

Problem 2355: Maximum Number of Books You Can Take

Problem Information

Difficulty: **Hard**

Acceptance Rate: 0.00%

Paid Only: No

Problem Description

You are given a

0-indexed

integer array

books

of length

n

where

books[i]

denotes the number of books on the

i

th

shelf of a bookshelf.

You are going to take books from a

contiguous

section of the bookshelf spanning from

l

to

r

where

$0 \leq l \leq r < n$

. For each index

i

in the range

$l \leq i < r$

, you must take

strictly fewer

books from shelf

i

than shelf

$i + 1$

.

Return

the

maximum

number of books you can take from the bookshelf.

Example 1:

Input:

books = [8,5,2,7,9]

Output:

19

Explanation:

- Take 1 book from shelf 1. - Take 2 books from shelf 2. - Take 7 books from shelf 3. - Take 9 books from shelf 4. You have taken 19 books, so return 19. It can be proven that 19 is the maximum number of books you can take.

Example 2:

Input:

books = [7,0,3,4,5]

Output:

12

Explanation:

- Take 3 books from shelf 2. - Take 4 books from shelf 3. - Take 5 books from shelf 4. You have taken 12 books so return 12. It can be proven that 12 is the maximum number of books you can take.

Example 3:

Input:

books = [8,2,3,7,3,4,0,1,4,3]

Output:

13

Explanation:

- Take 1 book from shelf 0. - Take 2 books from shelf 1. - Take 3 books from shelf 2. - Take 7 books from shelf 3. You have taken 13 books so return 13. It can be proven that 13 is the maximum number of books you can take.

Constraints:

1 <= books.length <= 10

5

0 <= books[i] <= 10

5

Code Snippets

C++:

```
class Solution {  
public:  
    long long maximumBooks(vector<int>& books) {  
  
    }  
};
```

Java:

```
class Solution {  
    public long maximumBooks(int[] books) {
```

```
}  
}
```

Python3:

```
class Solution:  
    def maximumBooks(self, books: List[int]) -> int:
```

Python:

```
class Solution(object):  
    def maximumBooks(self, books):  
        """  
        :type books: List[int]  
        :rtype: int  
        """
```

JavaScript:

```
/**  
 * @param {number[]} books  
 * @return {number}  
 */  
var maximumBooks = function(books) {  
  
};
```

TypeScript:

```
function maximumBooks(books: number[]): number {  
  
};
```

C#:

```
public class Solution {  
    public long MaximumBooks(int[] books) {  
  
    }  
}
```

C:

```
long long maximumBooks(int* books, int booksSize) {  
  
}
```

Go:

```
func maximumBooks(books []int) int64 {  
  
}
```

Kotlin:

```
class Solution {  
    fun maximumBooks(books: IntArray): Long {  
  
    }  
}
```

Swift:

```
class Solution {  
    func maximumBooks(_ books: [Int]) -> Int {  
  
    }  
}
```

Rust:

```
impl Solution {  
    pub fn maximum_books(books: Vec<i32>) -> i64 {  
  
    }  
}
```

Ruby:

```
# @param {Integer[]} books  
# @return {Integer}  
def maximum_books(books)  
  
end
```

PHP:

```
class Solution {

    /**
     * @param Integer[] $books
     * @return Integer
     */
    function maximumBooks($books) {

    }

}
```

Dart:

```
class Solution {
  int maximumBooks(List<int> books) {

  }
}
```

Scala:

```
object Solution {
  def maximumBooks(books: Array[Int]): Long = {

  }
}
```

Elixir:

```
defmodule Solution do
  @spec maximum_books(books :: [integer]) :: integer
  def maximum_books(books) do

  end
end
```

Erlang:

```
-spec maximum_books(Books :: [integer()]) -> integer().
maximum_books(Books) ->

.
```

Racket:

```
(define/contract (maximum-books books)
  (-> (listof exact-integer?) exact-integer?)
)
```

Solutions

C++ Solution:

```
/*
 * Problem: Maximum Number of Books You Can Take
 * Difficulty: Hard
 * Tags: array, dp, stack
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) or O(n * m) for DP table
 */

class Solution {
public:
    long long maximumBooks(vector<int>& books) {

    }
};
```

Java Solution:

```
/**
 * Problem: Maximum Number of Books You Can Take
 * Difficulty: Hard
 * Tags: array, dp, stack
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) or O(n * m) for DP table
 */

class Solution {
    public long maximumBooks(int[] books) {
```

```
}  
}
```

Python3 Solution:

```
"""  
Problem: Maximum Number of Books You Can Take  
Difficulty: Hard  
Tags: array, dp, stack  
  
Approach: Use two pointers or sliding window technique  
Time Complexity: O(n) or O(n log n)  
Space Complexity: O(n) or O(n * m) for DP table  
"""  
  
class Solution:  
    def maximumBooks(self, books: List[int]) -> int:  
        # TODO: Implement optimized solution  
        pass
```

Python Solution:

```
class Solution(object):  
    def maximumBooks(self, books):  
        """  
        :type books: List[int]  
        :rtype: int  
        """
```

JavaScript Solution:

```
/**  
 * Problem: Maximum Number of Books You Can Take  
 * Difficulty: Hard  
 * Tags: array, dp, stack  
 *  
 * Approach: Use two pointers or sliding window technique  
 * Time Complexity: O(n) or O(n log n)  
 * Space Complexity: O(n) or O(n * m) for DP table  
 */
```

```

/**
 * @param {number[]} books
 * @return {number}
 */
var maximumBooks = function(books) {

};

```

TypeScript Solution:

```

/**
 * Problem: Maximum Number of Books You Can Take
 * Difficulty: Hard
 * Tags: array, dp, stack
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) or O(n * m) for DP table
 */

function maximumBooks(books: number[]): number {

};

```

C# Solution:

```

/*
 * Problem: Maximum Number of Books You Can Take
 * Difficulty: Hard
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 * Time Complexity: O(n) or O(n log n)
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 */

public class Solution {
    public long MaximumBooks(int[] books) {

    }
}

```

```
}
```

C Solution:

```
/*
 * Problem: Maximum Number of Books You Can Take
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 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) or O(n * m) for DP table
 */

long long maximumBooks(int* books, int booksSize) {

}
```

Go Solution:

```
// Problem: Maximum Number of Books You Can Take
// Difficulty: Hard
// Tags: array, dp, stack
//
// Approach: Use two pointers or sliding window technique
// Time Complexity: O(n) or O(n log n)
// Space Complexity: O(n) or O(n * m) for DP table

func maximumBooks(books []int) int64 {

}
```

Kotlin Solution:

```
class Solution {
    fun maximumBooks(books: IntArray): Long {

    }
}
```

Swift Solution:

```

class Solution {
    func maximumBooks(_ books: [Int]) -> Int {

    }
}

```

Rust Solution:

```

// Problem: Maximum Number of Books You Can Take
// Difficulty: Hard
// Tags: array, dp, stack
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// Approach: Use two pointers or sliding window technique
// Time Complexity: O(n) or O(n log n)
// Space Complexity: O(n) or O(n * m) for DP table

impl Solution {
    pub fn maximum_books(books: Vec<i32>) -> i64 {

    }
}

```

Ruby Solution:

```

# @param {Integer[]} books
# @return {Integer}
def maximum_books(books)

end

```

PHP Solution:

```

class Solution {

    /**
     * @param Integer[] $books
     * @return Integer
     */
    function maximumBooks($books) {

    }
}

```

Dart Solution:

```
class Solution {  
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Scala Solution:

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object Solution {  
  def maximumBooks(books: Array[Int]): Long = {  
  
  }  
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