

American University of Armenia
CS 121B - Data Structures
Spring 2024
PSS 5

Problem 1 In Figure 1, a stack of books in various colors is presented. Your task is to arrange the books in lexicographical order based on their colors. Note that you are not permitted to use any additional containers.



Figure 1: Stack of books

Problem 2 In Figure 2, five cans of Pringles are presented, each containing a random number of chips. Additionally, one chip in each can is **moldy**. Your task is to remove the moldy chip from each can. In order to reach the moldy chip, you need to remove some chips from top of the cans. Note that, whenever you remove a chip from a can, you are not allowed to waste it if it's not the moldy chip, you can put it in other cans if they are not full. The capacity of each can is 20, when you are trying to move a chip from one can to another and every other can is full, then you can eat it. After you remove the moldy chip from a can, you need to bring the chips that you moved to the can which they belong to.



Figure 2: CALORIES

Problem 3 Add sortedPush method inside the Queue interface. SortedPush method adds an element inside the queue and it keeps the queue sorted.

Problem 4 Create a StackQueue class, this class implements the Stack interface and uses two queues as the underlying container.

Problem 5 You have a stack and a queue containing integers. Your objective is to remove the odd numbers from the stack and enqueue them into the queue. Simultaneously, take the even numbers from the queue and push them into the stack. It is important to observe the constraint that odd numbers from the queue cannot be pushed into the stack, and even numbers from the stack cannot be enqueued into the queue. You are not allowed to create additional containers.

Problem 6 Write a program that takes an Array List of Integers and Integer k, you need to move the elements of the List smaller than K to the left and bigger than K to the right without changing the order of the elements.

Problem 7 You have been provided with an ArrayList of Strings that includes both numbers and mathematical operation signs like "+," "-", "×," and "÷". Your task is to perform the specified operation on the preceding two numbers whenever you encounter an operation sign. Replace the operation sign with the result and remove the previous two numbers. If there is only one number preceding the operation sign, apply the operation to that single number.

3	×	9	5	+	−	4	2	÷	9	×	+
	9	9	5	+	−	4	2	÷	9	×	+
		9	14	−		4	2	÷	9	×	+
					5	4	2	÷	9	×	+
							5	2	9	×	+
									5	18	+
											23

Figure 3: A visualization of problem 6