## 716. Max Stack Premium

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Design a max stack data structure that supports the stack operations and supports finding the stack's maximum element.

Implement the MaxStack class:

- MaxStack() Initializes the stack object.
- void push(int x) Pushes element x onto the stack.
- int pop() Removes the element on top of the stack and returns it.
- int top() Gets the element on the top of the stack without removing it.

int peekMax() Retrieves the maximum element in the stack without removing it.

- int popMax() Retrieves the maximum element in the stack and removes it. If
- there is more than one maximum element, only remove the **top-most** one.

You must come up with a solution that supports 0(1) for each top call and 0(logn) for each other call.

## Example 1:

```
Input
["MaxStack", "push", "push", "top", "popMax", "top",
"peekMax", "pop", "top"]
[[], [5], [1], [5], [], [], [], [], [], []]
Output
[null, null, null, 5, 5, 1, 5, 1, 5]
Explanation
MaxStack stk = new MaxStack();
stk.push(5); // [5] the top of the stack and the maximum
number is 5.
stk.push(1);
             // [5, 1] the top of the stack is 1, but the
maximum is 5.
              // [5, 1, 5] the top of the stack is 5, which
stk.push(5);
is also the maximum, because it is the top most one.
stk.top(); // return 5, [5, 1, 5] the stack did not
change.
stk.popMax(); // return 5, [5, 1] the stack is changed now,
and the top is different from the max.
              // return 1, [5, 1] the stack did not change.
stk.top();
stk.peekMax(); // return 5, [5, 1] the stack did not change.
              // return 1, [5] the top of the stack and the
max element is now 5.
```

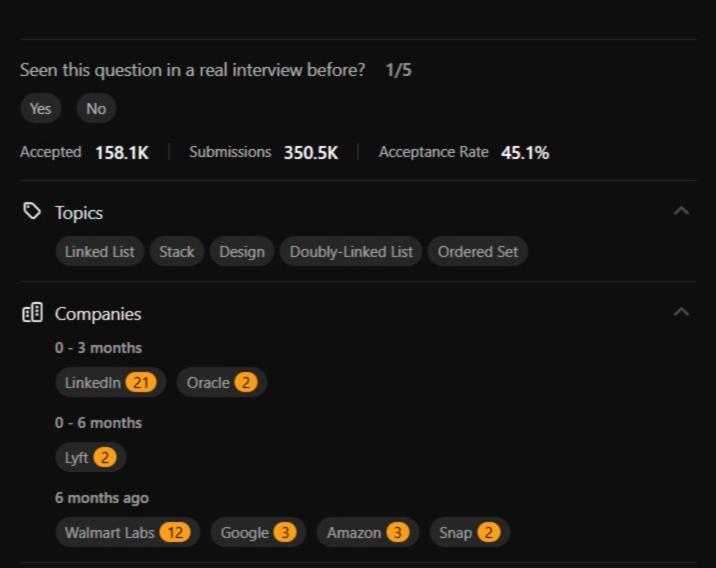
// return 5, [5] the stack did not change.

## Constraints:

•  $-10^7 <= x <= 10^7$ 

stk.top();

- At most 10<sup>5</sup> calls will be made to push, pop, top, peekMax, and popMax.
   There will be at least one element in the stack when pop, top, peekMax, or
- popMax is called.



Min Stack Medium

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