Min Cost Climbing Stairs

Memoization

Time Complexity : O(n)
Space Complexity : O(n)

Bast Check :

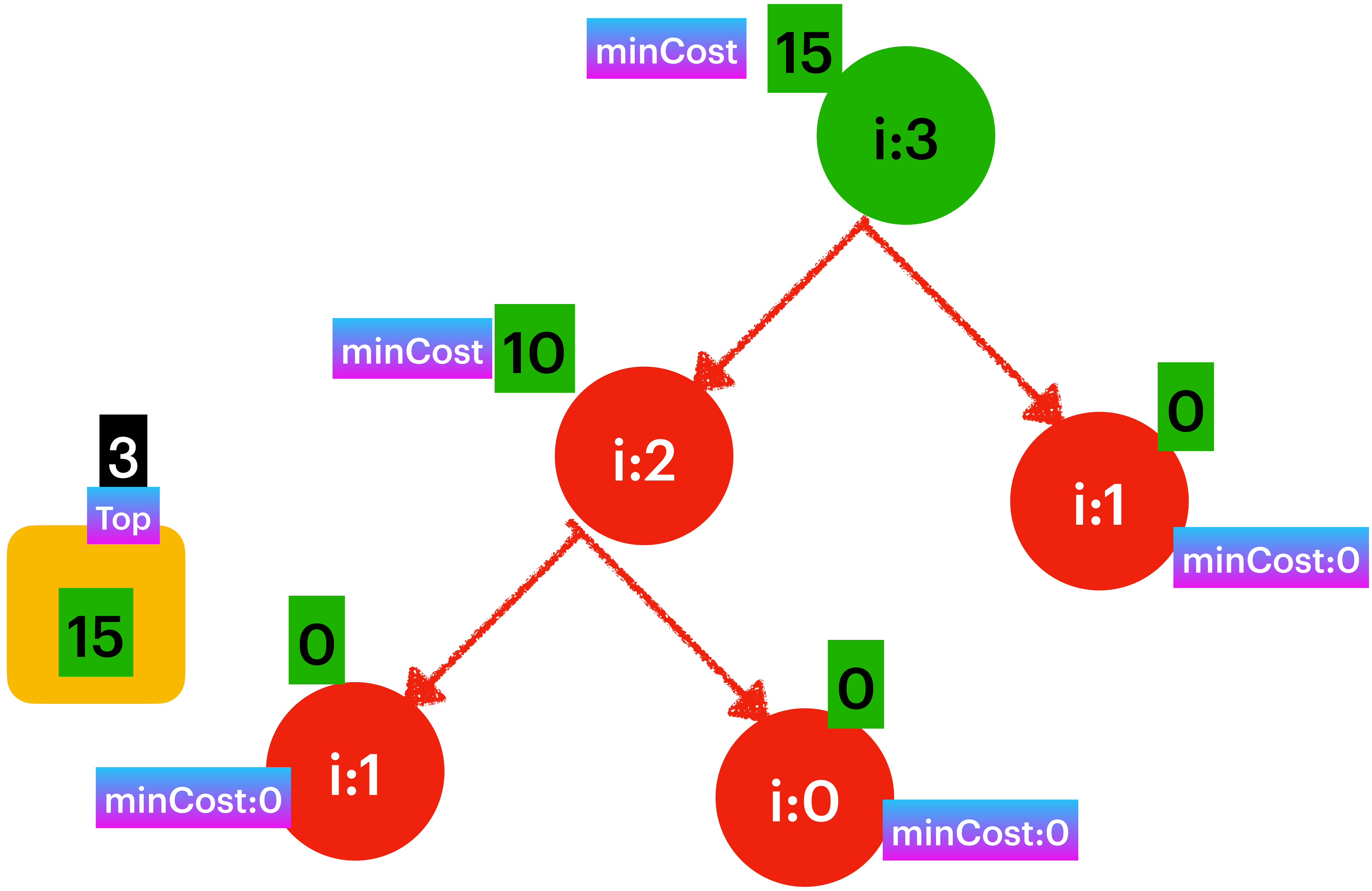
```
if( i <= 1)
{
return 0;
}
```

cost[]:

0	1	2
Step1	Step2	Step3
10	15	20

dp[] :

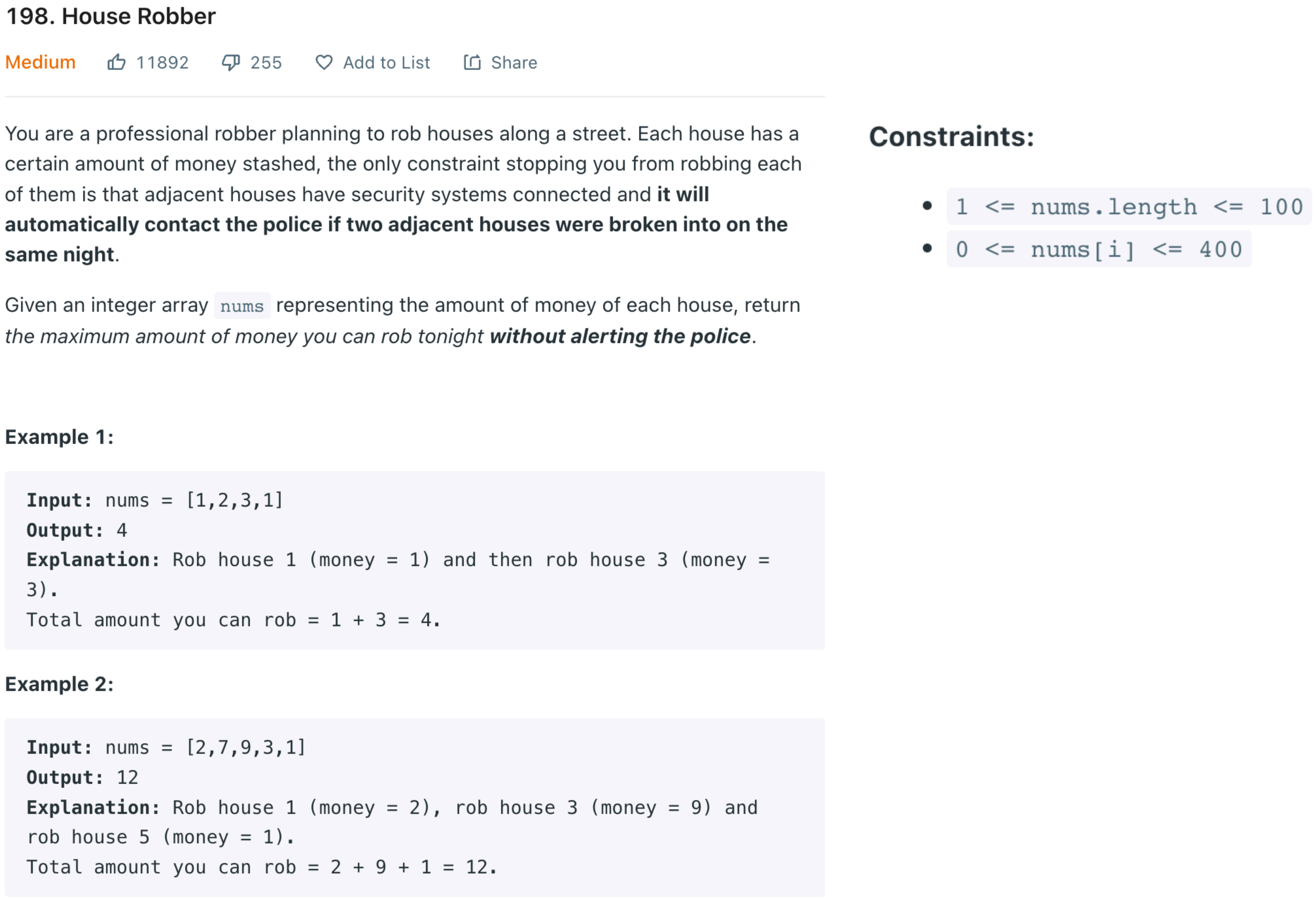
0	1	2	3
Step1	Step2	Step3	Top
0	0	10	15



Recurrence Relation —->

We can reach ith step either from i-1 or i-2 steps.

dp[i] = Math.min(cost[i-1] + dp[i-1] , cost[i -2] + dp[i-2])



198. House Robber

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:

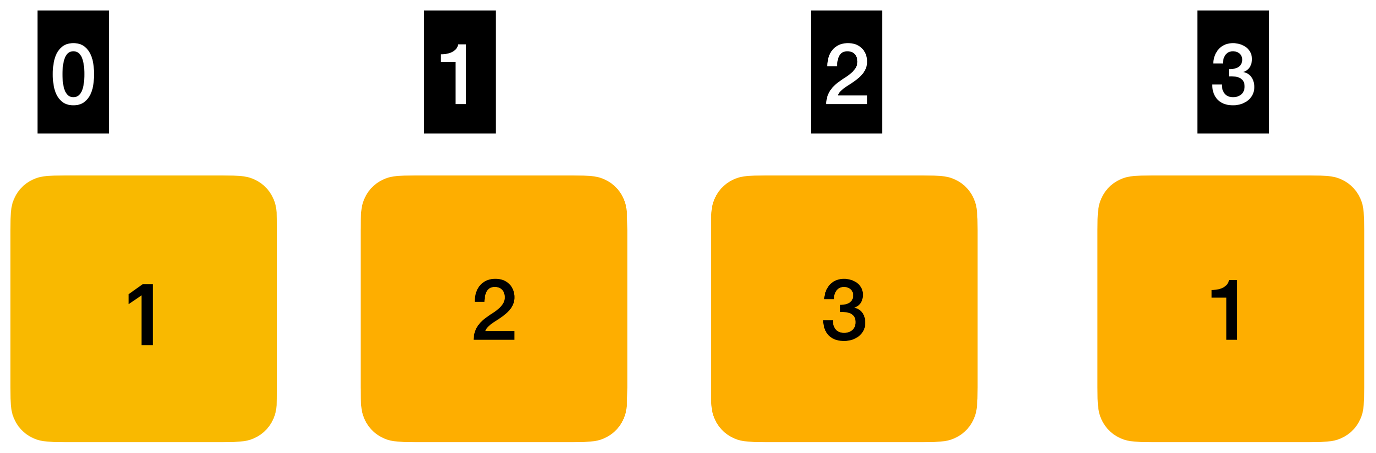
```
Input: nums = [2,7,9,3,1]
Output: 12
Explanation: Rob house 1 (money = 2), rob house 3 (money = 9) and
rob house 5 (money = 1).
Total amount you can rob = 2 + 9 + 1 = 12.
```

Constraints:

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

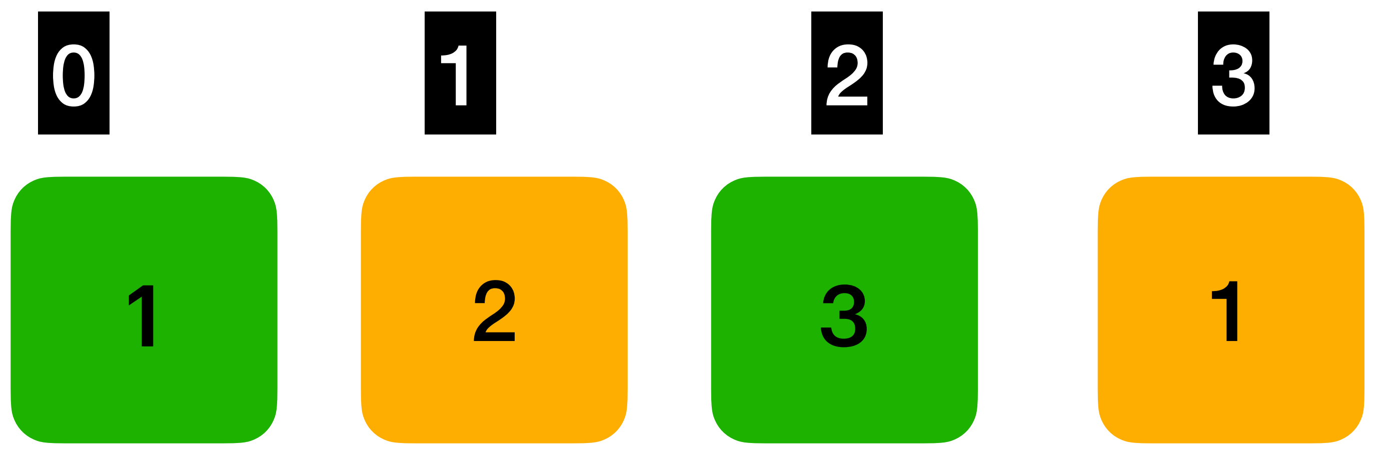
Constraint : You can not rob from adjacent houses

Get the Max Profit without altering the police



0	1	2	3
1	2	3	1

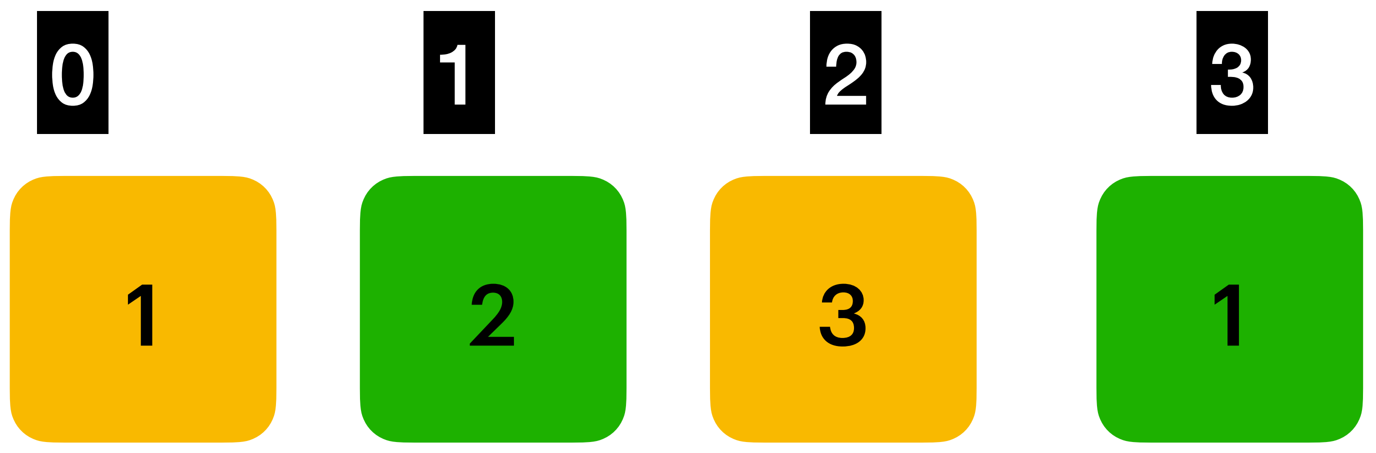
Case1



0	1	2	3
1	2	3	1

MaxProfit : 4

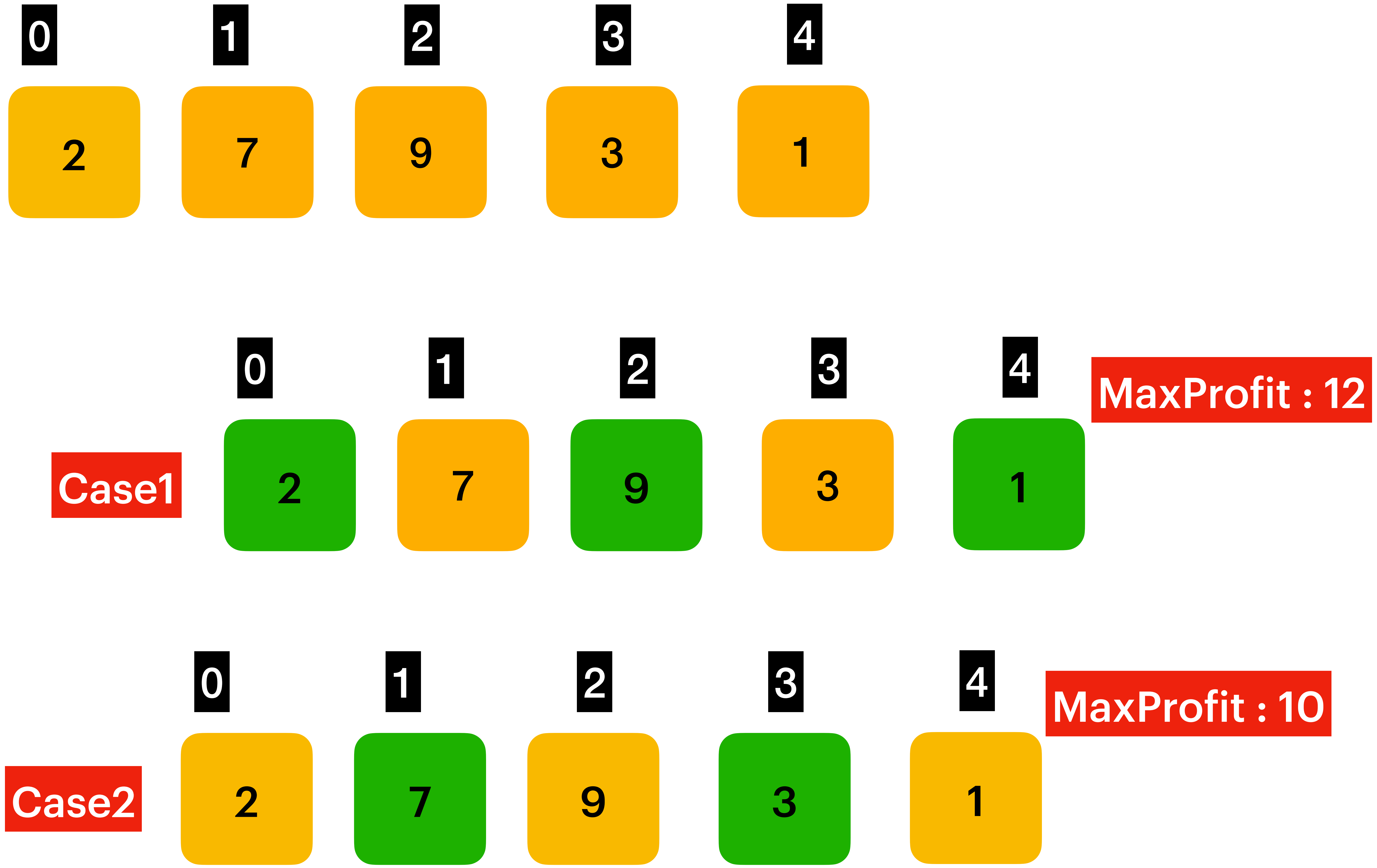
Case2



0	1	2	3
1	2	3	1

MaxProfit : 3

Should return Max Profit i.e 4



0	1	2	3	4
2	7	9	3	1

Case1

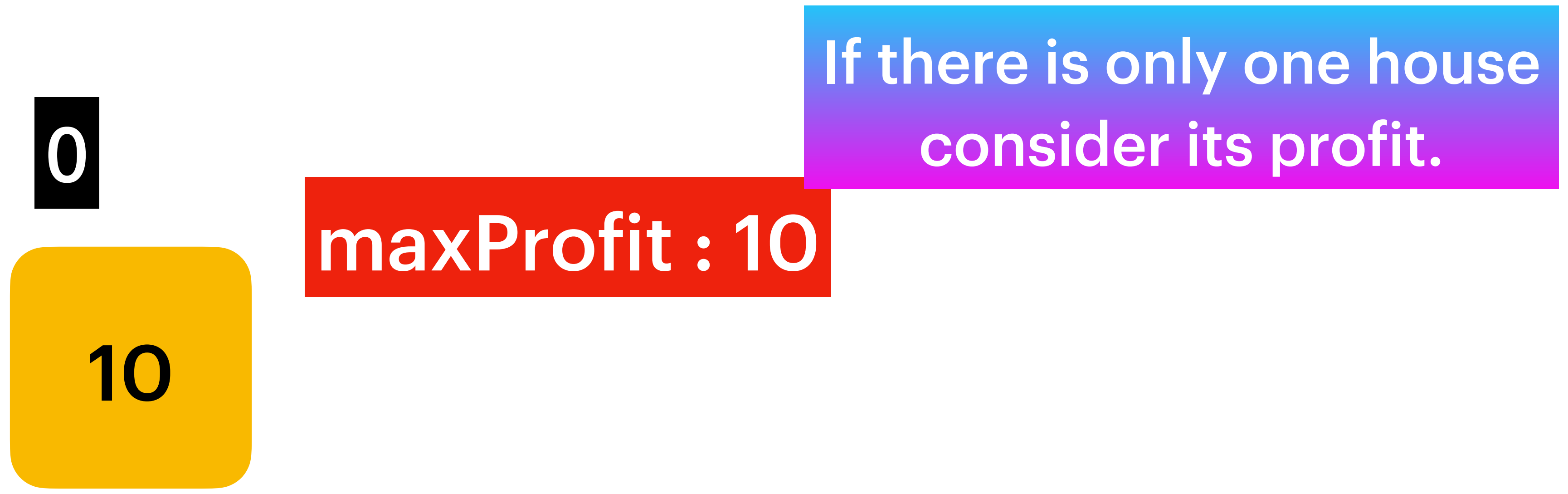
0	1	2	3	4
2	7	9	3	1

MaxProfit : 12

Case2

0	1	2	3	4
2	7	9	3	1

MaxProfit : 10

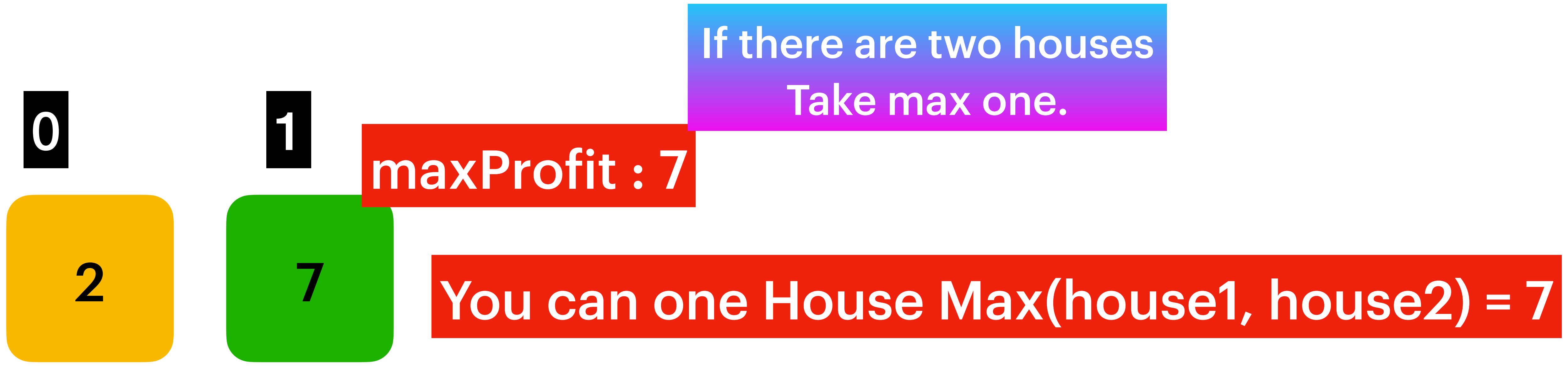


0

10

maxProfit : 10

If there is only one house consider its profit.



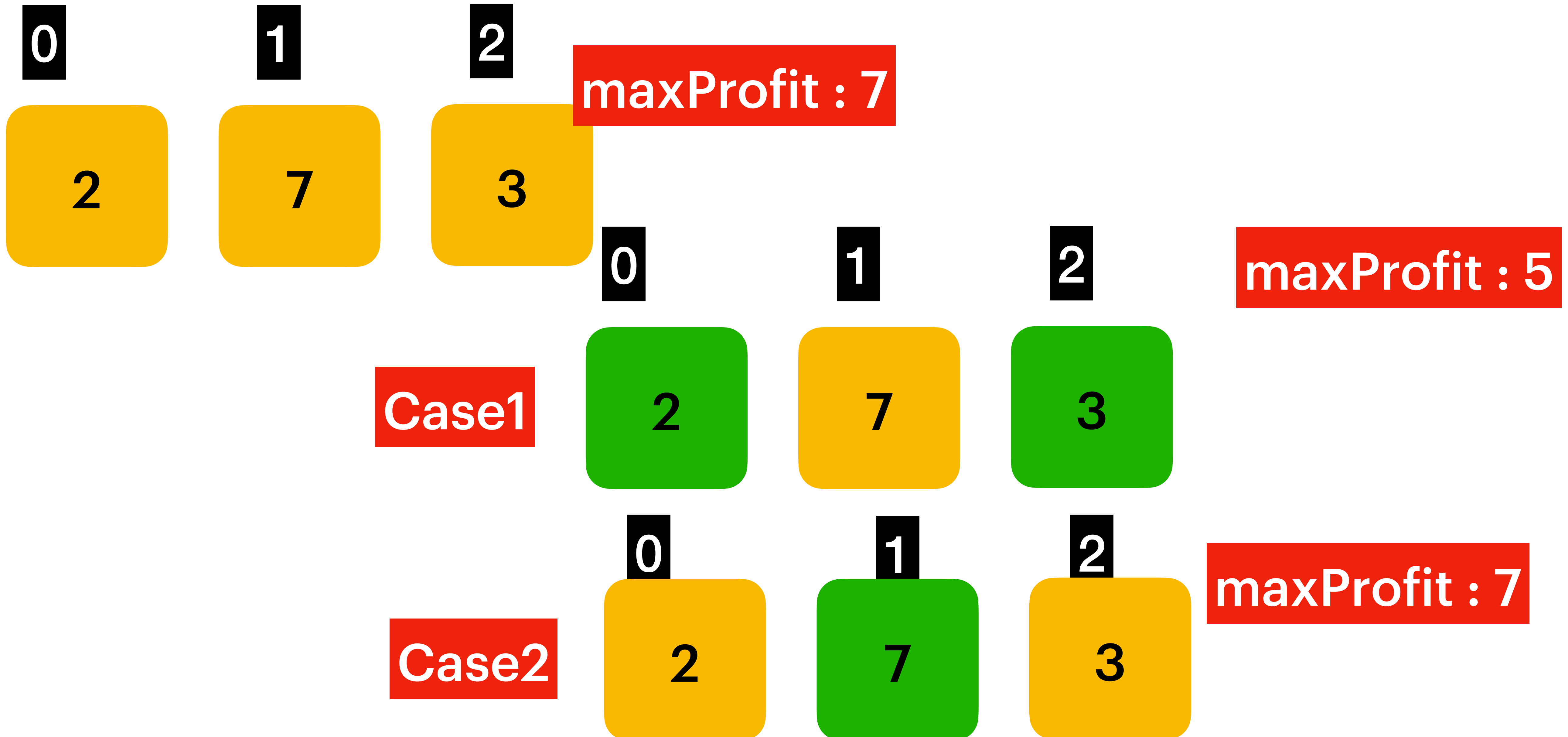
0 1

2 7

maxProfit : 7

If there are two houses Take max one.

You can one House Max(house1, house2) = 7



0 1 2

2 7 3

maxProfit : 7

Case1

0 1 2

2 7 3

maxProfit : 5

Case2

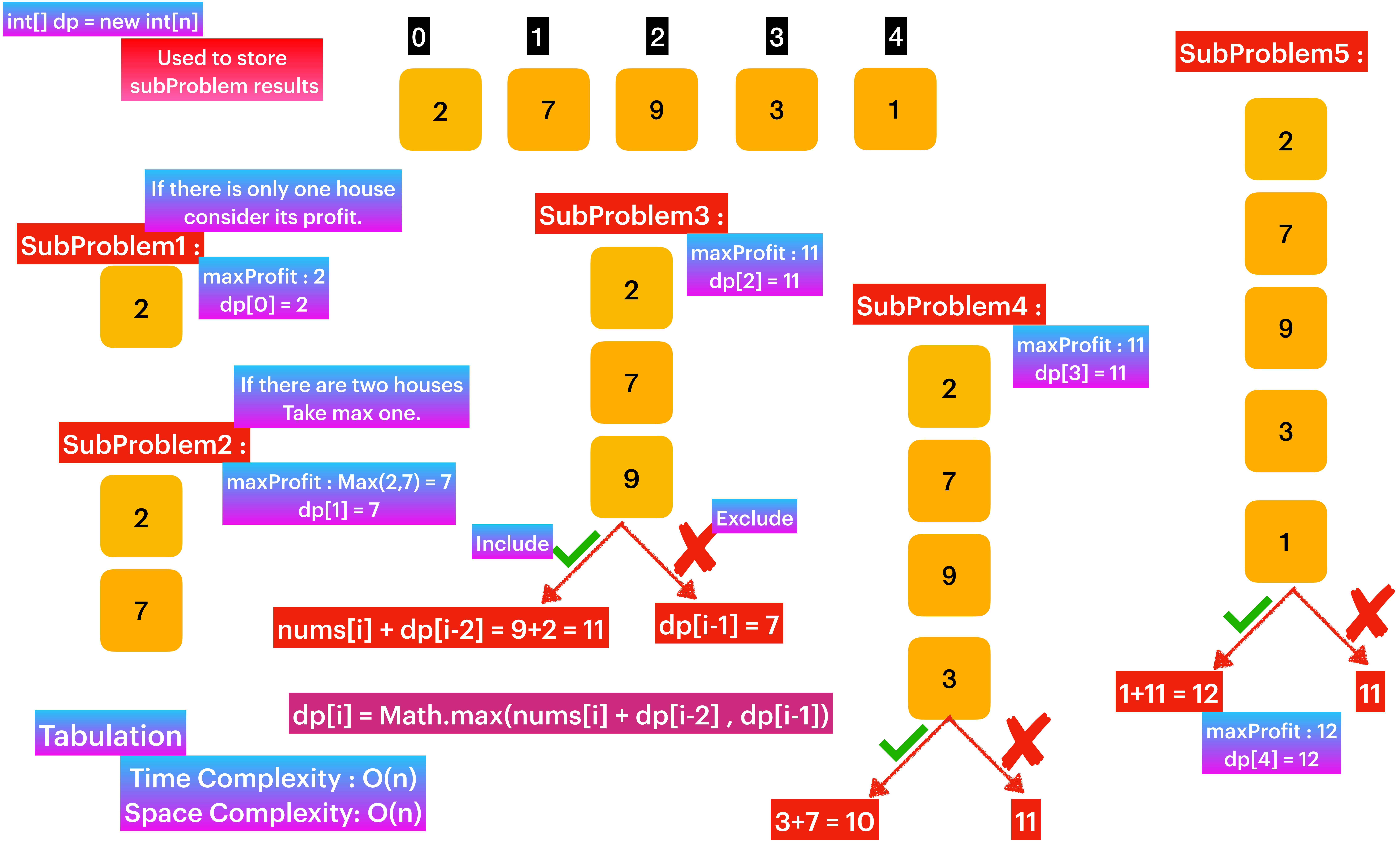
0 1 2

2 7 3

maxProfit : 7

int[] dp = new int[n]

Used to store subProblem results



If there is only one house consider its profit.

SubProblem1 :

maxProfit : 2
dp[0] = 2

If there are two houses Take max one.

SubProblem2 :

maxProfit : Max(2,7) = 7
dp[1] = 7

SubProblem3 :

maxProfit : 11
dp[2] = 11

Include

Exclude

nums[i] + dp[i-2] = 9+2 = 11

dp[i-1] = 7

SubProblem4 :

maxProfit : 11
dp[3] = 11

3+7 = 10

11

SubProblem5 :

1+11 = 12

11

maxProfit : 12
dp[4] = 12

dp[i] = Math.max(nums[i] + dp[i-2] , dp[i-1])

Tabulation

Time Complexity : O(n)
Space Complexity: O(n)

Can we improve on Space on Tabulation Approach,
Yes we just need previous two subproblem results to solve current subproblem.
So we can swap between two variables. So that Space would be constant O(1).

Base checks :

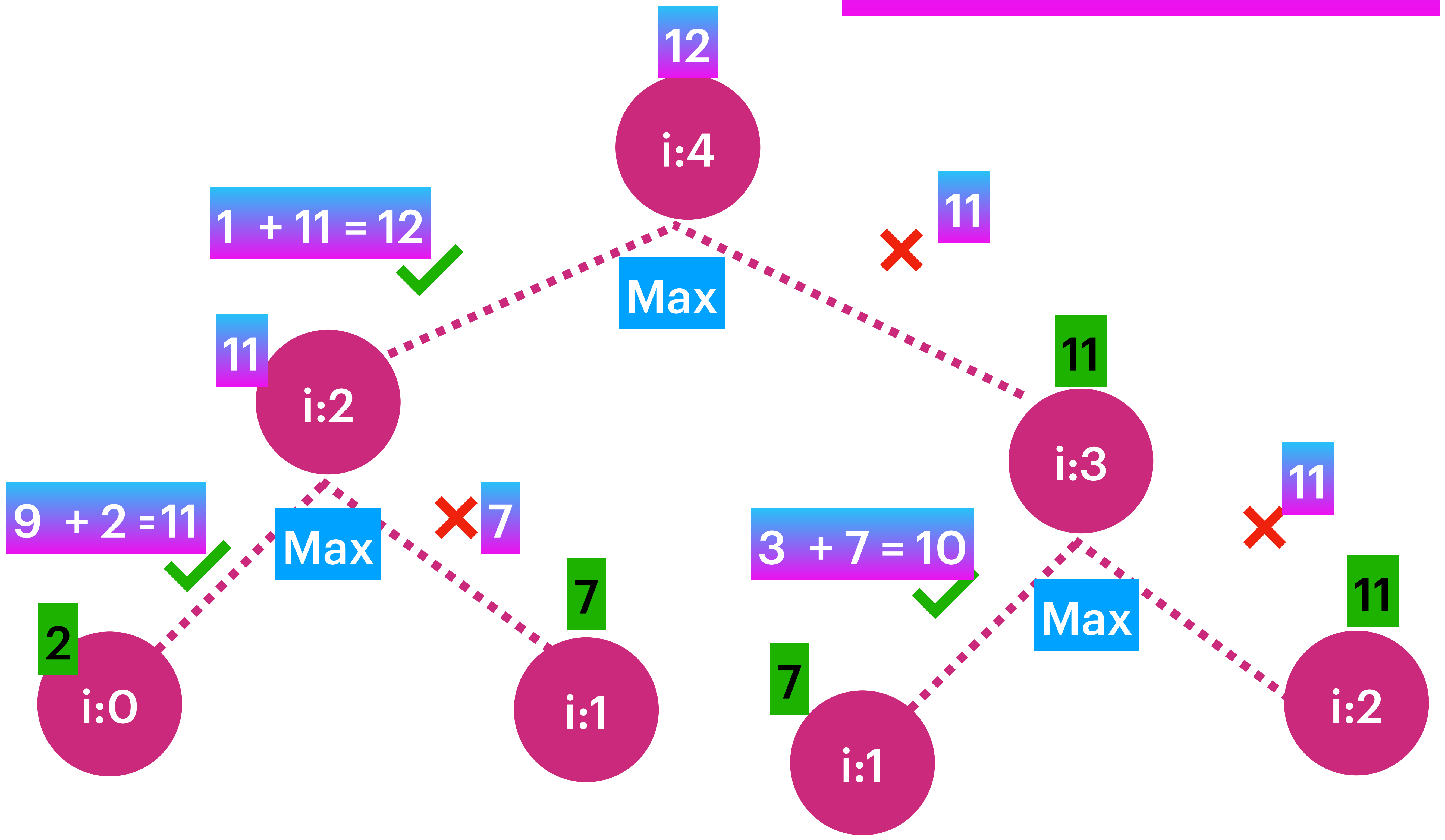
```
if(currentHouseIndex == 0)
{
    return nums[0];
}

if(currentHouseIndex == 1)
{
return Math.max(nums[0], nums[1]);
}
```

Memoization

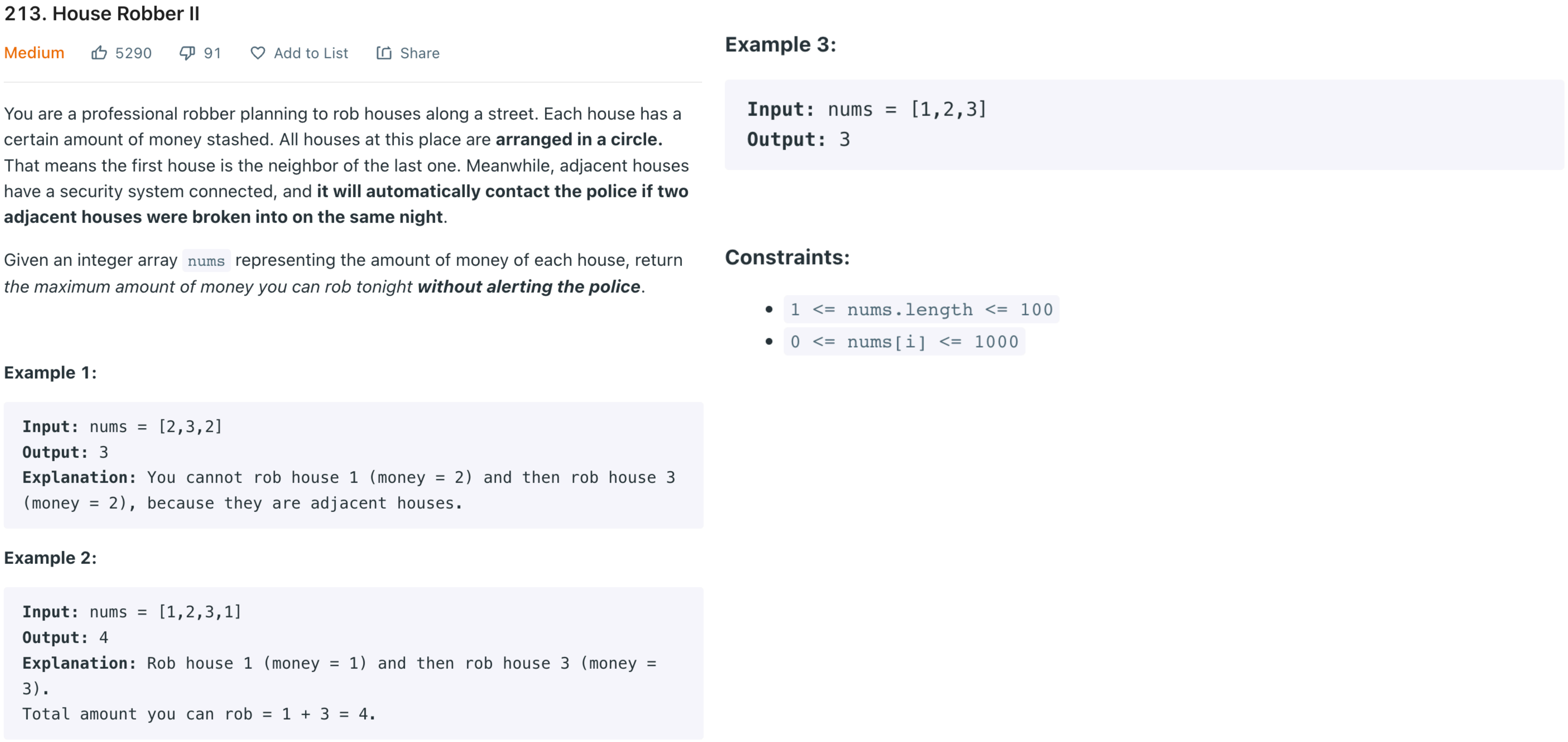
Time Complexity : O(n)
Space Complexity: O(n)

	0	1	2	3	4
nums :	2	7	9	3	1

	0	1	2	3	4
dp[] :	2	7	11	11	12



For Practice



213. House Robber II

Medium 👍 5290 👎 91 ♡ Add to List Share

You are a professional robber planning to rob houses along a street. Each house has a certain amount of money stashed. All houses at this place are **arranged in a circle.** That means the first house is the neighbor of the last one. Meanwhile, adjacent houses have a security system 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 = [2,3,2]
Output: 3
Explanation: You cannot rob house 1 (money = 2) and then rob house 3
(money = 2), because they are adjacent houses.
```

Example 2:

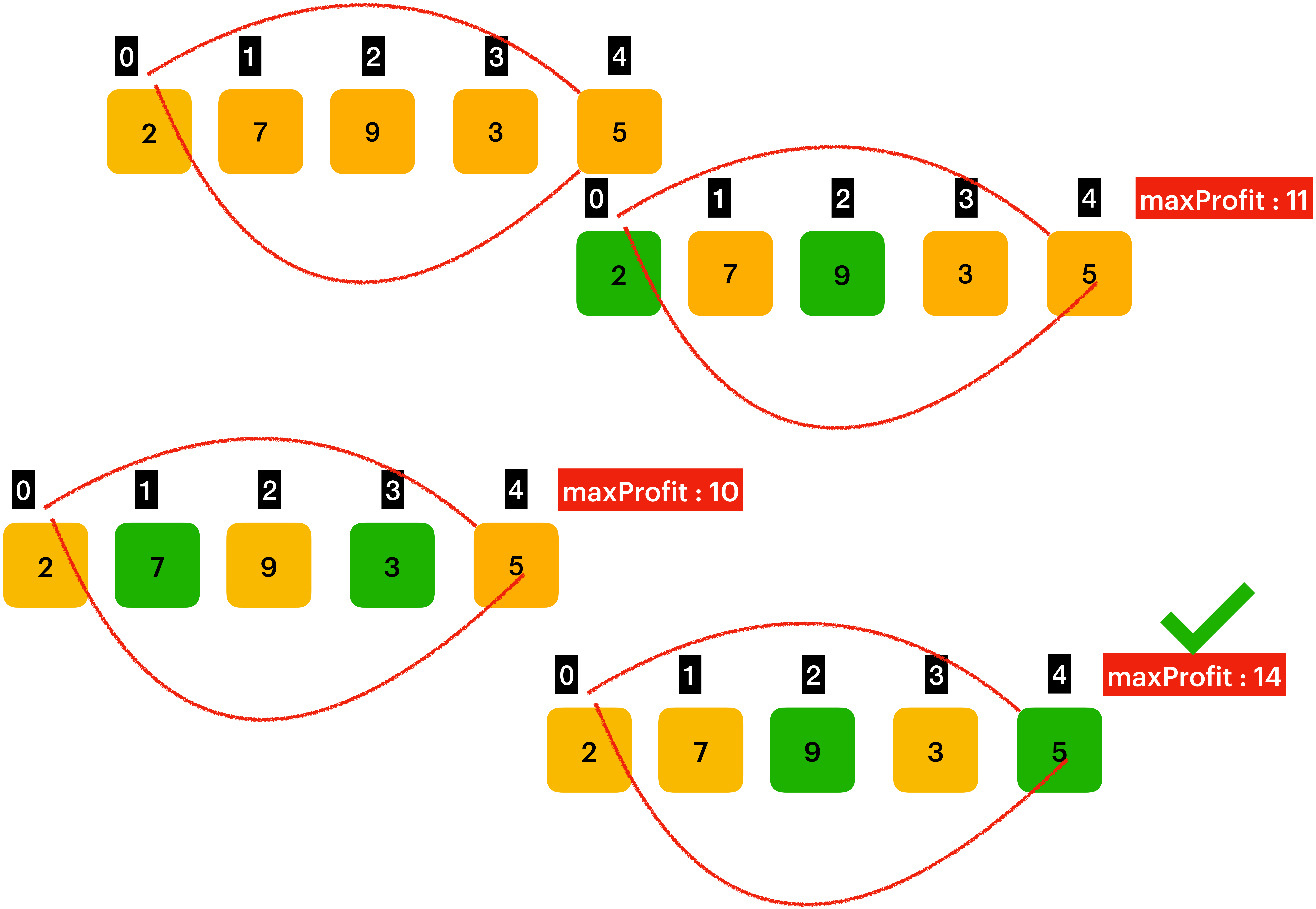
```
Input: nums = [1,2,3,1]
Output: 4
Explanation: Rob house 1 (money = 1) and then rob house 3 (money =
3).
Total amount you can rob = 1 + 3 = 4.
```

Example 3:

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

Constraints:

- `1 <= nums.length <= 100`
- `0 <= nums[i] <= 1000`



maxProfit : 11

maxProfit : 10

maxProfit : 14