Experiment 2.1

Student Name: Shivam Kumar **Branch: BE-CSE**

UID: 21BCS2124 **Section/Group: 21BCS-605(A)**

Date of performance: 14/09/2022 **Subject name: Data Structures**

AIM: Write a program to sort an array of integers in ascending/descending order using Merge Sort.

OBJECTIVE: To learn the concepts of Merge Sort.

CODE:

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

void printArray(int *A, int n)
{
    for (int i = 0; i < n; i++)
    {
        cout<< A[i]<<" ";
    }
    cout<<"\n";
}

void merge(int A[], int mid, int low, int high)
{
    int i, j, k, B[100];
    i = low;
    j = mid + 1;
    k = low;

    while (i <= mid && j <= high)
    {
        if (A[i] < A[j])
        {
            B[k] = A[i];
            i++;
            k++;
        }
        else
```

```
        {
            B[k] = A[j];
            j++;
            k++;
        }
    }
    while (i <= mid)
    {
        B[k] = A[i];
        k++;
        i++;
    }
    while (j <= high)
    {
        B[k] = A[j];
        k++;
        j++;
    }
    for (int i = low; i <= high; i++)
    {
        A[i] = B[i];
    }

}

void mergeSort(int A[], int low, int high){
    int mid;
    if(low<high){
        mid = (low + high) /2;
        mergeSort(A, low, mid);
        mergeSort(A, mid+1, high);
        merge(A, mid, low, high);
    }
}

int main()
{
    cout<<"======================\n";
    cout<<"Name - Shivam Kumar\nUID - 21BCS2124\nSection - 21BCS-605(A)\n";
    cout<<"======================\n";
    int A[] = {15, 11, 4, 12, 3, 19, 8};
    int n = 7;
    cout<<"\nUnsorted Array\n";
    printArray(A, n);
    mergeSort(A, 0, 6);
    cout<<"\nSorted Array by Merge Sort\n";
    printArray(A, n);
```

```
    cout<<"\n";
    return 0;
}
```

OUTPUT:

```
======================
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======================

Unsorted Array
15 11 4 12 3 19 8

Sorted Array by Merge Sort
3 4 8 11 12 15 19
```

Learning outcomes:

1. Learned sorting using Merge sort.
2. Learned to sort an array.
3. Concepts of Merge Sort.