Ruby Loco Hack night

Introduction to Go

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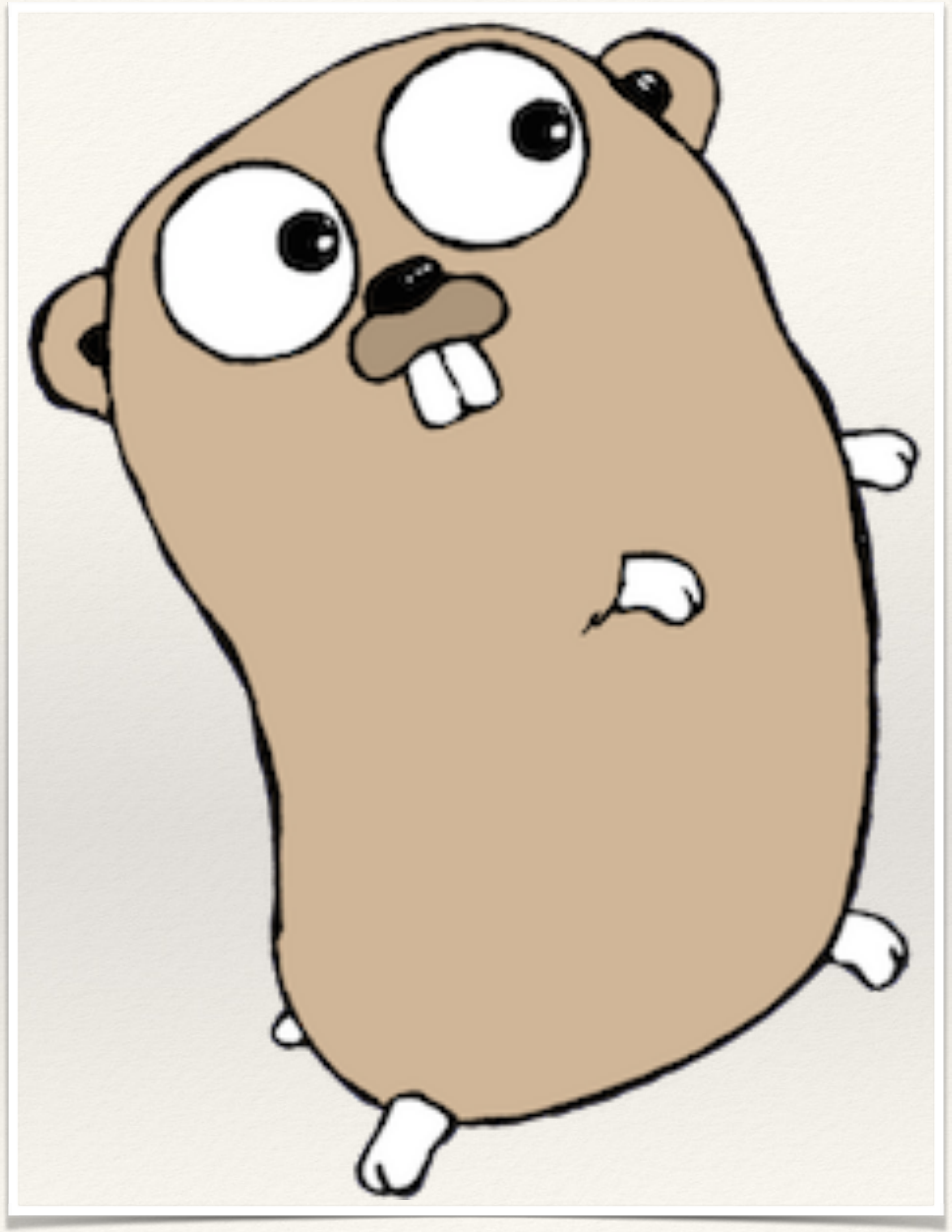

Go…what?

Ruby	Go
Dynamic typing	Static typing
Object oriented	Sort of object oriented
Tricky concurrency	Awesome concurrency
Beautiful syntax	Meh…
Interpretted	Compiled
Both embrace testing!!	

Go…why?

- Great community
- Compile to native code and distribute a single binary
- Easily cross compile from dev environment to any supported platform
    - Windows, MacOS and Linux
    - x86_64, i386 and ARM
- Fantastic concurrency
- Great toolset: go fmt, go get, gofix, go tool cover, etc
- I'm sure there are more reasons 🍺

Go…why not?

- Well, it's not Ruby…
  - Syntax isn't as clear
  - Static typing makes marshalling and unmarshalling data a little more difficult (think JSON)
  - No monkey patching or meta-programming
- Currently dependency management is tricky
  - projects usually import directly from master branch of the dependency
  - breaking changes in upstream code are unavoidable with this model (gofix helps with this)
  - I'm sure there are more reasons 🍻

Go…Core Concepts

- For a real training session, check out the **go tour**
- Go syntax is similar to C without the semicolons
- Go has functions, structs, arrays, maps and slices
    - Wait, slices? Effectively a pointer to a section of an array
    - functions are first-class citizens
- Go also has something called channels and go routines which simplify concurrency

Go…Core Concepts

- Full spec available:
  - https://golang.org/ref/spec
- All files start with a package
  - packages generally reflect the directory the code is in
  - package names are always lower case!
- Package statements can be followed by optional package imports

```
package main

import "fmt"
```

Go...Core Concepts

- Declarations follow any imports that are specified.
- Declarations can include new type definitions, function definitions and variable declarations
- Go determines which names are exported by examining the first letter of the declaration
  - Upper case names are exported, lower case names are not
- Non-exported definitions are not accessible outside the package (you could say they are private)

```go
/**
 * Create a new type called Meetup that
 * contains 3 exported fields and one
 * non-exported field
 */
type Meetup struct {
  Name     string
  Date     string
  Location string
  open     bool
}
```

Go…Core Concepts

- Functions work pretty much how you'd expect
- Note that arrays (and slices) are fixed in size. They cannot be expanded.
  - Append returns a new slice with the item appended to the given slice
  - This would seem like a slow solution, but it doesn't seem to cause a problem until you get to millions or billions of items

```
func main() {
   /* Create an empty slice of meetups */
   meetups := make([]Meetup, 0)

   /* Append a meetup and get a new slice */
   meetups = append(meetups, Meetup{
      "Ruby Loco Hack Night",
      "2015-04-13",
      "Phish Me",
      false,
   })

   /* Append a meetup and get a new slice */
   meetups = append(meetups, Meetup{
      "Ruby Loco Lunch",
      "2015-04-24",
      "Alamo Draft House",
      true,
   })

   fmt.Printf("%v\n", meetups)
}
```

Go… Methods and Interfaces

- Types can be given methods, just assign a variable name and the type between the func keyword and the argument list
- Interfaces are a collection of method definitions
- Any type that implements a method matching an Interface meets the requirements of implementing the Interface

```
/**
 * The Stringer interface specifies a
 * single String()function that takes no
 * arguments and returns a single string
 * value
 */
func (m Meetup) String() string {
  return "" +
    "    Name: " + m.Name + "\n" +
    "    Date: " + m.Date + "\n" +
    "Location: " + m.Date + "\n"
}

/* The %v format specifier will call
 * String() on the object if it implements
 * the Stringer interface
 */
fmt.Printf("%v\n", meetups)
```

Go… Channels and Routines

- Channels are like pipes. Put something in one end, take it out of the other
- Channels can block program execution
- Go routines are lightweight threads
  - Enable concurrency, but not necessarily parallelism
  - Parallelism can be enabled

```go
func main() {
   meetups := make([]Meetup, 0)

   c := make(chan Meetup)

   go func() {
      for {
         meetups = append(meetups, <-c)
      }
   }()

   c <- Meetup{
      "Ruby Loco Hack Night",
      "2015-04-13",
      "Phish Me",
      false,
   }

   c <- Meetup{
      "Ruby Loco Lunch",
      "2015-04-24",
      "Alamo Draft House",
      true,
   }
}
```

Go… Errors

- Go doesn't throw errors
- The Go convention is to return an error from the function
- If the error is nil, then there is no problem
- Otherwise, try to recover from the error

```
var meetups []Meetup
var c chan Meetup

func AddMeetup(name, location, date string, open bool) error {
   if len(meetups) < 10 {
      c <- Meetup{name, location, date, open}
      return nil
   }
   return fmt.Errorf("Meetups are full!")
}

…
/* Add two items to the channel */
err := AddMeetup("Ruby Loco Hack Night", "2015-04-13", "Phish
Me", false)
if err != nil {
   fmt.Printf("Error adding Meetup: %v", err)
   return
}

err = AddMeetup("Ruby Loco Lunch", "2015-04-24", "Alamo Draft
House", true)
if err != nil {
   fmt.Printf("Error adding Meetup: %v", err)
   return
}
```

That’s all folks!