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"""
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Class:BE-4 Computer Engineering
Batch : R4
Lab Assignment No: 06
Title: Write a program for analysis of quick sort by using deterministic
and randomized variant.

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"""
#Deterministic
def partition(array, low, high):
    pivot = array[high]
    i = low - 1
    for j in range(low, high):
        if array[j] <= pivot:
            i = i + 1
            (array[i], array[j]) = (array[j], array[i])
    (array[i + 1], array[high]) = (array[high], array[i + 1])
    return i + 1

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def quickSort(array, low, high):
    if low < high:
        pi = partition(array, low, high)

        # Recursive call on the left of pivot
        quickSort(array, low, pi - 1)
        # Recursive call on the right of pivot
        quickSort(array, pi + 1, high)

```

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data = []
print("Enter number of elements to sort")
size=int(input())
print("Enter input numbers:")
for i in range(size):
    s=int(input())
    data.append(s)
print("Unsorted Array")
print(data)

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quickSort(data, 0, size - 1)

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print('Sorted Array in Ascending Order:')
print(data)

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'''OUTPUT
Enter number of elements to sort
8
Enter input numbers:
56
34
44
89
12
46
7
8
Unsorted Array

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[56, 34, 44, 89, 12, 46, 7, 8]
Sorted Array in Ascending Order:
[7, 8, 12, 34, 44, 46, 56, 89]
'''

#-----Randomized Variant-----
'''
import random
def quicksort(arr, start , stop):

    if(start < stop):

        pivotindex = partitionrand(arr,start, stop)
        quicksort(arr , start , pivotindex-1)
        quicksort(arr, pivotindex + 1, stop)
def partitionrand(arr , start, stop):
    randpivot = random.randrange(start, stop)
    arr[start], arr[randpivot] = arr[randpivot], arr[start]
    return partition(arr, start, stop)

def partition(arr,start,stop):

    pivot = start
    i = start + 1
    for j in range(start + 1, stop + 1):
        if arr[j] <= arr[pivot]:
            arr[i] , arr[j] = arr[j] , arr[i]
            i = i + 1
    arr[pivot] , arr[i - 1] =arr[i - 1] , arr[pivot]
    pivot = i - 1
    return (pivot)

array = []
print("Enter number of elements to sort")
size=int(input())
print("Enter input numbers:")
for i in range(size):
    s=int(input())
    array.append(s)
print("Unsorted Array")
print(array)

quicksort(array, 0, size - 1)
print(array)

```

OUTPUT

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Enter number of elements to sort
8
Enter input numbers:
45
78
12
56
89
23
64

```

21

Unsorted Array

[45, 78, 12, 56, 89, 23, 64, 21]

[12, 21, 23, 45, 56, 64, 78, 89]

'''