3) (10 pts) ALG (Queues)

Suppose we wish to implement a queue using an array. The structure of the queue is shown below.

```
struct queue {
    int *array;
    int num_elements;
    int front;
    int capacity;
};
```

The queue contains the array and three attributes: the current number of elements in the array, the current front of the queue, and the maximum capacity. Elements may be added to the queue not just at the end of the array but also in the indices at the beginning of the array before front. Such a queue is called a circular queue.

Write a function to implement the dequeue functionality for the queue, while ensuring that no null pointer errors occur. Your function should take in 1 parameter: a pointer to the queue. Your function should return the integer that was dequeued. If the queue is NULL or if there are no elements to dequeue, your function should return 0.

```
int dequeue(struct queue * q) {









}
```

Computer Science Foundation Exam

August 28, 2021

Section I B

DATA STRUCTURES

NO books, notes, or calculators may be used,
and you must work entirely on your own.

Name: _____

UCFID: _____

NID: _____

Question #	Max Pts	Category	Score
1	10	ALG	
2	5	ALG	
3	10	ALG	
TOTAL	25		

You must do all 3 problems in this section of the exam.

Problems will be graded based on the completeness of the solution steps and <u>not</u> graded based on the answer alone. Credit cannot be given unless all work is shown and is readable. Be complete, yet concise, and above all <u>be neat</u>. For each coding question, assume that all of the necessary includes (stdlib, stdio, math, string) for that particular question have been made.