

# CS 154

## Formal Languages and Computability

Spring 2016

Department of Computer Science  
San Jose State University  
Instructor: Ron Mak

### Assignment #4

**Assigned:** Thursday, March 3

**Due:** Monday, March 14 at 11:59 pm

**Individual assignment**, 100 points max

#### JavaCC Super Calculator

Expand the JavaCC-generated Simple Calculator by adding the following operators:

Operators	Operations	Precedence	Examples
<code>^</code>	exponentiation	highest	$3*2^4/4^2$ is $3(2^4)/(4^2) = 3.0$
<code>==</code>	equal to	lowest	$1/2+1e2 == 1005E-1$
<code>!=</code>	not equal to	Same as <code>==</code>	$1/2+1e2 != 1005E-1$
<code>&lt;</code>	less than	lowest	$1/2+1e2 < 1005E-1$
<code>&lt;=</code>	less than or equal to	lowest	$1/2+1e2 <= 1005E-1$
<code>&gt;</code>	greater than	lowest	$1/2+1e2 > 1005E-1$
<code>&gt;=</code>	greater than or equal to	lowest	$1/2+1e2 >= 1005E-1$
<code>!</code>	not	Same as unary <code>-</code>	$!(1/2+1e2 >= 1005E-1)$
<code>  </code>	or	Same as <code>+ -</code>	$(3>4) \ \&\& \ (5==5) \    \ (9!=8)$ returns 1.0 (true)
<code>&amp;&amp;</code>	and	Same as <code>* /</code>	$(3>4) \ \&\& \ (5==5) \    \ (9==8)$ returns 0.0 (false)

Expand the number token to include both integer and real numbers.

The real numbers should have the syntax shown in class.

Examples include: 12.34 12e3 12e+45 0.123e4 123.45E-12

All calculated values should be doubles. For Boolean values, use 0 for false and any other value (default 1) for true.

First test your calculator with the above examples. Afterward, you can test with other expressions that you choose.

It is OK for your program to throw an exception and then quit whenever it encounters a syntax error.

Create a text file containing your calculator's output. You can cut and paste from your terminal window to create this file.

### **What to submit to Canvas**

Submit your .jz and sample output files into Canvas: **Assignment #4**