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1. Divide and conquer Algorithm
2. Choose a pivot at index q such that $A[p, q-1]$ are all less than $A[q]$ and $A[q+1, r]$ are all greater.
3. The task is to put the pivot in the right place.

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Called as Quicksort (A, p, r)

Base Condition

THE FOLLOWING PROCEDURE IMPLEMENTS QUICKSORT.

```

QUICKSORT( $A, p, r$ )
1  if  $p < r$ 
2  {  $q = \text{PARTITION}(A, p, r)$ 
3    QUICKSORT( $A, p, q-1$ )
4    QUICKSORT( $A, q+1, r$ )
  }
```

Divide & Conquer

Diagram illustrating the partitioning step:

Array: $7 \mid 8 \mid 2 \mid 3 \mid 5 \mid 7 \mid 4$

Pivot: 4 (labeled "first element")

Indices: p points to the first element (7), q points to the pivot (4), r points to the last element (4).

Divide & Conquer

To sort an entire array A , the initial call is `QUICKSORT($A, 1, A.length$)`.

```

const partition = (A, p, r) => {
    let j = p, i = p - 2; pivot = A[r]
    for (let j = p; j < r; j++) {
        if (A[j] < pivot) {
            {
                i = i + 1;
                exchange(A[i], A[j]);
            }
        }
    }
    exchange(A[i + 1], A[r])
    return i;
}

```

