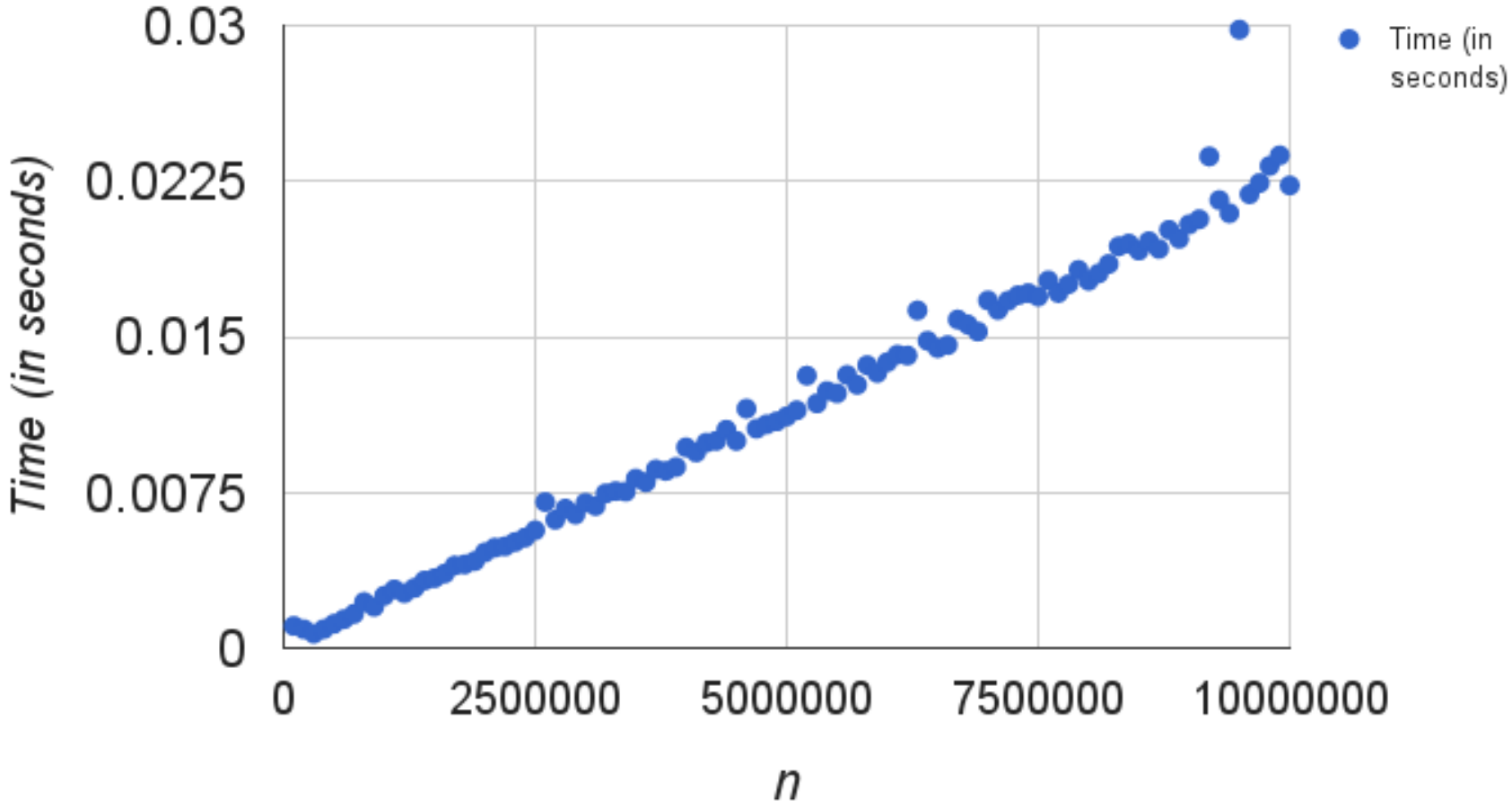
Concept Challenge

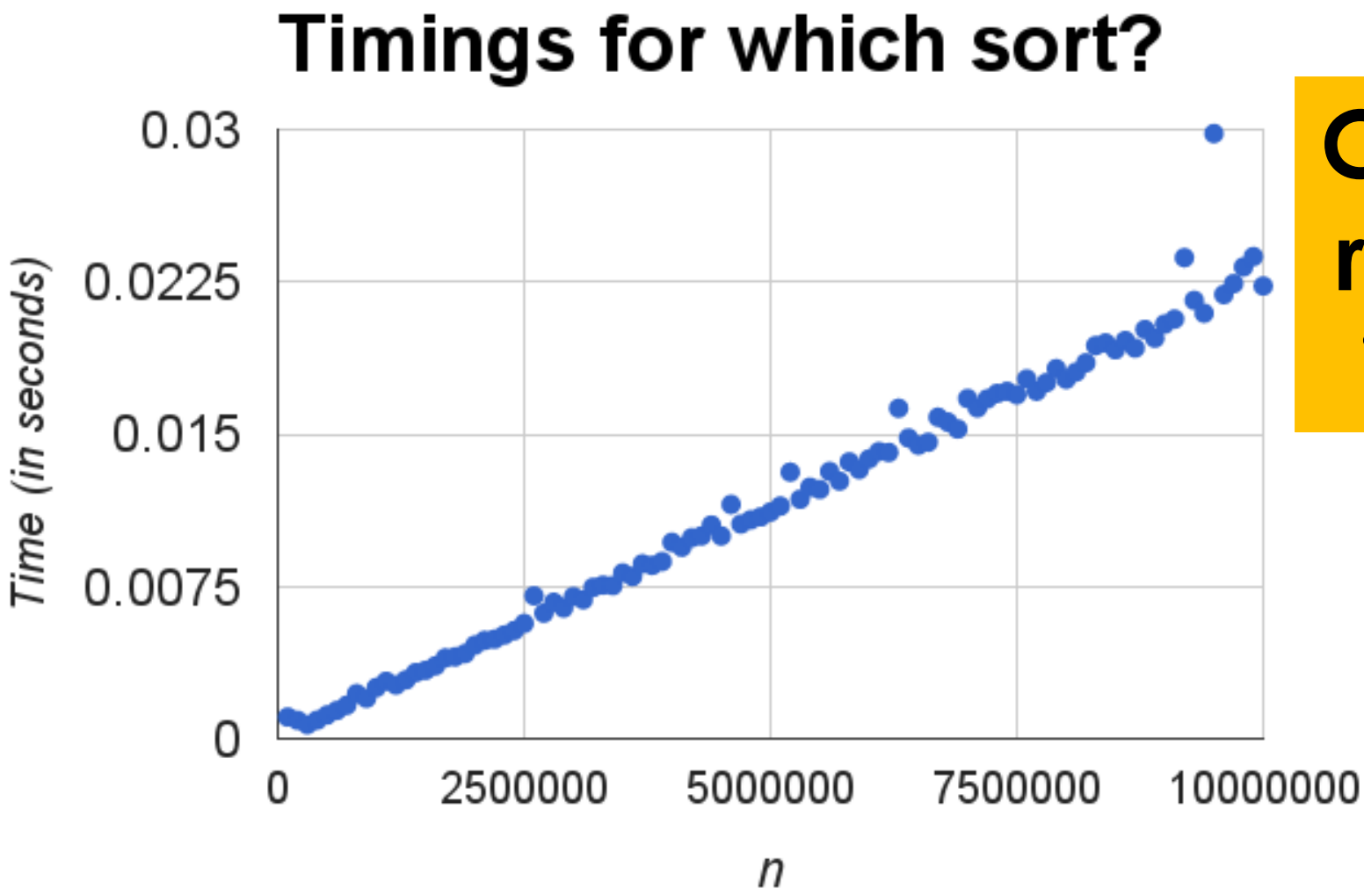
Using timings to evaluate performance

Concept Challenge

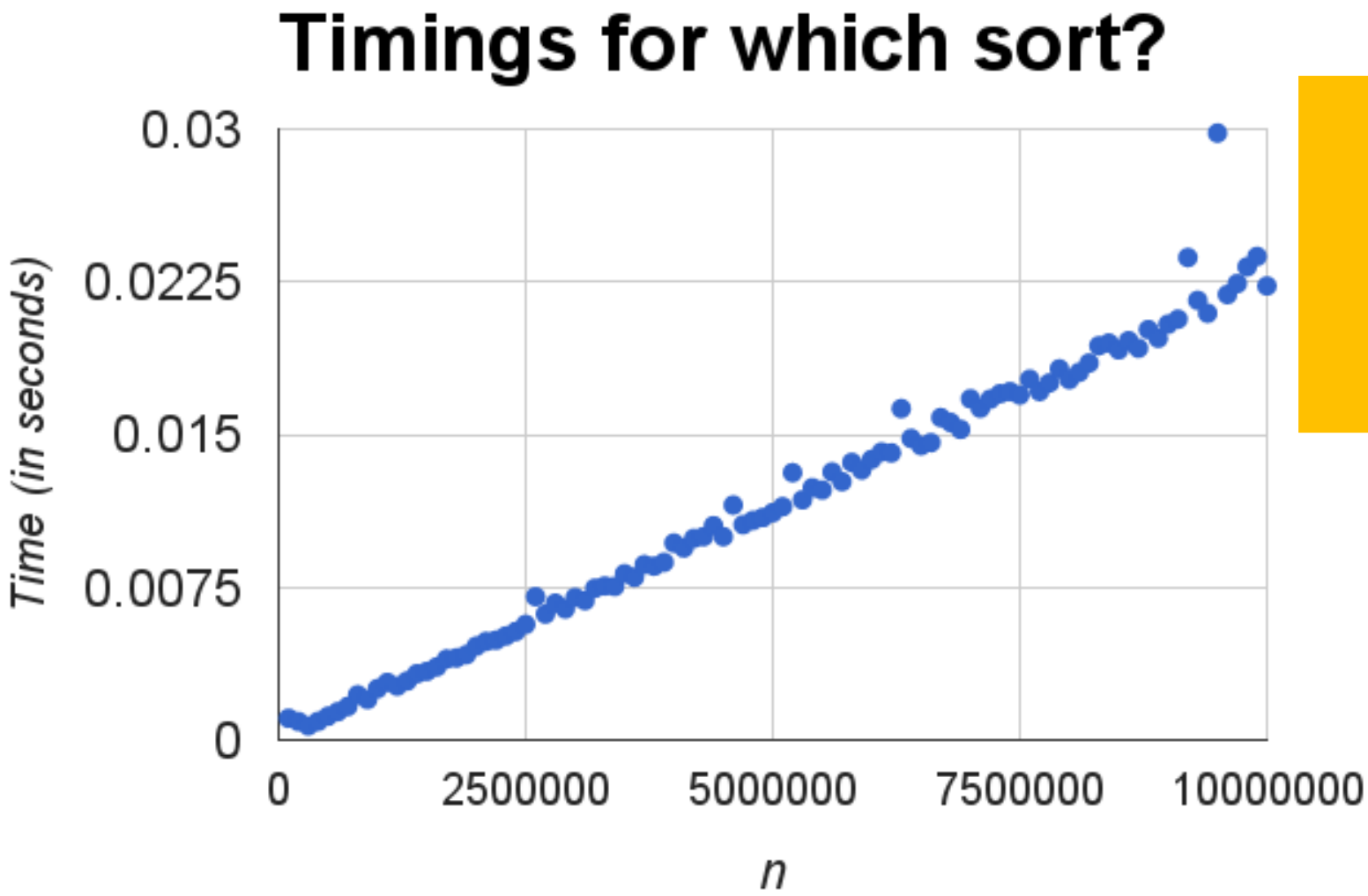
- **Pause** Try to solve the problem yourself
- **Discuss** with other learners (if you can)
- **Watch** the UCSD learners video
- **Confirm** your understanding with our explanation

Timings for which sort?



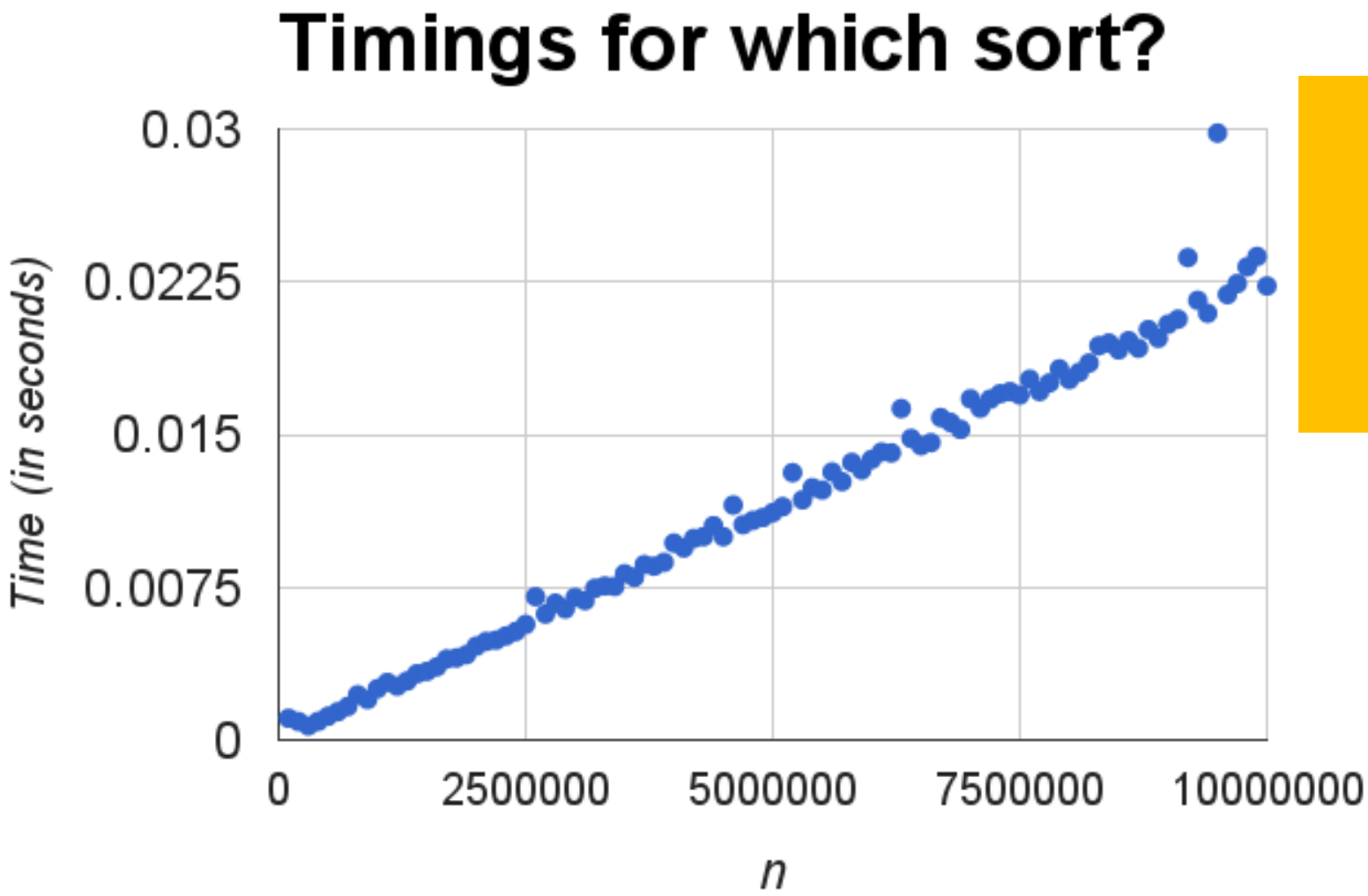


Could these be real timings for insertion sort?



IVQ Placeholder – Yes, No

	Best case	Average case	Worst case
Selection Sort	$O(n^2)$	$O(n^2)$	$O(n^2)$
Insertion Sort	$O(n)$	$O(n^2)$	$O(n^2)$
Merge Sort	$O(n \log n)$	$O(n \log n)$	$O(n \log n)$
Quick Sort	$O(n \log n)$	$O(n \log n)$	$O(n^2)$



This appears linear, not quadratic

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Selection Sort	$O(n^2)$	$O(n^2)$	$O(n^2)$
Insertion Sort	$O(n)$	$O(n^2)$	$O(n^2)$
Merge Sort	$O(n \log n)$	$O(n \log n)$	$O(n \log n)$
Quick Sort	$O(n \log n)$	$O(n \log n)$	$O(n^2)$

```
private static void insertionSort(double[] arr)
{
    for(int i = 1; i<arr.length; i++ ) {
        int j = i;
        while (j>0 && arr[j-1]>arr[j]) {
        // swap
            double temp = arr[j];
            arr[j] = arr[j-1];
            arr[j-1] = temp;
            j--;
        }
    }
  }
```

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