# Quick Sort

Trace the following code

|  |  |
| --- | --- |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14**  **15**  **16**  **17** | def partition(a, start, end):  pivot = a[end]  i=start-1  for j in range(start, end):  if a[j] <= pivot:  i=i+1  a[i], a[j] = a[j], a[i]  a[i+1], a[end] = a[end], a[i+1]  return i+1    def quickSort(a, start, end):  if start < end:  p = partition(a, start, end)  quickSort(a, start, p-1)  quickSort(a, p+1, end)    data = [9, 3, 8, 6]  quickSort(data, 0, len(data) - 1)  print(data) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Call** | **pivot** | **i** | **j** | **start** | **end** | **p** | **a** |
| 1 quicksort |  |  |  | 0 | 3 |  | [9,3,8,6] |
| 1 partition | 6 | -1 | 0 |  |  |  |  |
|  |  | 0 | 1 |  |  |  | [**3**,**9**,8,6] |
|  |  |  | 2 |  |  | 1 | [3,**6**,8,**9**] |
| 2 quicksort |  |  |  | 0 | 0 |  |  |
| 3 quicksort |  |  |  | 2 | 3 |  |  |
| 2 partition | 9 | 1 | 2 |  |  |  |  |
|  |  | 2 |  |  |  | 3 |  |
| 4 quicksort |  |  |  | 2 | 2 |  |  |
| 5 quicksort |  |  |  | 4 | 3 |  |  |

**Stack Heap**