

```

1  #include<stdio.h>
2  #include<stdlib.h>
3  #include<conio.h>
4  #include<time.h>
5
6  void mergesort(int [],int,int);
7  void merge(int [],int,int,int);
8
9  int main()
10 {
11     int i,n;
12     int c,d;
13     srand(time(0));
14     printf("Enter the No: of elements :");
15     scanf("%d",&n);
16     int a[n];
17     printf("Array elements :\n");
18     for(i=0;i<n;i++)
19     {
20         a[i]=rand()%1000;
21         printf("%d\t",a[i]);
22     }
23     mergesort(a,0,n-1);
24     printf("\nSorted array :\n");
25     for(i=0;i<n;i++)
26     {
27         printf("%d\t",a[i]);
28     }
29     clock_t t;
30     double cpu_time;
31     t=clock();
32     for (c = 1; c <= 5000; c++) for (d = 1; d <= 5000; d++) { }
33     t = clock() - t;
34     cpu_time=((double)t)/CLOCKS_PER_SEC;
35     printf("\nTime taken :%f sec\n", cpu_time);
36     return 0;
37 }
38 void mergesort(int a[],int low,int high)

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33     t = clock() - t;
34     cpu_time=((double)t)/CLOCKS_PER_SEC;
35     printf("\nTime taken :%f sec\n", cpu_time);
36     return 0;
37 }
38 void mergesort(int a[],int low,int high)
39 {
40     int mid;
41     if(low<high)
42     {
43         mid=(low+high)/2;
44         mergesort(a,low,mid);
45         mergesort(a,mid+1,high);
46         merge(a,low,mid,high);
47     }
48 }
49 void merge(int a[],int low,int mid,int high)
50 {
51     int i,j,k,c[100];
52     i=low;
53     k=low;
54     j=mid+1;
55     while(i<=mid && j<=high)
56     {
57         if (a[i]<a[j])
58         {
59             c[k++]=a[i++];
60         }
61         else
62         {
63             c[k++]=a[j++];
64         }
65     }
66     while(i<=mid)
67     {
68         c[k++]=a[i++];
69     }
70     while(j<=high)

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43     mid=(low+high)/2;
44     mergesort(a,low,mid);
45     mergesort(a,mid+1,high);
46     merge(a,low,mid,high);
47 }
48 }
49 void merge(int a[],int low,int mid,int high)
50 {
51     int i,j,k,c[100];
52     i=low;
53     k=low;
54     j=mid+1;
55     while(i<=mid && j<=high)
56     {
57         if (a[i]<a[j])
58         {
59             c[k++]=a[i++];
60         }
61         else
62         {
63             c[k++]=a[j++];
64         }
65     }
66     while(i<=mid)
67     {
68         c[k++]=a[i++];
69     }
70     while(j<=high)
71     {
72         c[k++]=a[j++];
73     }
74     for(i=low;i<=high;i++)
75     {
76         a[i]=c[i];
77     }
78 }
79

```

C:\WINDOWS\SYSTEM32\cmd.exe

Enter the No: of elements :100

Array elements :

91	812	668	96	293	384	528	139	981	797	915	163	255	57	586	233	840	324	291	753
	948	348	592	550	312	639	660	224	426	106	317	555	374	479	978	771	714	35	647
	836	876	977	639	198	482	169	226	897	491	974	15	877	348	559	26	646	445	579
	762	246	813	698	29	771	747	905	93	418	223	110	215	652	24	126	664	113	896
	268	595	74	101	866	954	219	808	60	705	416	259	611	193	383	79	680	587	327
	620	434	706	607															

Sorted array :

15	24	26	29	35	57	60	74	79	91	93	96	101	106	110	113	126	139	163	169
	193	198	215	219	223	224	226	233	246	255	259	268	291	293	312	317	324	327	348
	348	374	383	384	416	418	426	434	445	479	482	491	528	550	555	559	579	586	587
	592	595	607	611	620	639	639	646	647	652	660	664	668	680	698	705	706	714	747
	753	762	771	771	797	808	812	813	836	840	866	876	877	896	897	905	915	948	954
	974	977	978	981															

Time taken :0.049000 sec

(program exited with code: 0)

Press any key to continue . . .