**PROGRAM- 8**

**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.**

#include <stdio.h>

#include <time.h>

void merge(int a[], int i1, int j1, int i2, int j2)

{

int temp[1000];

int i, j, k;

i = i1;

j = i2;

k = 0;

while (i <= j1 && j <= j2)

{

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

temp[k++] = a[i++];

else

temp[k++] = a[j++];

}

while (i <= j1)

temp[k++] = a[i++];

while (j <= j2)

temp[k++] = a[j++];

for (i = i1, j = 0; i <= j2; i++, j++)

a[i] = temp[j];

}

void mergesort(int a[], int i, int j)

{

int mid;

if (i < j)

{

mid = (i + j) / 2;

mergesort(a, i, mid);

mergesort(a, mid + 1, j);

merge(a, i, mid, mid + 1, j);

}

}

int main()

{

int a[1000], n, i;

clock\_t start,end;

printf("Enter no of elements:");

scanf("%d", &n);

printf("The elements generated are:\n");

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

{

a[i]=rand()%1000;

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

}

start=clock();

mergesort(a, 0, n - 1);

end=clock();

printf("\nSorted array is :");

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

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

printf("\nTime taken is %f\n",((double)(end-start))/CLOCKS\_PER\_SEC);

return 0;

}