Introduction

CS 350

Dr. Joseph Eremondi

Last updated: June 21, 2024

Course Overview

Course Objectives

To learn:

- Functional programming

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- To change how you *think* about programming

Textbook

- *Programming Languages: Application and Interpretation*, 2nd edition, by Shriram Krishnamurthi

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  - Similar content but very different approach

Course Communication

- Everything on URCourses

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  - Announcements

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  - Assignments and Handin

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  - EXCEPTION: when you can’t ask your question without revealing your solution to the assignment

Grading Scheme

- 25% assignments

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- 25% assignments
- 25% midterm

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  - Aug 19

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  - Aug 19
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  - This room

Assignments

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  - But ultimately it's your responsibility to catch up on missed material

Office Hours

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Use of ChatGPT, GitHub Copilot, or any other Large Language Model or Generative AI is forbidden when completing the assignments for this class

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- Doing the assignments is the best way to study

Motivation: Functional Programming

Programming in This Class

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- We’ll learn more why this distinction is fuzzy

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    - Unless otherwise specified

Will I Ever Use Racket in Industry?

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No

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No

(probably)

Future Proofing

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  - Racket is effective for learning how languages work

Language Trends (from Google Trends)

Objective C vs Swift

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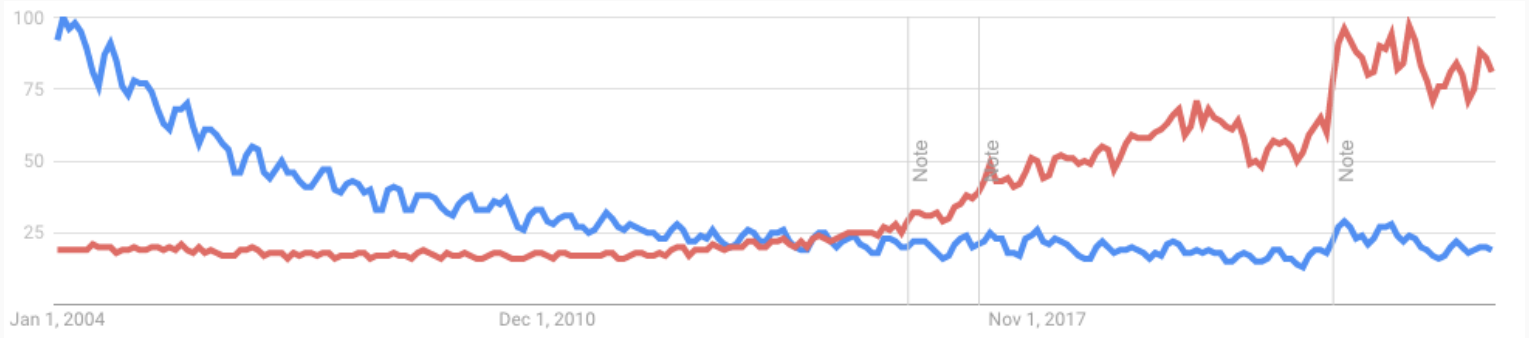
Objective C vs Swift

C++ vs Python



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    ret *= x;
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```

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

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  - Now in Python, Typescript, C++ (`std::variant`), Java (sealed interfaces), Rust (enums)
- Learning these features in Racket will help if/when they show up in other languages in the future

Motivation: Interpreters

Importance of Programming Languages

- Interpreter: Code + input $\hookrightarrow$ Output + effects

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    - Python, JavaScript, JVM all use some kind of interpreter
    - The CPU is just an interpreter for machine code

Programming Languages Aren’t Magic

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  - Why is it slow/fast
  - How to prevent/properly handle errors
  - How to know that it’s doing what you think it does

Is this a hard course?

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- By the end if this course, you will be able to write a program that is powerful enough to simulate every other computer program that ever has or ever will be written

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- It’s just a bunch of tree traversals