

LAB PROGRAM 4

AIM: Sort a given set of N integer elements using Merge Sort technique and compute its time taken. Run the program for different values of N and record the time taken to sort.

SOURCE CODE

```
#include<stdio.h>

#include<stdlib.h>

void mergesort(int arr[],int lb, int ub)
{
    if(lb<ub)
    {
        int mid=(lb+ub)/2;
        mergesort(arr,lb,mid);
        mergesort(arr,mid+1,ub);
        merge(arr,lb,mid,ub);
    }
}

void merge(int arr[],int lb,int mid,int ub)
{
    int i=lb;
    int b[20];
    int j=mid+1;
    int k=lb;

    while(i<=mid && j<=ub)
    {
        if(arr[i]<arr[j])
```

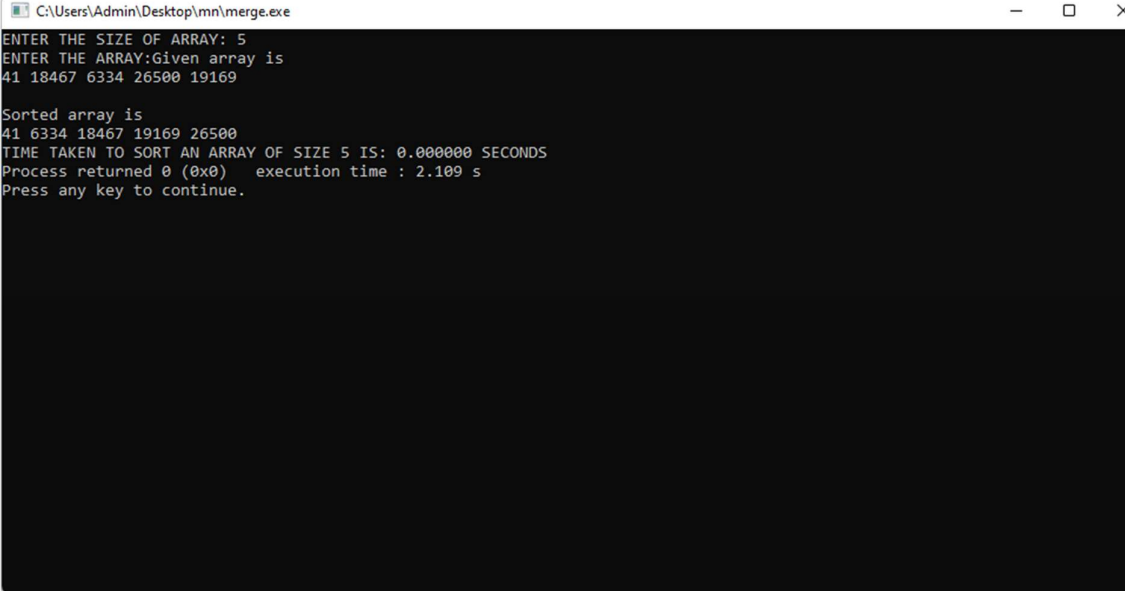
```
{  
    b[k]=arr[i];  
    i++;  
    k++;  
}  
else  
{  
    b[k]=arr[j];  
    j++;  
    k++;  
}  
}
```

```
if(i>mid)  
{  
    while(j<=ub)  
    {  
        b[k]=arr[j];  
        j++;  
        k++;  
    }  
}  
else  
{  
    while(i<=mid)  
    {  
        b[k]=arr[i];  
        i++;  
        k++;  
    }  
}
```

```
    }  
}  
for(k=0;k<ub;k++)  
{  
    arr[k]=b[k];  
}  
}
```

```
int main()  
{  
    int arr[20],i,j,n;  
    printf("ENTER THE SIZE OF ARRAY: ");  
    scanf("%d",&n);  
    printf("ENTER THE ARRAY:\n");  
    for(i=0;i<n;i++)  
    {  
        scanf("%d",&arr[i]);  
    }  
    mergesort(arr,0,n-1);  
    for(i=0;i<n;i++)  
    {  
        printf("%d\t",arr[i]);  
    }  
}
```

OUTPUT SCREENSHOT



```
C:\Users\Admin\Desktop\mn\merge.exe
ENTER THE SIZE OF ARRAY: 5
ENTER THE ARRAY:Given array is
41 18467 6334 26500 19169

Sorted array is
41 6334 18467 19169 26500
TIME TAKEN TO SORT AN ARRAY OF SIZE 5 IS: 0.000000 SECONDS
Process returned 0 (0x0)   execution time : 2.109 s
Press any key to continue.
```