
3. (15 pts) Work Programming Exercise 7.9 on p. 299 in the text (finding the smallest element in an array). Also prompt the user to enter the number of values to be entered. Test the program for the example in the text. Also test it for an example using 20 numbers (some positive, some negative, and some zero).
4. (15 pts) Write a C++ program that defines three 1D arrays with 19 elements in each array. The arrays will be used to store temperatures in degrees F, degrees C, and Kelvin. Use a loop to initialize the array with degrees F values to 32, 42, 52, ..., 212. The program should then calculate the corresponding array values for degrees C and Kelvin. Display the results neatly in a table with three columns (one for degrees F, one for degrees C, and one for Kelvin) and include table headings with units.

5. (18 points) Determine the output for each part below by hand (do not compile the programs).

<pre>// Array Homework: Problem 5A #include &lt;iostream&gt; using namespace std; int main(void) {   int const ArraySize=10;     int Sum = 0, A[ArraySize] = {5, 10, 15, 20, 25, 30};     double Avg;     for (int j = 0; j &lt; ArraySize; j++) Sum += A[j];         Avg = Sum/ArraySize;     cout &lt;&lt; "Avg = " &lt;&lt; Avg &lt;&lt; endl;     system("pause");     return 0; }</pre>	<p>Avg = _____</p>
<pre>// Array Homework: Problem 5B #include &lt;iostream&gt; using namespace std; int main(void) {   int const ArraySize=10;     int Sum = 0, A[ArraySize];     double Avg;     for (int j = 0; j &lt; ArraySize; j++) A[j] = 3*j;     for (int k = 0; k &lt; ArraySize; k += 2) Sum += A[k];     cout &lt;&lt; "Sum = " &lt;&lt; Sum &lt;&lt; endl;     system("pause");     return 0; }</pre>	<p>Sum = _____</p>
<pre>// Array Homework: Problem 5C #include &lt;iostream&gt; using namespace std; int main(void) {   int const ArraySize=10;     int Sum = 0, A[ArraySize];     double Avg;     for (int j = 0; j &lt; ArraySize; j++) A[j] = j-j*j;     for (int k = 0; k &lt; ArraySize/2; k++) Sum += A[k];     cout &lt;&lt; "Sum = " &lt;&lt; Sum &lt;&lt; endl;     system("pause");     return 0; }</pre>	<p>Sum = _____</p>

<pre>// Array Homework: Problem 5D #include &lt;iostream&gt; using namespace std; int main(void) {   int const ArraySize=10;     int Sum = 0, A[ArraySize] = {2,4,6,8,10,12,14,16,18,20};     int B[ArraySize] = {11,10,9,8,7,6,5,4,3,2},C[ArraySize];     double Avg;     for (int j = 0; j &lt; ArraySize; j++) C[j] = A[j]+B[j];     for (int k = 0; k &lt; ArraySize; k++) Sum += C[k];     cout &lt;&lt; "Sum = " &lt;&lt; Sum &lt;&lt; endl;     system("pause");     return 0; }</pre>	Sum = _____
<pre>// Array Homework: Problem 5E #include &lt;iostream&gt; using namespace std; int main(void) {   int const ArraySize=10;     int Sum = 0, A[ArraySize], B[ArraySize], C[ArraySize];     double Avg;     for (int j = 0; j &lt; ArraySize; j++)     {   A[j] = j+8;         B[j] = 2*j;   }     for (int k = 0; k &lt; ArraySize; k++)     {   if (A[k]&lt;B[k]) C[k]=A[k];         else C[k] = B[k];         Sum += C[k];   }     cout &lt;&lt; "Sum = " &lt;&lt; Sum &lt;&lt; endl;     system("pause");     return 0; }</pre>	Sum = _____
<pre>// Array Homework: Problem 5F #include &lt;iostream&gt; using namespace std; int main(void) {   int const ArraySize=10;     int Sum = 0, A[ArraySize], B[ArraySize], C[ArraySize];     double Avg;     for (int j = 0; j &lt; ArraySize; j++)     {   A[j] = 2*j;         B[j] = 2*ArraySize - j;   }     for (int k = 0; k &lt; ArraySize; k++)     {   if (A[k]&gt;B[k]) C[k]=0;         else C[k] = 1;         Sum += C[k];   }     cout &lt;&lt; "Sum = " &lt;&lt; Sum &lt;&lt; endl;     system("pause");     return 0; }</pre>	Sum = _____