DATE6/6/24

1. Odd String Difference

You are given an array of equal-length strings words. Assume that the length of each string is n.

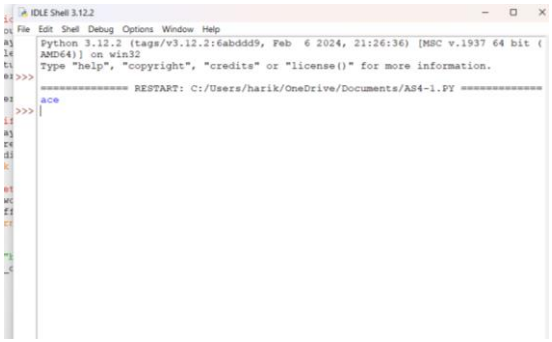
Each string words[i] can be converted into a difference integer array difference[i] of length n - 1 where difference[i][j] = words[i][j+1] - words[i][j] where 0 <= j <= n - 2. Note that the difference between two letters is the difference between their positions in the alphabet i.e. the position of 'a' is 0, 'b' is 1, and 'z' is 25.

CODE:

```
def odd_string_difference(words):
    # Helper function to convert a string to its difference array
    def to_difference_array(word):
        return [ord(word[i + 1]) - ord(word[i]) for i in range(len(word) - 1)]

    # Convert all words to their difference arrays
    difference_arrays = [to_difference_array(word) for word in words]

    # Use a dictionary to count the occurrences of each difference array
    difference_count = {}
    for diff_array in difference_arrays:
        diff_tuple = tuple(diff_array)  # Convert list to tuple to use as dict key
        if diff_tuple in difference_count:
            difference_count[diff_tuple] += 1
        else:
            difference_count[diff_tuple] = 1

    # Find the difference array that occurs only once
    for diff_array in difference_arrays:
        if difference_count[tuple(diff_array)] == 1:
            odd_diff_array = diff_array
            break

    # Find and return the word corresponding to the odd difference array
```

```
    for word in words:
        if to_difference_array(word) == odd_diff_array:
            return word


# Example usage:
words = ["abc", "bcd", "ace"]
print(odd_string_difference(words))
```

output:



2. Words Within Two Edits of Dictionary

You are given two string arrays, queries and dictionary. All words in each array comprise
of lowercase English letters and have the same length.
In one edit you can take a word from queries, and change any letter in it to any other letter. Find all words from queries that, after a maximum of two edits, equal some word from dictionary.
Return a list of all words from queries, that match with some word from dictionary after a
maximum of two edits. Return the words in the same order they appear in queries.
Example 1:
Input: queries = ["word","note","ants","wood"], dictionary = ["wood","joke","moat"]
Output: ["word","note","wood"]
Explanation:
- Changing the 'r' in "word" to 'o' allows it to equal the dictionary word "wood".
- Changing the 'n' to 'j' and the 't' to 'k' in "note" changes it to "joke".
- It would take more than 2 edits for "ants" to equal a dictionary word.
- "wood" can remain unchanged (0 edits) and match the corresponding dictionary word.
Thus, we return ["word","note","wood"].

CODE:

```
def words_within_two_edits(queries, dictionary):
    # Helper function to check if two words differ by at most two characters
```

```
    def within_two_edits(word1, word2):
        # Check if the two words differ by at most two characters
        count_diff = sum(1 for a, b in zip(word1, word2) if a != b)
        return count_diff <= 2

    # List to store the results
    result = []

    # Check each word in queries against each word in dictionary
    for query in queries:
        for dict_word in dictionary:
            if within_two_edits(query, dict_word):
                result.append(query)
                break

    return result

# Example usage:
queries = ["word", "note", "ants", "wood"]
dictionary = ["wood", "joke", "moat"]
print(words_within_two_edits(queries, dictionary))
```

output:

3. Next Greater Element IV

You are given a 0-indexed array of non-negative integers nums. For each integer in nums, you must find its respective second greater integer.

The second greater integer of nums[i] is nums[j] such that:

j > i

nums[j] > nums[i]

There exists exactly one index k such that nums[k] > nums[i] and i < k < j.
If there is no such nums[j], the second greater integer is considered to be -1.
For example, in the array [1, 2, 4, 3], the second greater integer of 1 is 4, 2 is 3, and that of 3 and 4 is -1.
Return an integer array answer, where answer[i] is the second greater integer of nums[i].

CODE:

```
def second_greater_element(nums):
    # Initialize the result array with -1 for each element
    result = [-1] * len(nums)

    # Iterate through the array to find the second greater element for each nums[i]
    for i in range(len(nums)):
        first_greater_found = False

        for j in range(i + 1, len(nums)):
            if nums[j] > nums[i]:
                if not first_greater_found:
                    first_greater_found = True
                else:
                    result[i] = nums[j]
                    break

    return result

# Example usage:
nums = [1, 2, 4, 3]
print(second_greater_element(nums))
```

OUTPUT:

4. Minimum Addition to Make Integer Beautiful
You are given two positive integers n and target.
An integer is considered beautiful if the sum of its digits is less than or equal to target. Return the minimum non-negative integer x such that n + x is beautiful. The input will be
generated such that it is always possible to make n beautiful.

CODE:

```
def min_addition_to_make_beautiful(n, target):
    # Helper function to calculate the sum of digits of a number
    def sum_of_digits(num):
        return sum(int(digit) for digit in str(num))

    # If the sum of digits of n is already <= target, no addition is needed
    if sum_of_digits(n) <= target:
        return 0

    # Initialize the result x to 0
    x = 0
    increment = 1

    # Process each digit from the least significant to the most significant
    while sum_of_digits(n + x) > target:
        # Calculate the next multiple of 10 for the least significant digit position
        next_increment = increment - (n % increment)
        x += next_increment
        n += next_increment
        increment *= 10
```

```
    return x


# Example usage:

n = 467

target = 15

print(min_addition_to_make_beautiful(n, target))
```

OUTPUT:

5. Sort Array by Moving Items to Empty Space

You are given an integer array nums of size n containing each element from 0 to n - 1 (inclusive). Each of the elements from 1 to n - 1 represents an item, and the element 0 represents an empty space.

In one operation, you can move any item to the empty space. nums is considered to be sorted if the numbers of all the items are in ascending order and the empty space is either at the beginning or at the end of the array.

For example, if n = 4, nums is sorted if:

- nums = [0,1,2,3] or
- nums = [1,2,3,0]

...and considered to be unsorted otherwise.

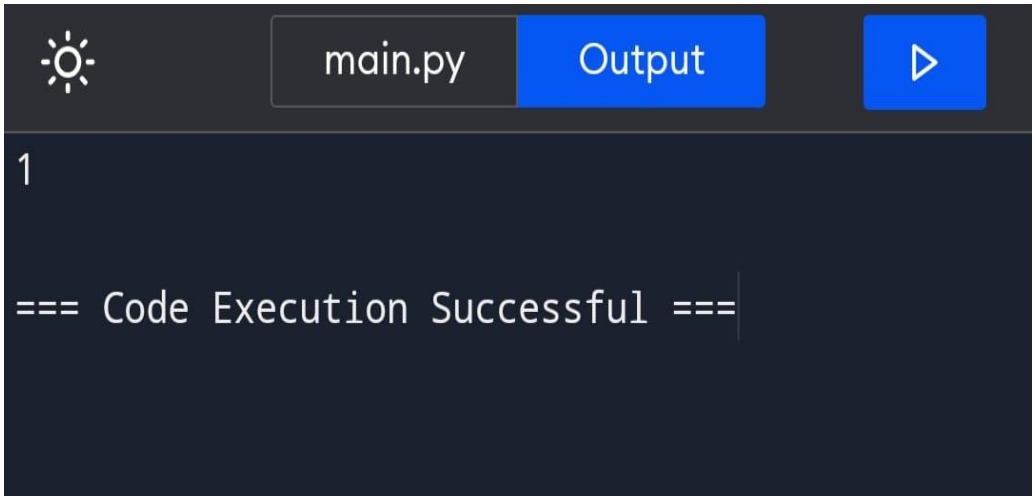
Return the minimum number of operations needed to sort nums.

CODE:

```
def min_operations_to_sort(nums):

    n = len(nums)

    target1 = list(range(n))  # [0, 1, 2, ..., n-1]

    target2 = list(range(1, n)) + [0]  # [1, 2, ..., n-1, 0]


    def count_moves(target):

        nums_copy = nums[:]

        pos = {num: i for i, num in enumerate(nums_copy)}  # positions of each number
```

```
    moves = 0

    for i in range(n):
        while nums_copy[i] != target[i]:
            empty_index = pos[0]
            target_num_index = pos[target[i]]

            # Swap the element at target_num_index with the empty space
            nums_copy[empty_index], nums_copy[target_num_index] =
nums_copy[target_num_index], nums_copy[empty_index]

            # Update positions in the map
            pos[nums_copy[empty_index]] = empty_index
            pos[nums_copy[target_num_index]] = target_num_index

            moves += 1

    return moves

  # Compute moves for both possible target configurations
  return min(count_moves(target1), count_moves(target2))

# Example usage:
nums = [2, 0, 1, 3]
print(min_operations_to_sort(nums))
```

OUTPUT:


main.py
Output
1
=== Code Execution Successful ===