163.

1. Given an array of points where points[i] = [xi, yi] represents a point on the X-Y plane and an integer k, return the k closest points to the origin (0, 0).
   (i) Input : points = [[**1**,**3**],[-**2**,**2**],[**5**,**8**],[**0**,**1**]],k=2
   Output:[[-2, 2], [0, 1]]

Code:

```
import heapq
def k_closest(points, k):
    heap = []
    for x, y in points:
        distance = x**2 + y**2
        heapq.heappush(heap, (distance, [x, y]))
    result = []
    for _ in range(k):
        result.append(heapq.heappop(heap)[1])
    return result
points = [[1, 3], [-2, 2], [5, 8], [0, 1]]
k = 2
output = k_closest(points, k)
print(f"Output: {output}")
```

output:

```
PS C:\Users\karth>
PS C:\Users\karth> & C:/Users/karth/AppData/Local/Programs/Python/Python312/python.exe c:/Users/karth/OneDrive/Desktop/csa0863_karthik/PROBLEM.py
Output: [[0, 1], [-2, 2]]
PS C:\Users\karth>
```

Time complexity:f(n)=o(nlogn)