

COP 3502 9/24/25

Queues: First In, First Out (FIFO)

↳ British word for a line!

Abstract Data Type

enqueue: add to back of queue

dequeue: remove item at the front

front: returns item at front w/o removing

size: returns # elems

2 Implementations

~~#~~ Goal

$O(1)$ operations
on average

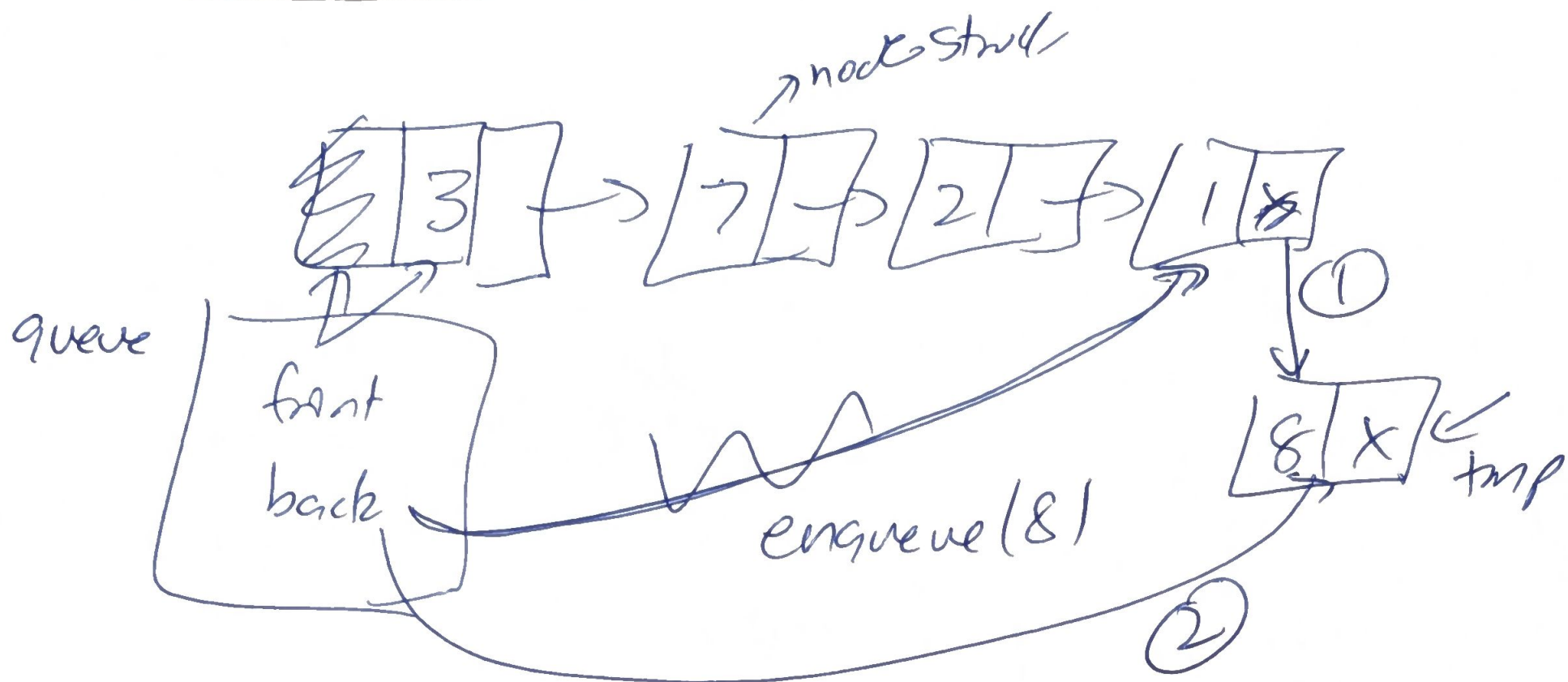
Linked List - easier

Array - has interesting index meth...

TODAY

LL version

Kattis Problem: Grid (introduce you to
a Breadth First Search
in CS2)

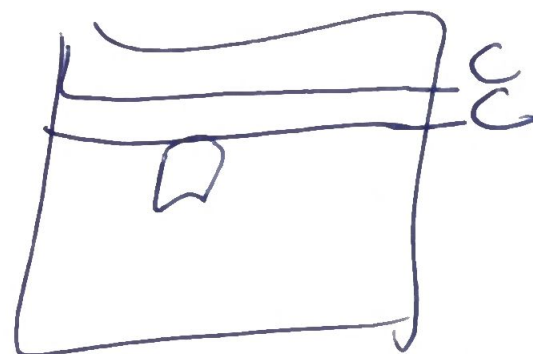


To dequeue $\rightarrow$ Save ptr to front

Move front to its next.

Return front node, letting whoever called it free it, OR free node then return value

Grid r rows
 c cols

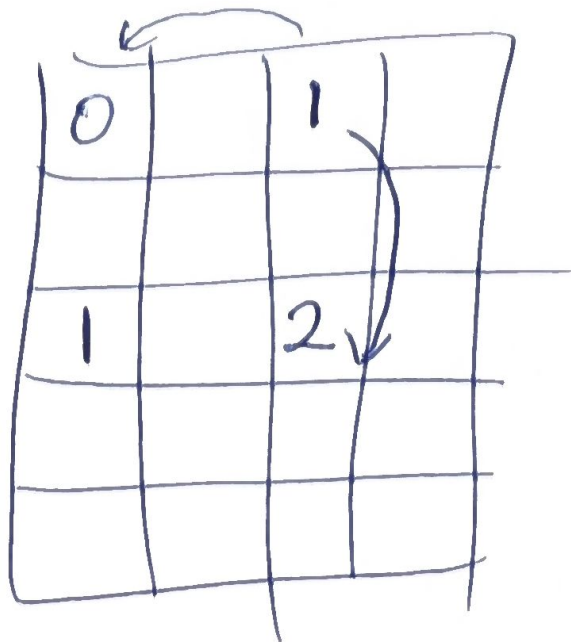


row x
col $y \rightarrow$ value = $c \times x + y$
rows I skip

Grid

0	1	2	0
1	2	0	3
3	1	1	3
1	1	2	0
1	1	1	0

DIST



Q = ~~(0,0)~~, ~~(0,2)~~, (2,0), (2,2)

while queue not empty:

pos = dequeue(queue)

~~if~~

Go to all next positions from pos:

if ~~is~~ not inbounds next:

continue

if dist[next] != -1

continue

dist[next] = dist[pos] + 1

enqueue(queue, next)