

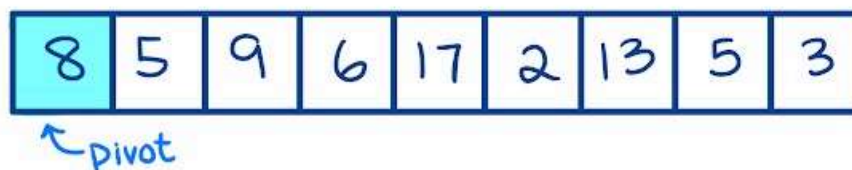
Suppose we implement Quicksort by using the leftmost element as the pivot. Which of the following real world scenarios would result in  $O(n^2)$  runtime when sorting the array via Quicksort?

\* 2 points

- ☐ Every time a user posts on Instagram, we add the timestamp to an array.
- ☐ Each week, RSF records the number of people that swiped in that week and adds it to an array.
- ☐ Every hour of a flight, an airplane records the amount of fuel left and adds it to an array.
- ☐ Every time an order is placed at McDonalds, the price of the order is added to an array.

Suppose we run Quicksort using Hoare Partitioning on the array below. What will the array look like right after we pivot around the leftmost element?

\* 2 points



- ☐ [9, 17, 13, 8, 5, 6, 2, 5, 3]
- ☐ [8, 5, 6, 2, 5, 3, 9, 17, 13]
- ☐ [2, 3, 5, 5, 6, 8, 9, 13, 17]
- ☐ [2, 5, 3, 6, 5, 8, 13, 17, 9]



Which of the following are effective methods of avoiding worst-case runtime for Quicksort?

\* 2 points

Select all that apply.

- ☐ Shuffle the array before running Quicksort
- ☐ Pick the median as the pivot
- ☐ Start by using another sort and switch to Quicksort when the array is mostly sorted
- ☐ Pick a random index as the pivot

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