

## **ASSIGNMENT 2**

### **TOPIC: INPUT OUTPUT & ARRAY**

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SECTION: 02

#### **QUESTION 1**

**[30 MARKS]**

- a) Write a program which takes input from user of two (2) arrays of 5 integers each, named array1 and array2. Meanwhile, array3 is an array with ten (10) integer numbers. The program should put into array3 the appending elements of array2 to array1, which is the first five (5) integers of array3 come from array1, the latter five (5) integers come from array2. Then, the program should display the contents of array3, the average of ten numbers, the range of values and the number of odd numbers in array3. The range of values in array is the difference between the largest and smallest values. Figure 1 illustrates an example run of the program. Note: The bold texts in the example run indicate input from the user.

```
Enter table array1:
Please enter an integer: 3
Please enter an integer: 6
Please enter an integer: 9
Please enter an integer: 12
Please enter an integer: 15

Enter table array2:
Please enter an integer: 2
Please enter an integer: 4
Please enter an integer: 16
Please enter an integer: 64
Please enter an integer: 36

OUTPUT:
Table array3:
3 6 9 12 15 2 4 16 64 36

The average of ten numbers in array3 = 16.7
The range of values in array3 = 62
The number of odd numbers in array3 = 3
```

**Figure 1:** Example Run

- b) You must ensure that your program meets the following criteria:

- The program is able to run and display correct output
- Using an appropriate structure for the program (e.g. all required header files are included and the function main is properly written).
- Using array concept in the program

```

1  //NAME 1: KAVIVARTHAN A/L MANNIVANAN  MATRIC NO: A24CS0093
2  //NAME 2 : KALAITHARAN A/L PALANYVELU MATRIC NO: A24CS0091
3
4  #include <iostream>
5  using namespace std;
6
7  int main() {
8      const int SIZE = 5; // Size of array1 and array2
9      int array1[SIZE], array2[SIZE], array3[SIZE * 2];
10     int sum = 0, odd_count = 0, max_val, min_val;
11
12     // Input array1
13     cout << "Enter table array1:" << endl;
14     for (int i = 0; i < SIZE; i++) {
15         cout << "Please enter an integer: ";
16         cin >> array1[i];
17     }
18     cout << endl;
19
20     // Input array2
21     cout << "Enter table array2:" << endl;
22     for (int i = 0; i < SIZE; i++) {
23         cout << "Please enter an integer: ";
24         cin >> array2[i];
25     }
26     cout << endl;
27
28     // Combine array1 and array2 into array3
29     for (int i = 0; i < SIZE; i++) {
30         array3[i] = array1[i];
31         array3[SIZE + i] = array2[i];
32     }
33
34     // Display array3
35     cout << "OUTPUT: " << endl;
36     cout << "Table array3: " << endl;
37     for (int i = 0; i < SIZE * 2; i++) {
38         cout << array3[i] << " ";
39     }
40     cout << endl;
41
42     // Calculate sum, find max, min, and count odd numbers
43     max_val = min_val = array3[0];
44     for (int i = 0; i < SIZE * 2; i++) {
45         sum += array3[i]; // Sum for average
46         if (array3[i] > max_val){
47             max_val = array3[i]; // Update max value
48         }
49         if (array3[i] < min_val){
50             min_val = array3[i]; // Update min value
51         }
52         if (array3[i] % 2 != 0) {
53             odd_count++; // Count odd numbers
54         }
55     }
56
57     // Calculate average
58     double average = static_cast<double>(sum) / (SIZE * 2);
59
60     // Calculate range
61     int range = max_val - min_val;
62
63     // Display results
64     cout << endl;
65     cout << "The average of ten numbers in array3 = " << average << endl;
66     cout << "The range of values in array3 = " << range << endl;
67     cout << "The number of odd numbers in array3 = " << odd_count << endl;
68
69     return 0;
70 }

```

```
Enter table array1:  
Please enter an integer: 3  
Please enter an integer: 6  
Please enter an integer: 9  
Please enter an integer: 12  
Please enter an integer: 15
```

```
Enter table array2:  
Please enter an integer: 2  
Please enter an integer: 4  
Please enter an integer: 16  
Please enter an integer: 64  
Please enter an integer: 36
```

OUTPUT:

```
Table array3:  
3 6 9 12 15 2 4 16 64 36
```

The average of ten numbers in array3 = 16.7

The range of values in array3 = 62

The number of odd numbers in array3 = 3

## QUESTION 2

[30 MARKS]

- a) Declare parallel arrays in the **main** function to store the following types of information:
- Item No.
  - Price.
  - Discount (%).
- b) Write a function to read the input named "**Input**".
- Non returning function
  - Receives parallel arrays defined in question 2 (a)
  - The function should assign the required values to each element of the parallel arrays by reading the data from the text file named "**input.txt**". The file includes the Item No. , Price, and Discount. **Figure 2** is the content of the "**input.txt**" file.
  - Program only continues reading the file if it is successfully opened; otherwise, print the error message and exit the program.

```
101 233 20
102 234 15
103 67 10
104 93 10
105 34 50
106 93 11
107 72 12
108 56 18
109 82 19
110 109 20
```

**Figure 2:** Input.txt

- c) Write a function to calculate price after discount "**Output**".
- It takes as input parameters the parallel arrays defined in question 2 (a)
  - Calculate the price after discount for each item.
  - The function should display Item No, Price, Discount (%), Price after discount
  - **Figure 3** shows the output that will be displayed on the screen based on the data given in the input file (see **Figure 2**).

Number of items on sale			
-----			
Item No	Price	Discount (%)	Price after discount
101	233	20	186.4
102	234	15	198.8
103	67	10	60.3
104	93	10	83.7
105	34	50	17
106	93	11	82.77
107	72	12	63.36
108	56	18	45.92
109	82	19	66.42
110	109	20	87.2

**Figure 3:** Output of the program

- d) Write a main function to perform following task:
- Declare the parallel array defined in question 2 (a)
  - Call the function "**Input**" and "**Output**" in order to produce the output.
  - Use stream manipulator to output the value in Item No, Price and Discount in **10 column**, value Price after discount in **15 column** and set the output in **right justified**.
- e) You must ensure that your program meets the following criteria:
- The program is able to run and display correct output
  - All required header files are included.
  - Applies function prototypes for functions described.

```
1  #include <iostream>
2  #include <fstream>
3  #include <iomanip>
4  #include <string>
5  #include <cstdlib>
6  using namespace std;
7
8  // Function Prototypes
9  void Input(int itemNo[], int price[], int discount[], int size);
10 void Output(int itemNo[], int price[], int discount[], int size);
11
12 int main() {
13     const int size = 10; // Number of items
14     int itemNo[size];
15     int price[size], discount[size];
16
17     // Call Input function to populate data
18     Input(itemNo, price, discount, size);
19
20     // Call Output function to display results
21     Output(itemNo, price, discount, size);
22
23     return 0;
24 }
25
26 // Function to read data from input.txt
27 void Input(int itemNo[], int price[], int discount[], int size) {
28     ifstream inputFile("input.txt");
29     if (!inputFile) {
30         cerr << "Error: Unable to open file 'input.txt'. Exiting program." << endl;
31         exit(1);
32     }
33
34     for (int i = 0; i < size; i++) {
35         inputFile >> itemNo[i] >> price[i] >> discount[i];
36     }
37
38     inputFile.close();
39 }
40
41 // Function to calculate and display the output
42 void Output(int itemNo[], int price[], int discount[], int size) {
43     cout << "Number of items on sale" << endl;
44     cout << "-----" << endl;
45     cout << setw(10) << right << "Item No"
46         << setw(10) << "Price"
47         << setw(15) << "Discount(%)"
48         << setw(20) << "Price after discount" << endl;
49
50     for (int i = 0; i < size; i++) {
51         float discountedPrice = price[i] - (price[i] * discount[i] / 100.0);
52         cout << setw(10) << right << itemNo[i]
53             << setw(10) << price[i]
54             << setw(15) << discount[i]
55             << setw(20) << fixed << setprecision(2) << discountedPrice << endl;
56     }
57 }
58
```