Comp 311
Functional Programming

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Announcement

- Homework 2 is done
- Homework 3 is due Nov 7
- Midterm exam details are on the calendar
- Final exam date and time is on the calendar (no room assignment yet)

More on Operators

Operator Precedence

Based on starting character, lowest to highest:

1. Assignment operators[†]
2. Any letter
3. |
4. ^
5. &
6. = !
7. < >
8. :
9. + -
10. * / %
11. All other symbols

[†] *The = operator, plus any other operator that ends with =, but doesn't start with =, and is not <=, >=, or !=*

Precedence Example

```
        1 % 2 → 4 ** 2 == 5 EQ true ^ false
      1 % (2 → 4) ** 2 == 5 EQ true ^ false
    (1 % (2 → 4)) ** 2 == 5 EQ true ^ false
  ((1 % (2 → 4)) ** 2) == 5 EQ true ^ false
  ((1 % (2 → 4)) ** 2) == 5 EQ (true ^ false)
(((1 % (2 → 4)) ** 2) == 5) EQ (true ^ false)
```

Colon Operators

- Binary operators ending with `:` are applied in reverse
    - The receiver is the *second* argument
    - The parameter is the *first* argument
- ``X :: Y ⇒ Y.`::`(X)``
- ``X +: Y ⇒ Y.`+:`(X)``
- ``X :+ Y ⇒ X.`:+`(Y)``

Destructuring with Binary Constructor Patterns

Binary case class factory methods can be used in patterns as binary operators for destructuring:

- The "cons" operator for matching head and tail of list:
  ```
  val x :: xs = List(1, 2, 3, 4)
  ```

- Any arity-2 case class constructor works:
  ```
  val a Tuple2 b = 5 → "five"
  ```

- Used a lot in Scala's parser combinators:
  ```
  A ~ B // match A followed by B
  ```