4- **Dutch National Flag Problem**

- The idea is to put 0 and 2 in their correct positions, which will make sure all the 1s are automatically placed in their right positions
- We will use heapsort which main steps are:
  - ✓ Convert the list into a maxheap (a complete binary tree with decreasing values)
  - ✓ Swap the top element with the last element in the list(putting it in it's correct final position)
  - ✓ Repeat with list[:len(list)-1] (all but the sorted elements)

Time Complexity:

O(nlogn)

Space Complexity:

O(1)

Heapsort is an in place sorting algorithm so no extra space needed.