

## Question2

Consider nuts and bolts as two random ordering arrays. Quick sort could be applied to this method. But the size of bolts can only be determined by nuts and vice-versa. Therefore, a double quick sort method could be implemented.

1. Like quick sort, choose one nut as pivot. Sort the array of bolts so that left side is less than that nut and right side is larger than that nut and return the index for next partition of nut
  2. Based on the bolt which just matched, sort the array of nuts so that the left side is less than that bolt and right side is larger than that bolt.
  3. Repeat the above two steps recursively until all nuts and bolts are matched. During the recursion, return the index of pivot.
- The partition operating would be done in  $O(n)$  complexity.
  - The expected time complexity of quick sort is  $O(n \log n)$ . The double quick sort method would be also  $O(n \log n)$  expected time complexity.