ECE368 Fall 2016 Homework 3

IMPORTANT:

- Do NOT leave your name or Purdue ID on this homework.

- Write your homework security number at the TOP of EACH page.

Read and sign the *Academic Honesty Statement* that follows:

"In signing this statement, I hereby certify that the work on this exercise is my own and that I have not copied the work of any other student while completing it. I understand that, if I fail to honor this agreement, I will receive a score of zero for this exercise and will be subject to further disciplinary action."

Homework security number:

Please acknowledge any people who have helped you with this homework.

Question	Credits
1	
2	
3	

1. (30 points) Illustrate the result of *each* of the operations `PUSH(S, 4)`, `PUSH(S, 1)`, `PUSH(S, 3)`, `POP(S)`, `PUSH(S, 8)`, and `POP(S)` on an initially empty stack *S* stored in array *S[0..5]*. Indicate where the `STACK_TOP` index is pointing.

2. (30 points) Illustrate the result of each of the operations ENQUEUE(Q, 4), ENQUEUE(Q, 1), ENQUEUE(Q, 3), DEQUEUE(Q), ENQUEUE(Q, 8), and DEQUEUE(Q) on an initially empty queue *Q* stored in array *Q[0..5]*. Here, ENQUEUE refers to inserting an element into the queue, and DEQUEUE refers to removing an element from the queue. Indicate where the FRONT and REAR pointers are.

3. (40 points) Show how to implement a queue using two stacks with the following primitives of the stack abstract data type: EMPTY(S), STACK TOP(S), PUSH(S, element), and POP(S)? Assuming O(1) time complexity for all these primitives, what is the run-time complexity of each of the following queue operations: EMPTY(Q), ENQUEUE(Q, element), DEQUEUE(Q), FRONT(Q), REAR(Q). (Note: Not all queue operations can be performed in O(1) time complexity.)