

```

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

```

```

32 printf("%d\t",a[i]);
33 }
34 clock_t t;
35 double cpu_time;
36 t=clock();
37 for (c = 1; c <= 5000; c++) for (d = 1; d <= 5000; d++) { }
38 t = clock() - t;
39 cpu_time=((double)t)/CLOCKS_PER_SEC;
40 printf("\nTime taken :%f sec\n", cpu_time);
41 return 0;
42 }
43
44 void heap_sort(int a[], int n)
45 {
46     int i,temp;
47     heap_cons(a,n);
48     for(i=n-1;i>0;i--)
49     {
50         temp=a[0];
51         a[0]=a[i];
52         a[i]=temp;
53         heap_adj(a,i);
54     }
55 }
56
57 void heap_cons(int a[], int n)
58 {
59     int i,j,k,item;
60     for(k=1;k<n;k++)
61     {
62         item=a[k];
63         i=k;
64         j=(i-1)/2;
65         while(i>0 && item>a[j])
66         {
67             a[i]=a[j];
68             i=j;
69             j=(i-1)/2;

```

```

62     item=a[k];
63     i=k;
64     j=(i-1)/2;
65     while(i>0 && item>a[j])
66     {
67         a[i]=a[j];
68         i=j;
69         j=(i-1)/2;
70     }
71     a[i]=item;
72 }
73 }
74
75 void heap_adj(int a[], int n)
76 {
77     int i,j,item;
78     j=0;
79     item=a[j];
80     i=2*j+1;
81     while(i<=n-1)
82     {
83         if(i+1<=n-1)
84         {
85             if(a[i]<a[i+1])
86                 i++;
87         }
88         if(item<a[i])
89         {
90             a[j]=a[i];
91             j=i;
92             i=2*j+1;
93         }
94         else
95             break;
96     }
97     a[j]=item;
98 }
99

```

C:\WINDOWS\SYSTEM32\cmd.exe

Enter the No: of elements :100

The Array elements are :

162	301	145	27	1	888	789	130	479	344	447	833	868	405	118	345	764	922	625	256
	163	755	463	374	441	989	270	191	121	589	96	564	791	731	443	910	505	776	344
	58	735	431	855	284	509	744	808	341	105	42	453	966	240	594	918	42	390	711
	941	510	509	792	739	605	53	616	323	274	37	552	254	428	314	678	934	193	678
	253	127	884	114	293	90	881	735	636	412	348	96	461	774	132	756	952	743	941
	836	18	639	134															

Sorted array:

1	18	27	37	42	42	53	58	90	96	96	105	114	118	121	127	130	132	134	145
	162	163	191	193	240	253	254	256	270	274	284	293	301	314	323	341	344	344	345
	348	374	390	405	412	428	431	441	443	447	453	461	463	479	505	509	509	510	552
	564	589	594	605	616	625	636	639	678	678	711	731	735	735	739	743	744	755	756
	764	774	776	789	791	792	808	833	836	855	868	881	884	888	910	918	922	934	941
	941	952	966	989															

Time taken :0.053000 sec

-----

(program exited with code: 0)

Press any key to continue . . .