

The background of the slide features a scenic landscape of the Flatirons mountain range in Boulder, Colorado. The mountains are composed of light-colored rock and are partially covered with green pine forests. In the foreground, there is a grassy, open field with a few small trees and shrubs. A group of people can be seen walking along a path on the left side of the field.

CSCI 1102 Computer Science 2

Meeting 8: Tuesday 2/23/2021
Queues

A photograph of five people standing in a line at a supermarket checkout. From left to right: a man in a blue polo shirt and khaki pants holding a red shopping basket; a man in a dark jacket and jeans holding a red shopping basket; a woman in an orange top and jeans with her arms crossed; a man in a teal long-sleeved shirt; and a man in a dark suit and tie holding a white plastic bag. Shelves filled with various products are visible in the background.

Queues

gettyimages
Rubberball/Mike Kemp

74214360

- Simple Queues – First-in First-out (FIFO)
- Deques – double-ended queues
- Priority Queues

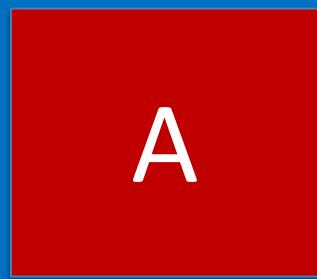
enqueue(A)

front back

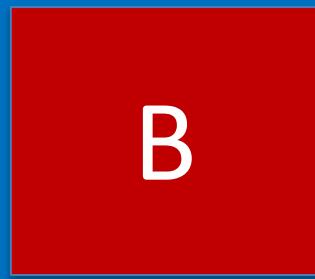


enqueue(B)

front



back



enqueue(C)

front



A

B

C

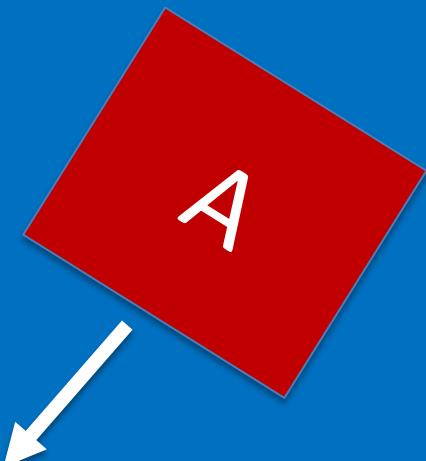
back



dequeue()

front

back



```
1 // An API for a simple queue data structure
2 //
3 public interface Queue<Item> {
4
5     void enqueue(Item item);
6
7     Item dequeue();
8
9     boolean isEmpty();
10
11    int size();
12
13    @Override
14    String toString();
15 }
```

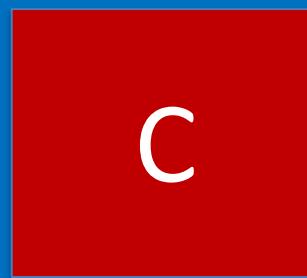
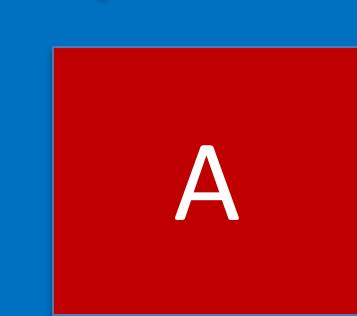
Double-ended Queues

Deques

Heads up! Deque != de-queue

```
pushLeft(C);  
pushLeft(B);  
pushLeft(A);
```

left

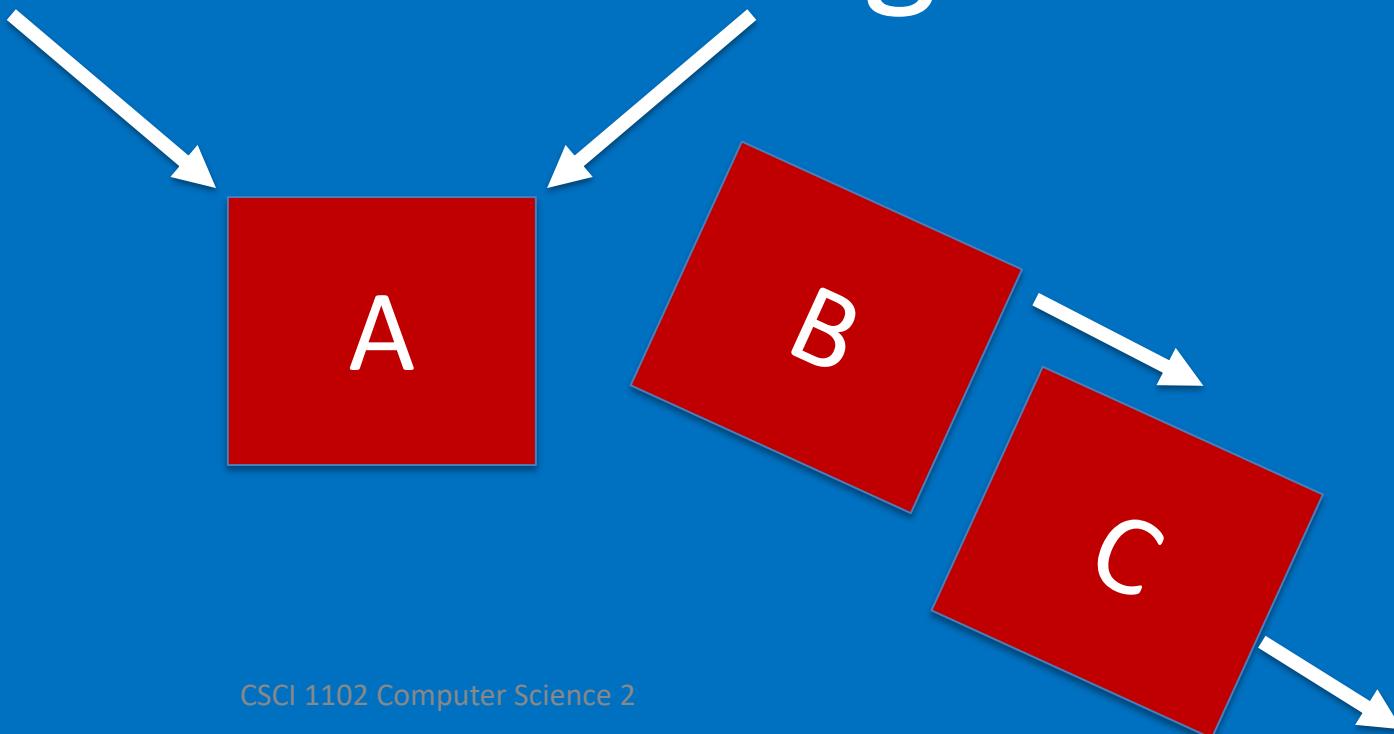


right

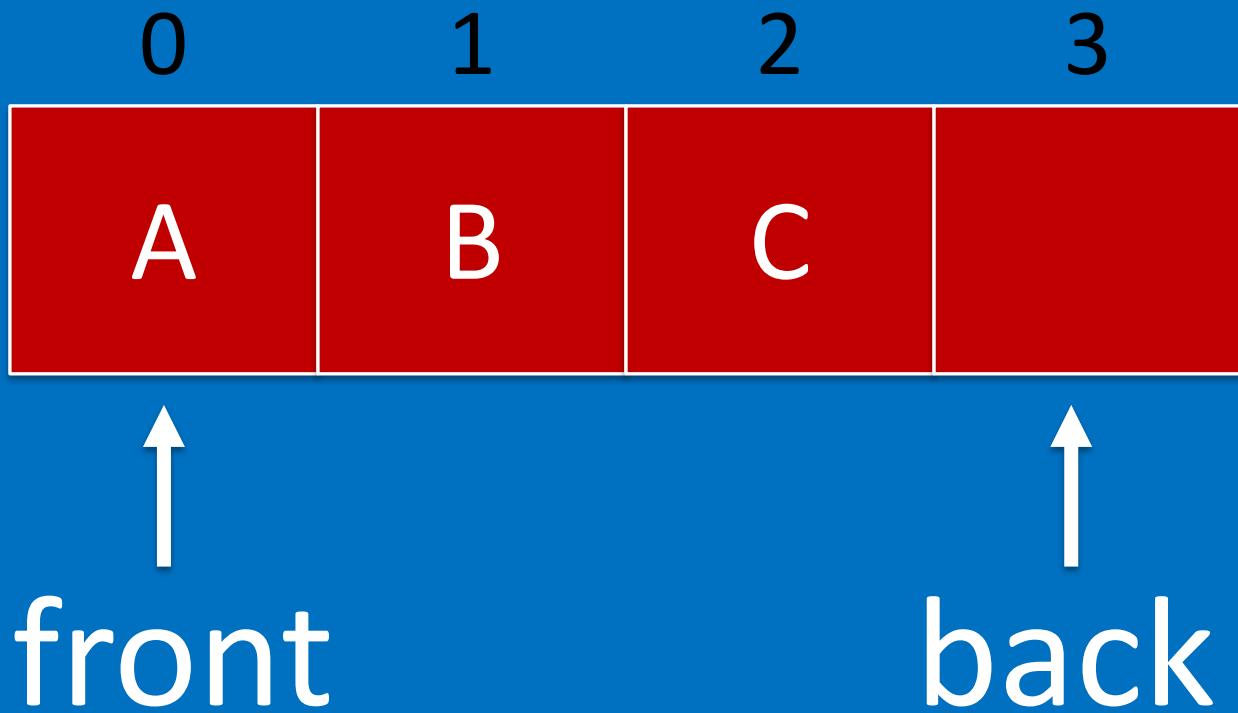
```
popRight();  
popRight();
```

left

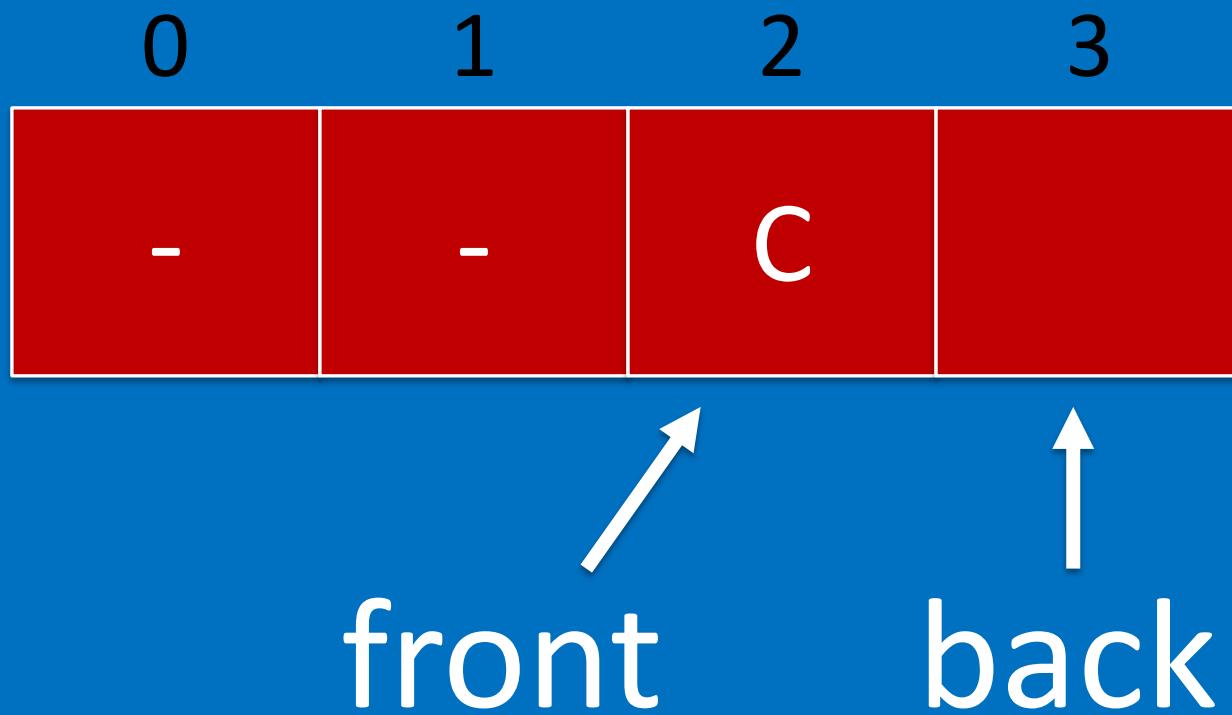
right



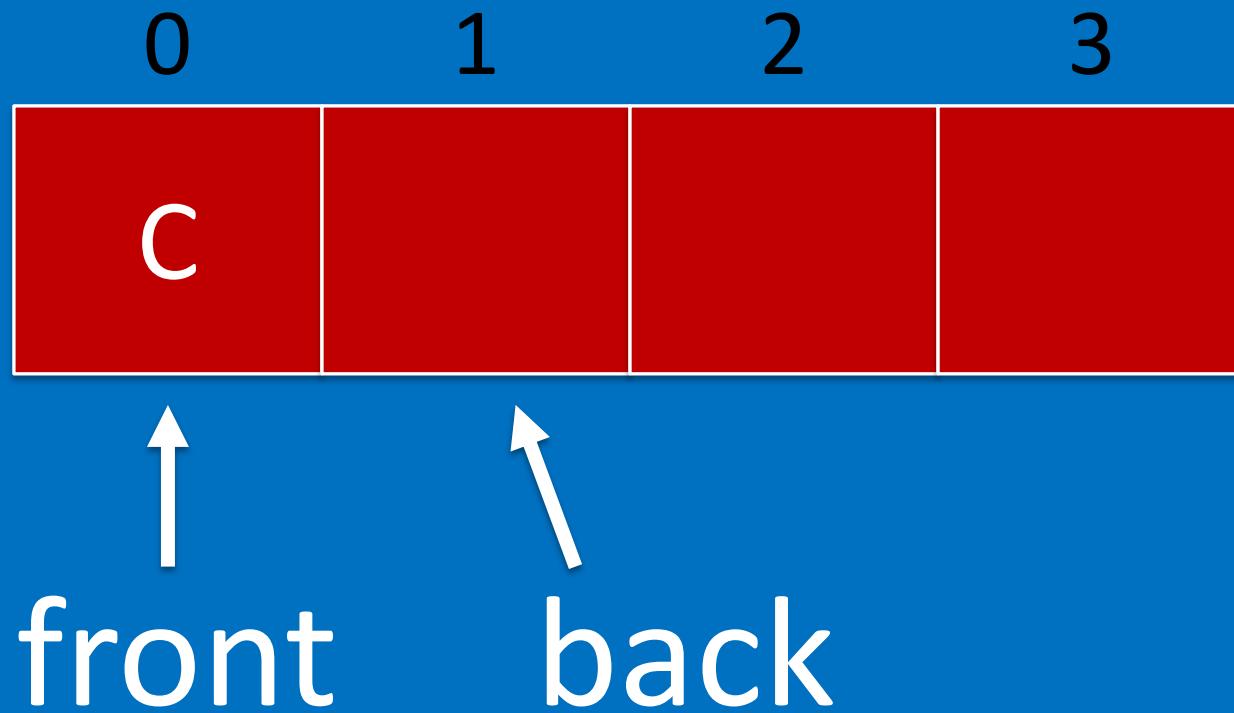
A Sequential Representation of Simple Queues

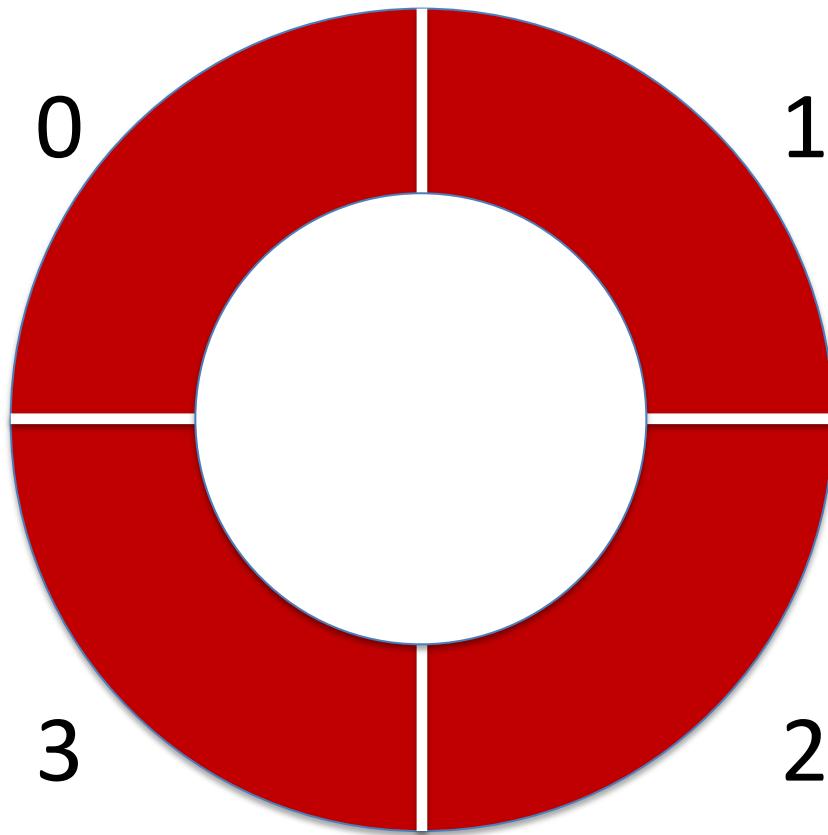


After dequeuing A & B

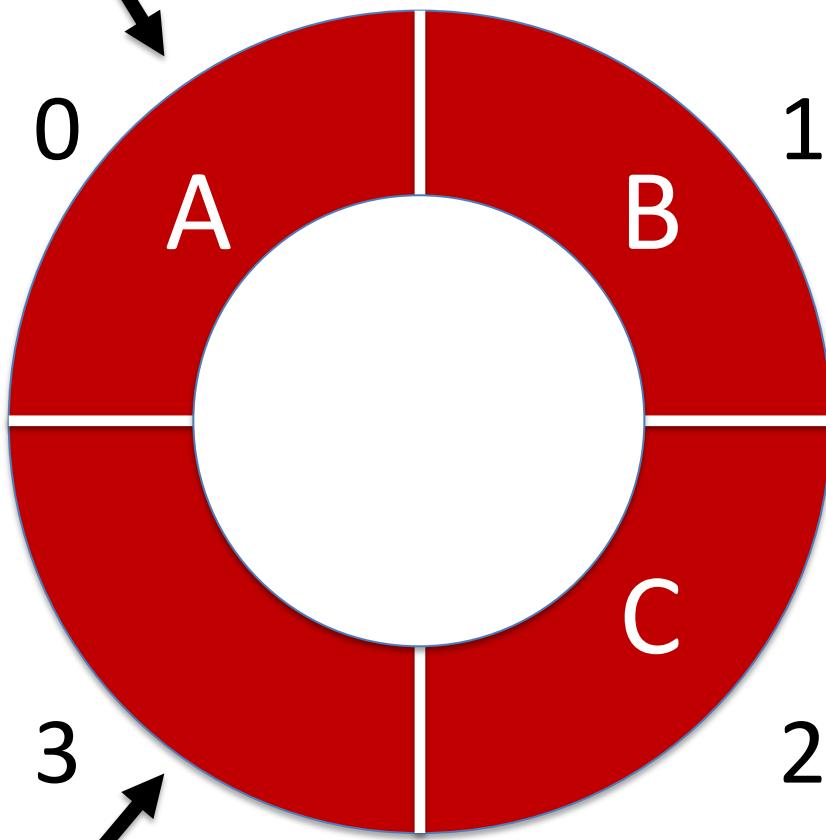


Could Slide Left – Linear Cost



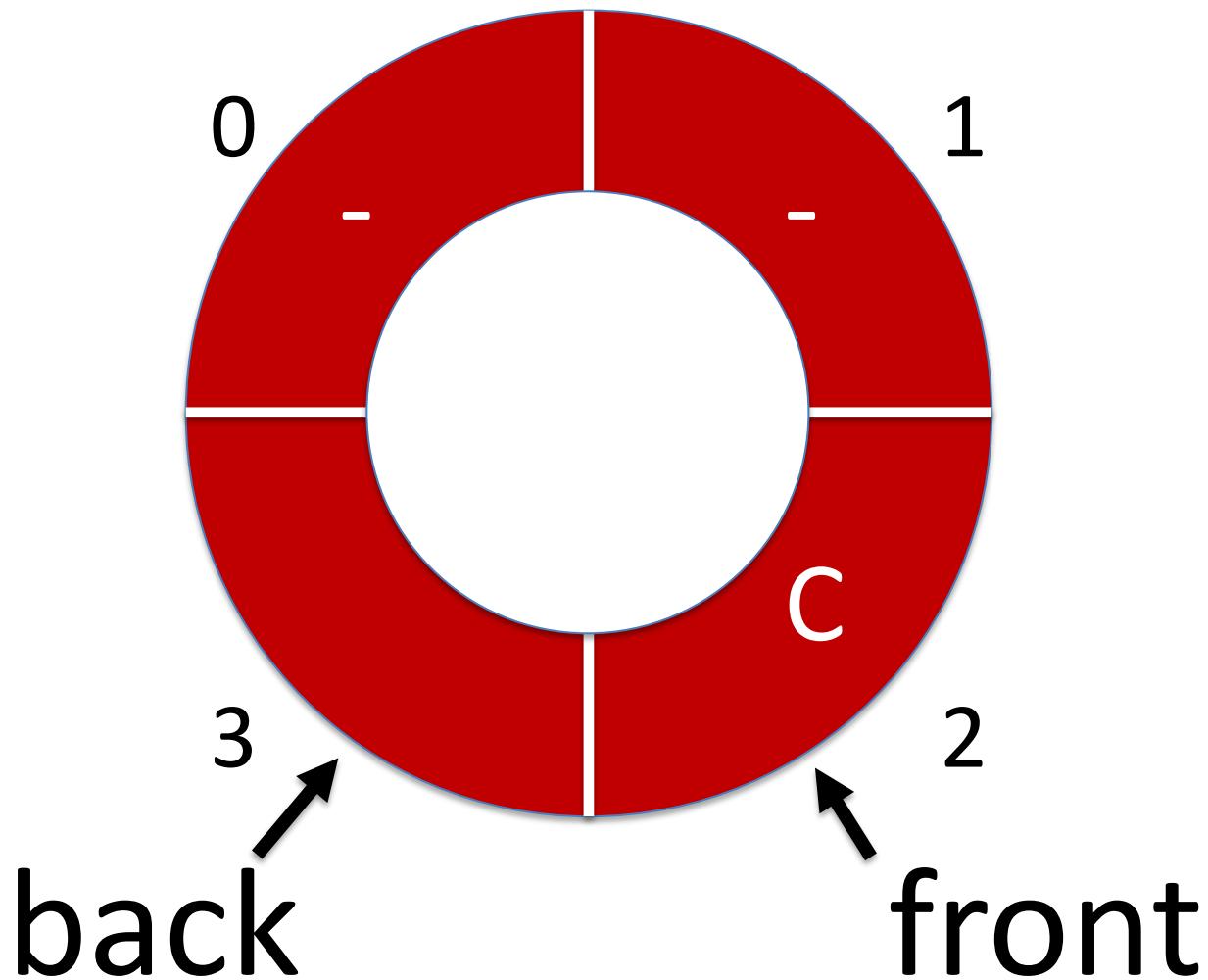


front

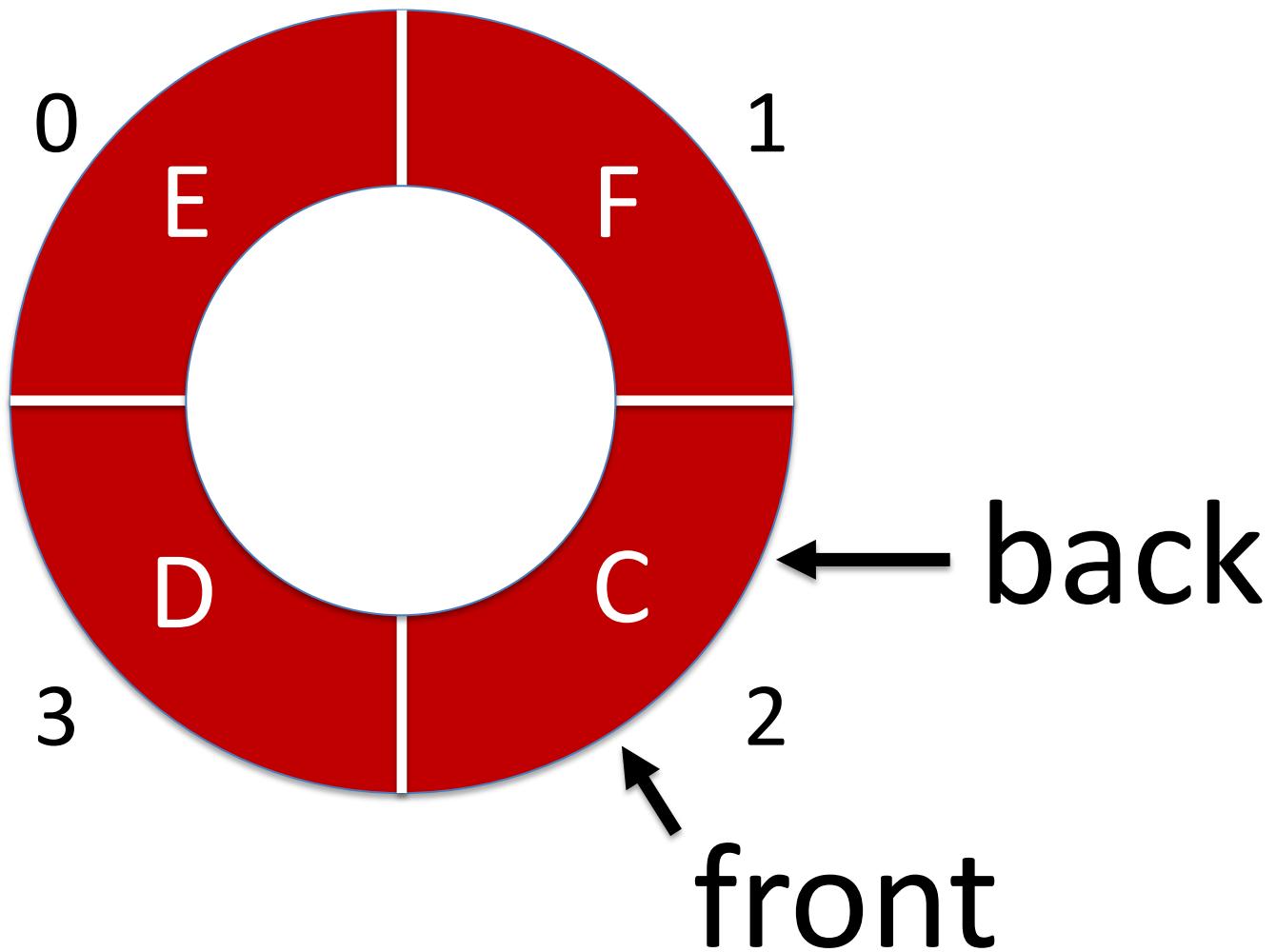


back

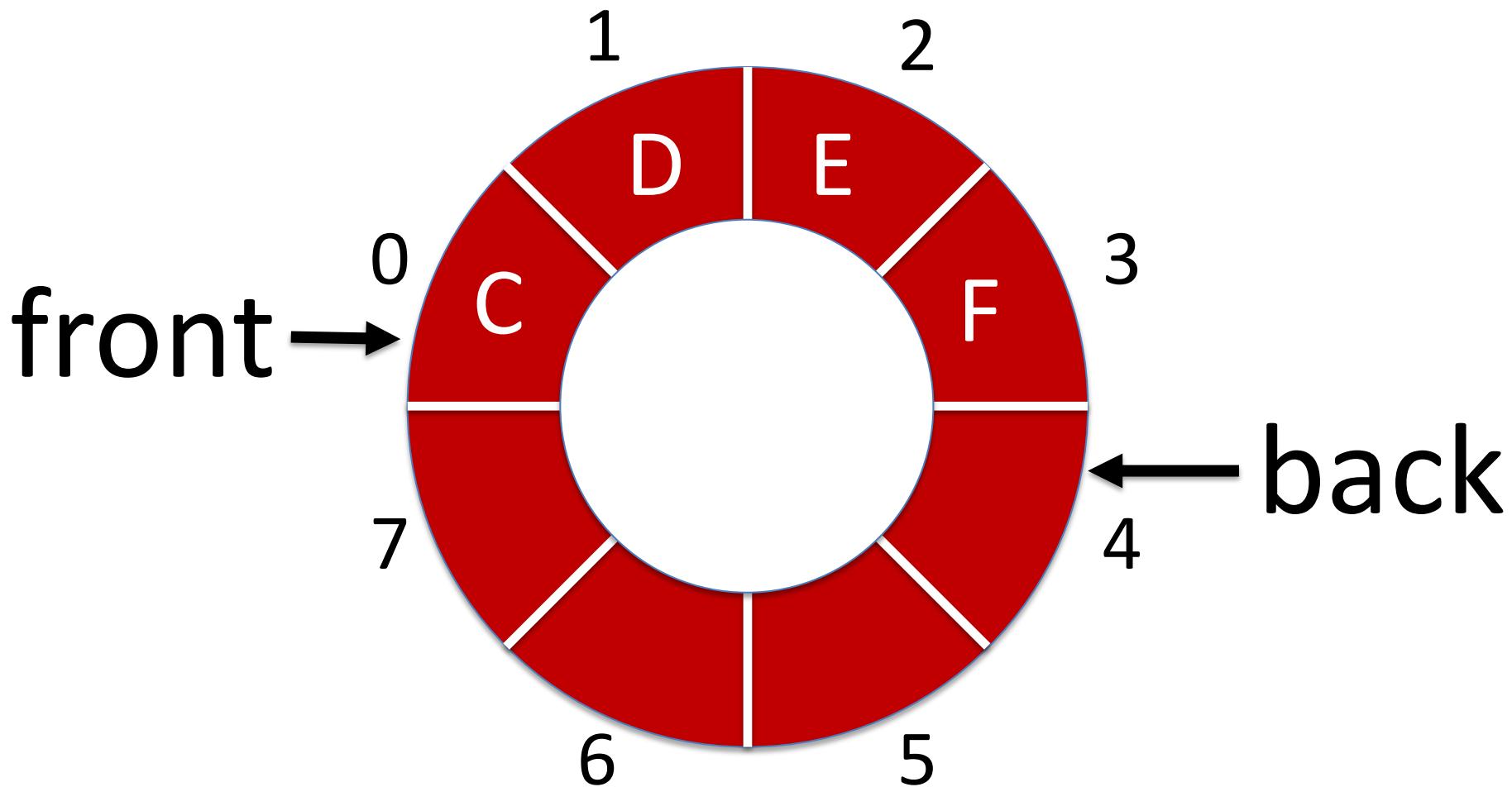
`dequeue(); dequeue();`



`enqueue(D); enqueue(E); enqueue(F);`



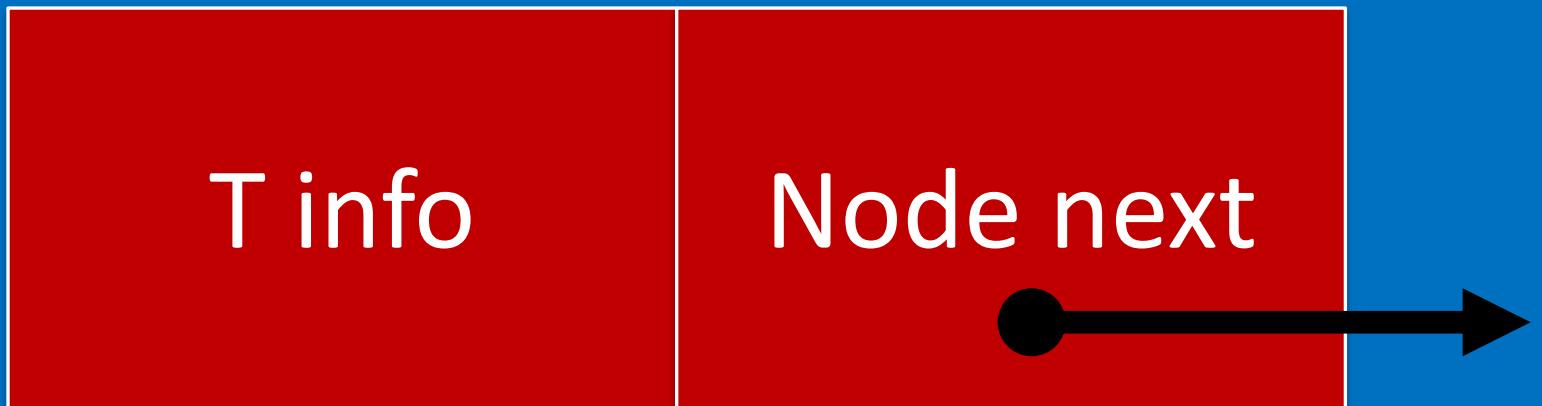
`resize()`



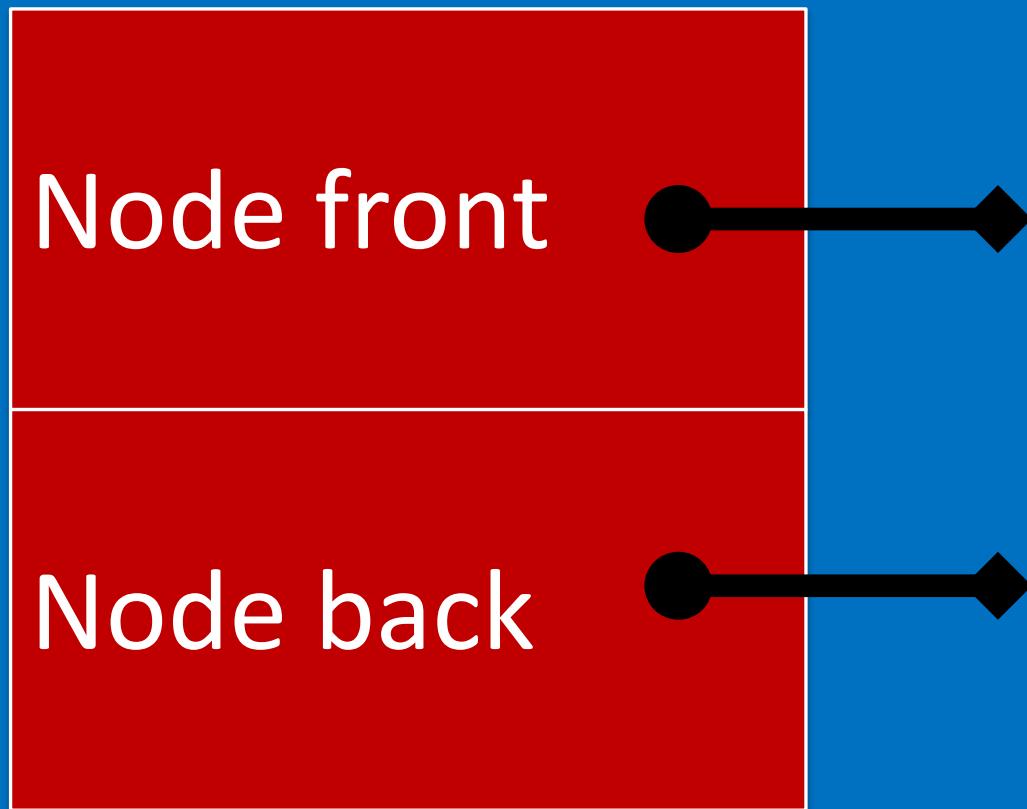
Code

A Linked Representation of Simple Queues

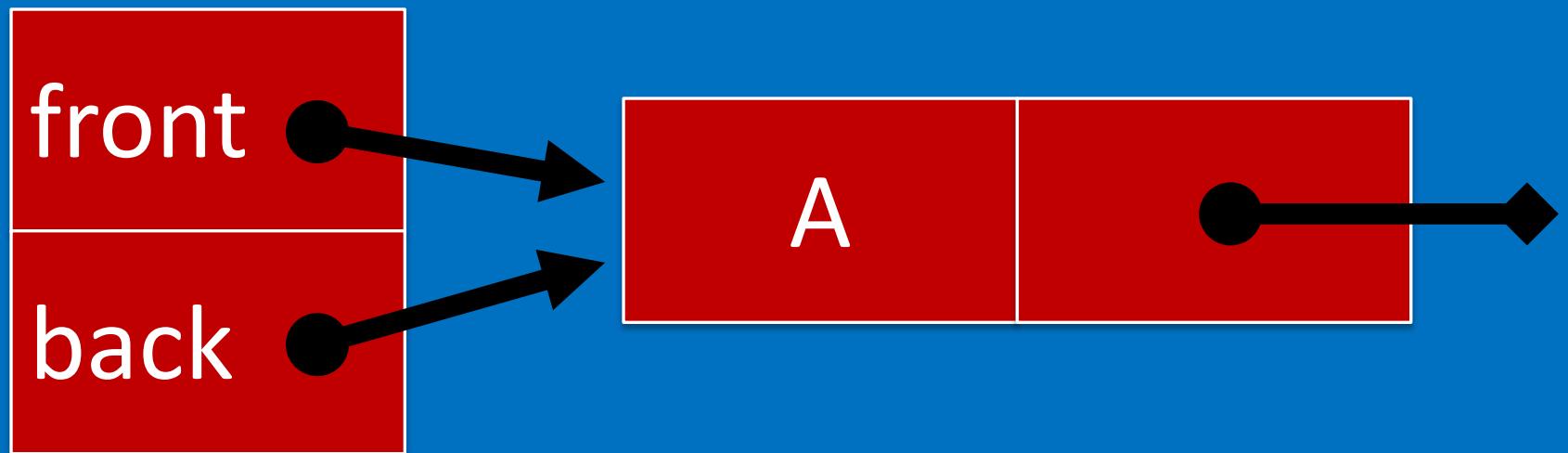
Node



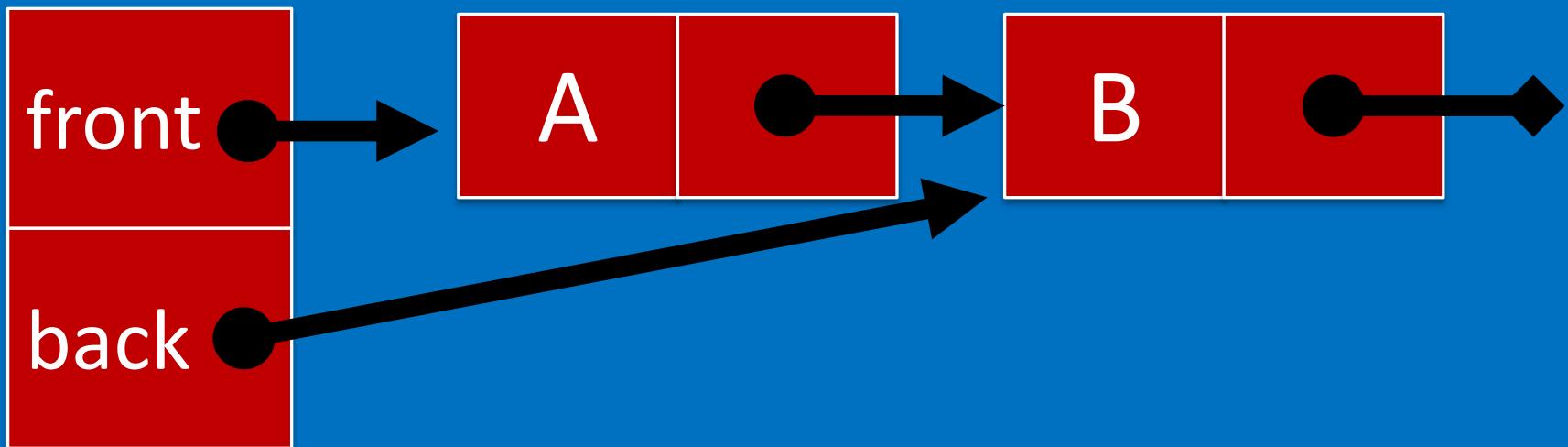
A Header – empty queue



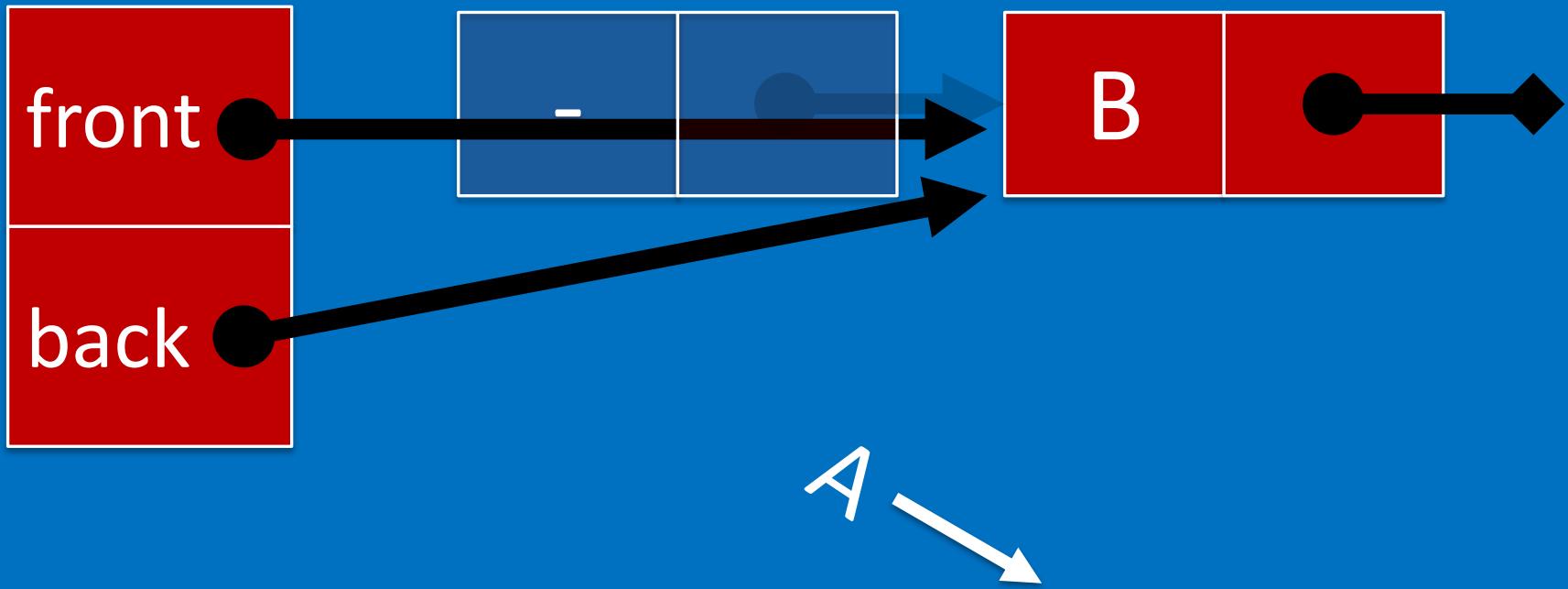
enqueue(A)



enqueue(B)



dequeue()



Code