005. Longest Palindromic Substring

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- **Dynamic Programming**+string

Description

Given a string s, find the longest palindromic substring in s. You may assume that the maximum length of s is 1000.

Example:
Input: "babad"
Output: "bab"

Note: "aba" is also a valid answer.

Example
Input: "cbbd"
Output: "bb"

1. Thought Line

(1) To each element, set it as the middle elements and check from both left and right direction.

2. Dynamic Programming+string

```cpp
class Solution {
public:
    string longestPalindrome(string s) {
        int n = s.size();
        int len = 0; //len is the max length of Palindrome string.
        int start = 0;
        for(int i = 0; i < n; i++){

            // start to expend the interval
            int left = i, right = i;
            // consider duplicate characters.
            while(right < n && s[right+1] == s[right])
                right++;
            i = right;

            // keep expanding
            while(left > 0 && right < n-1 && s[left-1] == s[right+1]){
                left--;
                right++;
            }

            //update results
            if(len < right-left+1){
                len = right - left + 1;
                start = left;
            }
        }
        return s.substr(start, len);
    }
};
```