kth maximum and minimum element

```python
import numpy as np
```

```python
def partition(arr,p,r):
    x = arr[r]
    i = p-1
    for j in range(p,r):
        if arr[j] < x:
            i += 1
            arr[i],arr[j] = arr[j],arr[i]
    arr[r],arr[i+1] = arr[i+1],arr[r]
    return i+1

def randomizedPartition(arr,p,r):
    i = np.random.randint(low= p,high =r+1)
    arr[i],arr[r] = arr[r],arr[i]
    return partition(arr,p,r)

def randomizeSelectmax(arr,p,r,i):
    if r <= p:
        return arr[r]
    q = randomizedPartition(arr,p,r)
    k = r-q+1
    if i == k:
        return arr[q]
    elif i < k:
        return randomizeSelectmax(arr,q+1,r,i)
    else:
        return randomizeSelectmax(arr,p,q-1,i-k)
def randomizeSelectmini(arr,p,r,i):
    if r == p:
        return arr[p]
    q = randomizedPartition(arr,p,r)

    k = q-p+1
    if i == k:
        return arr[q]
    elif i < k:
        return randomizeSelectmini(arr,p,q-1,i)
    else:
        return randomizeSelectmini(arr,q+1,r,i-k)
```

```python
low = np.random.randint(0,10)
high = np.random.randint(low+1,30)
arr = np.arange(low,high)
arr = np.random.permutation(arr)
kthmini= np.random.randint(1,len(arr)+1)
kthmax = np.random.randint(1,len(arr)+1)
print(f"low = {low}, high = {high}, kthmini = {kthmini}, kthmax = {kthmax}, minimum of array = {min(arr)}, maximum of array ="\
    +f" {max(arr)}\narray = {arr}")
```

```
low = 8, high = 25, kthmini = 14, kthmax = 1, minimum of array = 8, maximum of array = 24
array = [ 9 18 20 19 12 22 14 15 16 23 17 11 24 21 10 13  8]
```

```python
kmax,kmini = randomizeSelectmax(arr,0,len(arr)-1,kthmax),randomizeSelectmini(arr,0,len(arr)-1,kthmini)
```

```python
print("Kth max element in array = "+str(kmax)+"\nKth mini element in array= "+str(kmini))
```

```
Kth max element in array = 24
Kth mini element in array= 21
```