Amazon | OA2 | Pagination

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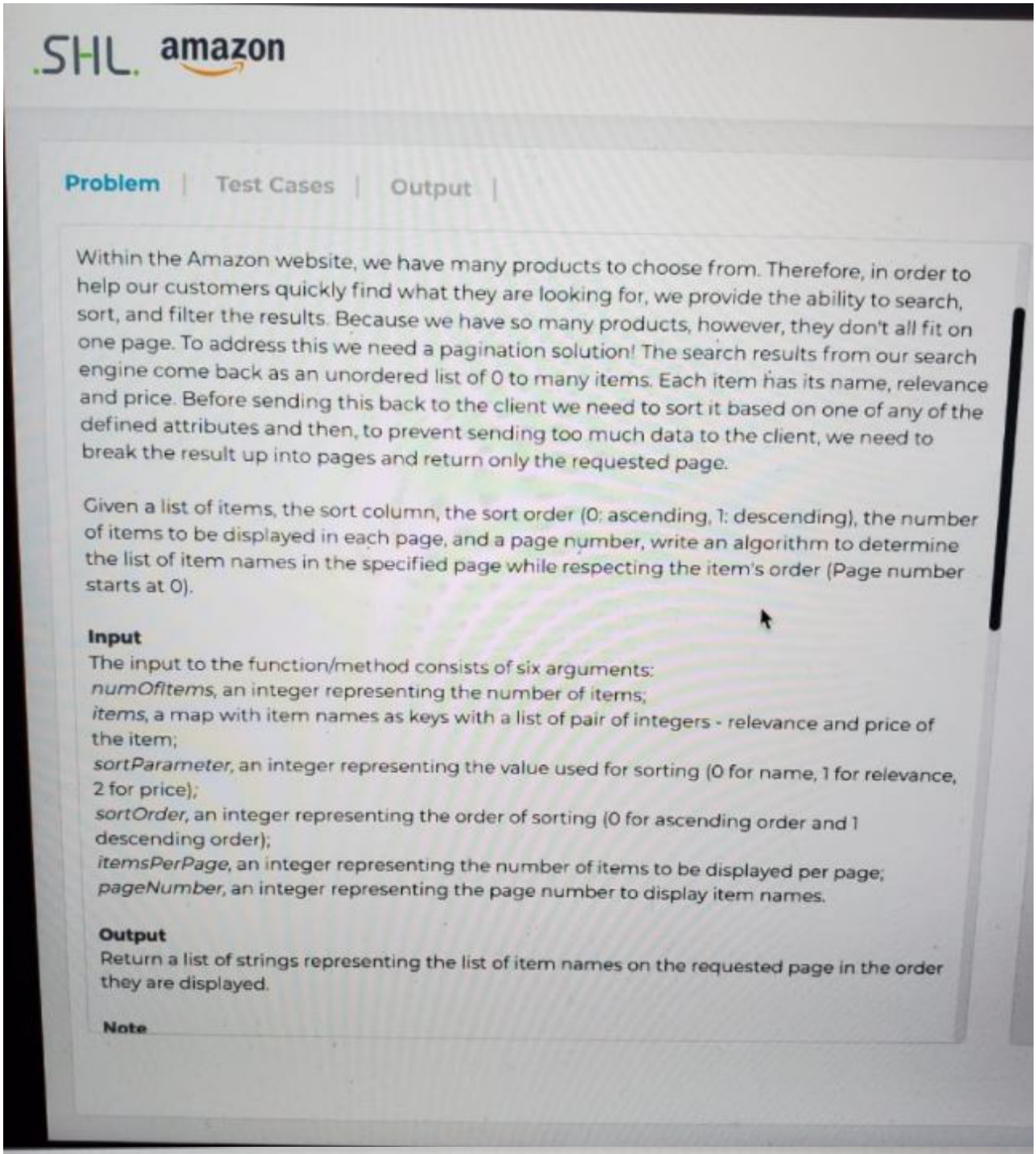
13

Position: New Grad 2021



SHL. amazon

Problem | Test Cases | Output |

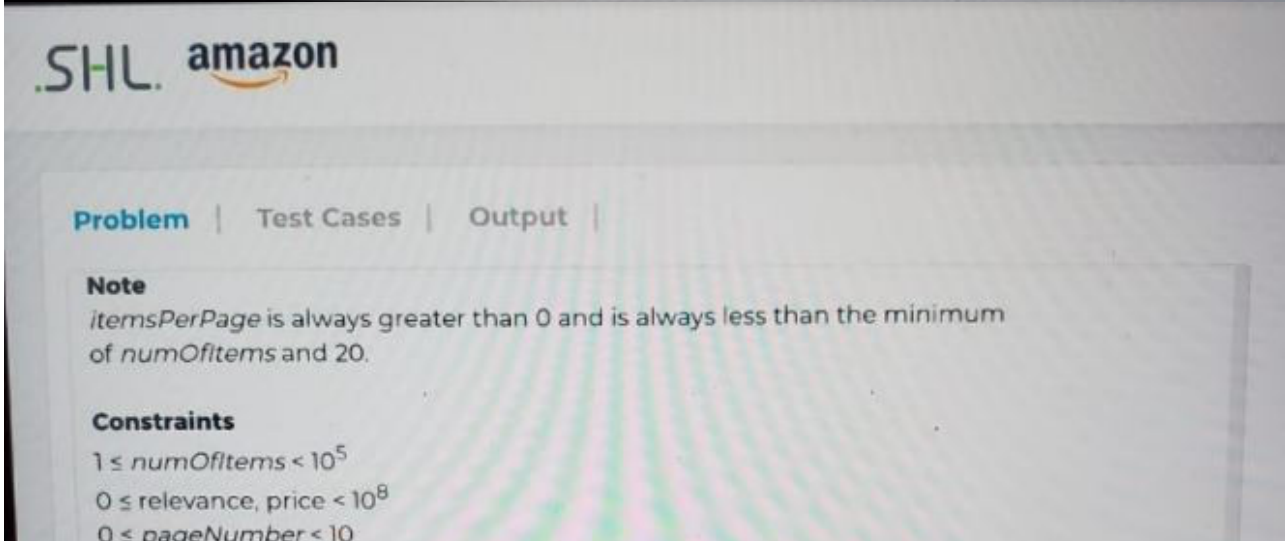
Within the Amazon website, we have many products to choose from. Therefore, in order to help our customers quickly find what they are looking for, we provide the ability to search, sort, and filter the results. Because we have so many products, however, they don't all fit on one page. To address this we need a pagination solution! The search results from our search engine come back as an unordered list of 0 to many items. Each item has its name, relevance and price. Before sending this back to the client we need to sort it based on one of any of the defined attributes and then, to prevent sending too much data to the client, we need to break the result up into pages and return only the requested page.

Given a list of items, the sort column, the sort order (0: ascending, 1: descending), the number of items to be displayed in each page, and a page number, write an algorithm to determine the list of item names in the specified page while respecting the item's order (Page number starts at 0).

Input
The input to the function/method consists of six arguments:
numOfItems, an integer representing the number of items;
items, a map with item names as keys with a list of pair of integers - relevance and price of the item;
sortParameter, an integer representing the value used for sorting (0 for name, 1 for relevance, 2 for price);
sortOrder, an integer representing the order of sorting (0 for ascending order and 1 descending order);
itemsPerPage, an integer representing the number of items to be displayed per page;
pageNumber, an integer representing the page number to display item names.

Output
Return a list of strings representing the list of item names on the requested page in the order they are displayed.

Note



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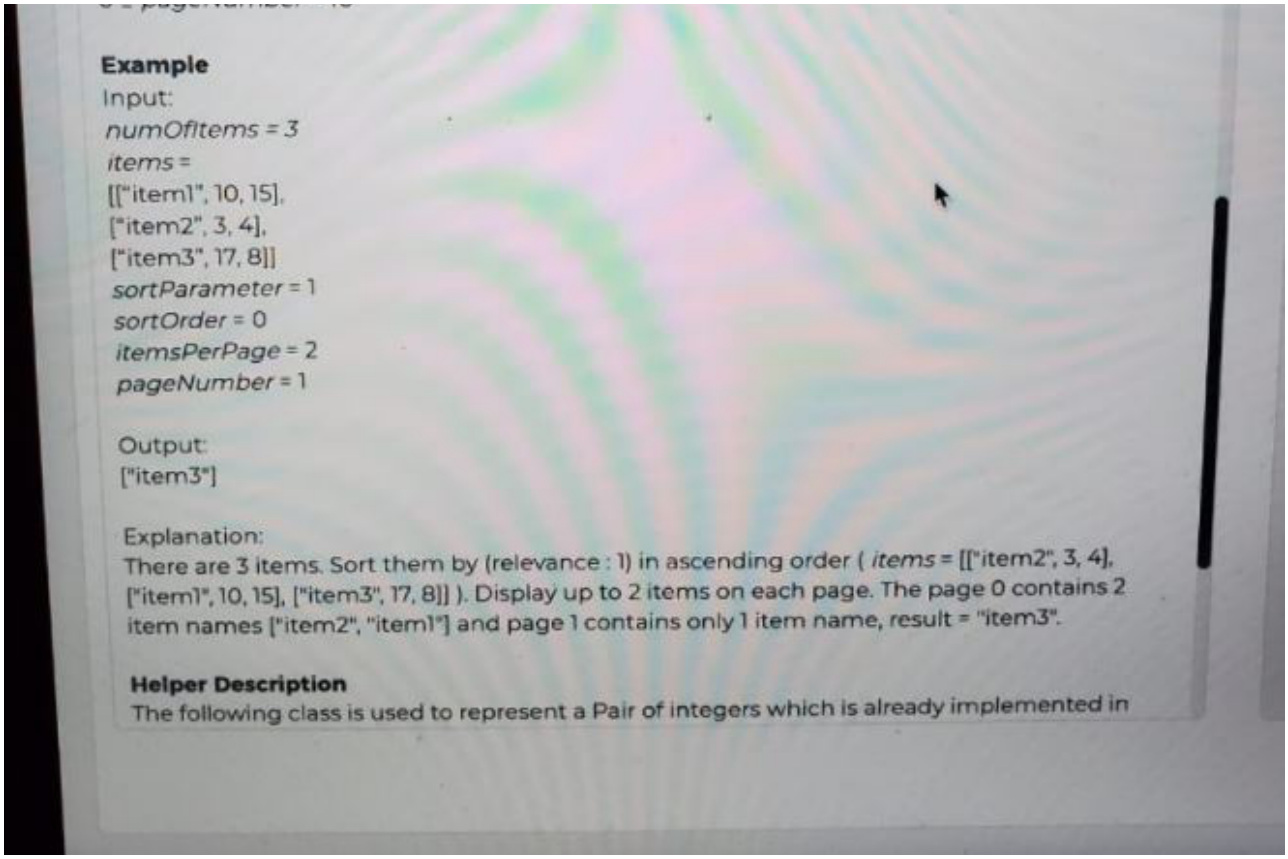
Problem | Test Cases | Output |

Note
itemsPerPage is always greater than 0 and is always less than the minimum of *numOfItems* and 20.

Constraints
$1 \le numOfItems < 10^5$
$0 \le relevance, price < 10^8$
$0 \le pageNumber < 10$



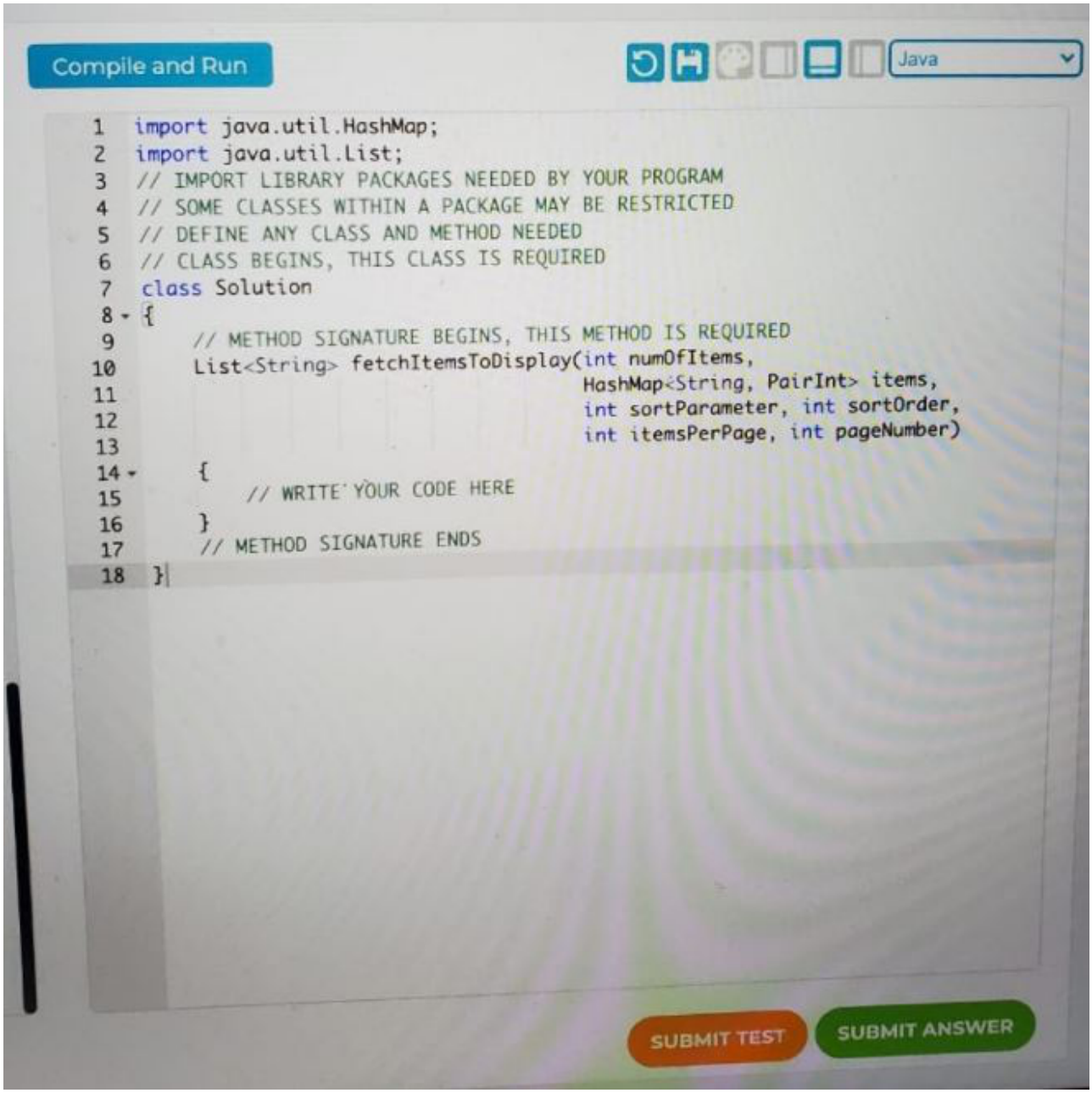
Example

Input:
numOfItems = 3
items =
[["item1", 10, 15],
["item2", 3, 4],
["item3", 17, 8]]
sortParameter = 1
sortOrder = 0
itemsPerPage = 2
pageNumber = 1

Output:
["item3"]

Explanation:
There are 3 items. Sort them by (relevance : 1) in ascending order (*items* = [["item2", 3, 4], ["item1", 10, 15], ["item3", 17, 8]]). Display up to 2 items on each page. The page 0 contains 2 item names ["item2", "item1"] and page 1 contains only 1 item name, result = "item3".

Helper Description
The following class is used to represent a Pair of integers which is already implemented in



Can somebody solve this ?

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So far nobody came up with the optimal solution. That is using quickselect to find the first and the last item to display in only O(n) time and in another O(n) time select the displayed items, then sort them with any fast sorting algorithm. The time will be O(k * log(k) + n) and this running time is optimal, where k is the number of items needed to display on the requested page.

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celmar_stone ★ 6 a day ago

What about this python solution:

```
class Solution:
    def get_items(self, n, items, sortParameter, sortOrder, itemsPerPage, pageNumber):
        items.sort(key=lambda x: x[sortParameter], reverse=sortOrder)
        return items[pageNumber*itemsPerPage: (pageNumber+1)*itemsPerPage]
```

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