

The American University in Cairo
Computer Science & Engineering Department
CSCE 1001 – Fundamentals of Computer Science

Lab Session 10

Programming of Arrays

Objectives:

- To learn how to declare and use arrays for storing collections of values of the same type.
- To understand how to use a subscript to reference the individual values in an array.
- To learn how to process the elements of an array in sequential order using loops.
- To learn a method for sorting an array

Problems:

1. Write a C++ program that takes a decimal integer number and displays its equivalent value in binary format.
2. Write a C++ program that takes an positive integer value for n (not more than 55) and computes the sum of the following series:

$$1 + 1 + 2 + 3 + 5 + 8 + 13 + 21 + \dots + n$$

3. Write a C++ program to enter 24 readings of temperature (each reading is between -5 and 45), compute and print out the average temperature, maximum temperature, minimum temperature, and the number of temperature readings that are below the computed average. Enforce the necessary validation on the user input. Use proper format for the output.
4. Write a C++ program that reads Id, first name, last name, GPA of each of n students in a course. The program should print the list of students in an ascending order according to the first name.
5. Show the output of each of the following C++ program segments:

<pre>int j; int one[5], two[10]; for (j = 0; j < 5; j++) one[j] = 5*j + 3; cout << "One cntains: "; for (j = 0; j < 5; j++) cout << setw(3) << one[j]; cout << endl; for (j = 0; j < 5; j++) { two[j] = 2*one[j] - 1; two[j + 5] = one[4 - j] - 1 + two [j]; } cout << "Two cntains: "; for (j = 0; j < 10; j++) cout << setw(3) << two[j]; cout << endl;</pre>	<pre>const int n = 6; int L[n] = {3, 5, 5, 4, 9, 9}; bool valu = true; int k = 0; while ((k < n-1) && (valu)) { if (L[k] > L[k+1]) { valu = false; cout << setw(2) << k << setw(2) << L[k] << endl; } else k++; } if (valu) cout << " The list is OK" << endl;</pre>
--	--

<pre>Int A[10], n = 248, num, c = 0; const int ten = 10; num = n; do { A[c] = num % ten; num = num / ten; c++; } while (num != 0); cout << "The " << setw(6) << n << " is now "; for (k = c-1; k >= 0; k--) cout << A[k]; cout << endl << "Done!!" << endl;</pre>	<pre>int F[6] = {1, 1}; cout << setw(3) << 0 << setw(3) << F[0] << endl; cout << setw(3) << 1 << setw(3) << F[1] << endl; for (int k = 2; k < 6; k++) { F[k] = F[k-1] + F[k-2]; cout << setw(3) << k << setw(3) << F[k] << endl; }</pre>
---	--

6. Show the content of array A after executing the following C++ program segment:

	initial		final	
	A		A	
<pre> int A[8] = {75,70,70,85,55,80,80,65} int T; n = 6; bool flag; do { flag = false; for (int j = 0; j < n; j++) if (A[j] > A[j+1]) { T = A[j]; A[j] = A[j+1]; A[j+1] = T; flag = true; } } while (flag); </pre>	A[0]	75		
	A[1]	70		
	A[2]	70		
	A[3]	85		
	A[4]	55		
	A[5]	80		
	A[6]	80		
	A[7]	65		