

# CS100J      Lab 01. Expressions, variables, declarations, and assignments      Spring 2008

Name \_\_\_\_\_ Cornell net id \_\_\_\_\_  
(e.g. Gries's Cornell email address is djg17@cornell.edu, and his net id is djg17.)

Section time \_\_\_\_\_ Section instructor \_\_\_\_\_

This lab deals with expressions and their evaluation in Java. Below are a list of expressions, some followed by questions. Type each expression into DrJava, hit the enter key to have it evaluated, record its value after the expression on this paper, and answer any question to the best of you ability. Do not simply write down what you think is the value of an expression; write down only what DrJava says is its value.

Rather than type an expression character for character, open this handout (from the course webpage) in a browser, copy an expression from the browser page, and paste it into the DrJava Interactions pane. That will save you time and prevent typing mistakes. Also, from time to time, it may make sense when in the Interactions pane to hit the uparrow key to obtain a previous expression, edit the expression, and hit the return key to have the modified expression evaluated.

The last part of this lab assignment concerns variables, declarations, and assignment statements, so you will be typing in declarations and assignments as well.

When you are finished with this assignment, show this sheet to your lab instructor, who will record that you did it. If you do not finish this assignment, finish it within the next few days and show this sheet to your lab instructor the next time you see them.

Don't waste time! If there is something you don't understand, ask your lab instructor or a consultant immediately! For example, you should understand HOW each expression is evaluated, and if an answer doesn't make sense to you, ask someone immediately.

The lab instructors and consultants are in the lab to help. They will look over your shoulder every once in a while and give you advice on what you are doing.

To save space, some of the rows have expressions in both columns. "Do" the left-column one first, then the right-column one.

<b>int</b> expressions	
5 + 2	
5 + 2 * 5	(5 + 2) * 5
4 - 3 - 3	4 - (3 - 3)
-4 - -4 - -4	
6 / 2	6 / 3
6 / 4	Why isn't 6/4 = 1.5?
7 % 2	8 % 3
6 % 3	What is the name of operator %?

Integer.MIN_VALUE	Integer.MIN_VALUE - 1
Why does Integer.MIN_VALUE - 1 have such a funny value?	
Integer.MIN_VALUE	Integer.MIN_VALUE + 1
Integer.MAX_VALUE	Integer.MAX_VALUE - 1
Integer.MAX_VALUE + 1	
<b>double</b> expressions	
5.0 + 2.0	1 + 1.99
(5 + 2.1) * 5	
4.0 - 3 - 3	4.0 - (3 - 3)
-4.0 - -4 - -4	
6.0 / 2	6.0 / 4
6.0 % 3	6 % 4
-6.0 % 3	-6.0 % 4
Double.MIN_VALUE	Double.MIN_VALUE - 1
Double.MAX_VALUE	Double.MAX_VALUE + 1
Double.MAX_VALUE + Double.MAX_VALUE	
<b>casting</b>	
(double) 4	(int) 4
(double) 7 / 4	(double) (7 / 4)
Which operator has higher precedence, casting or division?	
(int) 5.3	(double) (int) 5.3
(int) (int) 5.3	(double) (double) 4
(int) 5.3	(int) - 5.3
5 + 7 / 4	(double) 5 + 7 / 4
5 + 7 / (double) 4	
<b>boolean</b> expressions	
true	true && false

<code>true    false</code>	What is the name of operator <code>&amp;&amp;</code> ?
<code>false</code>	<code>true &amp;&amp; true</code>
<code>true    true</code>	What is the name of operator <code>  </code> ?
<code>!true</code>	What is the name of operator <code>!</code> ?
<code>!false</code>	<code>!!false</code>
<code>true &amp;&amp; false &amp;&amp; true</code>	<code>true    false    true</code>
<code>true    (false &amp;&amp; true)</code>	<code>true &amp;&amp; (true    false)</code>
<code>3 &lt; 5</code>	<code>3 &lt; 5 &amp;&amp; 5 &lt; 3</code>
<code>0 &lt;= 4 &amp;&amp; 4 &lt; 5</code>	
<code>false &amp;&amp; (5 / 0 == 1)</code> why does this work?	<code>(5 / 0 == 1) &amp;&amp; false</code> why doesn't this work?
<b>String expressions</b>	
<code>"Truth " + "is " + "best"</code>	<code>("Truth " + "is ") + "best"</code>
<code>"Truth " + ("is " + "best")</code>	<code>56 + "" + 56</code>
<code>"" + 4 / 2</code>	<code>("" + 4) / 2</code> — Gives an error message. Why?
<code>"" + (4 / 2)</code>	What does <code>+</code> do if at least one operand is String?
<code>4 + 2 + ""</code>	<code>4 + (2 + "")</code>
<b>Function calls</b>	
<code>Math.min(25, 4)</code>	In the function call on the left, what are the two constants 25 and 4 called?
<code>Math.max(25, 4)</code>	<code>Math.min(25, Math.max(27, 4))</code>
<code>Math.abs(25)</code>	<code>Math.abs(- 25)</code>
<code>Math.ceil(25.6)</code>	<code>Math.floor(25.6)</code>
<code>Math.ceil(- 25.6)</code>	<code>Math.floor(- 25.6)</code>
<code>Math.abs(Math.min(-25, -4))</code>	
Variables, declarations, and assignment statements	
It is important that you learn early in the game the difference between a declaration and an assignment statement. To the right, please write down the purpose of a declaration like <code>"int j;"</code> .	

To the right, write down how the assignment statement "j= j + 5;" is executed.	
int j;	(There will be no answer from the declaration to the left)
int j;	What happens when you try to declare a variable twice?
j	Does a newly declared variable have a value?
j= 2;	(To the left is your first assignment statement)
j	
j+4	
j= j + 9;	
j	(You can see what assigning to j did)
The following shows you that in the interactions pane, you don't have to declare a variable before using it. But in a Java program, you have to.	
k= 5;	j + k
w= j + k;	w
w;	(if you follow an expression with a semicolon, you don't see its value)

When done, show this to your lab instructor. Then, (1) find out how to use the course newsgroup, (2) experiment with DrJava, or (3) read something on the ProgramLive CD.