Introduction

Prof. Joseph Eremondi CS 350

Programming Languages

- What are they made of?

Programming Languages

- What are they made of?
- How do they work?

Interpreters

- How to make a programming language

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- Parts of an interpreter

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- How to make a programming language
- Parts of an interpreter
    - Parsing

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Interpreters

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  - Desugaring
  - Typechecking
  - Evaluation

What is Racket?

- LISP-like language

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- LISP-like language
  - parentheses

What is Racket?

- LISP-like language
  - parentheses
- A language for writing programming languages

Will I Ever Use Racket in Industry?

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No

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No

(probably)

Future Proofing

- Don’t know what you’ll use in industry in 10 years

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  - If you know how languages work, you can learn *any* language quickly

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  - If you know how languages work, you can learn *any* language quickly
  - Racket is effective for learning how languages work

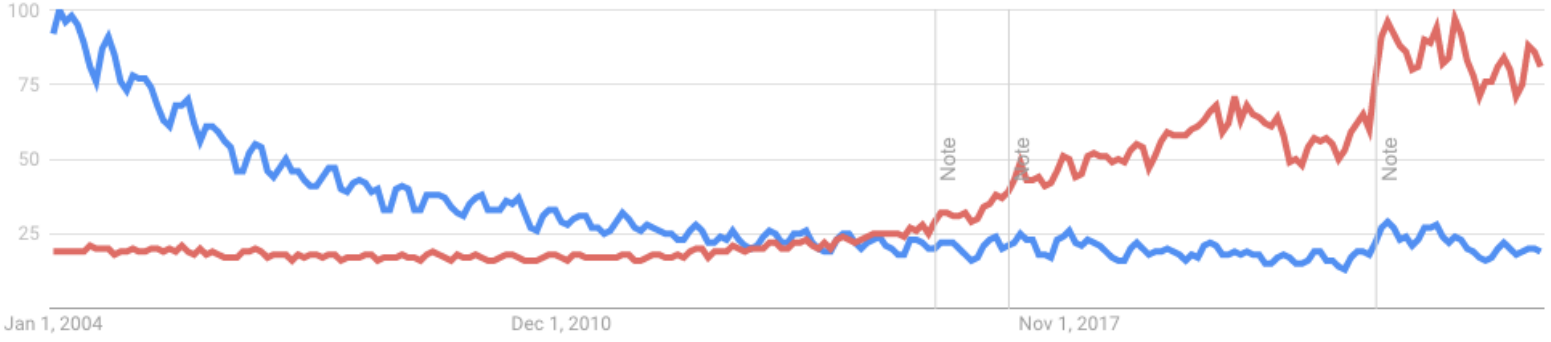
Future Proofing

Objective C vs Swift

Future Proofing

Objective C vs Swift

C++ vs Python



Syntax Vs Semantics

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  - Parentheses + functions, not operators
- Changes how you think about programs

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    ret *= x;
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  return ret;
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  for (int i = 0; i < y; i++){
    ret *= x;
  }
  return ret;
}
```

```racket
(define (pow x y)
  (if
    (<= y 0)
    0
    (* x (pow x (- y 1)))))
```

Why Functional Programming

- Sum types

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  - Missing/hard in most imperative languages

Functional Programming in Practice

- Anonymous functions

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  - C

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Why this course is easy

- It's just a bunch of tree traversals