Contains Duplicate II

For this problem we need to check if there are two equal elements whose indices differ by at most k.

Approach: Hash Map (Optimal)

Key Idea:

- Use a hash map to store the last index where each number appeared
- While iterating:
  1. If the number has been seen before and i - last Index <= k, return true.
  2. Otherwise, update its last index in the map.

Algorithm:

1. Create an unordered_map last Index.
2. Iterate through nums with index i:
   - If nums[i] exists in map:
     - Check if i - last Index[nums[i]] <= k
     - If true → return true.
   - Update last Index[nums[i]] = i.
3. Return false if no valid pair found.

Complexity:

- Time: O(n) - single pass.
  Space: O(n) - hash map storing indices of elements.