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

```c
#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])
```
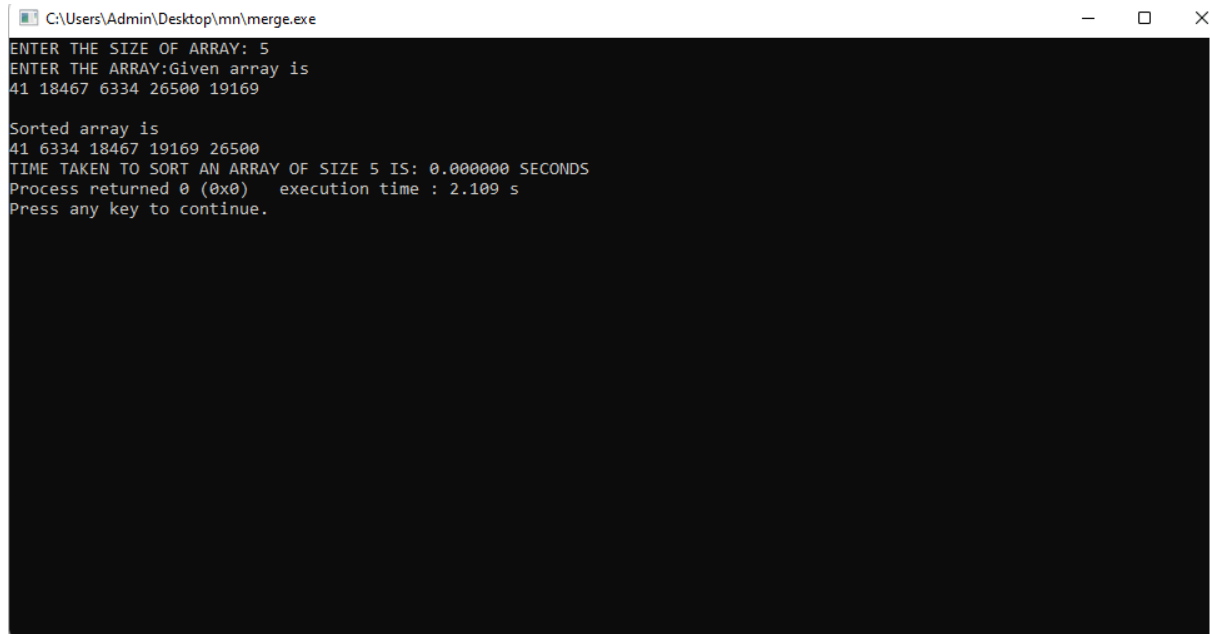
```
        {
            b[k]=arr[i];

            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++;
```

```c
        }
    }
    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.
```