

564. Find the Closest Palindrome

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/*
    Math
    Time complexity: O(logm)
    Space complexity: O(5+5+5)=O(1)
    where: m is the number of digits of n
*/

typedef long long ll;
typedef std::vector<ll> vl;

class Solution {
public:
    ll get_palindrome(ll left_half, bool is_even){
        ll pal=left_half;
        if(!is_even) left_half/=10;
        while(left_half>0){
            pal=pal*10+left_half%10;
            left_half/=10;
        }
        return pal;
    }

    std::string nearestPalindromic(std::string n) {
        ll number=std::stoll(n);

        int m=n.size();

        std::string sub=n.substr(0,(m+1)/2);
        ll left_half=std::stoll(sub);

        ll pal1=get_palindrome(left_half-1,m%2==0);
        ll pal2=get_palindrome(left_half,m%2==0);
        ll pal3=get_palindrome(left_half+1,m%2==0);
        ll pal4=std::pow(10,m-1)-1;;
        ll pal5=std::pow(10,m)+1;;
    }
};
```

```

    vl palindromes;
    if(pal1!=number) palindromes.push_back(pal1);
    if(pal2!=number) palindromes.push_back(pal2);
    if(pal3!=number) palindromes.push_back(pal3);
    if(pal4!=number) palindromes.push_back(pal4);
    if(pal5!=number) palindromes.push_back(pal5);

    vl diffs;
    for(auto&p: palindromes){
        diffs.push_back(abs(p-number));
    }

    for(auto&p: diffs) std::cout<<p<<"\n";

    ll min_diff=*std::min_element(diffs.begin(),diffs.end());

    vl mins;
    for(int i=0;i<diffs.size();++i){
        if(diffs[i]==min_diff) mins.push_back(palindromes[i]);
    }

    ll min_pal=*std::min_element(mins.begin(),mins.end());

    std::string ans=std::to_string(min_pal);

    return ans;
}
};

```