Announcements
- Test on Monday
- Review on Friday in class
- No lab tomorrow
Runtimes for stacks (from class)

Leaky Stack A - push $O(n) \Leftarrow$ BAD

- **push** : add new element
  - $t++$
  - (or threw an error)
  - $O(1)$

- **pop** : $t--$
  - or threw an error
  - $O(1)$

- **top** : $O(1)$

- **size & empty** : $O(1)$

Leaky Stack B - $O(1)$ for everything
Queues

What are they? Lines

First in, first out

Goal: Fast

Drawback: Limited
Array Queues

- We must wrap around! Why?

Data: capacity array front back size

push(1)
push(2)
pop(1)
Implementation

**push(e):**

- $\text{array}[\text{back}] = e$
- $\text{back} = (\text{back} + 1) \mod \text{capacity}$
- $\text{size}++$

**pop():**

- $\text{front}++ \mod \text{capacity}$
- $\text{size}--$
front++;

if (front >= 4) {
    front = 0;
}

front = 3;  // Capacity = 4

front = (front + 1) mod 4 = 0