Welcome to CSE 121!

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Summer 2024

Use this QR code as one way to ask questions!

sli.do #cse121

TAs:	Trey	Hannah	Mia	Vivian	Jolie	Colton	Ziao

Announcements, Reminders

- [Creative Project 0](#) due tonight (June 26) @ 11:59 PM

- Programming Assignment 0 released later today (due Tues, July 2)

- IPL is open! - [Schedule and instructions](#) can be found on course website.

- Reminder: please double-check all quiz and exam dates (let Simon know ASAP if you can't make it!)

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…

- `ints` (whole numbers)
- `doubles` (real numbers)
- `Strings`
- `booleans` (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

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(PCM) Precedence

Parentheses

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

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

If multiple operators at the same level?

Evaluate subexpressions from <u>left to right</u>!

Example

$$1 + 2 * 3$$

$$= 1 + 6$$

$$= 7$$

$$(1 + 2) * 3$$

$$= 3 * 3$$

$$= 9$$

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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

```
5 + 2 * 4

1 + 2 / 3

6 * 5 % 7
```

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Questions?

$1 + 2/3$

integer division

$0.\cancel{66}$

$= 1 + 0$

$= 1$

$6 * 5 \% 7$

$= 30 \% 7$

$= 2$

$$\begin{array}{r} 4\,R\,\textcircled{2} \\ 7\overline{)30} \end{array}$$

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(PCM) Mixing Types

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

- `ints` can be converted to `doubles`

- Both `ints` and `doubles` can be converted to `Strings`

Example 2

$$2 + 2 + \text{"hello"} + 3 * 5 + 10$$

$$= 2 + 2 + \text{"hello"} + 15 + 10$$

$$= 4 + \text{"hello"} + 15 + 10$$

$$= \text{"4hello"} + 15 + 10$$

$$= \text{"4hello15"} + 10$$

$$= \text{"4hello1510"}$$

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

- Can always refer back to PCM!

```
5 * 3 + 1.0
8 / 3 * 2.0
8.0 / 3 * 2
"Hello" + "world"
1 + "2" + 3
1 + 2 + "3"
1 + "2" + (3 + 4)
```

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Questions?

$$8.0 / 3 * 2$$

$$= 2.\overline{6} * 2$$

$$= 5.\overline{3}$$

(PCM) Boolean Operators

- **!** Logical Not

- **< > <= >=** Relational Operators

- **== !=** Relational Operators (equality)

- **&&** Logical And

- **||** Logical Or

(PCM) Precedence (updated)

Parentheses

Logical not

Multiplication, Modulo, Division

Addition (and Concatenation), Subtraction

Relational operators

Equality operators

Logical and

Logical or

Example 3

$$1 + 2 * 3 != (1 + 2) * 3$$

$$1 + 6 != 3 + 3$$

$$7 != 9$$

True

$\rightarrow$ (7 == 9
False)

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

- Can always refer back to PCM!

```
5 * 3 < 12

10 % 3 == 10 / 3

5 < 9 || (7 != 7)

!(1 + 2 == 3 && 10 % 4 > 2)
```

Questions?

$10 \% 3 == 10 / 3$

$1 == 3$

False

$!(1+2==3 \ \&\& \ 10\%4 > 2)$

$!(3==3 \ \&\& \ 2 > 2)$

$!(T \ \&\& F)$

$!(F)$

T

(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
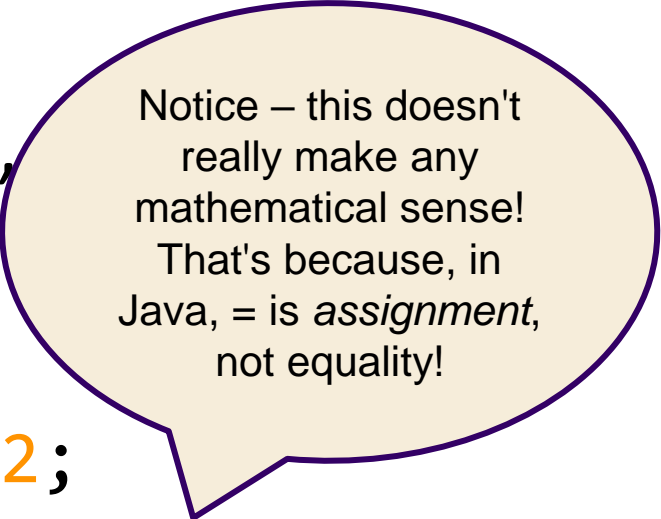
Declaration: `int x;`

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!

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