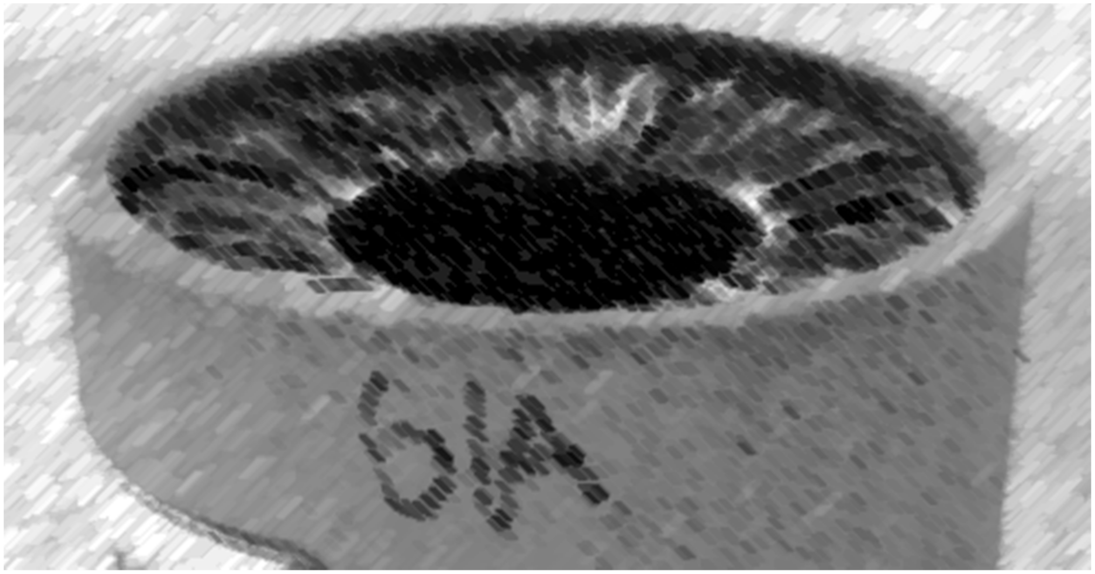

CS61A Lecture 33

Amir Kamil

UC Berkeley

April 8, 2013

Announcements

- Hog revisions due tonight
- HW10 due Wednesday
- Last chance to fill out survey on Piazza
  - We need to schedule alternate final exam times for those who have a conflict, so if you do, let us know on the survey when you are available

Programming Languages

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In computer science, languages can be *implemented*:

- An *interpreter* for a programming language is a function that, when applied to an expression of the language, performs the actions required to evaluate that expression
- The *semantics* and *syntax* of a language must be specified precisely in order to build an interpreter

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A subset of Scheme that includes:

- Number primitives
- Built-in arithmetic operators: **`+, -, *, /`**
- Call expressions

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```
> (+ (* 3 5) (- 10 6))
19
> (+ (* 3
        (+ (* 2 4)
           (+ 3 5)))
     (+ (- 10 7)
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57
```

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- The **/** operator returns the real-valued quotient of a dividend and divisor (i.e. a numerator and denominator)

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(http://inst.eecs.berkeley.edu/~cs61a/sp13/projects/scalc/scheme_reader.py.html)

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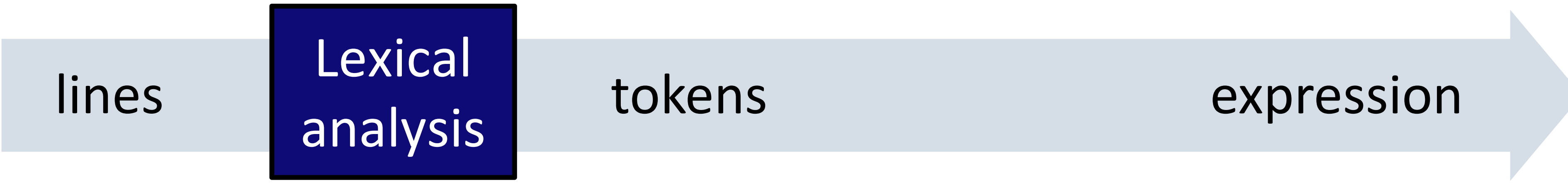

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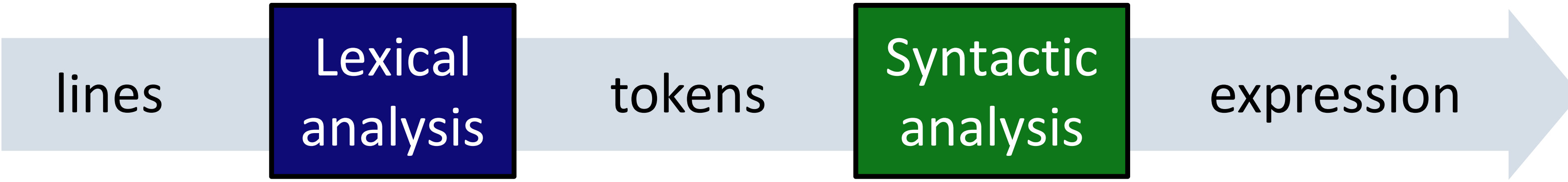

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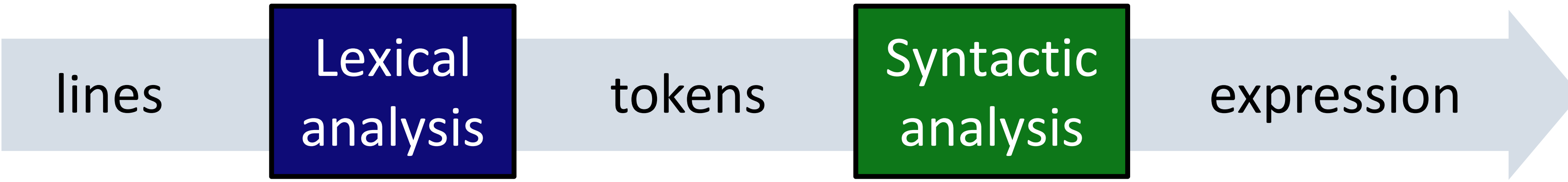


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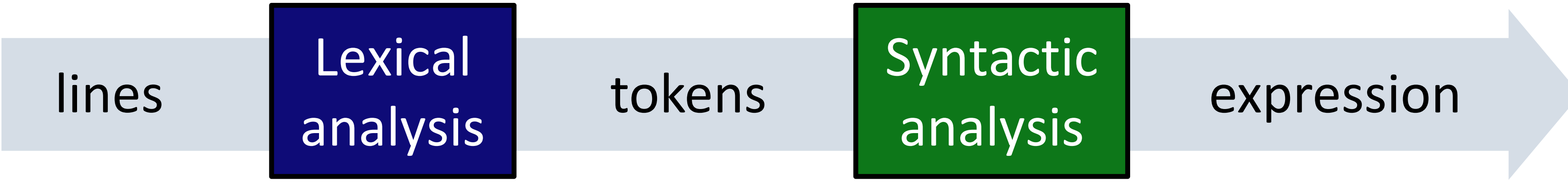


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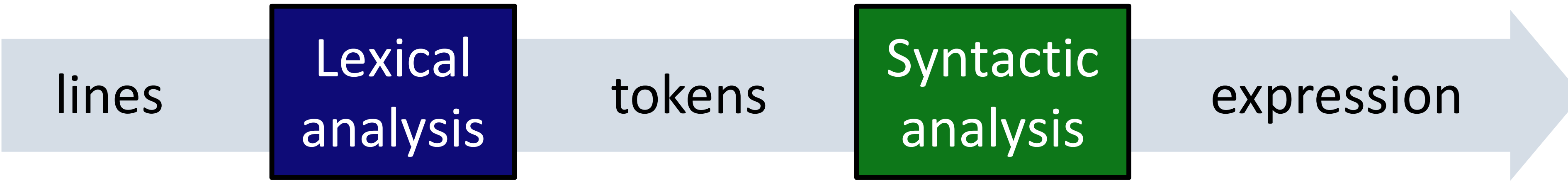


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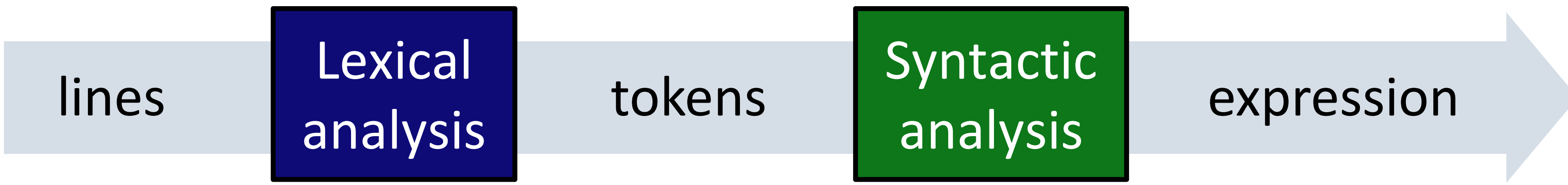


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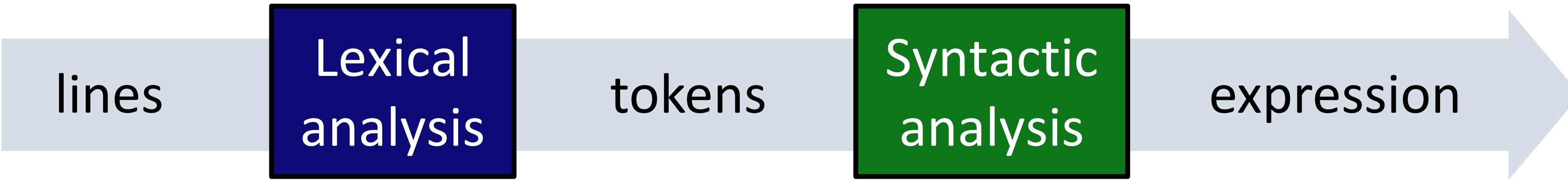


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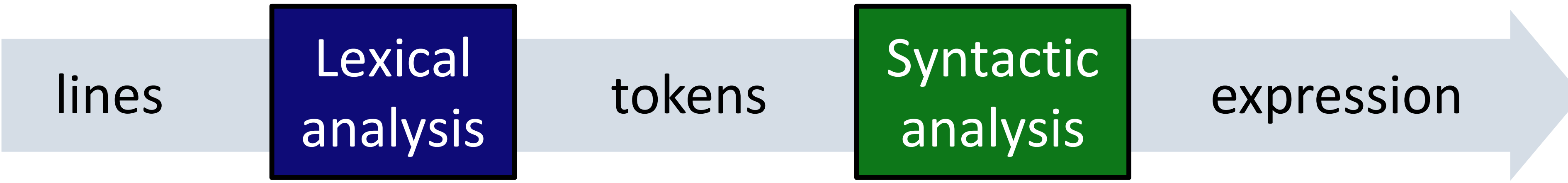


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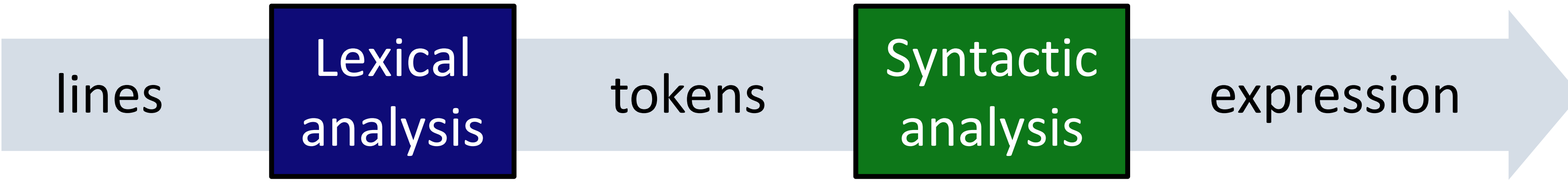


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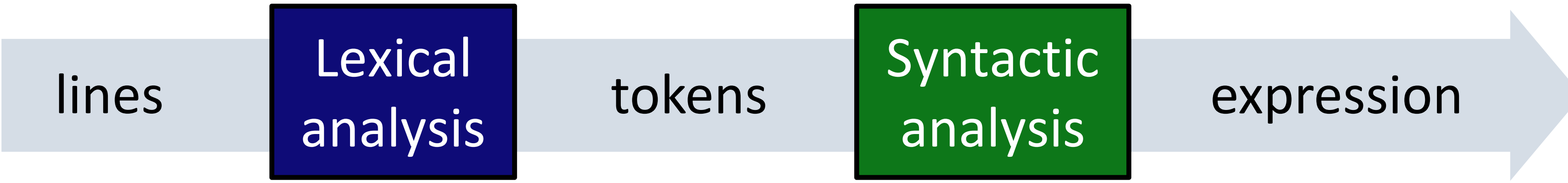


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'(+ 2 2)'                Pair('+', Pair(2, Pair(2, nil)))
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Expression Trees

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lines → **Parser** → expression → **Evaluator** → value

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Lines forming a Scheme expression

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Lines forming a Scheme expression

A number or a **`Pair`** with an operator as its first element

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`scheme_reader.py`

lines	expression	value
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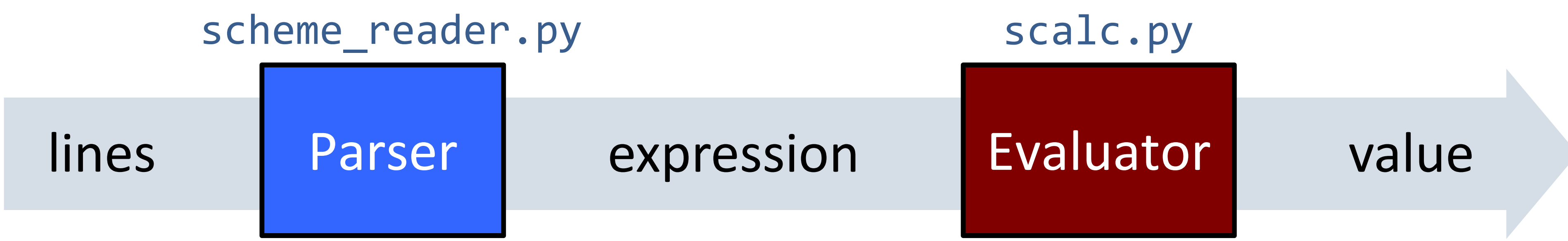


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- *Apply* the named operator to the argument list

Applying Operators

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(http://inst.eecs.berkeley.edu/~cs61a/sp13/projects/scalc/scalc.py.html)

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A well-designed REPL should not crash on any input!