SOF103 C and C++ Programming
Lab Exercise 5
Arrays [week 5]

Part A: Review Questions

Instruction: Answer the following review questions.

1. Write C++ statements to accomplish each of the following:

   (a) Display the value of the seventh element of character array **`c`**.

   (b) Input a value into element 4 of single-subscripted integer array **`b`**.

   (c) Initialize each of the 5 elements of single-subscripted integer array **`g`** to **`8`**.

   (d) Print the value stored in the 3rd row and 2nd column entry of a 2-dimensional double array **`table`**.

   (e) Print all the characters stored in the character array declared as

   ```
   char message[] = "Welcome";
   ```

2. Write a single statement that perform the following single-subscripted array operations:

   (a) Initialize the 10 elements of integer array **`counts`** to zero.

   (b) Add 1 to each of the 15 elements of integer array **`bonus`**.

   (c) Read 7 values for float array **`DaySales`** from the keyboard.

   (d) Print the 5 values of integer array **`bestScores`** in column format.

Part B: Programming Practice

1. One interesting application of computers is drawing graphs and bar charts (sometimes called "histograms"). Write a program that reads five numbers (each between 1 and 10). For each number read, your program should store the number in an integer array. Next, for every number in the array elements, print a line containing that number of adjacent asterisks. For example, if your program reads: **2 3 5 8 4**, it should print:

Element	Value	Histogram
0	2	**
1	3	***
2	5	*****
3	8	********
4	4	****

2. Write a program to ask the user for an integer value. The program then searches the element value of a 10-integer array **`data`** to locate the element with the same value entered by the user. If the element is found, the program outputs the element index where the value is found in the array. If there is no such element value, tell the user that the value entered is not found. For example, if the array **`data`** contains {23, 89, 1, 92, 67, 99, 12, 7, 19, 8}, then, the output is

```
Enter integer: 12
Integer value found in index element  6
```

Otherwise

```
Enter integer: 55
Integer not found
```

3. Ten students were asked to rate the quality of the food in the student cafeteria on a scale of 1 to 3 (1 means poor, 2 means average, 3 means good). Write a program to read the responses of the 10 students into an array and summarize the frequency of the rating. An example is shown below.

```
Enter the 10 responses: 1 3 2 3 2 1 3 2 1 2
Rating          Frequency
    1           3
    2           4
    3           3
```

4. Declare a 6-by-6 integer array, initialize the array as the sum of its row index and column index and then print out the results. For example,

0	1	2	3	4	5
1	2	3	4	5	6
2	3	4	5	6	7
3	4	5	6	7	8
4	5	6	7	8	9
5	6	7	8	9	10

5. Table 1 is the summary of examination marks for three students. The students are labelled as student[0], student[1] and student[2]. The subjects are labelled as subject[0], subject[1], subject[2] and subject[3]. Use a two-dimensional array to store the students' marks in the table format. Then, find the lowest mark, the highest mark and the average mark for student0, student1 and student2.

	subject[0]	subject[1]	subject[2]	subject[3]
student[0]	78	60	79	88
student[1]	85	80	77	91
student[2]	89	78	81	75

Table 1: Student marks and subjects

An example of the program output is:

	subject[0]	subject[1]	subject[2]	subject[3]
student[0]	78	60	79	88
student[1]	85	80	77	91
student[2]	89	78	81	75

Lowest mark: 60
Highest mark: 91
The average mark for student 0 is 76.25
The average mark for student 1 is 83.25
The average mark for student 2 is 80.75

6. A company has three salespeople (labelled 1 to 3) who sell two different products (labelled 1 and 2). Write a program to enter the sales according to products by each salesperson. Then, summarize the total sales by printing a table that includes the total sales to the right and to the bottom of the table. As an example,

```
Enter sales by salesperson 1 (product1 product2): 120 135
Enter sales by salesperson 2 (product1 product2): 230 100
Enter sales by salesperson 3 (product1 product2): 250 150

                Product 1  Product 2      Total
Salesperson 1     $120.00    $135.00    $255.00
Salesperson 2     $230.00    $100.00    $330.00
Salesperson 3     $250.00    $150.00    $400.00
Total             $600.00    $385.00    $985.00
```