Best Time to Buy and Sell Stock

- You are given an array prices where prices[i] is the price of a given stock on the ith day.

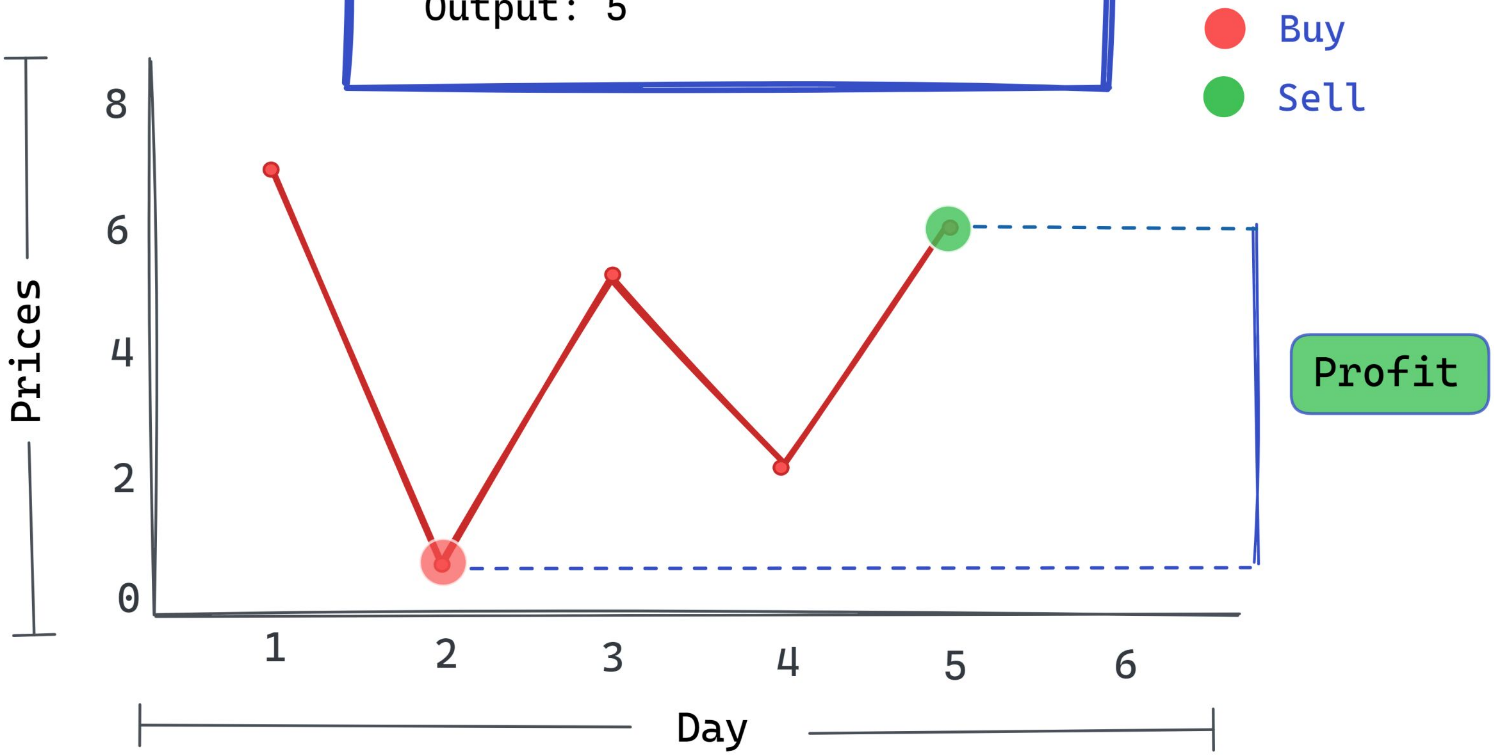
- You want to maximize your profit by choosing a single day to buy one stock and choosing a different day in the future to sell that stock.

- Return the maximum profit you can achieve

Example 1 :

```
Input: prices = [7,1,5,3,6]

Output: 5
```



Brute-Force Approach :

- We need to find out the maximum difference between two numbers in the given array.

- Also, the second number (selling price) must be larger than the first one (buying price).

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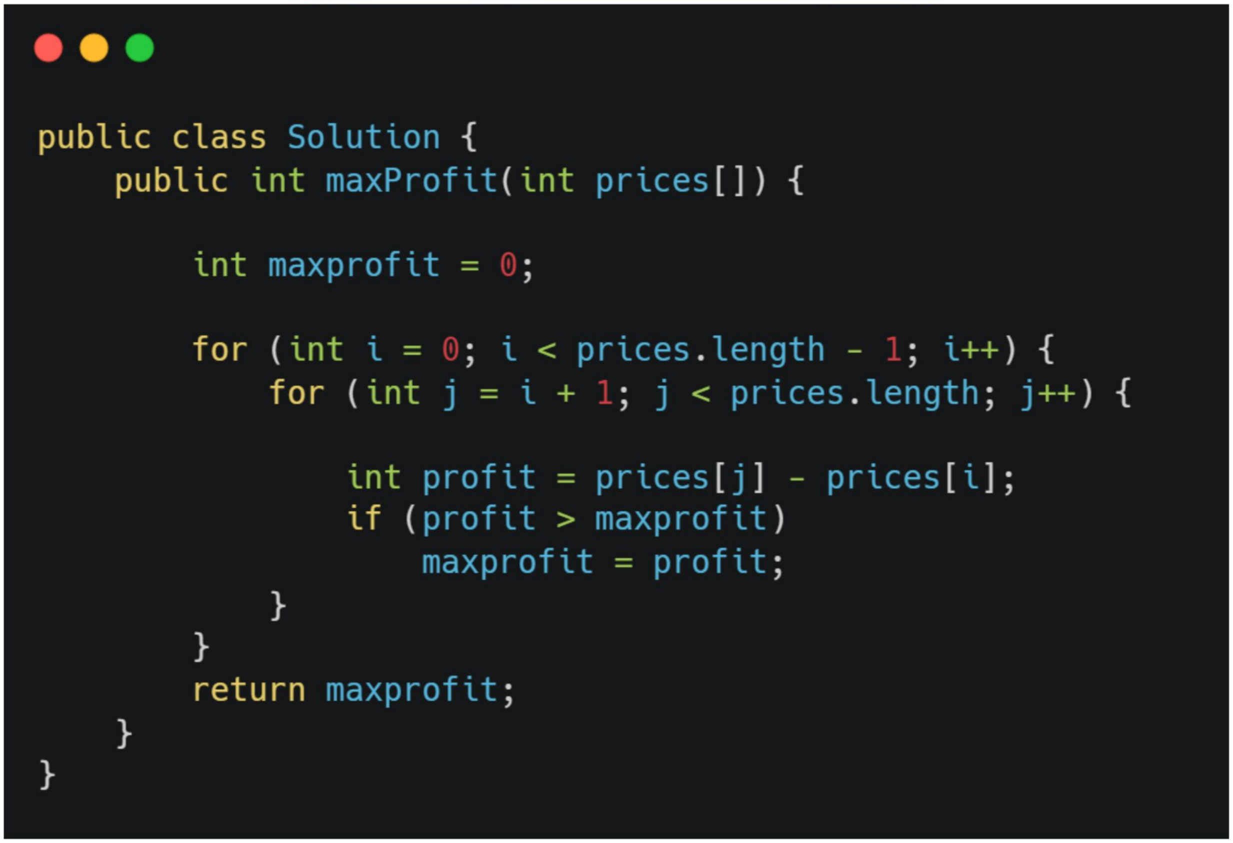
Code:-

```
max(prices[j] - prices[i])
```



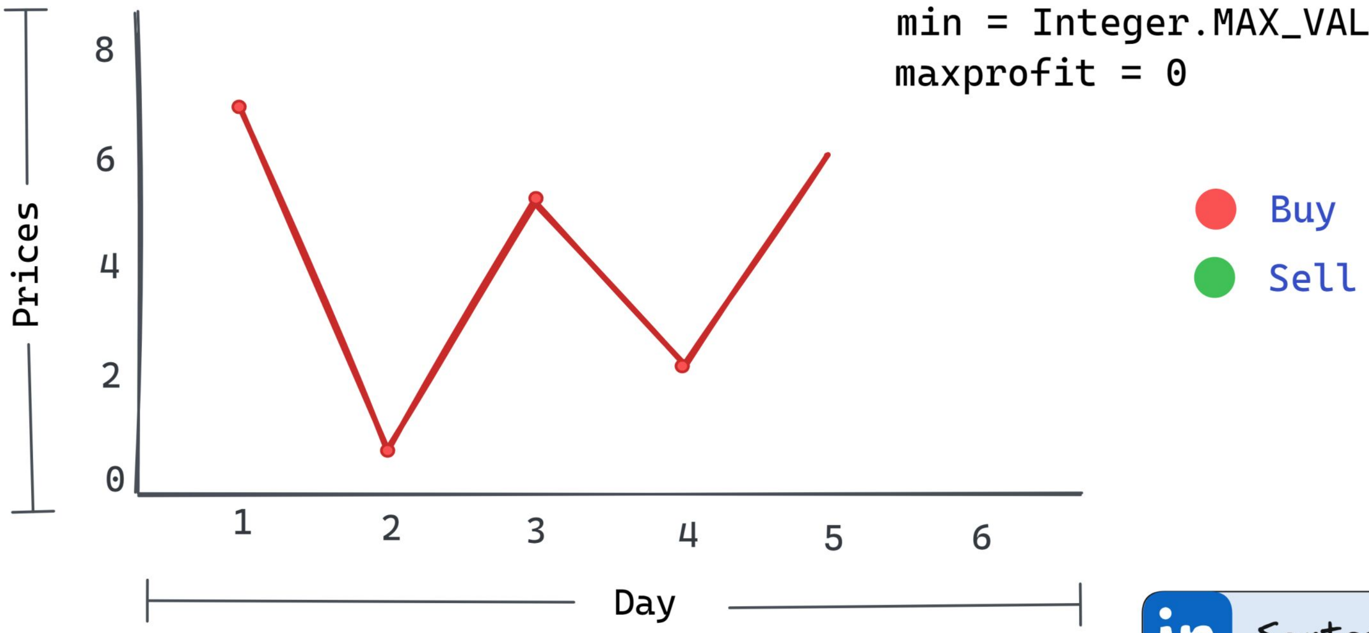
```
public class Solution {
    public int maxProfit(int prices[]) {

        int maxprofit = 0;

        for (int i = 0; i < prices.length - 1; i++) {
            for (int j = i + 1; j < prices.length; j++) {

                int profit = prices[j] - prices[i];
                if (profit > maxprofit)
                    maxprofit = profit;
            }
        }
        return maxprofit;
    }
}
```

Optimal Approach

→ we are going to initilize two variables min & max.

→ And if the difference between maxprofit - min > maxprofit.Then we are going to update our maxprofit.

```
min = Integer.MAX_VALUE
maxprofit = 0
```



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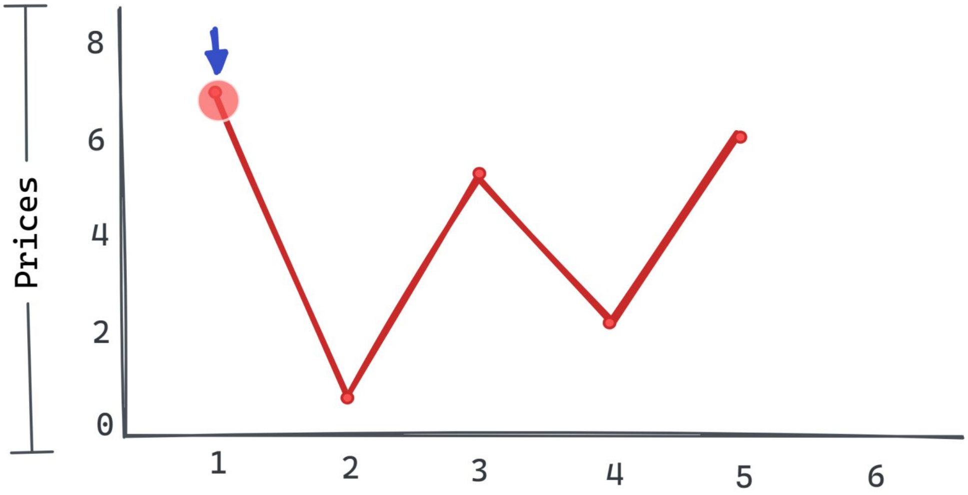
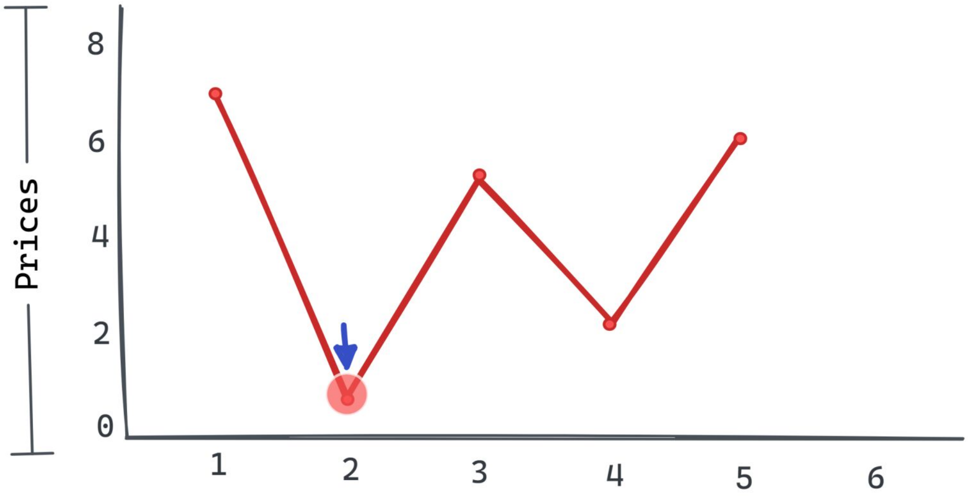
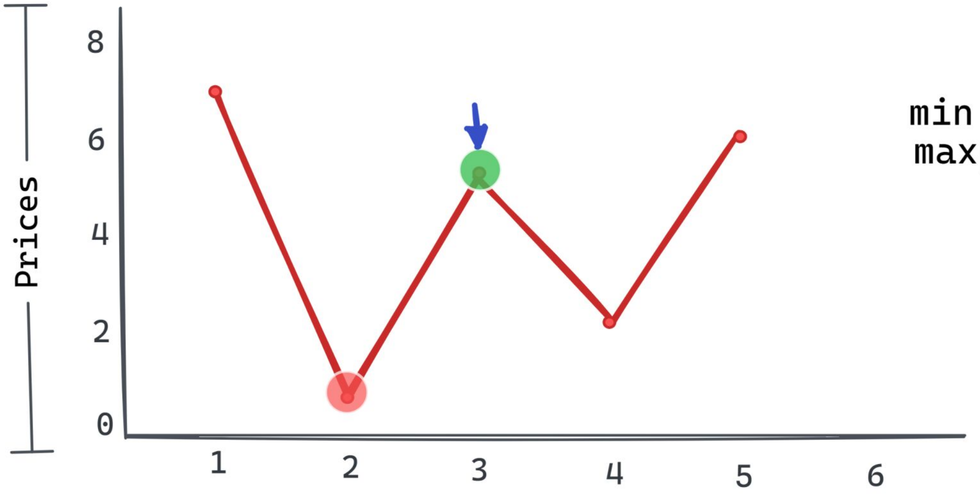


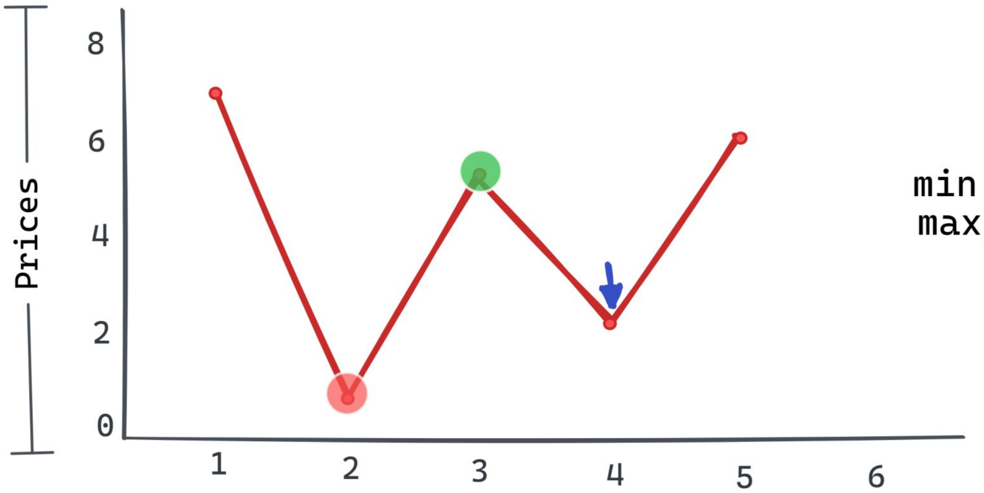
min = 7
maxprofit = 0



min = 1
maxprofit = 0



min = 1
maxprofit = 5-1 = 4



min = 1
maxprofit = 5-1 = 4

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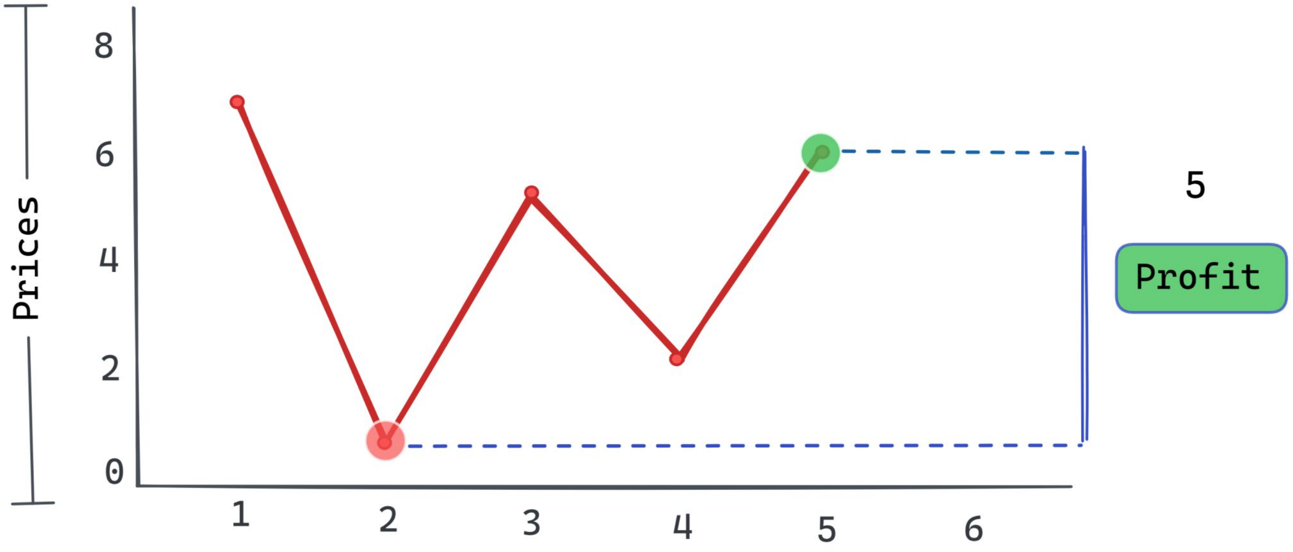
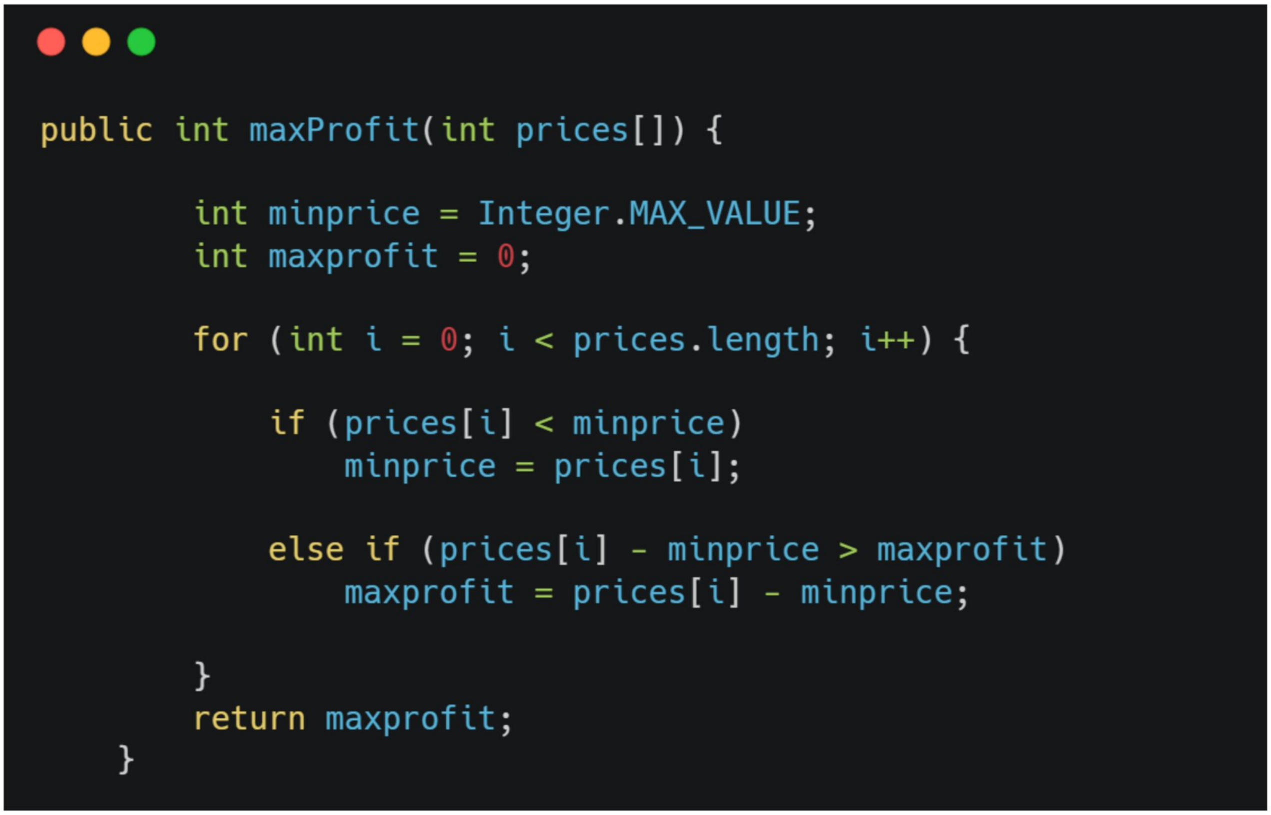
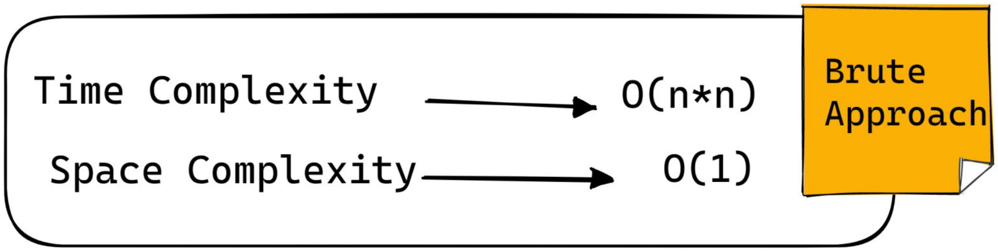


Code:-



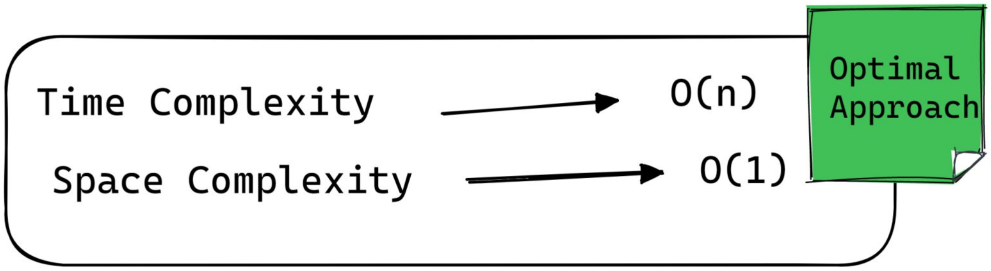
```
public int maxProfit(int prices[]) {

        int minprice = Integer.MAX_VALUE;
        int maxprofit = 0;

        for (int i = 0; i < prices.length; i++) {

            if (prices[i] < minprice)
                minprice = prices[i];

            else if (prices[i] - minprice > maxprofit)
                maxprofit = prices[i] - minprice;

        }
        return maxprofit;
    }
```



Time Complexity → O(n*n)

Space Complexity → O(1)

Brute Approach



Time Complexity → O(n)

Space Complexity → O(1)

Optimal Approach

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