

Merge Sort

ADA Lab

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```
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;
```

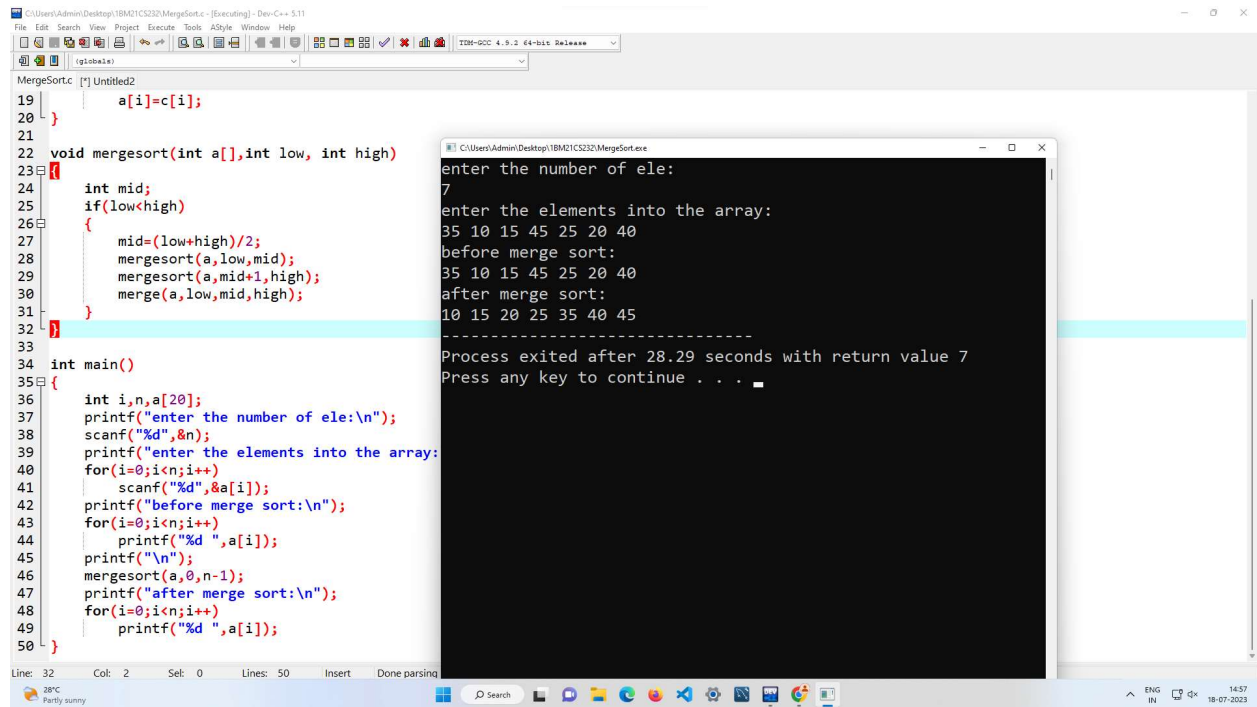
```

        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 screenshot displays a C++ IDE with a source code editor on the left and a console window on the right. The source code implements a Merge Sort algorithm. The console window shows the program's execution, including user input for the number of elements and the array elements, followed by the array state before and after sorting. The program exits after 28.29 seconds with a return value of 7.

```
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 |     {  
42 |         scanf("%d",&a[i]);  
43 |     }  
44 |     printf("before merge sort:\n");  
45 |     for(i=0;i<n;i++)  
46 |     {  
47 |         printf("%d ",a[i]);  
48 |     }  
49 |     printf("\n");  
50 |     mergesort(a,0,n-1);  
51 |     printf("after merge sort:\n");  
52 |     for(i=0;i<n;i++)  
53 |     {  
54 |         printf("%d ",a[i]);  
55 |     }  
56 |     printf("\n");  
57 | }
```

```
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 . . .
```