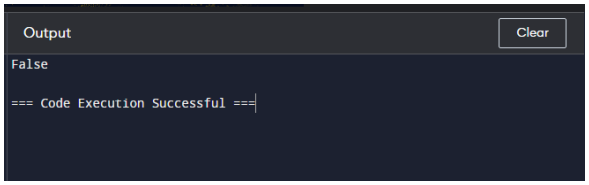
QUESTION 1:

IN AN GIVEN BINARY ARRAY CONSISTING OF N ELEMENTS LAST POSITION IS K ,IF K IS EQUAL TO 1 THEN THE RESULT SHOULD BE TRUE OTHERWISE FALSE.

CODE:

```
def k_length_apart(nums, k):
    prev = -k - 1
    for i, num in enumerate(nums):
        if num == 1:
            if i - prev <= k:
                return False
            prev = i
    return True
nums = [1, 0, 0, 1, 0, 1]
k = 2
print(k_length_apart(nums, k))
```



QUESTION 2

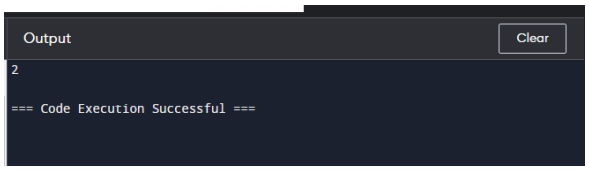
Longest Continuous Subarray With Absolute Diff Less Than or Equal to Limit

Given an array of integers nums and an integer limit, return the size of the longest non-empty subarray such that the absolute difference between any two elements of this subarray is less than or equal to limit.

CODE:

```
def longest_subarray(nums, limit):
    def helper(left, right, max_val, min_val):
```

```
        if right == len(nums):
            return right - left
        max_val = max(max_val, nums[right])
        min_val = min(min_val, nums[right])
        if max_val - min_val <= limit:
            return max(right - left + 1, helper(left, right + 1, max_val, min_val))
        else:
            return helper(left + 1, right, nums[left + 1], nums[left + 1])
    return helper(0, 0, nums[0], nums[0])
nums = [8, 2, 4, 7]
limit = 4
print(longest_subarray(nums, limit))
```



QUESTION 3:

Find the Kth Smallest Sum of a Matrix With Sorted Rows

You are given an m x n matrix mat that has its rows sorted in non-decreasing order and an integer k.

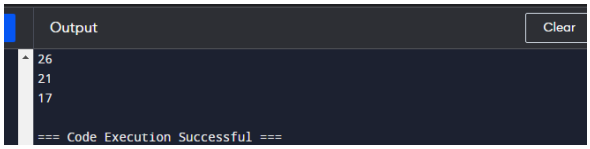
You are allowed to choose exactly one element from each row to form an array.

Return the kth smallest array sum among all possible arrays.

CODE:

```
from heapq import heappush, heappop
def kthSmallest(mat, k):
    m, n = len(mat), len(mat[0])
    def merge_rows(row1, row2):
```

```
        min_heap = []
        for num1 in row1:
            for num2 in row2:
                heappush(min_heap, num1 + num2)
                if len(min_heap) > k:
                    heappop(min_heap)
        result = []
        while min_heap:
            result.append(heappop(min_heap))
        result.sort()
        return result
    def recursive_combine(index):
        if index == 0:
            return mat[0]
        return merge_rows(recursive_combine(index - 1), mat[index])
    return recursive_combine(m - 1)[k - 1]
mat = [
    [1, 3, 11],
    [2, 4, 6],
    [5, 8, 9]
]
k = 5
print(kthSmallest(mat, k))
```



QUESTION 4:

Count Triplets That Can Form Two Arrays of Equal XOR

Given an array of integers arr.

We want to select three indices i, j and k where (0 <= i < j <= k < arr.length).

Let's define a and b as follows:

- a = arr[i] ^ arr[i + 1] ^ ... ^ arr[j - 1]
- b = arr[j] ^ arr[j + 1] ^ ... ^ arr[k]

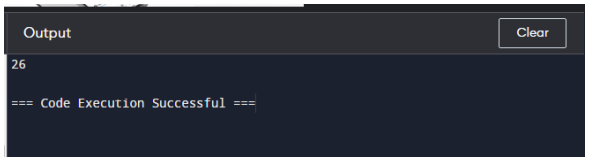
Note that ^ denotes the bitwise-xor operation.

Return the number of triplets (i, j and k) Where a == b.

CODE:

```
from heapq import heappush, heappop
def kthSmallest(mat, k):
    m, n = len(mat), len(mat[0])
    def merge_rows(row1, row2):
        min_heap = []
        for num1 in row1:
            for num2 in row2:
                heappush(min_heap, num1 + num2)
                if len(min_heap) > k:
                    heappop(min_heap)
        result = []
        while min_heap:
            result.append(heappop(min_heap))
        result.sort()
        return result
    def recursive_combine(index):
        if index == 0:
```

```
            return mat[0]
        return merge_rows(recursive_combine(index - 1), mat[index])
    return recursive_combine(m - 1)[k - 1]
mat = [
    [1, 3, 11],
    [2, 4, 6],
    [5, 8, 9]
]
k = 5
print(kthSmallest(mat, k))
```



QUESTION 5

Minimum Time to Collect All Apples in a Tree Given an undirected tree consisting of n vertices numbered from 0 to n-1, which has some apples in their vertices. You spend 1 second to walk over one edge of the tree. Return the minimum time in seconds you have to spend to collect all apples in the tree, starting at vertex 0 and coming back to this vertex. The edges of the undirected tree are given in the array edges, where edges[i] = [ai, bi] means that exists an edge connecting the vertices ai and bi. Additionally, there is a boolean array hasApple, where hasApple[i] = true means that vertex i has an apple; otherwise, it does not have any apple.

CODE:

```
def minTime(n, edges, hasApple):
    from collections import defaultdict
    tree = defaultdict(list)
    for u, v in edges:
        tree[u].append(v)
        tree[v].append(u)
```

```
    def dfs(node, parent):
        total_time = 0
        for neighbor in tree[node]:
            if neighbor == parent:
                continue
            time_spent = dfs(neighbor, node)
            if time_spent > 0 or hasApple[neighbor]:
                total_time += time_spent + 2
        return total_time
    return dfs(0, -1)
n = 7
edges = [[0,1],[0,2],[1,4],[1,5],[2,3],[2,6]]
hasApple = [False, False, True, False, True, True, False]
print(minTime(n, edges, hasApple))
```