Problem 3573: Best Time to Buy and Sell Stock V

Problem Information

Difficulty: Medium
Acceptance Rate: 41.82%
Paid Only: No
Tags: Array, Dynamic Programming

Problem Description

You are given an integer array `prices` where `prices[i]` is the price of a stock in dollars on the `ith` day, and an integer `k`.

You are allowed to make at most `k` transactions, where each transaction can be either of the following:

* **Normal transaction** : Buy on day `i`, then sell on a later day `j` where `i < j`. You profit `prices[j] - prices[i]`.

* **Short selling transaction** : Sell on day `i`, then buy back on a later day `j` where `i < j`. You profit `prices[i] - prices[j]`.

Note that you must complete each transaction before starting another. Additionally, you can't buy or sell on the same day you are selling or buying back as part of a previous transaction.

Return the **maximum** total profit you can earn by making **at most** `k` transactions.

Example 1:

Input: prices = [1,7,9,8,2], k = 2

Output: 14

Explanation:

We can make $14 of profit through 2 transactions:

* A normal transaction: buy the stock on day 0 for $1 then sell it on day 2 for $9. * A short selling transaction: sell the stock on day 3 for $8 then buy back on day 4 for $2.

Example 2:

Input: prices = [12,16,19,19,8,1,19,13,9], k = 3

Output: 36

Explanation:

We can make $36 of profit through 3 transactions:

* A normal transaction: buy the stock on day 0 for $12 then sell it on day 2 for $19. * A short selling transaction: sell the stock on day 3 for $19 then buy back on day 4 for $8. * A normal transaction: buy the stock on day 5 for $1 then sell it on day 6 for $19.

Constraints:

* `2 <= prices.length <= 103` * `1 <= prices[i] <= 109` * `1 <= k <= prices.length / 2`

Code Snippets

C++:

```
class Solution {
public:
long long maximumProfit(vector<int>& prices, int k) {

}
};
```

Java:

```
class Solution {
public long maximumProfit(int[] prices, int k) {

}
}
```

Python3:

```
class Solution:
def maximumProfit(self, prices: List[int], k: int) -> int:
```