

DESIGN AND ANALYSIS OF ALGORITHMS – 2CS503

Practical 2

Name: Bhanderi Mihir

Roll No.: 19BCE023

Batch No.: A-1

1. Randomized Quick Sort

Code:

```
#include<stdio.h>
```

```
#include<time.h>
```

```
void swap(int *a, int *b)
```

```
{
```

```
    int temp=*a;
```

```
    *a=*b;
```

```
    *b=temp;
```

```
}
```

```
int partition (int a[], int l, int h)
```

```
{
```

```
    int pivot = a[l];
```

```
    int i=l, j=h;
```

```
    while(i<j)
```

```
    {
```

```
        do{
```

i++;
}
while(a[i]<=pivot);
do{
j--;
}
while(a[j]>pivot);
if(i<j)
swap(&a[i],&a[j]);
}
swap(&a[l],&a[j]);
printf("\nAfter Partition :\n ");
display(a);
return j;
}
int random_lh (int a[], int l, int h)
{
srand(time(NULL));
int random = l + rand() % (h - l);
printf("Pivot is : %d",random);
swap(&a[random], &a[l]);
return partition(a, l, h);
}
void QuickSort(int a[], int l, int h)
{
if(l<h)
{

int j = random_lh(a,l,h);
QuickSort(a,l,j);
QuickSort(a,j+1,h);
}
}
void display(int a[])
{
int i;
for (i=0; i < 10; i++)
printf("%d ", a[i]);
printf("\n");
}
int main()
{
int size=10;
//printf("Enter size of array : ");
//scanf("%d",&size);
int a[size];
//printf("Enter array :");
for(int i=0; i<size; i++)
{
a[i] = 10-i;
}
printf("Original Array : \n");
display(a);
QuickSort(a, 0, size);
printf("\nSorted array: \n");

```
display(a);
```

```
return 0;
```

```
}
```

Output:

```
Original Array :
10 9 8 7 6 5 4 3 2 1
Pivot is : 5
After Partition :
4 1 2 3 5 10 6 7 8 9
Pivot is : 3
After Partition :
2 1 3 4 5 10 6 7 8 9
Pivot is : 1
After Partition :
1 2 3 4 5 10 6 7 8 9
Pivot is : 1
After Partition :
1 2 3 4 5 10 6 7 8 9
Pivot is : 3
After Partition :
1 2 3 4 5 10 6 7 8 9
Pivot is : 5
After Partition :
1 2 3 4 5 9 6 7 8 10
Pivot is : 8
After Partition :
1 2 3 4 5 7 6 8 9 10
Pivot is : 6
After Partition :
1 2 3 4 5 6 7 8 9 10
Pivot is : 6
After Partition :
1 2 3 4 5 6 7 8 9 10
Pivot is : 8
After Partition :
1 2 3 4 5 6 7 8 9 10

Sorted array:
1 2 3 4 5 6 7 8 9 10

Process returned 0 (0x0)   execution time : 0.062 s
Press any key to continue.
```