**ADA LAB-8**

* **MERGE SORT WITH TIME COMPLEXITY**
  + **PROGRAM**

#include<stdio.h>

#include<time.h>

#include<stdlib.h> /\* To recognise exit function when compiling with gcc\*/

void split(int[],int,int);

void combine(int[],int,int,int);

void main()

{

int a[15000],n, i,j,ch, temp;

clock\_t start,end;

while(1)

{

printf("\n1:For manual entry of N value and array elements");

printf("\n2:To display time taken for sorting number of elements N in the range 500 to 14500");

printf("\n3:To exit");

printf("\nEnter your choice:");

scanf("%d", &ch);

switch(ch)

{

case 1: printf("\nEnter the number of elements: ");

scanf("%d",&n);

printf("\nEnter array elements: ");

for(i=0;i<n;i++)

{

scanf("%d",&a[i]);

}

start=clock();

split(a,0,n-1);

end=clock();

printf("\nSorted array is: ");

for(i=0;i<n;i++)

printf("%d\t",a[i]);

printf("\n Time taken to sort %d numbers is %f Secs",n, (((double)(end-start))/CLOCKS\_PER\_SEC));

break;

case 2:

n=500;

while(n<=14500) {

for(i=0;i<n;i++)

{

a[i]=n-i;

}

start=clock();

split(a,0,n-1);

//Dummy loop to create delay

for(j=0;j<500000;j++){ temp=38/600;}

end=clock();

printf("\n Time taken to sort %d numbers is %f Secs",n, (((double)(end-start))/CLOCKS\_PER\_SEC));

n=n+1000;

}

break;

case 3: exit(0);

}

getchar();

}

}

void split(int a[],int low,int high)

{

int mid;

if(low<high)

{

mid=(low+high)/2;

split(a,low,mid);

split(a,mid+1,high);

combine(a,low,mid,high);

}

}

void combine(int a[],int low,int mid,int high)

{

int c[15000],i,j,k;

i=k=low;

j=mid+1;

while(i<=mid&&j<=high)

{

if(a[i]<a[j])

{

c[k]=a[i];

++k;

++i;

}

else

{

c[k]=a[j];

++k;

++j;

}

}

if(i>mid)

{

while(j<=high)

{

c[k]=a[j];

++k;

++j;

}

}

if(j>high)

{

while(i<=mid)

{

c[k]=a[i];

++k;

++i;

}

}

for(i=low;i<=high;i++)

{

a[i]=c[i];

}

}

* + **OUTPUT**



