

# Bucket Sort (Time Complexity)

best, average and worst case time complexity of the bucket sort algorithm (Reading time: under 1 minute)

T I M E			S P A C E
Best	Average	Worst	Worst
$O(n + k)$	$O(n + k)$	$O(n^2)$	$O(n)$

## Best and average:

As we have two separate for-loops, the time it takes for the entire function to run is dependent on the individual loops.

## Worst:

Every element gets allocated at the same bucket. First, we loop over  $n$  items, to then loop over  $n$  items again in the bucket array.  $n * n = n^2$ .

## Worst space:

The length of the sorted and bucket array grows with the same amount as the size of the input.

Now, let's move on to Radix sort.