School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering

CS-114 - Fundamentals of Programming

Lab Report # 08

Course Instructor: Dr Jawad Khan

Lab Instructor: Mr. Muhammad Affan, Mr. Saqib

Student Name: Ayesha Khan
CMS ID: 478212

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Arrays

Objectives:

- To get an introduction of arrays
- Array Initialization
- Accessing array elements

Lab Tasks:

Task 1:

Write a C++ program to calculate average of numbers of array.

Code:

```cpp
#include <iostream>
using namespace std;

int main()
{
    int n;
    double sum = 0, avg;
    cout<<"Enter the no of elements of the array: ";
    cin>>n;
    int a[n];
    cout<<"Enter the "<<n<<" elements of the array: ";
    for(int i=0; i<n; i++)
    {
        cin>>a[i];
        sum+= a[i];
    }

    avg = sum/n;
    cout<<"The average of the numbers of given array is: "<<sum<<"/"<<n<<" = "<<avg<<endl;
    return 0;
}
```

Output:

```
Enter the no of elements of the array: 6
Enter the 6 elements of the array: 1 2 3 4 5 6
The average of the numbers of given array is: 21/6 = 3.5

--------------------------------
Process exited after 13.22 seconds with return value 0
Press any key to continue . . .
```

Task 2:

Implement Bubble sort on an array of 5 integers.

Code:

```cpp
#include <iostream>
using namespace std;

int main()
{
    const int size = 4;
    int arr[size];

    cout << "Enter 5 integers for the array: ";
    for (int i = 0; i <= size; ++i)
    {
        cin >> arr[i];
    }
    for (int i = 0; i < size ; ++i)
    {
        for (int j = 0; j < size - i ; ++j)
        {
            if (arr[j] > arr[j + 1])
            {
                int temp = arr[j];
                arr[j] = arr[j + 1];
                arr[j + 1] = temp;
            }
        }
    }
    cout << "Sorted array: ";
    for (int i = 0; i <=size; ++i)
    {
        cout << arr[i] << " ";
    }
    return 0;
}
```

Output:

```
Enter 5 integers for the array: 2 3 77 23 1
Sorted array: 1 2 3 23 77
--------------------------------
Process exited after 14.56 seconds with return value 0
Press any key to continue . . .
```

Task 3:

Implement Selection Sort on an array of 5 integers.

Code:

```cpp
#include <iostream>
using namespace std;

int main()
{
    int a[5], min = 0;

    cout<<"Enter 5 elements of an array: ";
    for(int i=0; i<5;i++)
    {
        cin>>a[i];
    }
    for(int i=0; i<5; i++)
    {
        min = a[i];
        for(int j=i;j<5;j++)
        {
            if(min>a[j])
            {
                min = a[j];
                a[j] = a[i];
                a[i] = min;
            }
        }
    }
    cout<<"Sorted Array: ";
    for(int i=0; i<5; i++)
    {
        cout<<a[i]<<" ";
    }
    return 0;
}
```

Output:

```
Enter 5 elements of an array: -22 43 7 4 2
Sorted Array: -22 2 4 7 43
--------------------------------
Process exited after 33.85 seconds with return value 0
Press any key to continue . . .
```

Conclusion:

We learned about arrays. We learnt how to input elements in arrays and how to display an array. We also learned two methods of sorting: Bubble and Selection Sort.