PW SKILLS

Lesson Plan

Dp-2

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Today's checklist

- House robber problem [Leetcode 198]
- Perform the given Operations on N

House robber problem [leetcode 198]

Q1. You are a professional robber planning to rob houses along a street. Each house has a certain amount of money stashed, the only constraint stopping you from robbing each of them is that adjacent houses have security systems connected and it will automatically contact the police if two adjacent houses were broken into on the same night.

Given an integer array nums representing the amount of money of each house, return the maximum amount of money you can rob tonight without alerting the police.

Example 1:

Input: nums = [1,2,3,1]
Output: 4

Explanation: Rob house 1 (money = 1) and then rob house 3 (money = 3).
Total amount you can rob = 1 + 3 = 4.

Example 2:

Input: nums = [2,7,9,3,1]
Output: 12

Explanation: Rob house 1 (money = 2), rob house 3 (money = 9) and rob house 5 (money = 1).
Total amount you can rob = 2 + 9 + 1 = 12.

Constraints:

1 <= nums.length <= 100
0 <= nums[i] <= 400

Solution:

Code:

```
class Solution {


    public int rec(int []nums,int i,int[] dp)
    {
        if(i >= nums.length)
        {
            return 0;
        }
        if(dp[i]!=-1)/// pahle se stored hai to wahi use karlo
        {
            return dp[i];
        }
        int ans=0;
        //rob it
        ans=nums[i]+rec(nums,i+2,dp);
        //not rob it
        ans=Math.max(ans,rec(nums,i+1,dp));

        dp[i]=ans;
        return ans;
    }

    public int rob(int[] nums) {
        int n=nums.length;
        int[] dp=new int[n];

        for(int i=0;i<n;i++)
        {
            dp[i]=-1;
        }

        return rec(nums,0,dp);
    }
}
```

Q2. Given a number N. The task is to reduce the given number N to 1 in the minimum number of steps. You can perform any one of the below operations in each step.

Operation 1: If the number is even then you can divide the number by 2.

Operation 2: If the number is odd then you are allowed to perform either (n+1) or (n-1).
You need to print the minimum number of steps required to reduce the number N to 1 by performing the above operations.

Examples:

Input : n = 15
Output : 5
15 is odd 15+1=16
16 is even 16/2=8
8 is even 8/2=4
4 is even 4/2=2
2 is even 2/2=1

Input : n = 7
Output : 4
7->6
6->3
3->2
2->1

```
class PW {

    static int countways(int n)
    {
        if (n == 1)
            return 0;
        else if (n % 2 == 0)
            return 1 + countways(n / 2);
        else
            return 1 + Math.min(countways(n - 1), countways(n +
1));
    }

    public static void main(String args[])
    {
        int n = 15;

        System.out.println(countways(n));
    }
}
```

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THANK YOU !