Let's get Go-ing

An introduction to Go programming for COS 316

Today's Agenda

Just enough Go to get started on Assignment 1.

- What is Go?
- Variables, loops, and functions in Go
- Navigating the standard library documentation

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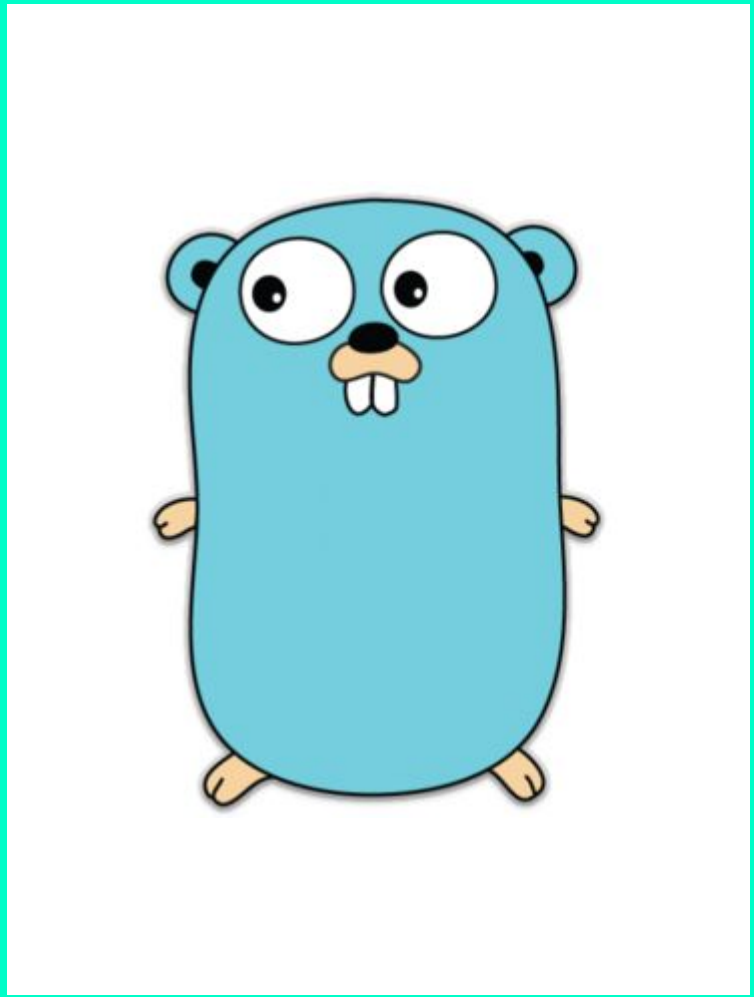
Features native, efficient concurrency primitives (i.e., *goroutines* and *channels*).



Okay, let's write our first program

Variables

- https://play.golang.org/

Variables

```
package main

func main() {

}
```

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func main() {
  var a int = 3
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Variable types come *after* variable names

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func main() {
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Variable types can be omitted and inferred

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func main() {
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A shorthand for 'var c =' is 'c :='

Variables

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package main

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   var d int
}
```

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Can choose to accept default value (i.e., 0)

Variables

```
package main

func main() {
   var a int = 3
   var b = 2
   c := 1
   var d int
   var e, f int = -1, -2
}
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Can choose to accept default value (i.e., 0)

Can declare and init. multiple vars in 1 line

Variables

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package main

func main() {
    var
    var
    c :=
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    var
}
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Okay, looks good!

Let's run our code.

Variable types come *after* variable names

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ccept

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func main() {
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Okay, looks good!

Let's run our code.

```
> go run main.go
```

Variable types come *after* variable names

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Variables

```
package main
```

Variable types come *after* variable names

Variable types can be

Compiler says nope!

X


```
./main.go:4:7: a declared and not used
./main.go:5:7: b declared and not used
./main.go:6:3: c declared and not used
./main.go:7:7: d declared and not used
./main.go:8:7: e declared and not used
./main.go:8:10: f declared and not used
```

default value (i.e., 0)

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Variable types come *after* variable names

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Go prevents you from compiling code with unused variables, so let's print them out

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package main

import "fmt"

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func main() {
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  fmt.Println(a, b, c)
}
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}
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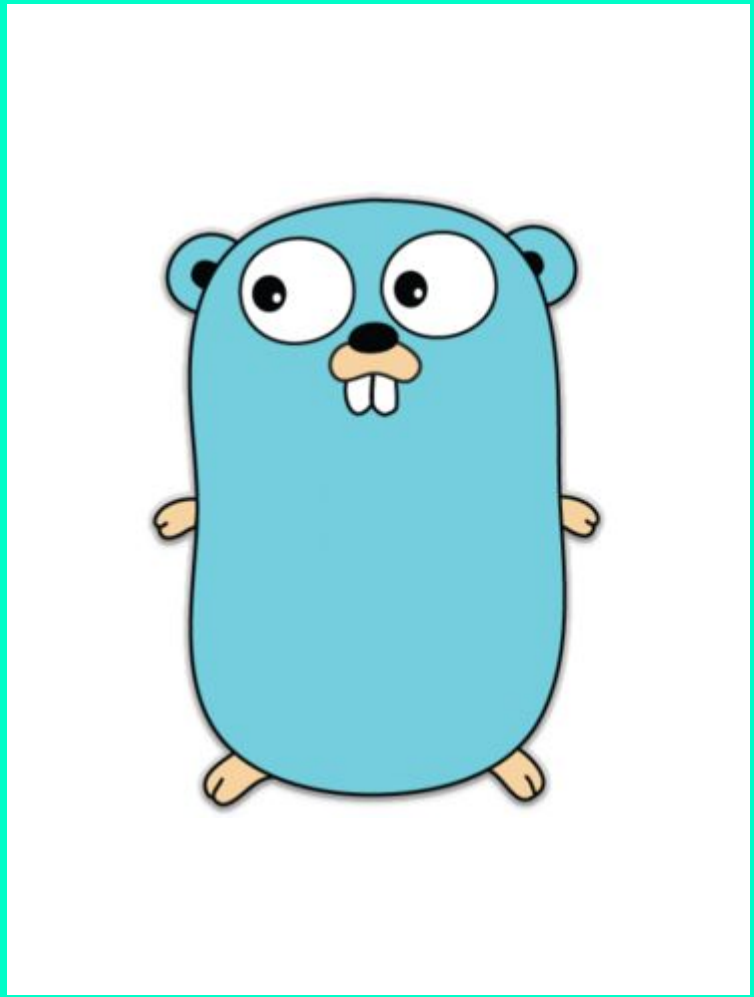

Let's see this in action!

Play time!

"Go" to
play.golang.org and
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Here are some ideas.

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1. Can you declare multiple variables with different types on the same line?

2. Can you infer the types of variables when declaring more than one on a line?

3. What does fmt.Println() print when it's given multiple arguments?

Play time!

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Here are some ideas.

Loops

```
package main

func main() {

}
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import "fmt"

func main() {
   for i := 1; i <= 3; i++ {
      fmt.Println(i)
   }
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Loops

'for' loops work like in Java/C, but don't require ()

Must use { }, even for 1-line loops

```
package main

import "fmt"

func main() {
   for i := 1; i <= 3; i++ {
      fmt.Println(i)
   }
   i := 4
   for i <= 10 {
      fmt.Println(i)
      i++
   }
}
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No such thing as 'while' loops in Go

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      i++
   }
   for {
      fmt.Println("done!")
      break
   }
}
```

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      break
   }
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```

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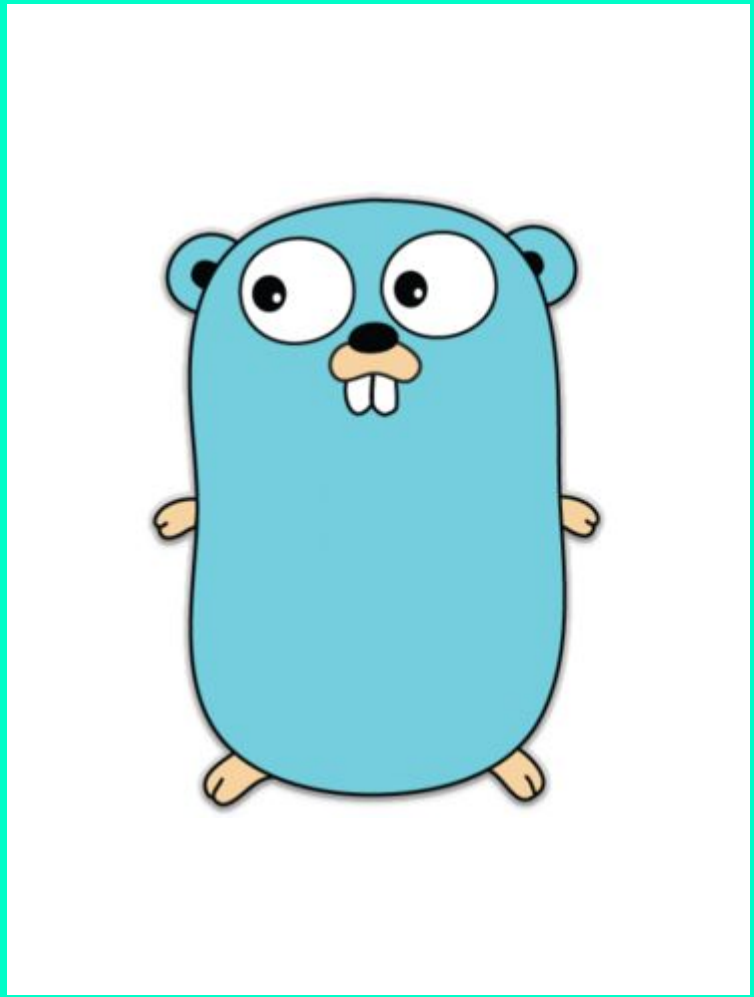
Can use 'break' and 'continue'



Let's try it ourselves

Let's Get Loopy

Navigate to play.golang.org and write a few Go loops.

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1. Does the scoping of the index variable in a Go 'for' loop extend beyond the loop?

2. Can you skip the conditional part in a 'for' loop but still use the init and post statements?

3. Does Go support 'labeled breaks' that let you choose which loop to leave?

Let's Get Loopy

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func f(a int, b int) int {
   return a + b
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func g(a, b int) int {
  return a * b
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If args are same type, can specify type once at end

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func f(a int, b int) int {
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func g(a, b int) int {
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}

func h(a, b int) (int,int) {
  return f(a, b), g(a, b)
}
```

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}

func main() {
  a, b := h(1, 2)
  _, c := h(3, 4)
}
```

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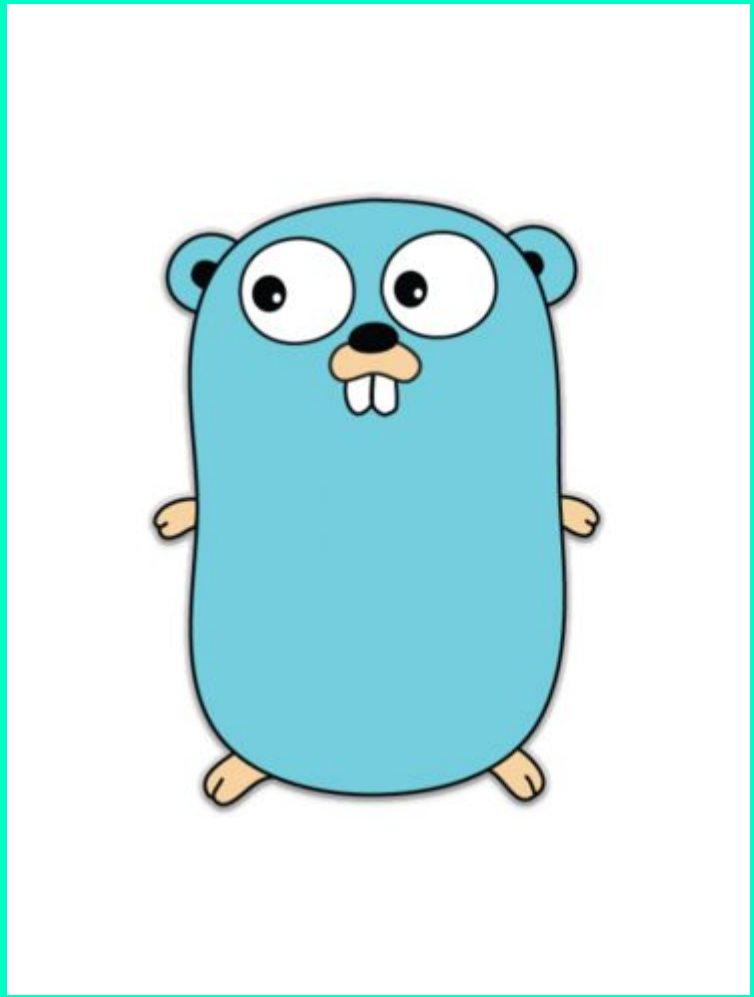
Functions can return more than one result

'_' throws away a return value



Last programming exercise!

1. Does Go allow you to use '_' to ignore all the return values of a function?

2. Can you use recursion with a function that returns multiple values?

3. Does Go require a return value for each function?

Functional Gogramming

Let's get back to play.golang.org and write a few programs using functions in Go.

Go Standard Library

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All Go programs have access to to a massive standard library of packages. (See golang.org/pkg)

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This collection of officially supported packages is one of the reasons Go is a useful language for systems programmers.

Reading The Documentation

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There's a lot of it and you'll be learning about the language as you read it.

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Expect to spend some time poring over it.

External Sources

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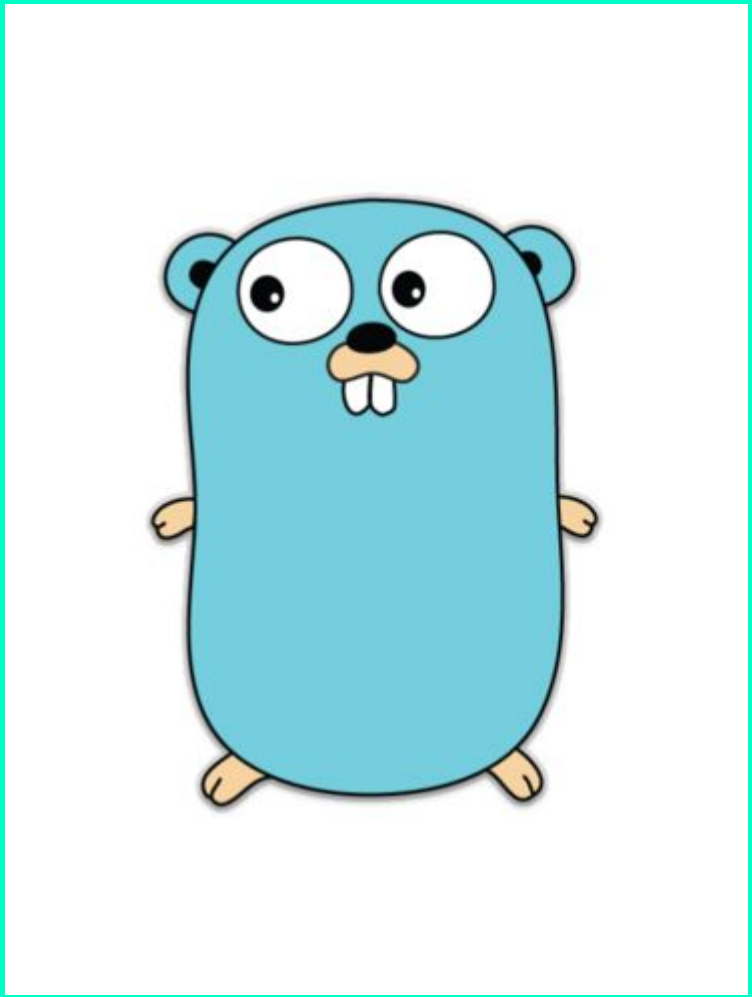
If you base a significant portion of your code on it, cite it in a comment in your code.



Let's see the docs

1. Find some “interesting” packages

2. Can you experiment using the provided examples?

Doc Hunt

Navigate to
golang.org/pkg

Use
play.golang.org

Please don't hesitate to ask!

Additional Resources

- golang.org
- play.golang.org
- gobyexample.com
- "Learn Go Programming" (7 hour YouTube tutorial)

Assignment 0

- Set up common development environment
  - Go, Git, etc.
  - Virtual Machine (optional)
  - Necessary for precepts and assignments

GIT & GO

- Command line Git
- Desktop Git
- Git Tutorial
- Git Cheatsheet
- Download Go