

Merge Sort

ADA Lab

```
void merge(int a[],int low, int mid,int high)
{
    int i,j,k,c[20];
    i=low;
    j=mid+1;
    k=low;
    while(i<=mid && j<=high)
    {
        if(a[i]<a[j])
            c[k++]=a[i++];
        else
            c[k++]=a[j++];
    }
    while(i<=mid)
        c[k++]=a[i++];
    while(j<=high)
        c[k++]=a[j++];
    for(i=low;i<=high;i++)
        a[i]=c[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,low,mid,high);
    }
}

int main()
{
    int i,n,a[20];
    printf("enter the number of ele:\n");
    scanf("%d",&n);
    printf("enter the elements into the array:\n");
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    printf("before merge sort:\n");
    for(i=0;i<n;i++)
        printf("%d ",a[i]);
    printf("\n");
    mergesort(a,0,n-1);
    printf("after merge sort:\n");
    for(i=0;i<n;i++)
        printf("%d ",a[i]);
}

```

Output:

The image shows a C program in a code editor and its execution output in a terminal window. The code implements a Merge Sort algorithm. The terminal output shows the program's execution flow, including input prompts, array display before and after sorting, and the final sorted array.

```
19 |     a[i]=c[i];  
20 | }  
21 |  
22 | void mergesort(int a[],int low, int high)  
23 | {  
24 |     int mid;  
25 |     if(low<high)  
26 |     {  
27 |         mid=(low+high)/2;  
28 |         mergesort(a,low,mid);  
29 |         mergesort(a,mid+1,high);  
30 |         merge(a,low,mid,high);  
31 |     }  
32 | }  
33 |  
34 | int main()  
35 | {  
36 |     int i,n,a[20];  
37 |     printf("enter the number of ele:\n");  
38 |     scanf("%d",&n);  
39 |     printf("enter the elements into the array:\n");  
40 |     for(i=0;i<n;i++)  
41 |         scanf("%d",&a[i]);  
42 |     printf("before merge sort:\n");  
43 |     for(i=0;i<n;i++)  
44 |         printf("%d ",a[i]);  
45 |     printf("\n");  
46 |     mergesort(a,0,n-1);  
47 |     printf("after merge sort:\n");  
48 |     for(i=0;i<n;i++)  
49 |         printf("%d ",a[i]);  
50 | }
```

enter the number of ele:
7
enter the elements into the array:
35 10 15 45 25 20 40
before merge sort:
35 10 15 45 25 20 40
after merge sort:
10 15 20 25 35 40 45

Process exited after 28.29 seconds with return value 7
Press any key to continue . . .