

The quick

The quicksort algorithm works by selecting a 'pivot' element from the array and partitioning the other elements into two sub-arrays, according to whether they are less than or greater than the pivot. The pivot element itself ends up in its final sorted position.

$$A = \{3, 1, 2, 4, 5, 8, 7, 6, 9\}$$

All elements the left of the pivot are less than or equal to the pivot

All elements the right of the pivot are greater than or equal to the pivot

- If '3' were the pivot, then 1 and 2 being the left would be correct, but 4, 5, 8, 7, 6, 9 being the right would not be correct because 4 & 5 are greater than 3
 - If '4' were the pivot, the 3, 1, 2, being the left and 5, 8, 7, 6, 9 being to its right would be a correct partition
 - The same logic applies to '5' being the pivot with 3, 2, 1, 4 to the left and 8, 7, 6, 9 to the right
 - Any element greater than 5 cannot be the pivot because there are elements to their right that are less than them, which violates the partitioning principle.
- ☐ Thus with a correct partitioning, the possible pivots could be '4' or '5'.