# Merge Sort

Trace the following code

|  |  |
| --- | --- |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14**  **15**  **16**  **17**  **18**  **19**  **20**  **21**  **22**  **23**  **24**  **25**  **26**  **27**  **28**  **29**  **30** | def mergeSort(a):  if len(a)>1:  mid = len(a)//2  left = a[0:mid]  right = a[mid:len(a)]  mergeSort(left)  mergeSort(right)  i=0  j=0  k=0  while i < len(left) and j < len(right):  if left[i] < right[j]:  a[k]=left[i]  i=i+1  else:  a[k]=right[j]  j=j+1  k=k+1  while i < len(left):  a[k]=left[i]  i=i+1  k=k+1  while j < len(right):  a[k]=right[j]  j=j+1  k=k+1  return    a=[5,2,4]  mergeSort(a)  print(a) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Call** | **mid** | **left** | **right** | **a** | **i** | **j** | **k** |
| 1 | 1 | [5] | [2,4] | [5,2,4] |  |  |  |
| 2 |  |  |  | [5] |  |  |  |
| 1 | 1 | [5] | [2,4] | [5,2,4] |  |  |  |
| 3 | 1 | [2] | [4] | [2,4] |  |  |  |
| 4 |  |  |  | [2] |  |  |  |
| 3 | 1 | [2] | [4] | [2,4] |  |  |  |
| 5 |  |  |  | [4] |  |  |  |
| 3 | 1 | [2] | [4] | [2,4] | 0 | 0 | 0 |
|  |  |  |  |  | 1 | 1 | 1 |
|  |  |  |  |  |  |  | 2 |
| 1 | 1 | [5] | [2,4] | [5,2,4] | 0 | 0 | 0 |
|  |  |  |  | [2,4,4] |  | 1 | 1 |
|  |  |  |  | [2,4,5] | 1 | 2 | 2 |
|  |  |  |  |  |  |  | 3 |

**Stack Heap**