LEC 02

CSE 121

Expressions and Datatypes

Questions during Class?

Raise hand or send here

sli.do #cse121





Talk to your neighbors:

What's your favourite song right now?

Music: 121 25wi lecture playlist 🛞



Christopher

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> TAs: Ailsa Alice Chloë

Fthan Hannah Hibbah Hanna Janvi Judy Julia Kelsey Luke Maitreyi Lucas Merav

Samrutha Ruslana Sam

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Announcements, Reminders

- Creative Project 0 due tonight by 11:59 PM
- Programming Assignment 0 releases later today
 - making a receipt generator!
 - due Tuesday, Jan 21st at 11:59 PM
 - now on regular "cadence" (Wed release, due following Tue)
- IPL is open! Schedule & instructions on website.
- "Extra resources" tab more practice! (with a caveat)

Reminder: Post-Section Work

- Due at midnight on each quiz section day (except quizzes)
 - not strictly "did you go to quiz section", though going helps
 - graded on attempt/effort only
 - helps your TAs plan quiz section!
- Optional (not part of your grade)
 - but, 12/16 give you an extra resub
 - up to you on whether or not you think it's helpful
- You will get PSW completion grades on Canvas
 - sorry! the only way for us to do this :(

Intro Survey – things we're excited for!

- "Learning programming" / "Learning how to code"
- "Being introduced to the world of computer science"
- "I love working on things where I can be creative with what I do."
- "Getting to meet people and problem solve with others."
- "understanding a mysterious world of tech"
- "Learning how to program in JAVA!"
- "Matt"

Reassuring worries from intro survey (1/2)

Common: responses along the lines of... "not knowing how to code"

You're in the right place! This class expects zero prior knowledge.

Difficulty, workload, pace, & falling behind

- recognizing that programming can be difficult (if it was easy: why have a class?)
- as a result, have built many support systems (section, IPL, office hours, Ed, etc.)
- if you feel like you're struggling: reach out early!
 - especially with pace of quarter system

Reassuring worries from intro survey (2/2)

Grades, competitiveness, this class being a "weed-out" class

- explicitly <u>not</u> the goal of this class
- course designed against this (minimum grade guarantees, resubmissions, etc.)

Quizzes & final exams

- timed assessments can be stressful but we'll build you up there slowly!
- will have many practice resources (though, be wary of overfitting!)

Not doing the optional work

- really mature thought!
- something to work on over time (and build discipline)

PCM Recap: Data Types & Expressions

- Programming is about data; we tell Java what type of data we have!
- Data types (so far): int, double, String, boolean
 - note: only String is capitalized!
- All values in a (Java) program have a type!
 - some are "obvious", e.g. 42 or "hello world"
 - aside: these are called "literals"
 - some are more complicated expressions!

PCM Recap: Operators

We learned a *ton* of operators!

Numerical:

- + Addition
- Subtraction
- * Multiplication
- / Division (tricky!)
- % Modulo (or "mod")
- <, >, <=, >=, != Relational

Strings:

+ Concatenation (not addition!)

Booleans:

- ! Logical Not
- && Logical And
- || Logical Or
- == and != Relational

PCM Recap: Precedence

Operators have precedence (an order of operations).

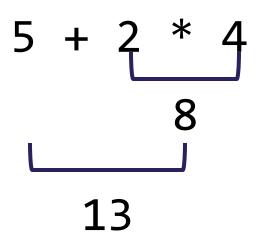
In Math:

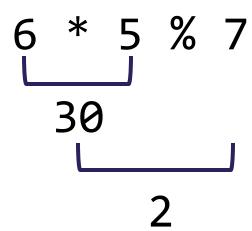
- 1. Parentheses
- 2. Exponent
- 3. Multiplication
- 4. Division
- 5. Addition
- 6. Subtraction

In Java:

- 1. Parentheses
- 2. Logical not
- 3. Multiplication, Modulo, Division
- 4. Addition (and concatenation), Subtraction
- 5. Relational operators
- 6. Equality operators
- 7. Logical AND
- 8. Logical OR

Expressions in "little steps"





PCM Recap: Conversions

When mixing types in an expression, Java will <u>convert</u> one type to the other and then perform the operation "normally".

Some conversions are straightforward:

- ints can be converted to doubles (add .0)
- ints and doubles can be converted to Strings (add "")

So, Java does these for you! (is this good? controversial!)

New: Conversions (Gone Wrong!!)

Other conversions are "lossy", because you lose data.

- e.g. to make 3.14 an int, you'd probably pick either 3 or 4 but either one loses data
- Java won't do this automatically for you you need to "ask".
 - called a cast: you'll see this in Friday's PCM + in P0

Some conversions don't make sense.

- how would you convert "Beyoncé" to an int? double?
- Java really doesn't let you do these...

Work on Expressions and Types Practice (1)

- Ed lesson linked from course calendar
- Work with folks around you!
- TAs & I will walk around and help!

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

Part 1 Walkthrough

```
"Hello" + "world"
  "Helloworld"
```

```
8.0 / 3 * 2.0
 2.666...
   5. 333...
```

Work on Expressions and Types Practice (2)

- Ed lesson linked from course calendar
- Work with folks around you!
- TAs & I will walk around and help!

```
5 * 3 < 12

10 % 3 == 10 / 3

5 < 9 || (7 != 7)

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

Part 2 Walkthrough (1)

```
10 % 3 == 10 / 3
     false
```

```
5 < 9 |  (7 != 7)
            false
 true
          false
 true
      true
```

Part 2 Walkthrough (2)

```
!(1 + 2 == 3 \&\& 10 \% 4 > 2)
!(1 + 2 == 3 \&\&
    3 == 3 &&
                      false )
       == 3, &&
              &&
                      false
      true
            false
            true
```

Ed time:)

Applying what we learned to variables!

What's in a (variable) name or String?

Switch over to Ed and do some experiments (with a partner), then report back on sli.do.

- 1. What types of characters are "allowed" in Strings?
- 2. What types of characters are "allowed" in variable names?



Food for Thought!

This is the beginning of a very interesting rabbit hole! (but also, a decision made by the Java designers)

Whether or not you program for a career, you will also make decisions like these!

- for example, what's a "valid name"?
- a theme we'll revisit (and something to continuously reflect on!)

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