

532. K-diff Pairs in an Array

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Given an array of integers `nums` and an integer `k`, return the number of **unique** `k`-diff pairs in the array.

A **k-diff** pair is an integer pair $(\text{nums}[i], \text{nums}[j])$, where the following are true:

- $0 \leq i < j < \text{nums.length}$
- $|\text{nums}[i] - \text{nums}[j]| == k$

Notice that $|\text{val}|$ denotes the absolute value of `val`.

Example 1:

Input: `nums = [3,1,4,1,5]`, `k = 2`

Output: 2

Explanation: There are two 2-diff pairs in the array, (1, 3) and (3, 5).

Although we have two 1s in the input, we should only return the number of unique pairs.

$$(3, 1, 4, 1, 5) \quad k = 2$$

$$3 - 1 = 2$$

$$5 - 3 = 2$$

Example 2:

Input: `nums = [1,2,3,4,5]`, `k = 1`

Output: 4

Explanation: There are four 1-diff pairs in the array, (1, 2), (2, 3), (3, 4) and (4, 5).

$$(1, 3) \quad (3, 5)$$

2 → 0/p

Example 3:

Input: `nums = [1,3,1,5,4]`, `k = 0`

Output: 1

Explanation: There is one 0-diff pair in the array, (1, 1).

$$[1, 2, 3, 4, 5] \quad k = 1$$

$$(1, 2) \quad (2, 3) \quad (3, 4) \quad (4, 5) \quad 0/p \Rightarrow 4$$

$$\begin{array}{cccccc} 3 & 1 & 4 & 1 & 5 & k = 2 \\ \downarrow & & & & & \\ 1 & 1 & 3 & 4 & 5 \\ i & j \end{array}$$

if ($|i - j| = k$)
return $\{i, j\}$

Steps:

- Create a HashMap with both key-value as Integers. Keys will represent the array element and value will represent their frequencies/counts.
- Declare a variable count and initialize it to 0.
- Iterate through only the keys in the Map. You can do this by making a set of Keys using the `keySet()` method on the Map. (to avoid duplicate of elements)
 - If $k > 0$ and the value ' i th key + k ' is present in the Map (OR) if $k = 0$, and the value ' $\text{freq}(i$ th key)' is greater than 1, then increment count.
- Return count as the result.

Example:

Nums : [3,1,4,1,5] $k = 2$

Key	Value
3	1
1	2
4	1
5	1

`map.keySet = [3, 1, 4, 5]`

So, if $k \geq 0$ and the value ' i th key + k ' is present in the map
(OR) if $k = 0$ and the value ' $\text{freq}(i$ th key)' is greater than 1 then
increment count.

Key	Value
3	1
1	2
4	1

5

1

$[3, 1, 4, 5]$
 $\uparrow \quad \uparrow \quad \uparrow \quad \uparrow$
 i^{th}

 $k = 2$ $C = \{1, 2\}$ $k > 0 \Rightarrow 2 > 0$

So, now

i is at 3 $\Rightarrow (i^{\text{th}} \text{ key} + k) \Rightarrow (3 + 2) = 5 \rightarrow$ this is present in the map.

So one pair is $(3, 5)$ increase the count by 1

 $i + 1 \Rightarrow 4 > 0$

$(i^{\text{th}} \text{ y } 1) \Rightarrow (1 + 2) = 3 \rightarrow$ present in the map.

So one pair is $(1, 3)$ count = 2.

 i is at 4 $4 > 0$

$(i^{\text{th}} \text{ key} + k) \Rightarrow (4 + 2) = 6 \rightarrow$ not present in the map

So no pair don't increase the count

 i is at 5 $5 > 0$

$(i^{\text{th}} \text{ key} + k) \Rightarrow (5 + 2) = 7 \rightarrow$ not present in the map

So no pair don't increase the count

return count = 2 → ans

One more example

nums = [1, 3, 1, 5, 4], k = 0

Key	Value (frequency)
1	2
3	1
5	1
4	1

count = 0

map.keySet = [1, 3, 5, 4]

1, 3, 5, 4 now k = 0 here
~~1~~ ~~3~~ ~~5~~ ↑
 ith

In case of k = 0 check the frequency of the value 1 greater than 1

At ith key i = 1 count = 2

1, 3 → " " 0 increase

move to 5 and 4-

" " S → " " 100 100 100

Same for S and 4-