

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
-

WHY LEARN GO?

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Go is a programming language designed for large, distributed systems.

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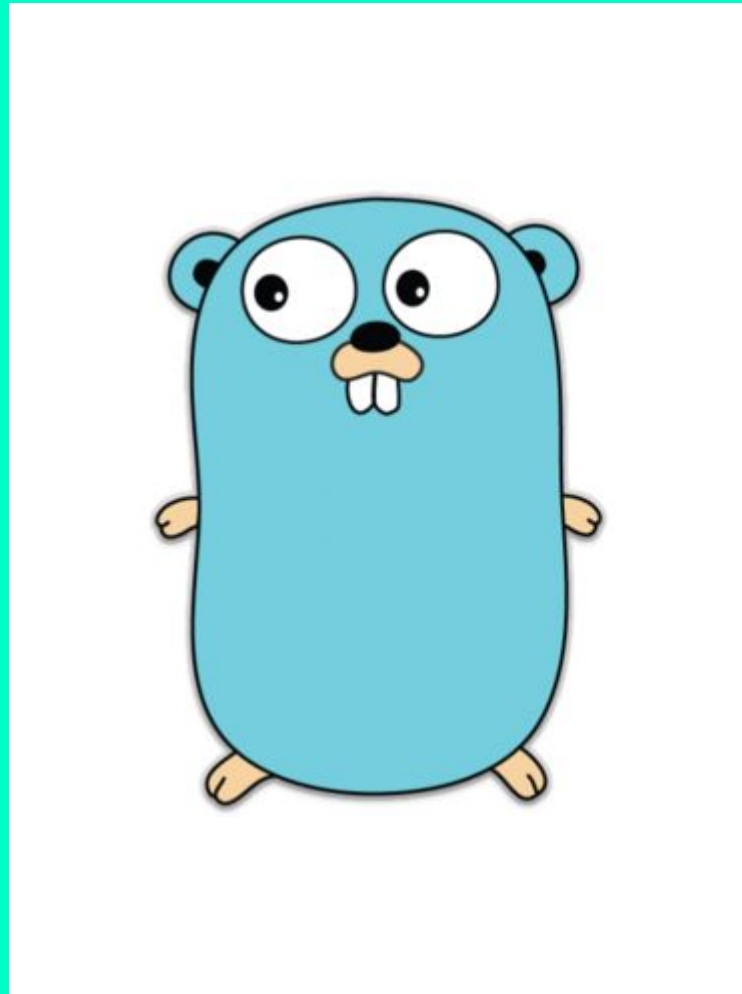
Widely used in industry.

WHY LEARN GO?

Go is a programming language designed for large, distributed systems.

Widely used in industry.

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



Okay, let's write our first program

VARIABLES

```
https://go.dev/play
```


VARIABLES

```
package main
```

```
func main() {
```

```
}
```

VARIABLES

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

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```
package main
```

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

Variable types can be
omitted and inferred

VARIABLES

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package main
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func main() {  
    var a int = 3  
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'var c =' is 'c :='

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A shorthand for 'var c =' is 'c :='

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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A shorthand for 'var c =' is 'c :='

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

Can declare and init. multiple vars in 1 line

VARIABLES

```
package main
```

```
func main() {
```

```
    var
```

```
    var
```

```
    c :=
```

```
    var
```

```
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```
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Variable types come
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Variable types can be
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Okay, looks good!

Let's run our code.

accept
(e., 0)

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multiple vars in 1 line

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Variable types come
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Variable types can be
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Okay, looks good!

Let's run our code.

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

accept
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VARIABLES

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package main
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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)

Can declare and init.
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VARIABLES

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    var
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```
    c :=
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```
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```

```
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```

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}
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Variable types come *after* variable names

Variable types can be omitted and inferred

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

accept
(e., 0)

Can declare and init. multiple vars in 1 line

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VARIABLES

```
package main

import "fmt"

func main() {
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import "fmt"

func main() {
    var a int = 3
    var b = 2
    c := 1
    var d int
    var e, f int = -1, -2

    fmt.Println(a, b, c)
}
```

Variable types come *after* variable names

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    c := 1
    var d int
    var e, f int = -1, -2

    fmt.Println(a, b, c)
    fmt.Println(d, e, f)
}
```

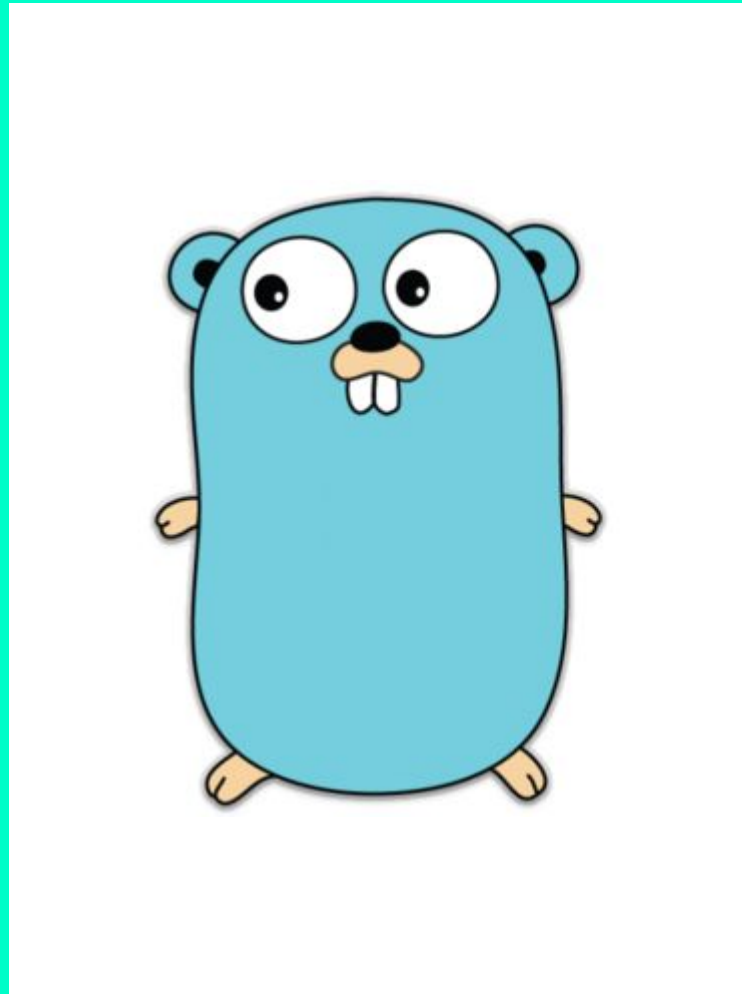
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Let's see this in action!

PLAY TIME!

"Go" to
go.dev/play and try
out some variable
declarations.

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"Go" to go.dev/play and try out some variable declarations.

Here are some ideas.

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

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Here are some ideas.

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!

"Go" to go.dev/play and try out some variable declarations.

Here are some ideas.

LOOPS

```
package main
```

```
func main() {
```

```
}
```

LOOPS

```
package main
```

```
import "fmt"
```

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

LOOPS

```
package main
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import "fmt"
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func main() {  
    for i := 1; i <= 3; 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
```

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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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    for i := 1; i <= 3; i++ {  
        fmt.Println(i)  
    }  
    i := 4  
    for i <= 10 {  
        fmt.Println(i)  
        i++  
    }  
    for {  
        fmt.Println("done!")  
        break  
    }  
}
```

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Must use {}, even for 1-line loops

No such thing as 'while' loops in Go


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

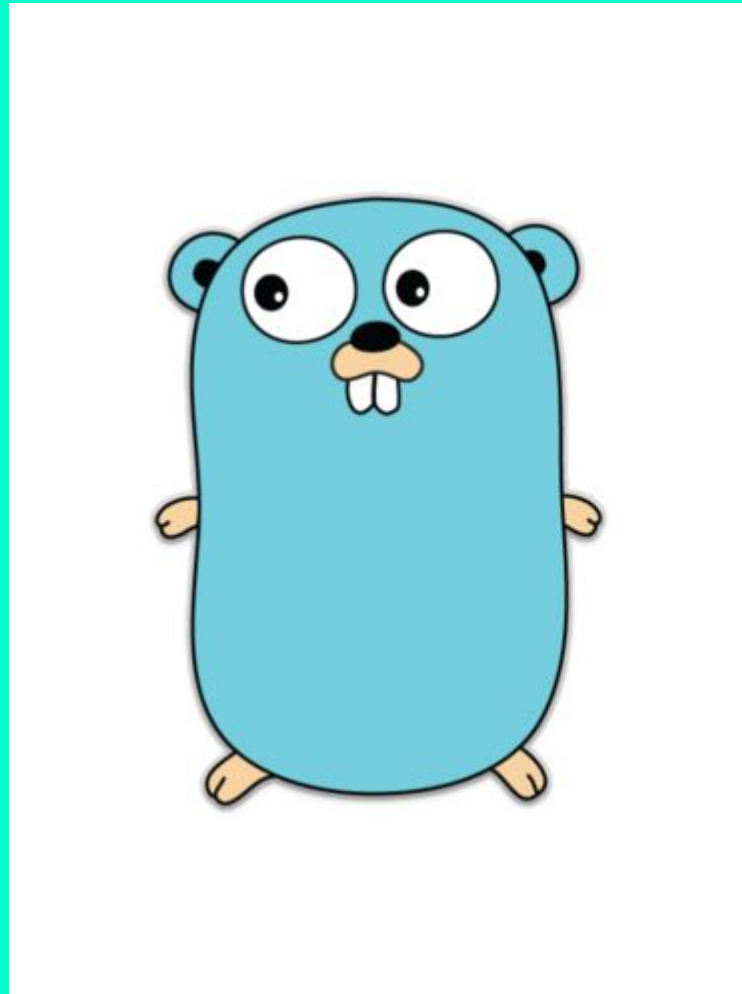
LOOPS

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

Must use {}, even for 1-line loops

No such thing as 'while' loops in Go

Can use 'break' and 'continue'



Let's try it ourselves

LET'S GET LOOPY

Navigate to
go.dev/play and
write a few Go
loops.

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

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

LET'S GET LOOPY

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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

Navigate to go.dev/play and write a few Go loops.

FUNCTIONS

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```
func f(a int, b int) int {  
    return a + b  
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A function's return type is listed after its args

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func f(a int, b int) int {  
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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 {  
    return a + b  
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```
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    return a * b  
}
```

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

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Functions can return more than one result

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

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

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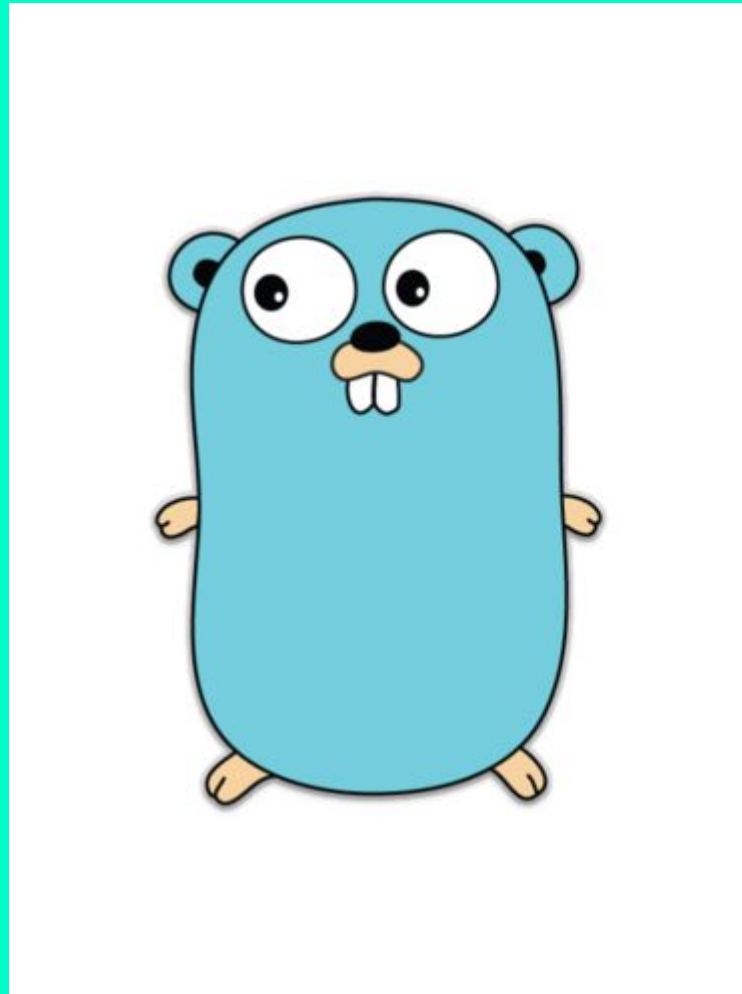
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Functions can return more than one result

'_' 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?

GO FUNCTIONS

Let's get back to go.dev/play and write a few programs using functions in Go.

GO STANDARD LIBRARY

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

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Expect to spend some time pouring over it.

EXTERNAL SOURCES

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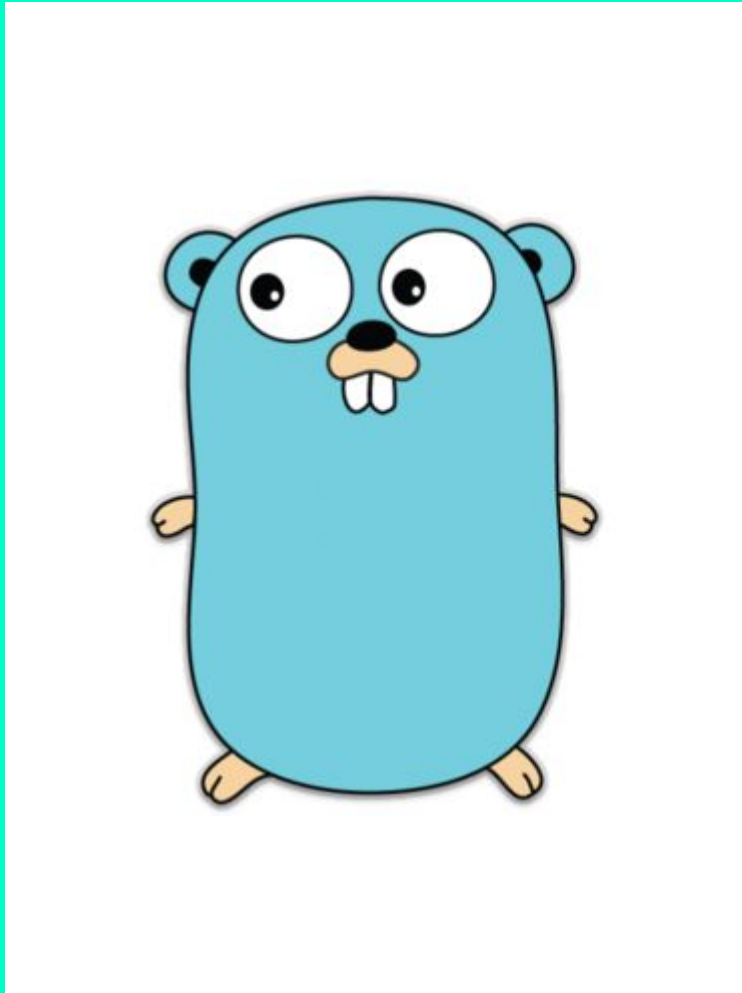
If you base a significant portion of your code on it, cite it in a comment in your code.

EXTERNAL SOURCES

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Search for “golang” instead.



Let's see the docs

1. Find some
“interesting” packages

2. Can you experiment
using the provided
examples?

DOC HUNT

Navigate to
pkg.go.dev

Use
go.dev/play

QUESTIONS?

Please don't hesitate to ask!

ADDITIONAL RESOURCES

- go.dev
- go.dev/play
- gobyexample.com
- ["Learn Go Programming"](#)
[\(7 hour YouTube tutorial\)](#)

ASSIGNMENT 0

Ungraded!

Set up common development environment

- Go, Git, etc.

- Necessary for precepts and assignments

GIT & GO

- [Command line Git](#)
- [Desktop Git](#)
- [Git Tutorial](#)
- [Git Cheatsheet](#)
- [Download Go](#)