CSE 121 – Lesson 2

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Autumn 2023

Music: 121 23au Lecture Tunes 🌧️

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TAs:				
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Lucas	Ritesh	Andras	Shayna	Jessie
Logan	Hibbah	Archit	Hannah	Lydia
Jacob	Julia	Ayesha	Aishah	Yijia

Announcements, Reminders

- [Creative Project 0](#) due tonight (Oct 4) @ 11:59 PM
- Programming Assignment 0 released later today (due Tues, Oct 10)
- 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…

- `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

(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
```

Questions?

$5 + 2 * 4$

$5 + 8$

13

$1 + 2 / 3$

$1 + 0$

1

$6 * 5 \% 7$

$30 \% 7$

2

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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`

String

double

int

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!

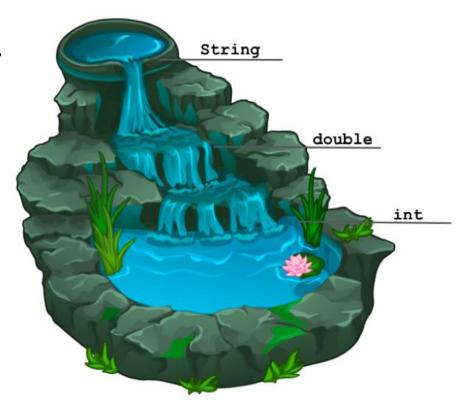- TAs and I will be walking around to help

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

Questions?

$5 * 3 + 1.0$

$15 + 1.0$

16.0

$8 / 3 * 2.0$

$2 * 2.0$

4.0

$8.0 / 3 * 2$

$2.6666 * 2$

5.333

"Hello" + "World"

"HelloWorld"

"1" + "2" + 3

"12" + 3

"123"

$1 + 2 + $ "3"

"3" + "3"

"33"

$1 + $ "2" $ + (3 + 4)$

$1 + $ "2" $ + 7$

"12" + 7

"127"

(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

$$1 + 2 * 3 \mathrel{!=} (1 + 2) * 3$$

$$1 + 2 * 3 \quad != 3 * 3$$

$$1 + 6 \quad\quad != 3 * 3$$

$$1 + 6 \quad\quad != 9$$

$$7 \quad != 9 \quad \Rightarrow true$$

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

```
5 * 3 < 12

10 % 3 == 10 / 3

5 < 9 || (7 != 7)

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

Questions?

$$5 * 3 < 12$$
$$15 < 12$$
$$\text{false}$$

$$10 \% 3 == 10 / 3$$
$$1 \qquad == 10 / 3$$
$$1 \qquad == 3$$
$$\text{false}$$

$$5 < 9 \ || \ (7 \mathrel{!=} 7)$$
$$5 < 9 \ || \ \text{false}$$
$$\text{true} \ || \ \text{false}$$
$$\text{true}$$

Questions?

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

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

$!(\underline{3==3} \ \&\& \ 2>2)$

$!(true \ \&\& \ \underline{2>2})$

$!(true \ \&\& \ false)$

$!(false) => true$

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;`

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