

# CSCI 1112 Algorithms and Data Structures

## Lab 9 – Queues and Stacks II

### Part 1: Array Implementation of Queues and Stacks (14 points)

- Download *ArrayQueue.java*.
- Add a `poll()` method to the `ArrayQueue` class, which should return the integer value of the front element in the queue, and remove it from the queue (just increment the front index)

```
public int poll(){  
    // if the queue is empty return -1  
    int item= data[front]; //get the value of the front element  
    //increment front index  
    //return the value  
}
```

- Add a `peek()` method, which should return the value of the front element without removing it from the queue.
- Create a new class called `ArrayStack`. You may use `ArrayQueue` as a reference. Implement a stack using an array. Add all stack methods: `push()`, `pop()`, `peek()`, `isEmpty()`, and `print()`.
- Test your implementation of `ArrayQueue` and `ArrayStack`.

### Part 2: Circular Array Queue (6 points)

- Modify `add()` and `poll()` methods in the class `ArrayQueue` (implemented in Part 1). The front and rear indices should circle back to index 0 whenever the end of the array is reached.
- Modify the `print()` method.
- Test your implementation by running `QueueTest.java`. The expected output is shown in the comments.