

## 2921. Maximum Profitable Triplets With Increasing Prices II Premium

Hard Topics Companies Hint

Given the **0-indexed** arrays `prices` and `profits` of length `n`. There are `n` items in an store where the `ith` item has a price of `prices[i]` and a profit of `profits[i]`.

We have to pick three items with the following condition:

- `prices[i] < prices[j] < prices[k]` where `i < j < k`.

If we pick items with indices `i`, `j` and `k` satisfying the above condition, the profit would be `profits[i] + profits[j] + profits[k]`.

Return *the **maximum profit** we can get, and `-1` if it's not possible to pick three items with the given condition.*

### Example 1:

**Input:** `prices = [10,2,3,4]`, `profits = [100,2,7,10]`  
**Output:** `19`  
**Explanation:** We can't pick the item with index `i=0` since there are no indices `j` and `k` such that the condition holds. So the only triplet we can pick, are the items with indices `1`, `2` and `3` and it's a valid pick since `prices[1] < prices[2] < prices[3]`. The answer would be sum of their profits which is `2 + 7 + 10 = 19`.

### Example 2:

**Input:** `prices = [1,2,3,4,5]`, `profits = [1,5,3,4,6]`  
**Output:** `15`  
**Explanation:** We can select any triplet of items since for each triplet of indices `i`, `j` and `k` such that `i < j < k`, the condition holds. Therefore the maximum profit we can get would be the 3 most profitable items which are indices `1`, `3` and `4`. The answer would be sum of their profits which is `5 + 4 + 6 = 15`.

### Example 3:

**Input:** `prices = [4,3,2,1]`, `profits = [33,20,19,87]`  
**Output:** `-1`  
**Explanation:** We can't select any triplet of indices such that the condition holds, so we return `-1`.

### Constraints:

- `3 <= prices.length == profits.length <= 50000`
- `1 <= prices[i] <= 5000`
- `1 <= profits[i] <= 106`

Seen this question in a real interview before? 1/5

Yes No

Accepted **500** | Submissions **1.1K** | Acceptance Rate **45.7%**

### Topics

Array Binary Indexed Tree Segment Tree

### Companies

0 - 6 months

IBM 2

### Hint 1

Let's fix the middle chosen item for instance index `j`.

### Hint 2

Let's define an array `max_right`, where `max_right[j]` represents the maximum `profit[k]` for every index `k > j` such that `prices[k] > prices[j]`.

### Hint 3

Consider using a Fenwick tree to fill the `max_right`.

### Hint 4

Do the same for items with an index `i < j` such that `prices[i] < prices[j]` and find the maximum `profit[i]` among them. Let's call this array `max_left`.

### Hint 5

Now the profit when an item with the index `j` is the middle one would be `profit[j] + max_right[j] + max_left[j]`.

### Hint 6

Finally, do the above procedure for all `j`'s and find the maximum profit among them. That would be the final answer.

### Discussion (1)