

Inserting a Node Into a Sorted Doubly Linked List

Given a reference to the head of a doubly-linked list and an integer, *data*, create a new *DoublyLinkedListNode* object having data value *data* and insert it into a sorted linked list.

Complete the `DoublyLinkedListNode SortedInsert(DoublyLinkedListNode head, int data)` method in the editor below. It has two parameters:

1. *head*: A reference to the head of a doubly-linked list of *Node* objects.
2. *data*: An integer denoting the value of the *data* field for the *Node* you must insert into the list.

The method must insert a new *Node* into the sorted (in ascending order) doubly-linked list whose data value is *data* without breaking any of the list's double links or causing it to become unsorted.

Note: Recall that an empty list (i.e., where *head* = `null`) and a list with one element *are* sorted lists.

Input Format

The first line contains an integer *t*, the number of test cases.

Each of the test case is in the following format:

- The first line contains an integer *n*, the number of elements in the linked list.
- Each of the next *n* lines contains an integer, the *data* for each node of the linked list.
- The last line contains an integer *data* which needs to be inserted into the sorted doubly-linked list.

Constraints

- $1 \leq t \leq 10$
- $1 \leq n \leq 1000$
- $1 \leq list[i] \leq 1000$

Output Format

Do not print anything to stdout. Your method must return a reference to the *head* of the same list that was passed to it as a parameter.

The output is handled by the code in the editor and is as follows:

For each test case, print the elements of the sorted doubly-linked list separated by spaces on a new line.

Sample Input

```
1
4
1
3
4
10
5
```

Sample Output

```
1 3 4 5 10
```

Explanation

The initial doubly linked list is: $1 \leftrightarrow 3 \leftrightarrow 4 \leftrightarrow 10 \rightarrow \text{NULL}$.

The doubly linked list after insertion is: $1 \leftrightarrow 3 \leftrightarrow 4 \leftrightarrow 5 \leftrightarrow 10 \rightarrow \text{NULL}$