

LAB 07

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SP22-BSCS-0046

AM SECTION

1. MERGE SORT.

SOURCE CODE:

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

```
void Merge(int arr[], int start, int middle, int end){
    int sizeOfFirstArray = middle - start + 1;
    int sizeOfSecondArray = end - middle;

    int FirstArray[sizeOfFirstArray];
    int SecondArray[sizeOfSecondArray];

    for(int i = 0; i < sizeOfFirstArray; i++){
        FirstArray[i] = arr[start + i];
    }

    for(int i = 0; i < sizeOfSecondArray; i++){
        SecondArray[i] = arr[middle + 1 + i];
    }

    int j = 0;
    int k = 0;
    int l = start;

    while(j < sizeOfFirstArray && k < sizeOfSecondArray){
        if(FirstArray[j] <= SecondArray[k]){
            arr[l++] = FirstArray[j++];
        }
        else{
            arr[l++] = SecondArray[k++];
        }
    }
}
```

```

        while(j < sizeOfFirstArray){
            arr[l++] = FirstArray[j++];
        }

        while(k < sizeOfSecondArray){
            arr[l++] = SecondArray[k++];
        }
    }

void Mergesort(int arr[], int start, int end){
    if(start < end){
        int middle = start + (end - start)/2;
        Mergesort(arr, start, middle);
        Mergesort(arr, middle + 1, end);
        Merge(arr, start, middle, end);
    }
}

int main(){

    int length;

    cout<<"Enter the length of an array : "<<endl;
    cin>>length;

    int arr[length];

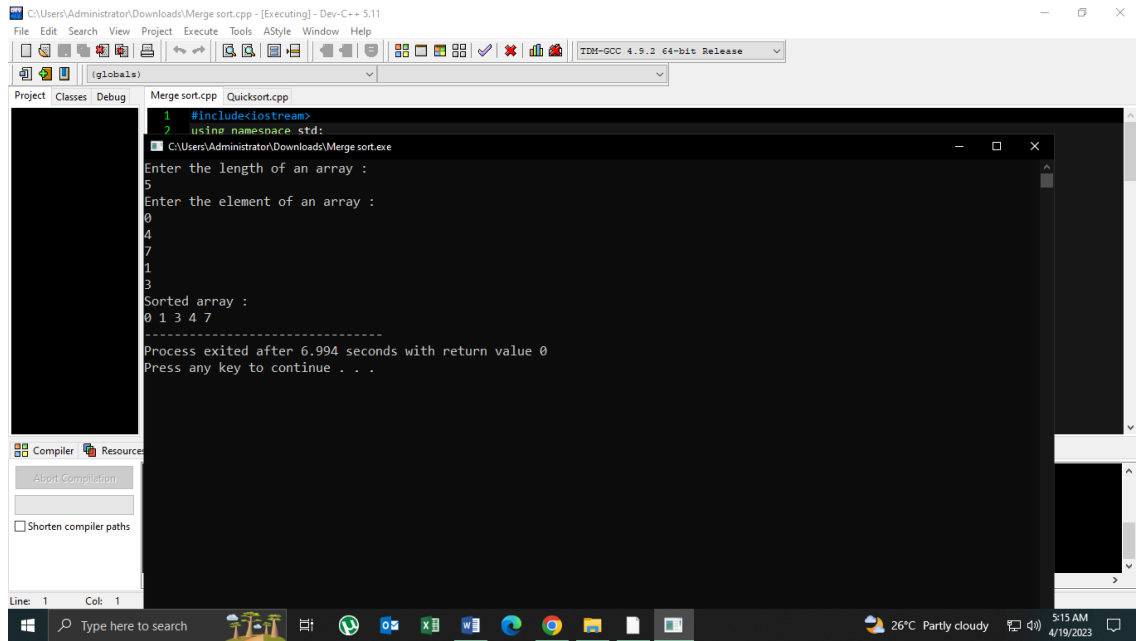
    cout<<"Enter the element of an array : "<<endl;

    for(int i = 0; i < length; i++){
        cin>>arr[i];
    }

    Mergesort(arr, 0, length - 1);
    cout<<"Sorted array : "<<endl;
    for(int i = 0; i < length ; i++){
        cout<<arr[i]<<" ";
    }
    return 0;
}

```

PICTURE:



2. QUICK SORT.

SOURCE CODE:

```
#include<iostream>
using namespace std;
int partition(int arr[], int start, int end){
    int pivot = arr[end];
    int firstpointer = start - 1;
    for (int secondpointer=start;secondpointer<end;secondpointer++){
        if (arr[secondpointer] < pivot){
            firstpointer++;
            int temp = arr[firstpointer];
            arr[firstpointer] = arr[secondpointer];
            arr[secondpointer] = temp;
        }
    }
    int temp = arr[firstpointer + 1];
    arr[firstpointer + 1] = arr[end];
    arr[end] = temp;
    return (firstpointer + 1);
}
void quicksort(int arr[], int start, int end){
    if (start<end){
        int middle = partition(arr, start, end);
        quicksort(arr, start, middle - 1);
        quicksort(arr, middle + 1, end);
    }
}
```

```

}
int main(){
    int n;
    cout << "Enter the size of the array: " << endl;
    cin >> n;
    int arr[n];
    cout << "Enter the elements in the array: " << endl;
    for(int i=0;i<n;i++){
        cin >> arr[i];
    }
    quicksort(arr, 0, n - 1);
    cout << "The sorted array is: " << endl;
    for(int i=0;i<n;i++){
        cout << arr[i] << " ";
    }
}

```

PICTURE:

The screenshot shows the Dev-C++ IDE with the following content in the console window:

```

Enter the size of the array:
5
Enter the elements in the array:
4
7
9
1
2
The sorted array is:
1 2 4 7 9
-----
Process exited after 5.796 seconds with return value 0
Press any key to continue . . .

```

The IDE interface includes a menu bar (File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help), a toolbar, and a status bar at the bottom showing the system date and time (5:17 AM, 4/19/2023) and weather (26°C, Partly cloudy).