

```
1  #!/python
2  #cython: language_level=3
3
4  import cython
5
6  def hoare_partition(array_, int start, int end):
7      pivot = array_[(start + end) // 2]
8
9      cdef int i = start - 1
10     cdef int j = end + 1
11     cdef long temp # makes it slower sometimes?
12
13     while True:
14         i += 1
15         while array_[i] < pivot:
16             i += 1
17
18         j -= 1
19         while array_[j] > pivot:
20             j -= 1
21
22         if i >= j:
23             return j
24
25         temp = array_[i]
26         array_[i] = array_[j]
27         array_[j] = temp
28
29 # quicksort
30 def quicksort(array_, int start, int end):
31     cdef int crossing
32     if start >= 0 and end >= 0 and start < end:
33         crossing = hoare_partition(array_, start, end)
34
35         quicksort(array_, start, crossing)
36         quicksort(array_, crossing + 1, end)
```