Algorithms

Binary Search Homework 3

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Teaching, Training and Coaching for more than a decade!

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Problem #1: LeetCode 1060 - Missing Element in Sorted Array

- Given an integer array nums which is **sorted** in **ascending** order and all of its elements are **unique** and given also an integer k
- Return the **kth missing number** starting from the **leftmost number** of the array.
- int missingElement(vector<int> &nums, int k)
  - We can develop a simple O(n) code
  - Find an O(logn) time approach

Example 1:

```
Input: nums = [4,7,9,10], k = 1
Output: 5
Explanation: The first missing number is 5.
```

Example 2:

```
Input: nums = [4,7,9,10], k = 3
Output: 8
Explanation: The missing numbers are [5,6,8,...], hence the third missing number
is 8.
```

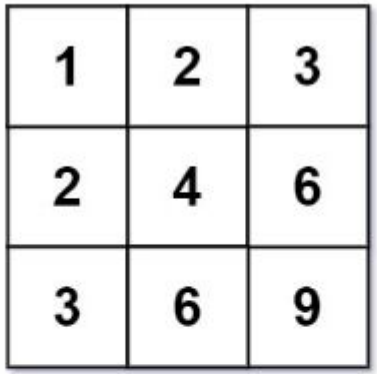
Example 3:

```
Input: nums = [1,2,4], k = 3
Output: 6
Explanation: The missing numbers are [3,5,6,7,...], hence the third missing
number is 6.
```

Problem #2: LeetCode 668. Kth Smallest Number in Multiplication Table

- The multiplication table of size m x n is an integer matrix where mat[i][j] == i * j (1-indexed).
- Given three integers m, n, and k, return the **k^{th} smallest element** in the m x n multiplication table.
- int findKthNumber(int m, int n, int k)
  - 1 <= m, n <= $3 * 10^4$
  - 1 <= k <= m * n

Example 1:



Input: m = 3, n = 3, k = 5
Output: 3
Explanation: The 5th smallest number is 3.

Example 2:

Input: m = 2, n = 3, k = 6
Output: 6
Explanation: The 6^{th} smallest number is 6.

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."