

2024-04-17

5118006-03 Data Structures

## Test #1 (1/2)

### Outline

- Problem 1: Programming, 50 points
- Problem 2: Descriptive Writing, 25 points
- Problem 3: Descriptive Writing, 25 points

### Problem 1.

Check out the postfix expression evaluator at <http://github.com/hongshin/DataStructures/test/test1>.

Fix `postfix.c` to properly use `gstack_t`.

After that, revise the program to add the following features:

1. Make it support a new unary operator “++”, which increments the given operand by one.
2. Make it support a new unary operator “--”, which decrements the given operand by one.
3. Make it support a new binary operator “^” which returns the power of the first operand to the second operand (e.g., `2 3 ^` ; is evaluated to 8)
4. Print out “Invalid” when the given input is not in a valid form.

The followings are the expected results of your program:

Input	Output
<code>3 -- 1 + 2 ^ ;</code>	9
<code>2 ++ 4 -- * 5 + ;</code>	14
<code>3 2 + -2 * 1 + ;</code>	-9
<code>2a 8 * 2 + ;</code>	Invalid
<code>3 ++ 5 -- ^^ ;</code>	Invalid
<code>3 9 + 4 8 * 2 ;</code>	Invalid

Submit your result (`postfix.c`) via LMS by 4:30 PM.

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## Test #1 (2/2)

Your name : \_\_\_\_\_ Student number: \_\_\_\_\_

**Problem 2.** Discuss the advantages and disadvantages of circular queue compared with a linear queue.

**Problem 3.** Suppose that you are asked to write a program that uses a stack to convert a given postfix expression into the corresponding infix expression. Explain how the program uses the stack.