CSE2012

DAA LAB

Name: Preyash

Registration Number: 20BPS1022

Ex2: Merge Sort

Code window:

```cpp
#include<iostream>
#include<vector>
using namespace std;
void merge(vector<int>& v, int s, int m, int e) {
    vector<int> temp;
    int i, j;
    i = s;
    j = m + 1;
    while (i <= m && j <= e) {
        if (v[i] <= v[j]) {
            temp.push_back(v[i]);
            ++i;
        }
        else {
            temp.push_back(v[j]);
            ++j;
        }
    }
    while (i <= m) {
        temp.push_back(v[i]);
        ++i;
    }
    while (j <= e) {
        temp.push_back(v[j]);
        ++j;
    }
    for (int i = s; i <= e; ++i)
    {
        v[i] = temp[i - s];
    }
}

```

```
33 void MergeSort(vector<int>& v, int s, int e) {
34         if (s < e) {
35             int m = (s + e) / 2;
36             MergeSort(v, s, m);
37             MergeSort(v, m + 1, e);
38             merge(v, s, m, e);
39     }
40 }
41
42 int main()
43 {
44     int n;
45     vector<int> v;
46     cout << "Enter Size of Vector : ";
47     cin >> n;
48     v = vector<int>(n);
49     cout << "Enter Elements of Vector : ";
50     for (int i = 0; i < n; ++i)
51     {
52         cin >> v[i];
53     }
54     MergeSort(v, 0, n - 1);
55     cout << "\nVector Obtained After Sorting: ";
56     for(auto i:v)
57     {
58         cout << i << " ";
59     }
60     return 0;
61 }
```

Code:

```
#include<iostream>

#include<vector>

using namespace std;

void merge(vector<int>& v, int s, int m, int e) {

    vector<int> temp;

    int i, j;

    i = s;
```

```
    j = m + 1;
    while (i <= m && j <= e) {
        if (v[i] <= v[j]) {
            temp.push_back(v[i]);
            ++i;
        }
        else {
            temp.push_back(v[j]);
            ++j;
        }
    }
    while (i <= m) {
        temp.push_back(v[i]);
        ++i;
    }
    while (j <= e) {
        temp.push_back(v[j]);
        ++j;
    }
    for (int i = s; i <= e; ++i)
    {
        v[i] = temp[i - s];
    }
}

void MergeSort(vector<int>& v, int s, int e) {
        if (s < e) {
```

```
            int m = (s + e) / 2;
            MergeSort(v, s, m);
            MergeSort(v, m + 1, e);
            merge(v, s, m, e);
    }
}

int main()
{
    int n;
    vector<int> v;
    cout << "Enter Size of Vector : ";
    cin >> n;
    v = vector<int>(n);
    cout << "Enter Elements of Vector : ";
    for (int i = 0; i < n; ++i)
    {
        cin >> v[i];
    }
    MergeSort(v, 0, n - 1);
    cout << "\nVector Obtained After Sorting: ";
    for(auto i:v)
    {
        cout << i << " ";
    }
    return 0;
}
```

Output:

```
Enter Size of Vector : 5
Enter Elements of Vector : 5 4 3 2 1

Vector Obtained After Sorting: 1 2 3 4 5
```