This worksheet serves as a review for concepts that do not appear on Sherif's practice exam. This is not a comprehensive way to prepare for the midterm.

Problem 1

Calculate the value of the following expressions in post-fix notation. You must use a stack. Please show your work.

$$2\ \ 3+5\ \ 3-* \tag{1}$$

$$5\ \ 12*6+2- \tag{2}$$

$$2\ \ 3-7\ \ 5*5/+ \tag{3}$$

Problem 2

Convert the following expressions into post-fix notation. You must use a stack. Please show your work.

$$3 + 2 * 5 - (4 + 2) \tag{1}$$

$$(A - B) * C \tag{2}$$

$$A + B - (C - D) * (E + F) * G \tag{3}$$

Problem 3

True or False. There are some recursive algorithms that cannot be made iterative.

Problem 4

In one line finish the clear method for a linked stack. Assume the first node is named head.

Listing 1: Finish the method

```
1 public void clear() {
2     // You may only use one line.
3
4 }
```

Problem 5

Explain the pros and cons for array based implementations of a bag and linked implementations of a bag. You can assume that the array is resizeable.

Problem 6

List and explain the three main stack operations.

Problem 7

What is left on the stack after the following operations?

push(22), pop(), push(17), peek(), pop(), push(142857), peek(), peek(), peek(), push(37), push(17), pop(), peek(), pop().

Problem 8

Write code for the contains(E elem) method for an Array Bag implementation. Pseudocode is fine. Assume the array for the bag is called bag. Also state the runtime of contains(E elem). Please explain your answer.