

the theoretical time complexity of the implemented algorithm for worst-case is  $n^2$ . ( Each time the number x found is either the largest or the smallest, such that there are n-1 numbers on one side after the division)

the theoretical time complexity of the implemented algorithm for average-case and best-case is both  $n \log n$ .

```
quiz11.py
Project
  quiz11
    main.py
    quiz11.docx
    quiz11.py
    ~$quiz11.docx
  External Libraries
  Scratches and Consoles

main.py
1 stack.append((arr[l], r))
2 stack.append(0)
3 while stack:
4     l = stack.pop()
5     r = stack.pop()
6
7     index = partition(arr, l, r)
8     if l < index - 1:
9         stack.append(index - 1)
10        stack.append(l)
11    if r > index + 1:
12        stack.append(r)
13        stack.append(index + 1)
14
15 def partition(arr, start, end):
16     pivot = arr[start]
17     while start < end:
18         while start < end and arr[end] >= pivot:
19             end -= 1
20         arr[start] = arr[end]
21         while start < end and arr[start] <= pivot:
22             start += 1
23         arr[end] = arr[start]
24     arr[start] = pivot
25     return start
26
27
28
29
30

Run: main
/usr/local/bin/python3.9 /Users/xiaxiaoyu/Desktop/pycharm/pycharm/algorithm/quiz11/main.py
original list: [100, -10, 200, 50, -22, 22, 32, 101]
after quick sort: [-22, -10, 22, 32, 50, 100, 101, 200]
Process finished with exit code 0

Version Control Run Python Packages TODO Python Console Problems Terminal Services
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31/1 LF UTF-8 4 spaces Python 3.9
```