Nearest Multiple Of 10

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Platform	GeeksForGeeks
difficulty	Easy
tags	String Manipulation
language	C++
solved on	@19/10/2024
link	https://www.geeksforgeeks.org/problems/nearest-multiple-of-102437/1
Completion	☑

Intuition

We are tasked with rounding a given number, represented as a string, to the nearest number by modifying the last digit. If the last digit is greater than or equal to 5, we need to round up. Otherwise, we round down by replacing the last digit with '0'. If rounding up causes a carryover (e.g., a '9' being incremented), the previous digits must be adjusted accordingly.

Approach

1. Convert the string representation of the number to handle each character.
2. Inspect the last character of the string. If it is less than or equal to '5', we simply set it to '0', which effectively rounds down.
3. If the last character is greater than '5', replace it with '0' and propagate the carryover backward to the previous digits.
4. Continue moving leftward, handling cases where digits are '9' and need to be turned into '0', until a non-'9' digit is encountered, which can be incremented by 1.
5. If the entire string becomes all zeros, handle the special case by adding '1' at the front.

Complexity

Time Complexity:

The time complexity of the approach is **O(n)**, where `n` is the length of the string. In the worst case, we traverse the string once to handle carryover propagation.

Space Complexity:

The space complexity is **O(1)** since the operation is performed in-place on the string, and no additional space is used other than a few variables.

Code

```
class Solution {
  public:
    string roundToNearest(string str) {
        int n = str.size();
```

```
        char last = str[n-1];
        str[n-1] = '0';

        if(last <= '5')  return str;
        for(int i = n-2; i >= 0; i--){
            if(str[i] < '9'){
                str[i]++;
                return str;
            }
            else  str[i] = '0';
        }
        return "1" + str;
    }
};
```