

Program - 2

Sort a given set of N integer elements using Quick Sort technique and compute its time taken.

Code:

```
#include<stdio.h>
#include<time.h>
#include<stdlib.h>
#include<unistd.h>

void swap(int *x, int *y){
    int temp=*x;
    *x=*y;
    *y=temp;
}

int partition(int arr[], int st, int end){
    int p=arr[st], i=st+1, j=end;
    while(i<=j){
        while(i<=end && arr[i]<=p) i++;
        while(j>st && arr[j]>=p) j--;
        if(i<j)
            swap(&arr[i], &arr[j]);
    }
    swap(&arr[j], &arr[st]);
    return j;
}

void quickSort(int arr[], int st, int end){
    if(st<end){
        usleep(1000);
        int s=partition(arr, st, end);
        quickSort(arr, st, s-1);
        quickSort(arr, s+1, end);
    }
}

int main(){
    int n=10000, arr[n];
```

```

clock_t start_time, end_time;

for(int i=0;i<n;i++)
    arr[i]=rand()%10000;

start_time=clock();
quickSort(arr, 0 ,n-1);
end_time=clock();

printf("After performing quick sort:\n");
for(int i=0;i<n;i++)
    printf("%d\t", arr[i]);

printf("\nTotal time taken for program
execution=%lf", (double)(end_time-start_time)/CLOCKS_PER_SEC);
return 0;
}

```

Output:

```

After performing quick sort:
0      1      2      3      4      5      5      6      6      8      11      11      12      16      16      1
8      18      21      22      23      23      23      24      26      26      27      27      29      29      29      2
9      31      33      34      35      35      36      37      37      38      38      39      40      40      41      4
1      41      41      42      42      42      44      44      45      46      47      47      48      48      50      5
3      53      54      56      57      58      59      61      62      62      64      64      64      66      67      6
7      68      69      69      70      71      73      76      78      78      81      82      82      84      88      9
0      90      91      91      92      93      94      95      95      99

Total time taken for program execution=1.160000
Process returned 0 (0x0)   execution time : 1.242 s
Press any key to continue.

```

```

11      616      617      617      617      618      619      619      620      622      623      624      624      625      625      6
25      625      626      626      626      626      627      627      627      629      629      629      629      634      634      6
34      635      636      637      637      637      639      641      643      644      646      646      648      648      648      6
49      650      650      651      651      652      653      654      655      655      657      658      658      659      662      6
62      662      663      664      667      667      668      668      670      671      673      673      673      674      675      6
76      676      678      678      678      679      681      683      685      686      687      688      689      690      690      6
90      692      693      694      694      695      695      696      698      699      700      701      701      702      703      7
04      704      704      705      705      705      706      710      711      712      712      713      716      717      717      7
18      718      721      722      723      723      724      724      725      726      726      728      729      734      734      7
34      734      736      737      740      741      741      745      745      748      748      750      752      753      753      7
54      756      756      757      757      757      758      758      759      759      760      760      762      763      763      7
63      763      766      767      769      771      771      773      774      775      777      778      778      781      783      7
83      786      786      787      788      788      789      790      790      796      798      798      798      800      801      8
02      805      807      808      811      812      813      813      814      815      815      815      818      818      823      8
24      824      825      825      827      827      829      829      829      831      831      832      832      833      833      8
33      835      836      838      840      841      842      843      844      844      847      848      850      850      851      8
51      853      855      855      855      858      859      861      864      865      866      867      868      869      869      8
69      869      869      870      870      874      875      875      877      878      881      881      882      885      886      8
87      888      888      890      892      893      893      894      895      896      898      898      900      900      900      9
00      901      902      902      902      903      905      909      909      911      912      912      913      913      913      9
23      923      924      924      924      926      928      929      930      931      932      932      932      934      935      9
36      937      938      938      938      940      941      941      942      942      943      944      944      944      945      9
45      945      946      948      948      949      949      951      954      954      954      955      956      958      958      9
58      959      961      961      962      962      962      962      963      964      966      966      969      970      971      9
71      971      972      972      974      974      975      976      977      977      982      985      985      986      989      9
90      992      993      993      994      995      996      997      998      999

Total time taken for program execution=10.880000
Process returned 0 (0x0)   execution time : 11.332 s
Press any key to continue.

```