CSE 121 – Lesson 2

Kai Daniels

Summer 2023

Music: 🌸k-pop girlies playlist🌸

sli.do #cse121

Announcements, Reminders

- **Creative Project 0** was due yesterday (Jun 27) @ 11:59 PM
- Programming Assignment 0 released later today (due Wed, July 5th bc holiday)
- IPL is open! - Schedule and instructions can be found on course website.
- **Just joined CSE 121?** Resubmission policy is your friend! See more in syllabus.

- Reminder: Pre-Class Work and Section work are not graded! (but you should do them anyway 😉)

PCM Recap: Data Types & Expressions

- `Types: int`, `double`, `String`, `boolean`
- Expressions: Operators
- Beware of precedence! (order of operations)

(PCM) Data Types in Java

In programming, you're dealing with data…

- `int`s (whole numbers)
- `double`s (real numbers)
- `String`s
- `boolean`s (true or false)

(PCM) Operators (for numerical & `String` values)

Numerical:

- + Addition
- - Subtraction
- * Multiplication
- / Division
- % Modulo or “Mod”

Strings

- + Concatenation

Booleans

- ! Logical Not
- && Logical And
- || Logical Or
- <, >, <=, >=, ==, !=

(PCM) Precedence

Parentheses

Multiplication, **M**odulo, **D**ivision

Addition (and Concatenation), **S**ubtraction

If multiple operators at the same level?

Evaluate subexpressions from left to right!

Example

```
1 + 2 * 3
  1 + 6
    7
```

```
(1 + 2) * 3
    3 * 3
      9
```

Work on Expressions/Types Practice Problems
Part 1

- Ed lesson linked from the course calendar
- Work with the folks around you!
- TAs and I will be walking around to help

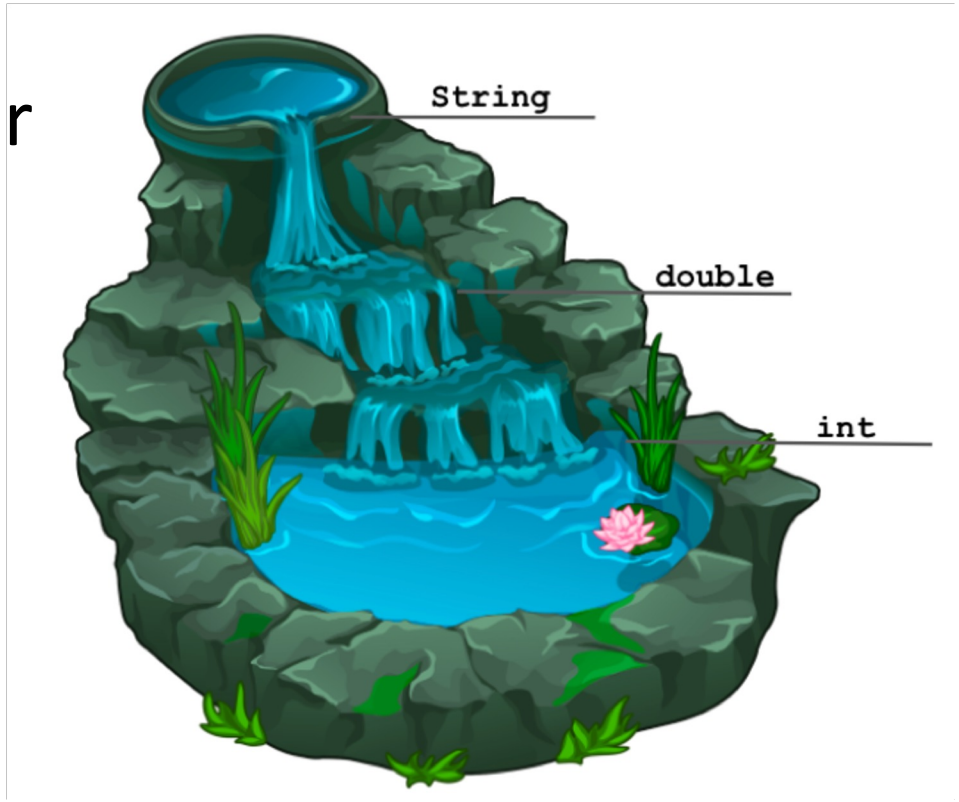
Questions?

(PCM) Mixing Types

- When mixing types in an expression, Java will convert one type to the other and then perform the operation "normally"

- `int`s can be converted to `double`s

- Both `int`s and `double`s can be converted to `String`s



Example 2

```
2 + 2 + "hello" + 3 * 5 + 10
  2 + 2 + "hello" + 15 + 10
    4 + "hello" + 15 + 10
      "4hello" + 15 + 10
        "4hello15" + 10
          "4hello1510"
```

Work on Expressions/Types Practice Problems
Part 2

- Ed lesson linked from the course calendar
- Work with the folks around you!
- TAs and I will be walking around to help

Questions?

(PCM) Boolean Operators

- ! Logical Not
- < > <= >= Relational Operators
- == != Relational Operators (equality)
- && Logical And
- || Logical Or

(PCM) Precedence (updated)

Logical not

Parentheses

Multiplication**, M**odulo**, D**ivision

Addition (and Concatenation)**, S**ubtraction

Relational operators

Equality operators

Logical and

Logical or

Example 3

```
1 + 2 * 3 != (1 + 2) * 3
  1 + 2 * 3 != 3 * 3
    1 + 6 != 3 * 3
      1 + 6 != 9
        7 != 9
        true
```

Work on Expressions/Types Practice Problems
Part 3

- Ed lesson linked from the course calendar
- Work with the folks around you!
- TAs and I will be walking around to help

Questions?

(PCM) Variables

- Now that we know about different types and data, we can learn about how to store it!
- Java allows you to create variables within a program. A variable has
  - A type
  - A name
  - (Potentially) a value it is storing

Declaration: `int x;`

Initialization: `x = 30;`

Or all in one line:

```
int x = 30;
```

(PCM) Variables

They’re made to be manipulated, modified,

```
int myFavoriteNumber = 7;
int doubleFV = myFavoriteNumber * 2;
myFavoriteNumber = myFavoriteNumber + 3;
```

Notice – this doesn't really make any mathematical sense! That's because, in Java, = is *assignment*, not equality!

New Operators!

```
myFavoriteNumber = myFavoriteNumber + 3;
```

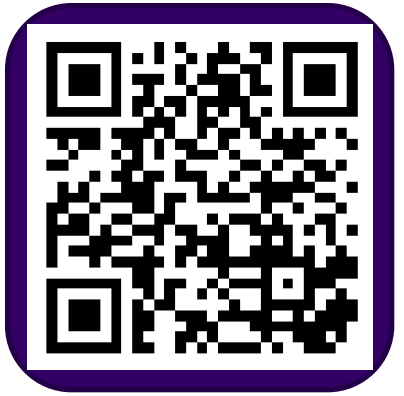
This type of pattern is so common, we have an even *shorter* way we can write it!

```
myFavoriteNumber += 3;
```

You can do the same for `-=`, `*=`, `/=`, and `%=`

And there are even shorter versions for *incrementing* and *decrementing*! `myFavoriteNumber++;` `myFavoriteNumber--;`

Poll in with your answer!



What do a, b, and c hold after this code is executed?

```
int a = 10;
int b = 30;
int c = a + b;
c -= 10;
a = b + 5;
b /= 2;
```

A. 10, 30, 40

B. 35, 15, 30

C. 35, 15.5, 30

D. 20, 15, 30