January 2024, CSE 106

Online on Array list and Linked list

Time: 30 minutes

Rearrange the bookshelf

Let's say you have n books in a shelf. These books have ID from *0* to *n-1*, and they are not arranged in order. You want to rearrange them.

You start looking from the left side of the shelf, decide what to do with the book in that position, do it, and then continue to the next book on the right. In this way, you iteratively check all the books and finish rearranging.

There are 3 things you can decide to do with each book.

1) Skip: You have decided that the book is in its correct place. So, you skip to the next book.
2) Move to position and shift: You take the book out and put it at any position of the shelf, shifting the other books in the process
3) Discard: You decide the book shouldn't be on the shelf.

The demonstration of these functionalities is given below:

Table 1

Before	Function name	After
$< 1\ \ \|3\ \ 0\ \ 2 >$	skip()	$< 1\ \ 3\ \ \|0\ \ 2 >$
$< 1\ \ \|3\ \ 0\ \ 2 >$	move_and_shift(3)	$< 1\ \ \|0\ \ 2\ \ 3 >$
$< 1\ \ \|3\ \ 0\ \ 2 >$	discard()	$< 1\ \ \|0\ \ 2 >$

You have to implement these functionalities for both implementations of your list ADT. You can use the operations you implemented in your offline or use any helper functions of your choosing.

You can copy your offline assignment code and then modify it. Keep the assignment code intact for evaluation.

Input format:

The first line of the input is a single number $n,$ denoting the *number of books.*

The books will have ID from 0 to *n-1.*

The next line contains n *numbers from 0 to n-1,* denoting the order of the books as they appear on the shelf.

The next n lines contain two integers *F and P,* in each of them.

F denotes the function number (1 for skip(), 2 for move_and_shift (..), etc.)

P denotes the parameter of the function(ignore it when the function doesn't take any parameters)

Output format:

Like your assignment, after every operation, print the description of the operation done, and the list afterwards.