

28) Given an array of points where $\text{points}[i] = [x_i, y_i]$ represents a point on the X-Y plane and an integer k , return the k closest points to the origin $(0, 0)$. The distance between two points on the X-Y plane is the Euclidean distance (i.e., $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$). You may return the answer in any order. The answer is guaranteed to be unique (except for the order that it is in).

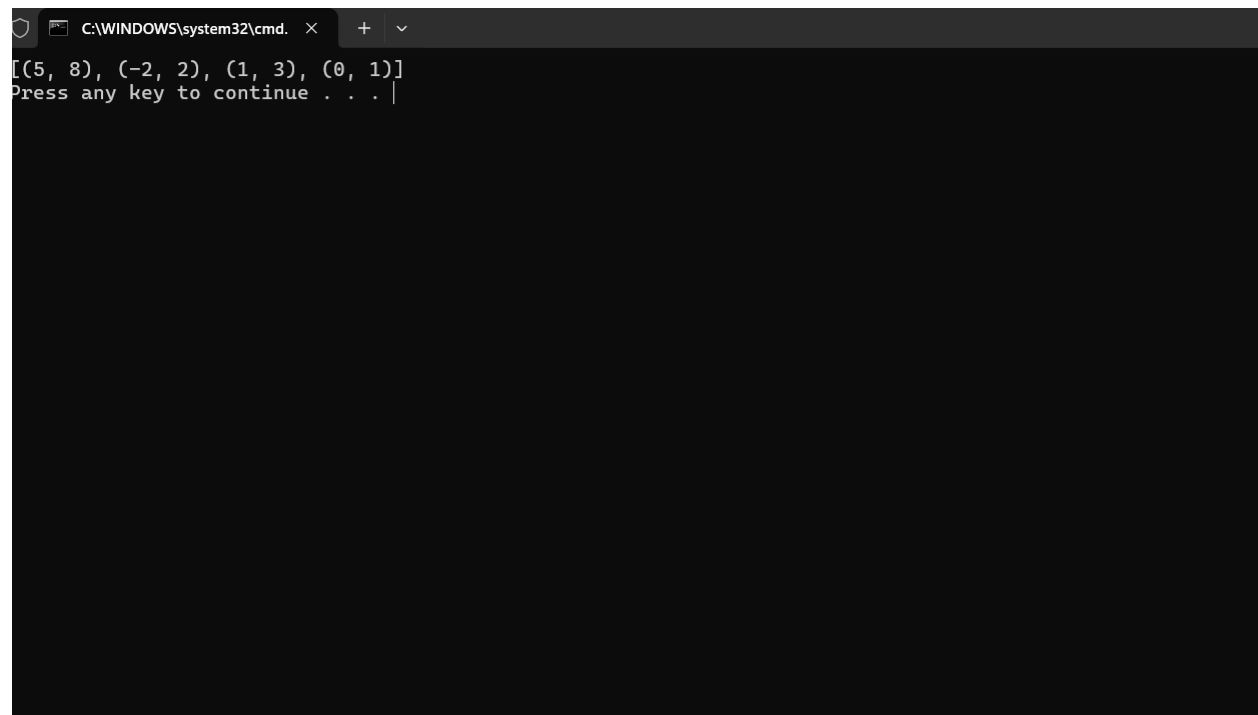
CODE:

```
import heapq

def kClosest(points, k):
    heap = []
    for x, y in points:
        dist = -(x*x + y*y)
        if len(heap) == k:
            heapq.heappushpop(heap, (dist, x, y))
        else:
            heapq.heappush(heap, (dist, x, y))
    return [(x, y) for (dist, x, y) in heap]

points = [[1, 3], [-2, 2], [5, 8], [0, 1]]
k = 6
print(kClosest(points, k))
```

OUTPUT:

A screenshot of a Windows command prompt window. The title bar shows the path 'C:\WINDOWS\system32\cmd.' and standard window controls. The command prompt displays the output of the Python code: '[(5, 8), (-2, 2), (1, 3), (0, 1)]'. Below the output, it says 'Press any key to continue . . . |' with a cursor. The rest of the window is dark and empty.

TIME COMPLEXITY : $O(n \log k)$