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Solution

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284. Peeking Iterator

Medium

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Design an iterator that supports the `peek` operation on an existing iterator in addition to the `hasNext` and the `next` operations.

Implement the `PeekingIterator` class:

- `PeekingIterator(Iterator<int> nums)` Initializes the object with the given integer iterator `iterator`.
- `int next()` Returns the next element in the array and moves the pointer to the next element.
- `boolean hasNext()` Returns `true` if there are still elements in the array.
- `int peek()` Returns the next element in the array **without** moving the pointer.

**Note:** Each language may have a different implementation of the constructor and `Iterator`, but they all support the `int next()` and `boolean hasNext()` functions.

**Example 1:**

**Input**  
["PeekingIterator", "next", "peek", "next", "next", "hasNext"]  
[[[1, 2, 3]], [], [], [], [], []]

**Output**  
[null, 1, 2, 2, 3, false]

**Explanation**

```
PeekingIterator peekingIterator = new PeekingIterator([1, 2, 3]); // [1,2,3]
peekingIterator.next();      // return 1, the pointer moves to the next element [1,2,3].
peekingIterator.peek();      // return 2, the pointer does not move [1,2,3].
peekingIterator.next();      // return 2, the pointer moves to the next element [1,2,3]
peekingIterator.next();      // return 3, the pointer moves to the next element [1,2,3]
peekingIterator.hasNext();    // return False
```

**Constraints:**

- `1 <= nums.length <= 1000`
- `1 <= nums[i] <= 1000`
- All the calls to `next` and `peek` are valid.
- At most `1000` calls will be made to `next`, `hasNext`, and `peek`.

**Follow up:** How would you extend your design to be generic and work with all types, not just integer?

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```
1 // Java Iterator interface reference:
2 // https://docs.oracle.com/javase/8/docs/api/java/util/Iterator.html
3
4 class PeekingIterator implements Iterator<Integer> {
5     public PeekingIterator(Iterator<Integer> iterator) {
6         // initialize any member here.
7     }
8
9
10    // Returns the next element in the iteration without advancing the iterator.
11    public Integer peek() {
12    }
13
14    // hasNext() and next() should behave the same as in the Iterator interface.
15    // Override them if needed.
16    @Override
17    public Integer next() {
18    }
19
20 }
21
22 @Override
23 public boolean hasNext() {
24 }
25
26 }
```

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