

**CSE2012**

**DAA LAB**

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Ex2: Merge Sort

Code window:

```
1  #include<iostream>
2  #include<vector>
3  using namespace std;
4  void merge(vector<int>& v, int s, int m, int e) {
5      vector<int> temp;
6      int i, j;
7      i = s;
8      j = m + 1;
9      while (i <= m && j <= e) {
10         if (v[i] <= v[j]) {
11             temp.push_back(v[i]);
12             ++i;
13         }
14         else {
15             temp.push_back(v[j]);
16             ++j;
17         }
18     }
19     while (i <= m) {
20         temp.push_back(v[i]);
21         ++i;
22     }
23     while (j <= e) {
24         temp.push_back(v[j]);
25         ++j;
26     }
27     for (int i = s; i <= e; ++i)
28     {
29         v[i] = temp[i - s];
30     }
31 }
32
```

```

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
```