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1670. Design Front Middle Back Queue

Medium

540

82

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Design a queue that supports `push` and `pop` operations in the front, middle, and back.

Implement the `FrontMiddleBack` class:

- `FrontMiddleBack()` Initializes the queue.
- `void pushFront(int val)` Adds `val` to the **front** of the queue.
- `void pushMiddle(int val)` Adds `val` to the **middle** of the queue.
- `void pushBack(int val)` Adds `val` to the **back** of the queue.
- `int popFront()` Removes the **front** element of the queue and returns it. If the queue is empty, return `-1`.
- `int popMiddle()` Removes the **middle** element of the queue and returns it. If the queue is empty, return `-1`.
- `int popBack()` Removes the **back** element of the queue and returns it. If the queue is empty, return `-1`.

Notice that when there are **two** middle position choices, the operation is performed on the **frontmost** middle position choice. For example:

- Pushing `6` into the middle of `[1, 2, 3, 4, 5]` results in `[1, 2, 6, 3, 4, 5]`.
- Popping the middle from `[1, 2, 3, 4, 5, 6]` returns `3` and results in `[1, 2, 4, 5, 6]`.

Example 1:

Input:

```
["FrontMiddleBackQueue", "pushFront", "pushBack", "pushMiddle", "pushMiddle", "popFront", "popMiddle", "popMiddle", "popBack", "popFront"]
```

Output:

```
[[], [1], [2], [3], [4], [], [], [], [], [], []]
```

Explanation:

```
FrontMiddleBackQueue q = new FrontMiddleBackQueue();
q.pushFront(1); // [1]
q.pushBack(2); // [1, 2]
q.pushMiddle(3); // [1, 3, 2]
q.pushMiddle(4); // [1, 4, 3, 2]
q.popFront(); // return 1 -> [4, 3, 2]
q.popMiddle(); // return 3 -> [4, 2]
q.popMiddle(); // return 4 -> [2]
q.popBack(); // return 2 -> []
q.popFront(); // return -1 -> [] (The queue is empty)
```

Constraints:

- $1 \leq val \leq 10^9$
- At most `1000` calls will be made to `pushFront`, `pushMiddle`, `pushBack`, `popFront`, `popMiddle`, and `popBack`.

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```
1 class FrontMiddleBackQueue {
2
3 public FrontMiddleBackQueue() {
4
5 }
6
7 public void pushFront(int val) {
8
9 }
10
11 public void pushMiddle(int val) {
12
13 }
14
15 public void pushBack(int val) {
16
17 }
18
19 public int popFront() {
20
21 }
22
23 public int popMiddle() {
24
25 }
26
27 public int popBack() {
28
29 }
30 }
31
32 /**
33  * Your FrontMiddleBackQueue object will be instantiated and called as such:
34  * FrontMiddleBackQueue obj = new FrontMiddleBackQueue();
35  * obj.pushFront(val);
36  * obj.pushMiddle(val);
37  * obj.pushBack(val);
38  * int param_4 = obj.popFront();
39  * int param_5 = obj.popMiddle();
40  * int param_6 = obj.popBack();
41  */
```

Problems

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1670/2430

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