CMPS109 Spring 2018 : Lab 1

In this lab you will implement a Reverse Polish Notation (RPN) Calculator in three programming languages, namely C, BASH, and Python 3.

This lab is worth 7% of your final grade.

Submissions are due NO LATER than 23:59, Sunday April 8, 2018.

Late submissions will not be graded.

Background Information

Details of RPN can be found in many places on-line, but if you are unfamiliar the notation, a good place to start is it's Wikipedia entry: https://en.wikipedia.org/wiki/Reverse_Polish_notation

Teaching Servers

Enrolled students in CMPS109 have exclusive access to the following machines, all of which are 24 core Ubuntu Linux servers with 128GB RAM.

```
graculus.soe.ucsc.edu          olaf.soe.ucsc.edu
grolliffe.soe.ucsc.edu         thor.soe.ucsc.edu
```

Your home directory is UCSC AFS, so will look the same as when you log into the UCSC Unix Timeshare.

You are not required to do your work on the CMPS109 teaching servers, but before submitting, you should test your code on one of them as the automated grading system runs on an identically configured machine.

Accessing the teaching servers file systems from your personal computer

You home directories on the teaching servers are UCSC AFS, i.e. they are the same as if you logged into the UCSC Unix Timeshare. To access files in your home directory to edit them using an IDE on your laptop, you can do one of two things:

- Use an SSH synchronization client like Cyberduck: https://cyberduck.io/
  - Configure Cyberduck to point at any of the teaching servers
  - Connect with your CruzID and Blue Password

- Install an AFS client on your laptop: https://www.auristor.com/openafs/client-installer/
  - The Kerberos realm is: CATS.UCSC.EDU
  - The OpenAFS Cell is: cats.ucsc.edu
  - Use your CruzID and Blue Password
  - This is a far from trivial setup. If you get stuck, switch to using something like Cyberduck.
  - **DO NOT CONTACT UCSC AFS SUPPORT FOR ANY REASON WHATSOEVER**

Setup

SSH in to any of the CMPS109 teaching servers using your CruzID Blue credentials:

```
$ ssh <cruzid>@<server>.soe.ucsc.edu
```
(use Putty http://www.putty.org/ if on Windows)

Authenticate with Kerberos:

```
$ kinit <cruzid>@CATS.UCSC.EDU
```

Authenticate with AFS:

```
$ aklog
```

Create a suitable place to work: ***(only do this the first time you log in)***

```
$ mkdir -p ~/CMPS109/Lab1
$ cd ~/CMPS109/Lab1
```

Install the lab environment: ***(only do this once)***

```
$ tar xvf /var/classes/CMPS109/Spring18/Lab1.tar.gz
```

Make the skeleton system:

```
$ make grade
```

What to submit

In a command prompt:

```
$ cd ~/CMPS109/Lab1
$ make submit
```

This creates a gzipped tar archive named `CMPS109-Lab1.tar.gz` in your home directory.

UPLOAD THIS FILE TO THE APPROPRIATE CANVAS ASSIGNMENT.

Requirements

Your three RPN calculators are required to implement the following operators:

`+`	addition
`-`	subtraction
`*`	multiplication
`/`	division
`^`	power

Whilst you are welcome to implement additional operators, they will not be tested by the automated grading system. Take care not to waste time implementing operators that will gain you no credit.

To test your implementations beyond the bounds of the twelve RPN expressions provided, add additional lines to the `check.dat` file in a format matching the existing expressions.

Grading Scheme

The following aspects will be assessed by executing your code on a machine with an identical configuration to the CMPS109 teaching servers:

1. (70 Marks) **Does it work?**

    a. RPNC Calculator in C (20 marks)
    b. RPNC Calculator in Bash (20 marks)
    c. RPNC Calculator in Python 3 (20 marks)
    d. C Code free of warnings (10 marks)

For a, b, and c, marks are deducted for any RPN calculations failing to produce the correct answer.

Note that the RPN expressions used by the automated grading system will **NOT NECESSARILY** be the same as those provided in the lab environment you installed.

2. (-100%) **Did you give credit where credit is due?**

    a. Your submission is found to contain code segments copied from on-line resources and you failed to give clear and unambiguous credit to the original author(s) in your source code (-100%)

    b. Your submission is determined to be a copy of another CMPS109 student's submission (-100%)

    c. Your submission is found to contain code segments copied from on-line resources that you did give a clear an unambiguous credit to in your source code, but the copied code constitutes too significant a percentage of your submission:

        - < 25% copied code — No deduction
        - 25% to 50% copied code — (-50%)
        - 50% to 75% copied code — (-75%)
        - > 75% — (-100%)

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