

Solution 1

```
1 // Copyright © 2020 AlgoExpert, LLC. All rights reserved.
2
3 class Program {
4     // Best: O(n) time | O(1) space
5     // Average: O(n) time | O(1) space
6     // Worst: O(n^2) time | O(1) space
7     func quickSelect(_ array: [Int], _ k: Int) -> Int? {
8         let position = k - 1
9         var startIndex = 0
10        var endIndex = array.count - 1
11        var variableArray = array
12
13        return quickSelectHelper(&variableArray, &startIndex, &endIndex, position)
14    }
15
16    func quickSelectHelper(_ array: inout [Int], _ startIndex: inout Int, _ endIndex: inout Int, _ position: Int) -> Int {
17        while true {
18            let pivotIndex = startIndex
19            var leftPointer = startIndex + 1
20            var rightPointer = endIndex
21
22            while leftPointer <= rightPointer {
23                if array[leftPointer] > array[pivotIndex], array[rightPointer] < array[pivotIndex] {
24                    swap(&array, leftPointer, rightPointer)
25                }
26
27                if array[leftPointer] <= array[pivotIndex] {
28                    leftPointer += 1
29                }
30
31                if array[rightPointer] >= array[pivotIndex] {
32                    rightPointer -= 1
33                }
34            }
35
36            swap(&array, pivotIndex, rightPointer)
37
38            if rightPointer == position {
39                return array[rightPointer]
40            } else if rightPointer < position {
41                startIndex = rightPointer + 1
42            } else {
43                endIndex = rightPointer - 1
44            }
45        }
46    }
47
48    func swap(_ array: inout [Int], _ leftPointer: Int, _ rightPointer: Int) {
49        let temp = array[leftPointer]
50
51        array[leftPointer] = array[rightPointer]
52        array[rightPointer] = temp
53    }
54 }
55
```

