Assignment 05
50 points
Due 03/30/2020 (11:45 A.M.)

Assignment Objectives
- Learn about arrays
- Explore how to declare and manipulate data into arrays
- Learn about ''array index out of bounds''
- Become familiar with the restrictions on array processing
- Discover how to pass an array as a parameter to a function
- Learn how to sort an array
- Learn about ''array index out of bounds''
- Become familiar with the restrictions on array processing
- Learn about C-strings
- Examine the use of string functions to process C-strings
- Discover how to input data into—and output data from—a C-string
- Discover how to pass an array as a parameter to a function

Answer questions 1 to 8 on a word file; write a program for Q.9.

All assignments must be submitted by the Canvas. **No email or hard copy** is accepted. You must follow the following format:

a. For non-programming questions, use a word file to type your answers. Don't use the text box on the Canvas to answer the questions or to write comments, we will not read it.
b. State your answer clearly.
c. For programming questions, include only the source file for each problem.
d. Submit your file to the Canvas. You must submit your assignment on time; otherwise, you will receive zero. In addition, you cannot submit your file more than one time.
e. There will be several folders on the Canvas. You need to upload your file(s) using the correct folder on the Canvas.
f. Name each file: "Assignment Number(Question number(s))".
g. To upload your file(s):
   - In Course Navigation, click the Assignments link.
   - Click the title of the assignment.
   - Click the **Submit** Assignment button.
   - Add **File**. ...
   - Add Another **File**. ...
   - **Submit** Assignment. ...
   - View **Submission**.

It is your responsibility to make sure that each file is uploaded correctly. If you uploaded a wrong file, you receive zero; files will not be accepted after due date even if you have a prove that the file is created before the due date.

Make sure you review the Cheating & Plagiarism policy on Canvas.

1. (3 points)

Consider the following declaration:

```
int accountNum[75];
```

In this declaration, identify the following:

a. The array name.
b. The array size.
c. The data type of each array component.
d. The range of values for the index of the array.
e. The index of the first element.
f. The index of the last element.

2. (3 points)

Determine whether the following array declarations are valid. If a declaration is invalid, explain why.

a. `string customers[];`

b. `int numArray[50];`

c. `const int SIZE = 30;`
   `double list[20 - SIZE];`

d. `int length = 50;`
   `double list[length - 50];`

e. `int ids[-30];`

f. `colors [30] string;`

3. (10 points)

Write C++ statement(s) to do the following:

a. Declare an array `alpha` of 50 components of type `int`.
b. Initialize each component of `alpha` to -1.
c. Output the value of the first component of the array `alpha`.
d. Set the value of the twenty-fifth component of the array `alpha` to 62.
e. Set the value of the tenth component of `alpha` to three times the value of the fiftieth component of `alpha` plus 10.
f. Use a `for` loop to output the value of a component of `alpha` if its index is a multiple of 2 or 3.
g. Output the value of the last component of `alpha`.
h. Output the value of the `alpha` so that 15 components per line are printed.
i. Use a `for` loop to increment every other element (the even indexed elements).
j. Use a `for` loop to create a new array, `diffAlpha`, whose elements are the differences between consecutive elements in `alpha`.

4. (6 points)

Determine whether the following array declarations are valid. If a declaration is valid, determine the size of the array.

a. `int list[] = {18, 13, 14, 16};`

b. `int x[10] = {1, 7, 5, 3, 2, 8};`

c. `double y[4] = {2.0, 5.0, 8.0, 11.0, 14.0};`

d. `double lengths[] = {8.2, 3.9, 6.4, 5.7, 7.3};`

e. `int list[7] = {12, 13, , 14, 16, , 8};`

f. `string names[8] = {"John","Lisa", "Chris", "Katie"};`

5. (4 points)

Suppose that you have the following function definition:

```
void sum(int x, int y, int& z)
{
    z = x + y;
}
```

Consider the following declarations:

```
int list1[10], list2[10], list3[10];
int a, b, c;
```

Which of the following function calls is valid?

a. `sum(a, b, c);`

b. `sum(list1[0], list2[0], a);`

c. `sum(list1, list2, c);`

d. ```
for (int i = 1; i <= 10; i++)
    sum(list1[i], list2[i], list3[i]);
```

## 6. (4 points)

Sort the following list using the selection sort algorithm as discussed in this chapter. Show the list after each iteration of the outer **for** loop.

```
6, 45, 10, 25, 58, 2, 50, 30, 86
```

7. (4 points)

Given the declaration:
```
char name[8] = "Shelly";
```

Mark the following statements as "Yes" if they output Shelly. Otherwise, mark the statement as "No" and explain why it does not output Shelly.

a. `cout << name;`

b. ```
for (int j = 0; j < 6; j++)
    cout << name[j];
```

c. ```
int j = 0;
while (name[j] != '\0')
    cout << name[j++];
```

d. ```
int j = 0;
while (j < 8)
    cout << name[j++];
```

8. (7 points)

Given the declaration:

```cpp
char string15[16];
```

Mark the following statements as valid or invalid. If a statement is invalid, explain why.

a. `strcpy(string15, "Hello there");`

b. `strlen(string15);`

c. `string15 = "Jacksonville";`

d. `cin >> string15;`

e. `cout << string15;`

f. `if (string15 >= "Nice day")`
   `cout << string15;`

g. `string15[6] = 't';`

Programming Question

9. (9 points)

Write a program that allows the user to enter the last names of five candidates in a local election and the number of votes received by each candidate. The program should then output each candidate's name, the number of votes received, and the percentage of the total votes received by the candidate. Your program should also output the winner of the election. A sample output is:

```
Candidate          Votes Received          % of Total Votes

Johnson                 5000                    25.91
Miller                  4000                    20.73
Duffy                   6000                    31.09
Robinson                2500                    12.95
Ashtony                 1800                     9.33
Total                  19300

The Winner of the Election is Duffy.
```