University of Sri Jayewardenepura, Sri Lanka

Bachelor of Information and Communication Technology Semester 1
ITC 1063 – Fundamentals of Programming
Laboratory Exercise 9

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1. Write a C program to store examination marks of one subject for 10 students in an array. The marks should be taken from the user with the *scanf* function.

   Write a **separate function** to **calculate the average of the marks**.

   First, the array values should be displayed. Finally, the calculated average should be displayed.

   Example:

   ```
   Enter marks of student 1: 69
   Enter marks of student 2: 78
   ……
   Student Marks: 69,78,……

   The average of the student marks is = 62.23
   ```

2. Write a program in C to find an array's maximum and minimum elements.

   - Create an integer array (array length is 50) using **randomly generated values between 0 and 1000**.
   - Print the values of the array.
   - Find the maximum and minimum values of the array and display them.

   See the following sample output.

   ```
   Array Elements:

   107,658,961,472,880,……,12, 794,196,62

     Maximum Value: 961
     Minimum Value: 12
   ```

3. Write a C program to assist a shop cashier counter in generating the invoice for the items that the customer bought.

   a) First, the program should get the user inputs, **amount,** and **unit price** for each item (You can use a fixed number of items, for instance, 5). **Store** these values in **two arrays**.

   b) Then **calculate the amount for each item** and store it in a **different array**.

      (item amount = number of items * unit price)

   c) Calculate the **total amount** by adding amounts of all items.

   d) **Display the invoice**.

   Example:

```
Enter unit price: 40
Enter the number of Items: 10
Enter unit price: 129
Enter the number of Items : 3
……
……

Unit Price              Number Of Items
     Amount
----------          ---------------              -----
40.00                    10                      400.00
129.00              3                       387.00
……                  ……                      ……

Total     1452.00
```

4. Create a C program to get student **index numbers** and **student marks** for a subject. Then **depending on the marks**, decide **whether** the **student has passed or failed** (you can decide the pass mark, for example, 35).

   Print the list of passed students and **failed students** separately.

   All these data **should** be stored in **arrays**. Test the program for 5 students.

Example:

```
Enter index: 1
Enter marks: 78
Enter index: 2
Enter marks: 57
Enter index: 3
Enter marks: 32
Enter index: 4
Enter marks: 25
Enter index: 5
Enter marks: 90

Students who passed the examination:
1,2,5
Students who Failed the examination:
3,4
```

Note:

To generate random numbers, **rand()** and **srand()** functions can be used.

The **srand()** function is used to **set the starting value for the series of random integers**.

```
srand(time(0));
```

The **rand()** function **generates random numbers** that can be any integer value. To generate random numbers **within a specific range**, a formula **returns a random number between given ranges**.

```
number = (rand() % (upper - lower + 1)) + lower
```

A sample program is given below.

```
#include <stdio.h>
#include <time.h>
int main()
{
    int lower = 1, upper = 6, count = 10;
    srand(time(0));
    int randomNumber = (rand() % (upper - lower + 1)) + lower;
    return 0;
}
```

How to Submit:

Create a zipped file with all the source files (.c files). Rename the zipped file with your index number and the lab exercise number as follows.

```
ict23801_lab9.zip
```

Follow the naming conventions as it is. All letters **are lowercase**; use the underscore (_) between the index and lab exercise numbers.