Kth Largest Element in a Stream

Try to solve the Kth Largest Element in a Stream problem.

We'll cover the following

Statement

Given an infinite stream of integers (sorted or unsorted), `nums`, design a class to find the k^{th} largest element in a stream.

> **Note**: It is the k^{th} largest element in the sorted order, not the k^{th} *distinct* element.

The class should have the following functions, inputs, and return values:

- **Init()**: It takes an array of integers and an integer k and initializes the class object.
- **Add(value)**: It takes one integer value, appends it to the stream, and calls the **Return kth largest()** function.
- **Return kth largest()**: It returns an integer value that represents the k^{th} largest element in the stream.

Constraints

- $1 \leq k \leq 10^3$
- $0 \leq$ `nums.length` $\leq 10^3$
- $-10^3 \leq$ `nums[i]` $\leq 10^3$
- $-10^3 \leq$ `value` $\leq 10^3$
- At most 10^3 calls will be made to add.
- It is guaranteed that there will be at least k elements in the array when you search for the k^{th} element.

Examples

Sample example 1

Input

`k = 6`

6	8	7	5	9	4	2	3

Output

4

Understand the problem

Let's take a moment to make sure you've correctly understood the problem. The quiz below helps you check if you're solving the correct problem:

K^{th} Largest Element in an Array

1 Given the following inputs, what will be the output?

nums = [4, 2, 1, 3, 5, 8]

k = 5

A) 9

B) 2

C) 8

D) 5

Submit Answer

Question 1 of 4
0 attempted

Reset Quiz

Figure it out!

We have a game for you to play. Rearrange the logical building blocks to develop a clearer understanding of how to solve this problem.

Drag and drop the cards to re-arrange them in the correct sequence

Create a min heap from the elements in the input number stream

Pop from the heap until the its size $= k$

In the add function, push the incoming number to the stream

If the size exceeds k, pop from the heap

After iterating all of the numbers, return the top of the heap as the k^{th} largest element

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Try it yourself

Implement your solution in the following coding playground.

Java

usercode > KthLargest.java

```java
import java.util.*;

class KthLargest {

    // constructor to initialize topKHeap and add values in it
    public KthLargest(int k, int[] nums) {
        // Write your code Here
    }

    public int add(int val) {
        // Your code will replace this placeholder return statement

        return -1;
    }
    // returns kth largest element from topKHeap
    public int returnKthLargest() {
        // Your code will replace this placeholder return statement

        return -1;
    }

}
```

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Test Cases | Results

Case 1 | Case 2 | Case 3

Input #1

["KthLargest","add","add","add","add","add"]

Input #2

[[3],[4,5,8,2],[3],[5],[10],[9],[4]]

Kth Largest Element in a Stream

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