Exam Instruction: Palindrome Checker

Objective:

Write a Python function to check if a given string is a palindrome. A palindrome is a word, phrase, number, or other sequence of characters that reads the same forward and backward, ignoring spaces, capitalization, and punctuation.

Instructions:

1. Define a function named is_palindrome(s: str) -> bool that takes a string as input and returns True if it is a palindrome, otherwise False.
2. Ignore **case sensitivity** (e.g., "Racecar" should be considered a palindrome).
3. Ignore **spaces and punctuation** (e.g., "A man, a plan, a canal: Panama" is a palindrome).
4. You **cannot use** built-in functions like re.sub() for regex filtering.
5. Your function should efficiently handle long strings.
6. The function should return a boolean value (True or False).

Example Test Cases:

python

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print(is_palindrome("racecar")) # True

print(is_palindrome("hello")) # False

print(is_palindrome("A man, a plan, a canal: Panama")) # True

print(is_palindrome("No lemon, no melon")) # True

Constraints:

- The input string can have a length of **1 to 1000** characters.
- The function should run in **O(n) time complexity**.
- Do **not** use built-in string reversal methods like s[::-1].

Submission Guidelines:

- Submit a .py file containing your function.

- Do not include any extra print statements outside of the test cases.
- Ensure your function is well-commented and formatted properly

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