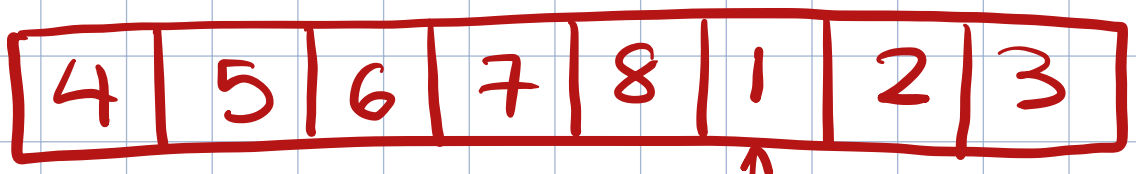
Why did i fail the last circular queue test ???

here is my queue!



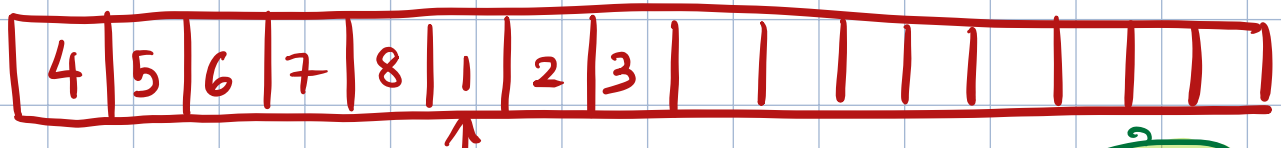
front index = 5
size = 8
capacity = 8

but what if I want to add 9 onto my queue

↳ its full, so lets assign some more memory!

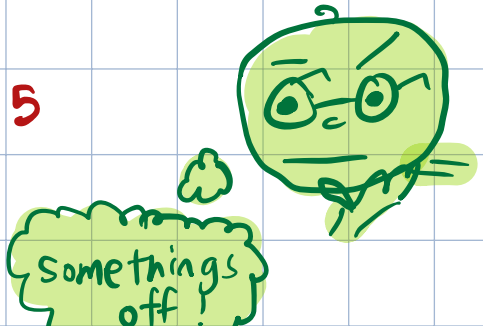
```
q -> items = realloc(q->items, 2 * capacity * sizeof(Item));
capacity = capacity * 2;
```

done ..... right?!!??



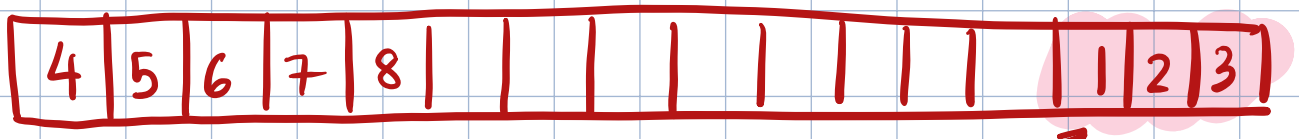
front index = 5
size = 8
cap = 16

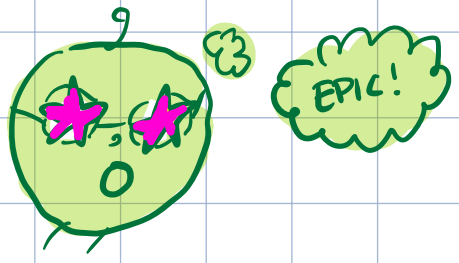
Our circular queue has a massive GAP?!?



↳ shouldn't the number after 3 be 4?!? but right now is a bunch of unassigned memory!

OPT 1... move 1,2,3 to the end...



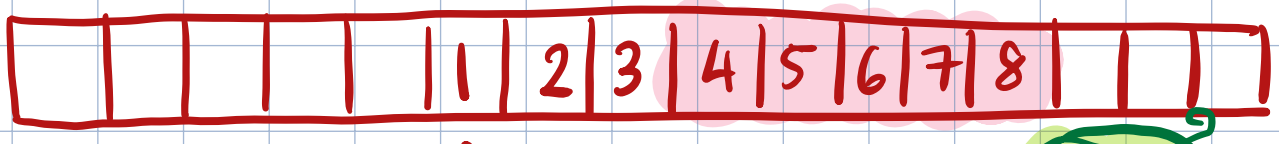


front index = 5 + 8 = 12
size = 8
cap = 16

make sure to move front index!

```
for (i = front index; i < oldcap; i++) {
    q->items[i + oldcap] = q->items[i];
}
frontindex += oldcap;
```

Opt 2... move 4, 5, 6, 7, 8 to after the '3'



front index = 5
size = 8
capacity = 8

```
for (i = 0; i < frontIndex; i++) {
    q->items[i + oldcap] = q->items[i];
}
```

notice how all elements before front index moved 8 spots forward!!?