Data Structure

Lab 2. Parsing Using Stack

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Submission & Evaluation

- Submission deadline: 4 PM, Apr 14 (Tue)

- Online test: http://34.84.71.80 (Session ID: 65CH9n5)

- Evaluation: 5 points x 2 problems (total 10 points)
  - 5 points/problem: Succeed on time (before the deadline)
  - 4 points/problem: Succeed by 9 PM, Apr 17 (Thur)
  - Upto 3 points/problem: submit a report by 4 PM, Apr 18 (Fri)

- Note
  - You must use stack.c used in the class
    https://github.com/hongshin/DataStructure/blob/stack/ver2/stack.c
  - You must construct a solution as a single source file

Postfix2 (1/2)

- Construct postfix2.c by extending postfix.c
- postfix2.c is extended with adding the following features:
  - exponentiation operator **^**
    - e.g., "2 3 ^ ;" evaluates to 8 (= 2^3)
  - reverse operator **~**
    - this operator is unary (connected with only one operand)
    - e.g., "3 1 ~ + ;" evaluates to 2
  - error messages
    - print out "undefined" for the following two cases:
      - the second operand given to division (/) is zero
      - the second operand given to exponentiation is negative
    - print out "invalid" if the given input is not well formed

Postfix2 (2/2)

- Input
  - Given from the standard input
  - Input is a sequence of tokens ended with ';'
  - The number of tokens do not exceed 100 and each token has no more thatn 16 characters
- Output
  - Print an evaluation result or error message to the standard output

```
3 1 ~ + 3 ^ ;↲
```

<Input 1>

```
8↲
```

<Output 1>

```
1 ~ + 3 * ;↲
```

<Input 2>

```
invalid↲
```

<Output 2>

```
3 1 * 2 3 + @ ;↲
```

<Input 3>

```
invalid↲
```

<Output 3>

```
3 1 + 2 3 - ^ ;↲
```

<Input 4>

```
undefined↲
```

<Output 4>

Carbohydrate (1/2)

A carbohydrate is a chemical compound that consists of only carbon, (C), hydrogen (H) and oxygen (O). A molecular formula is a string of element symbols, positive integers, and parentheses to represent the composition of a molecule in a simple manner. The formula for a carbohydrate can have 'C', 'H' and 'O' as element symbols. An element symbol *s* may be followed by a positive integer *n* when there is a chunk of the *n* number of the *s* elements.

A molecular formula may contain another molecular formula surrounded by a parenthesis. Such a nested molecular formula may be followed by a positive integer if that structure repeats multiple times in the molecule.

The relative masses of carbon (C), oxygen (O), and hydrogen (H) are 12, 16 and 1, respectively. The relative mass of a molecule is the sum of the relative masses of all its elements.

Write a program that computes the relative mass of a given molecula formula of a carbohydrate.

Carbohydrate (2/2)

- Input
  - Given from the standard input. Assume that only valid input is given.
  - One line that contains up to 100 character is given. It does not have any whitespace (blank) in a middle.
- Output
  - Print the relative mass of the given molecule to the standard output.

```
COOH↵
```
<Input 1>

```
45↵
```
<Output 1>

```
CH2O↵
```
<Input 2>

```
30↵
```
<Output 2>

```
(CH2O)6↵
```
<Input 3>

```
180↵
```
<Output 3>

```
CH(CH3)2COOH↵
```
<Input 4>

```
88↵
```
<Output 4>