★ Articles > 121. Best Time to Buy and Sell Stock ▼

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Next **1**

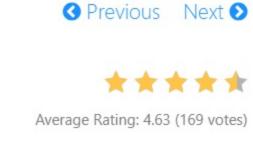
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121. Best Time to Buy and Sell Stock

June 23, 2016 | 424.1K views

Input: [7,1,5,3,6,4]



If you were only permitted to complete at most one transaction (i.e., buy one and sell one share of the stock),

Say you have an array for which the i^{th} element is the price of a given stock on day i.

design an algorithm to find the maximum profit. Note that you cannot sell a stock before you buy one.

Example 1:

```
Output: 5
 Explanation: Buy on day 2 (price = 1) and sell on day 5 (price = 6), profit = 6-1 = 5.
              Not 7-1 = 6, as selling price needs to be larger than buying price.
Example 2:
 Input: [7,6,4,3,1]
 Output: 0
 Explanation: In this case, no transaction is done, i.e. max profit = 0.
```

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

Approach 1: Brute Force

public class Solution {

public int maxProfit(int prices[]) {

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

for (int j = i + 1; j < prices.length; <math>j++) { int profit = prices[j] - prices[i];

int maxprofit = 0;

Solution

We need to find out the maximum difference (which will be the maximum profit) between two numbers in

Java

In formal terms, we need to find $\max(\text{prices}[j] - \text{prices}[i])$, for every i and j such that j > i.

```
if (profit > maxprofit)
                         maxprofit = profit;
  10
              return maxprofit;
  11
  12
  13
Complexity Analysis
  ullet Time complexity : O(n^2). Loop runs \frac{n(n-1)}{2} times.
   ullet Space complexity : O(1). Only two variables - maxprofit and profit are used.
```

Approach 2: One Pass

```
[7, 1, 5, 3, 6, 4]
```

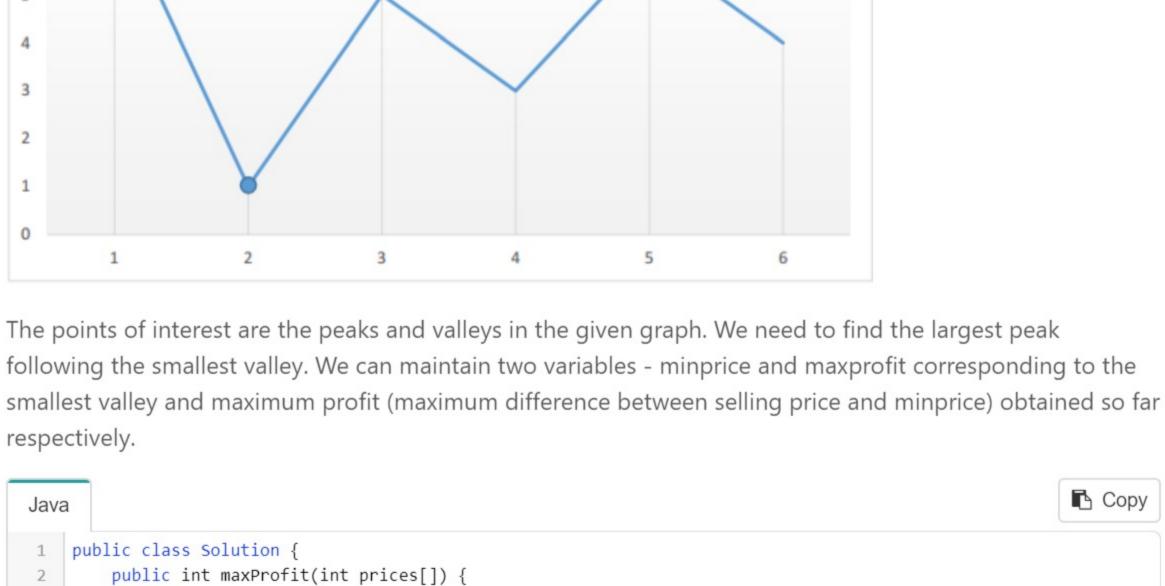
Algorithm

Say the given array is:

int minprice = Integer.MAX_VALUE;

int maxprofit = 0;

If we plot the numbers of the given array on a graph, we get:



Maximum Profit

for (int i = 0; i < prices.length; i++) {</pre> if (prices[i] < minprice)</pre> minprice = prices[i]; else if (prices[i] - minprice > maxprofit) maxprofit = prices[i] - minprice; 10 return maxprofit; 11 12

O Previous

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Preview

link.

Complexity Analysis

13 }

```
Type comment here... (Markdown is supported)
```

Doombris ★ 600 ② June 26, 2018 9:45 PM

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• Time complexity : O(n). Only a single pass is needed.

• Space complexity : O(1). Only two variables are used.

```
It's not a dynamic programming problem.
SHOW 27 REPLIES
momukhtar ★ 43 ② March 31, 2018 2:10 PM
I do not understand why is this a dynamic programming problem. The above solution looks simple. It
```

IKnowWhatYouDidLastSummer ★ 31 ② August 26, 2018 12:28 AM my code as follows,i write them by my intuition, do u think my code is so short and clear?

This is the definition of dynamic programming as mentioned on this link:-

just uses two simple variables. It does not use any memoization or tabulations as mentioned on this

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Read More **SHOW 4 REPLIES** StayingFoolish ★ 58 ② February 9, 2019 12:59 PM

int maxProfit(int* prices, int pricesSize) {

int minPricePos = a mayProfit = a.

I wanna know whether approach 2 is DP and why

LittleOtterpop ★ 17 ② June 25, 2018 4:27 PM

I was thinking for the whole afternoon trying to come up with a DP solution, then cleared my mind when taking the shower and came up with sol2. 21 A V C Share Reply **SHOW 4 REPLIES**

https://youtu.be/mmIMpgh67vg

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kevin41 ★ 21 ② August 5, 2018 10:00 AM

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I made a video if anyone is having trouble understanding the solution (clickable link)

Consider [4, 7, 1, 2] i = 0: minprice = 4 maxprofit = 0 Read More 17 ∧ ∨ ♂ Share ★ Reply

Shouldn't it be maxprofit = max(maxprofit, prices[I] - minprice)?

CodingGeek123 ★ 108 ② August 23, 2018 9:41 AM Kadane's Algorithm! :P 14 \Lambda 🗸 🗗 Share 👆 Reply SHOW 6 REPLIES

class Solution { public int maxProfit(int[] prices) { int maxProf = 0 i = 0. Read More

Using java for approach 2

jiawenzhong888 ★ 13 ② July 8, 2018 8:30 AM

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13 A V C Share Reply hundanLi ★ 39 ② August 9, 2018 10:51 AM My code: public int maxProfit(int prices[]) {

if (prices.length == 0 || prices.length == 1) {

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(1 2 3 4 5 6 ... 14 15 >

return A.