Today’s goals

- Understand what defines a scripting language
- Become familiar with Lua’s syntax and semantics
- Be able to write small Lua programs
Taxonomy of modern GPPLs

- **Scripting languages**
  - Lua
  - JavaScript
  - Ruby
  - Python

- **Automatic memory management**
  - Go

- **More types**
  - Java
  - C#
  - OCaml
  - Swift
  - Rust

- **Manual memory management**
  - C
  - C++

- **x86**
- **LLVM**
What is a scripting language?

• Common features of a scripting language
  - Dynamically typed
  - Garbage collected
  - Rich standard library
  - Reflection/metaprogramming

• Ousterhout’s dichotomy: scripts vs. systems
  - Scripting languages are primarily “glue code”
Figure 1. A comparison of various programming languages based on their level (higher level languages execute more machine instructions for each language statement) and their degree of typing. System programming languages like C tend to be strongly typed and medium level (5-10 instructions/statement). Scripting languages like Tcl tend to be weakly typed and very high level (100-1000 instructions/statement).
Why are scripting langs so productive?

• Key idea: encode program information as you go
  - e.g. type information, data lifetime
  - No one likes commitment!

• Easy to use certain idioms hard to express in static types
  - Interfaces/duck typing
  - Polymorphism
  - Heterogeneous data structures
  - Extensible classes

• Abstractions barriers are recommendations, not requirements
Moving between encoding schemes is an open problem!
Scripting langs are semi-specialized

- Bash-like scripting languages ("Swiss Army Knife")
  - e.g. Python, Perl
  - For file manipulation, data crunching, command line parsing

- Web scripting languages
  - e.g. JavaScript, PHP
  - Specialized constructs for dealing with webpages or HTTP requests

- Embedded scripting languages
  - Mostly just Lua
  - Lightweight, easy to build, simple semantics for games, config files
Why Lua?

- Simplest, cleanest scripting language still in use
- “Correct” scoping
- No class system (let’s build our own!)
- Easy to learn in a day
Lua time!
Final thoughts

• Assignment 1 will be out tonight
  - Implementing serialization library + RPC class wrapper

• Will is out until Saturday

• Start early to iron out the logistics!

• Office hours start Friday 1pm-3pm @ Huang basement

• Private Piazza is only for personal issues