CS180 - Queues

Announcements

- Test on Monday
- Review on Friday in class
- No lab tomorrow

Runtimes for stacks (from class

push	O(1)
pop	O(1)
:	

Leaky Stack A — push   O(n) ← 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

O(1)
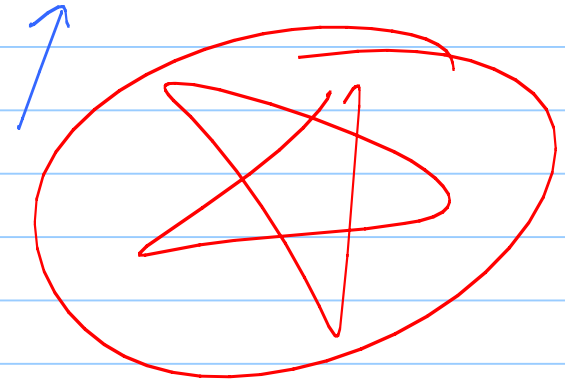
Queues

What are they? <u>Lines</u>

First in, first out
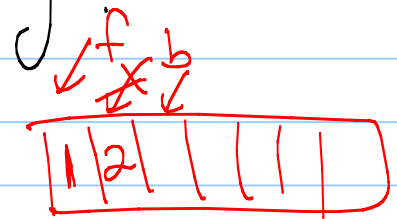
Goal: fast

Drawback: limited

Array Queues

- We must wrap around! Why?

capacity
array
front
back
size
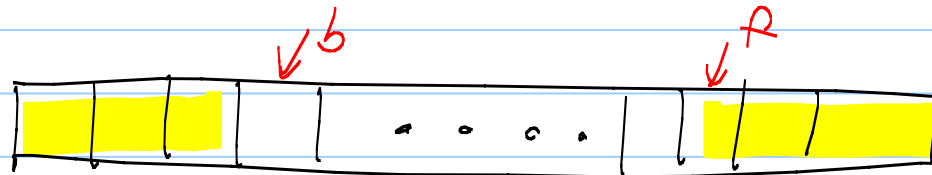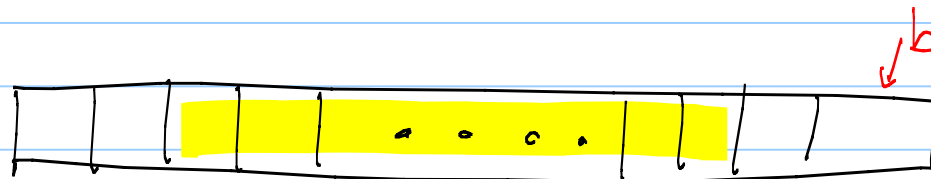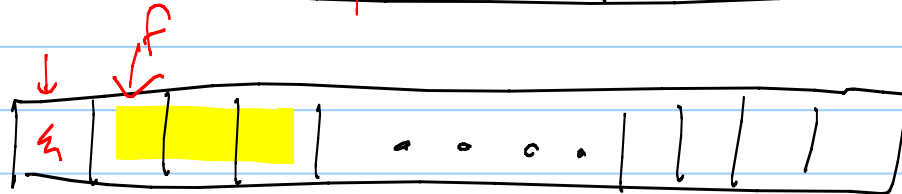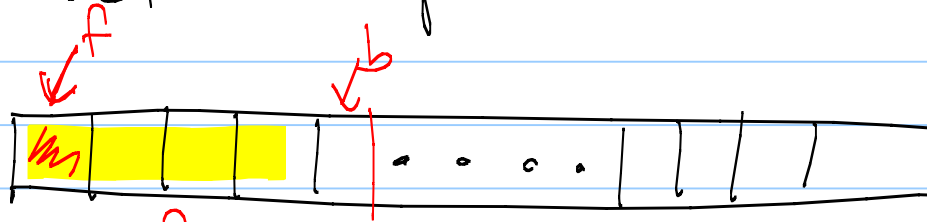
push(1)

push(2)

pop()

Implementation

$4 \mod 3 = 1$

$$\begin{array}{r} 1 \text{ r.1} \\ 3\overline{)4} \\ 3 \\ \hline 1 \end{array}$$

$16 \mod 3 = 1$

$$\begin{array}{r} 5 \\ 3\overline{)16} \\ 15 \\ \hline 1 \end{array}$$

push(e):

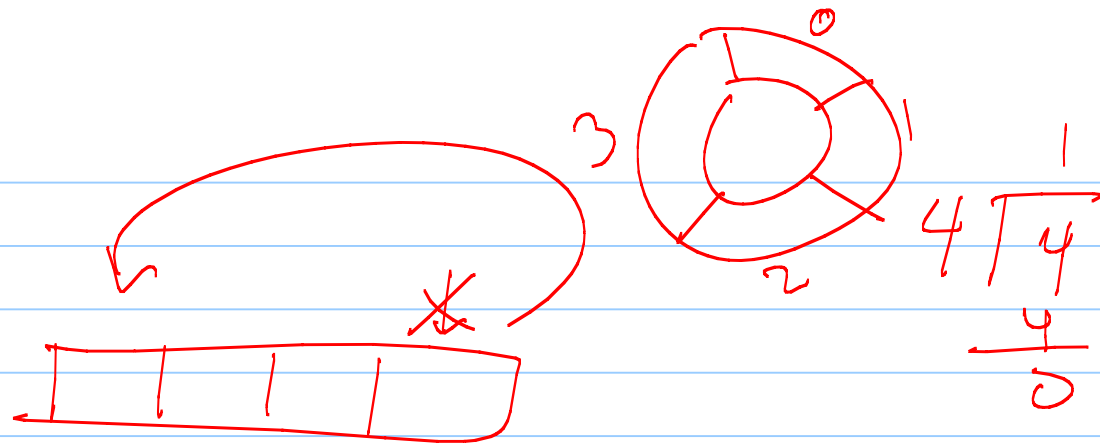   array[back] = e   ← modulo

   back = (back+1) % capacity;

   size++;

pop():

   front ++; ←— (mod capacity)

   size --;

$$4 \sqrt{4}$$
$$\frac{4}{0}$$

front++;

If (front >= 4)
   front = 0;

capacity = 4

front = 3 4

front = (front + 1) mod 4 = 0