

Go

Getting Started With Golang

Who made this thing?

- Ken Thompson (B, C, Unix, UTF-8)
- Rob Pike (Unix, UTF-8)
- Robert Griesemer (Hotspot, JVM)
- And a few other engineers at Google

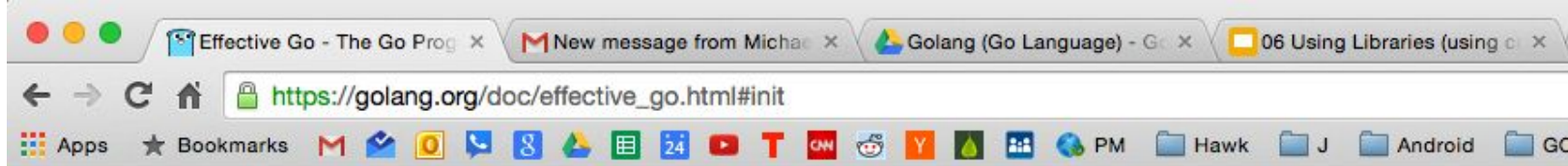
Go was invented by geniuses

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Unless you speak “genius”
Go can be hard-er-ish to learn
from the docs.

Go was invented by geniuses



The init function

Finally, each source file can define its own niladic `init` function to set up whatever state is required. (Actually each file can have multiple `init` functions.) And finally means finally: `init` is called after all the variable declarations in the package have evaluated their initializers, and those are evaluated only after all the imported packages have been initialized.

Besides initializations that cannot be expressed as declarations, a common use of `init` functions is to verify or repair correctness of the program state before real execution begins.

```
func init() {  
    if user == "" {  
        log.Fatal("$USER not set")  
    }  
    if home == "" {  
        home = "/home/" + user  
    }  
    if GOPATH == "" {  
        GOPATH = home + "/go"  
    }  
    // GOPATH may be overridden by --GOPATH flag on command line.  
    flag.StringVar(&GOPATH, "GOPATH", GOPATH, "override default GOPATH")  
}
```

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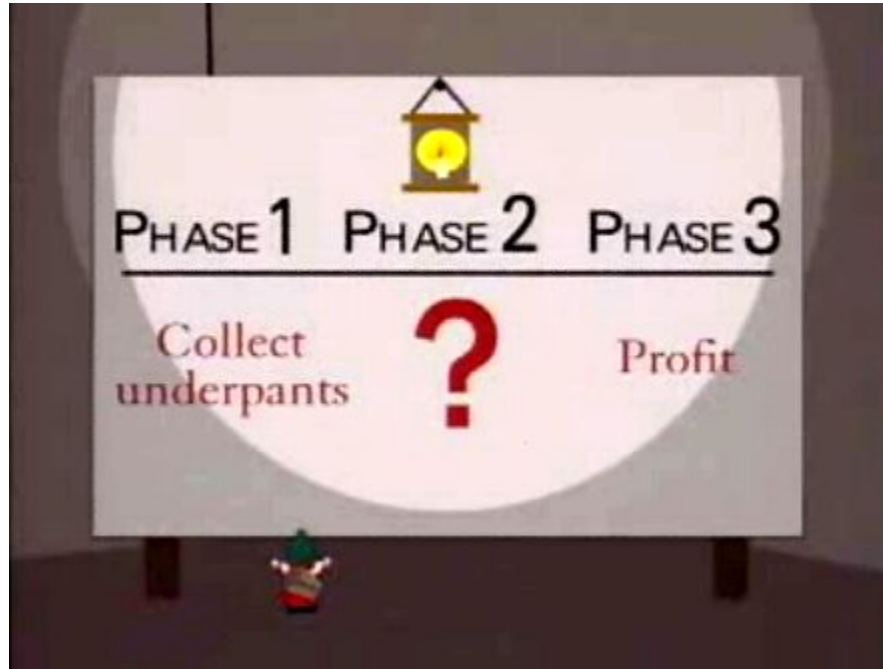
learning go from the docs ...

“Go is a very well documented programming language but this documentation can be difficult to understand unless you are already familiar with programming languages.”

~ [Caleb Doxsey](#)



learning go in this course



My goal is to make it easy to learn Go.

install

<https://golang.org/doc/install>

download

<https://golang.org/dl/>

SHA1 checksum

<https://support.apple.com/en-us/HT201259>

at terminal:

`openssl sha1 [full path to file]`



Terminal

Shell

Edit

View

Window

Help



Downloads — bash — 113x33

```
~ $ pwd
```

```
/Users/tm002
```

```
~ $ cd Downloads/
```

```
Downloads $ ls
```

```
042515_CorrespondentsDinner.mp3
```

```
CIT-15-38529-2015SU (1).xlsx
```

```
CIT-15-38529-2015SU.xlsx
```

```
font-awesome-4.4.0
```

```
gcs.json
```

```
Downloads $ openssl sha1 go1.4.2.darwin-amd64-osx10.8.pkg
```

```
SHA1(go1.4.2.darwin-amd64-osx10.8.pkg)= 8fde619d48864cb1c77ddc2a1aec0b7b20406b38
```

```
Downloads $ _
```

```
go1.4.2.darwin-amd64-osx10.8.pkg
```

```
pictures
```

```
radon course
```

```
secret.pem
```

```
vaista temp
```

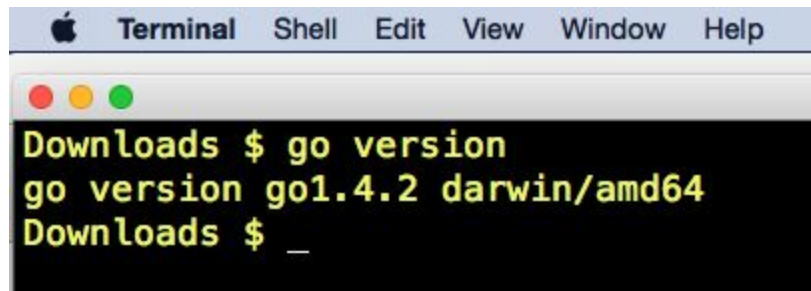

Stable versions

go1.4.2 ▼

File name	Kind	OS	Arch	Size	SHA1 Checksum
go1.4.2.src.tar.gz	Source				460caac03379f746c473814a65223397e9c9a2f6
go1.4.2.darwin-386-osx10.6.tar.gz	Archive	OS X 10.6+	32-bit		fb3e6b30f4e1b1be47bbb98d79dd53da8dec24ec
go1.4.2.darwin-386-osx10.8.tar.gz	Archive	OS X 10.8+	32-bit		65f5610fdb38febd869aefbfd426c83b650bb408
go1.4.2.darwin-386-osx10.6.pkg	Installer	OS X 10.6+	32-bit		3ed569ce33616d5d36f963e5d7cefb55727c8621
go1.4.2.darwin-386-osx10.8.pkg	Installer	OS X 10.8+	32-bit		7f3fb2438fa0212febef13749d8d144934bb1c80
go1.4.2.darwin-amd64-osx10.6.tar.gz	Archive	OS X 10.6+	64-bit		00c3f9a03daff818b2132ac31d57f054925c60e7
go1.4.2.darwin-amd64-osx10.8.tar.gz	Archive	OS X 10.8+	64-bit		58a04b3eb9853c75319d9076df6f3ac8b7430f7f
go1.4.2.darwin-amd64-osx10.6.pkg	Installer	OS X 10.6+	64-bit		3fa5455e211a70c0a920abd53cb3093269c5149c
go1.4.2.darwin-amd64-osx10.8.pkg	Installer	OS X 10.8+	64-bit		8fde619d48864cb1c77ddc2a1aec0b7b20406b38
go1.4.2.linux-386.tar.gz	Archive	Linux	32-bit		50557248e89b6e38d395fda93b2f96b2b860a26a

test install

go version

A screenshot of a macOS Terminal window. The title bar at the top is light blue and contains an Apple logo, the word "Terminal", and menu items: "Shell", "Edit", "View", "Window", and "Help". Below the title bar is a light gray bar with three colored window control buttons (red, yellow, green). The main area of the terminal has a black background with yellow text. The text shows a user prompt "Downloads \$" followed by the command "go version", the output "go version go1.4.2 darwin/amd64", and a second prompt "Downloads \$" with a cursor line.

```
Downloads $ go version
go version go1.4.2 darwin/amd64
Downloads $ _
```

“go” commands

<https://golang.org/cmd/go/>



Usage:

```
go command [arguments]
```

The commands are:

build	compile packages and dependencies
clean	remove object files
env	print Go environment information
fix	run go tool fix on packages
fmt	run gofmt on package sources
generate	generate Go files by processing source
get	download and install packages and dependencies
install	compile and install packages and dependencies
list	list packages
run	compile and run Go program
test	test packages
tool	run specified go tool
version	print Go version
vet	run go tool vet on packages

Use "go help [command]" for more information about a command.


```
~ $ go help
Go is a tool for managing Go source code.
```

Usage:

```
go command [arguments]
```

The commands are:

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tool	run specified go tool
version	print Go version
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Use "go help [command]" for more information about a command.

Additional help topics:

c	calling between Go and C
filetype	file types
gopath	GOPATH environment variable
importpath	import path syntax
packages	description of package lists
testflag	description of testing flags
testfunc	description of testing functions

Use "go help [topic]" for more information about that topic.

```
~ $ go help
Go is a tool for managing Go source code.
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Usage:

```
go command [arguments]
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The commands are:

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Use "go help [topic]" for more information about that topic.
```

exercise

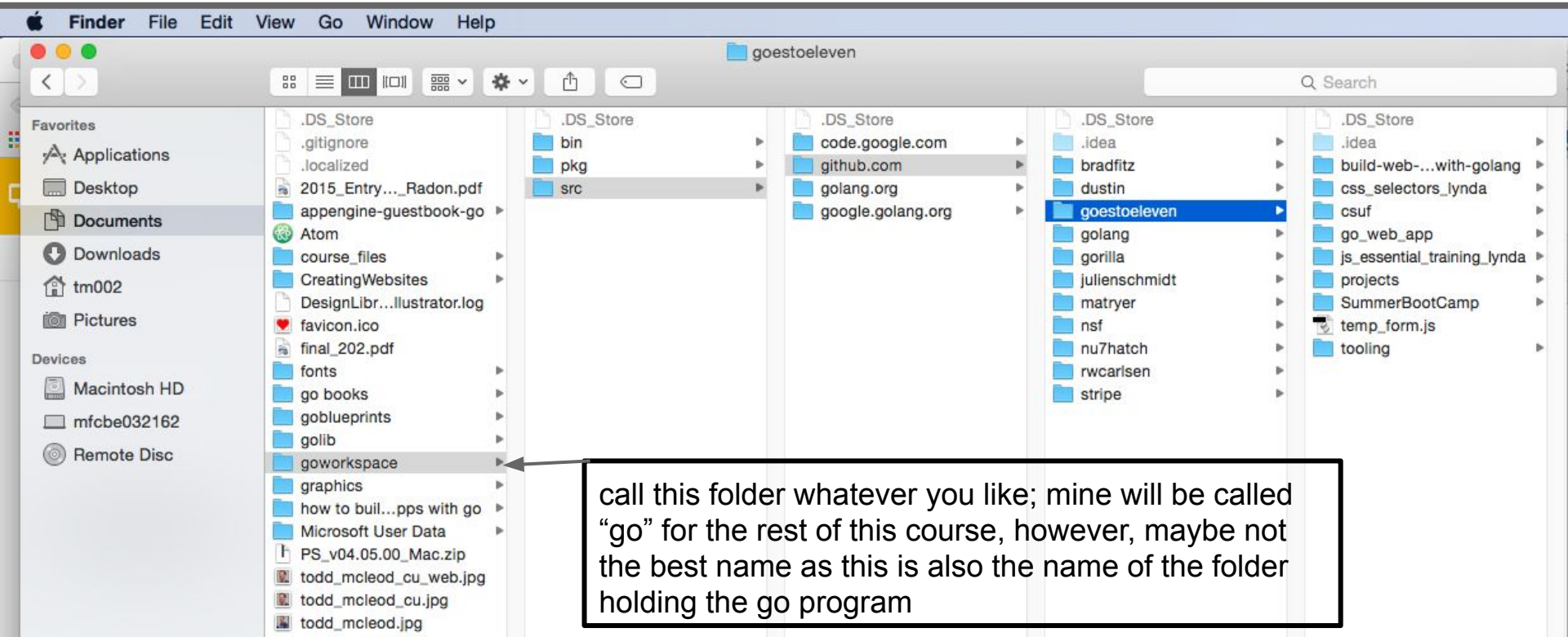
try running “go help” at terminal

exercise

try running “go env” at terminal

workspace

go is opinionated



path variables

```
Downloads $ go env
GOARCH="amd64"
GOBIN=""
GOCHAR="6"
GOEXE=""
GOHOSTARCH="amd64"
GOHOSTOS="darwin"
GOOS="darwin"
GOPATH="/Users/tm002/Documents/go"
GORACE=""
GOROOT="/usr/local/go"
GOTOOLDIR="/usr/local/go/pkg/tool/darwin_amd64"
CC="clang"
GOGCCFLAGS="-fPIC -m64 -pthread -fno-caret-diagnostics -Qunused-arguments -fmessage-length=0 -fno-common"
CXX="clang++"
CGO_ENABLED="1"
Downloads $ _
```

GOPATH

must point to your workspace

GOROOT

must point to golang source code

How To Set GOPATH

```

~ $ cd ~
~ $ pwd
/Users/tm002
~ $ ls -la
total 5720
drwxr-xr-x+ 48 tm002 2102769110 1632 Aug  4 16:14 .
drwxr-xr-x   7 root  admin      238 Feb 17 17:53 ..
-r-----   1 tm002 2102769110    7 Feb 17 17:53 .CFUserTextEncoding
-rw-r--r--@  1 tm002 2102769110 14340 Aug  5 08:40 .DS_Store
drwx----- 537 tm002 2102769110 18258 Aug  5 09:09 .Trash
drwxr-xr-x   3 tm002 2102769110   102 Apr  6 18:26 .WebStorm10
-r-----   1 tm002  admin      90304 Aug  4 16:14 .account
drwxr-xr-x  13 tm002 2102769110   442 Feb 22 15:00 .android
-rw-----   1 tm002 2102769110    0 Mar  7 15:37 .appcfg_cookies
-rw-r--r--   1 tm002 2102769110   42 Jul 24 11:08 .appcfg_nag
-rw-----   1 tm002 2102769110  747 Jul 19 22:09 .appcfg_oauth2_tokens
drwxr-xr-x  13 tm002 2102769110   442 Feb 18 13:23 .atom
-rw-----   1 tm002 2102769110 10459 Aug  3 20:55 .bash_history
-rw-r--r--   1 tm002 2102769110  124 May 10 15:37 .bash_profile
-rw-r--r--   1 tm002 2102769110  214 Apr 18 11:58 .bash_profile.backup
-rw-----   1 tm002 2102769110  140 Feb 21 21:57 .bash_profile.save
-rw-r--r--@  1 tm002 2102769110  633 Jul 15 17:09 .bashrc
drwxr-xr-x   3 tm002 2102769110   102 Jul  3 09:38 .cache

```

at terminal

nano .bash_profile



Terminal Shell Edit View Window Help



tm002 — nano — 141x43

GNU nano 2.0.6

File: .bash_profile

```
# This loads in the configuration in .bashrc
# Put all configuration there!
if [ -f ~/.bashrc ]; then
    source ~/.bashrc
fi
```

GNU nano 2.0.6

File: .bash_profile

```
# This loads in the configuration in .bashrc
# Put all configuration there!
if [ -f ~/.bashrc ]; then
    source ~/.bashrc
fi
```

[Read 5 lines]

[^]G Get Help
[^]X Exit

[^]O WriteOut
[^]J Justify

[^]R Read File
[^]W Where Is

[^]Y Prev Page
[^]V Next Page

[^]K Cut Text
[^]U UnCut Text

[^]C Cur Pos
[^]T To Spell

GNU nano 2.0.6

File: .bashrc

```
cal
date
```

```
#PS1="$ "
PS1="\W $ "
```

```
# redefine a command to add options
alias mv='mv -i'
alias cp='cp -i'
alias rm='rm -i'
alias df='df -h'
alias du='du -h'
alias mkdir='mkdir -p'
alias pbsort='pbpaste | sort | pbcopy'
```

```
# for G0 programming
export GOROOT="/usr/local/go"
export GOPATH="$HOME/Documents/go"
export PATH="$HOME/Documents/go/bin:$PATH"
```

```
# for G0 APP ENGINE
export PATH="/usr/local/go_appengine:$PATH"
```

```
# The next line updates PATH for the Google Cloud SDK.
source '/Users/tm002/google-cloud-sdk/path.bash.inc'
```

```
# The next line enables bash completion for gcloud.
source '/Users/tm002/google-cloud-sdk/completion.bash.inc'
```

[Read 29 lines]

```
^G Get Help
^X Exit
```

```
^O WriteOut
^J Justify
```

```
^R Read File
^W Where Is
```

```
^Y Prev Page
^V Next Page
```

```
^K Cut Text
^U UnCut Text
```

```
^C Cur Pos
^T To Spell
```



Edit the system environment variables

Control panel



Edit environment variables for your account

Control panel



Web



environment variables



environment variables windows



environment variables linux



environment variable path



environment variables windows 10



environment variable powershell



environment variables in dos



environment variables in ssis



My stuff



Web



environment variable

Computer Name

Hardware

Advanced

System Protection

Remote

You must be logged on as an Administrator to make most of these changes.

Performance

Visual effects, processor scheduling, memory usage, and virtual memory

Settings...

User Profiles

Desktop settings related to your sign-in

Settings...

Startup and Recovery

System startup, system failure, and debugging information

Settings...

Environment Variables...

OK

Cancel

Apply

User variables for Daniel

Variable	Value
ELM_HOME	C:\Program Files (x86)\Elm Platform\0.1...
GOPATH	C:\Users\Daniel\gocode
PATH	C:\Program Files (x86)\Elm Platform\0.1...
TEMP	%USERPROFILE%\AppData\Local\Temp

New...

Edit...

Delete

System variables

Variable	Value
GLEWDIR	C:\Visual Studio Libraries\glew-1.12.0\
GOROOT	C:\Go\
JAVA_HOME	C:\Program Files\Java\jdk1.8.0_25
NUMBER_OF_P...	2

New...

Edit...

Delete

OK

Cancel

System Properties

Computer Name Hardware Advanced System Protection Remote

Environment Variables

Edit System Variable

Variable name:

Path

Variable value:

%JAVA_HOME%\bin;%C:\Program Files\nodejs;%C:\Program Files (x86)\Git\bin;%C:\Go\bin

OK

Cancel

System variables

Variable	Value
OS	Windows_NT
Path	C:\MinGW\bin;C:\Python27;%C:\Python...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;....
PROCESSOR_A...	AMD64

New...

Edit...

Delete

OK

Cancel

Environment Variables



User variables for Daniel

Variable	Value
ELM_HOME	C:\Program Files (x86)\Elm Platform\0.1...
GOPATH	C:\Users\Daniel\gocode
PATH	C:\Program Files (x86)\Elm Platform\0.1...
TEMP	%USERPROFILE%\AppData\Local\Temp

Edit User Variable



Variable name:

PATH

Variable value:

;C:\Users\Daniel\AppData\Local\atom\bin;\$GOPATH\bin;C:\Users\Daniel\go_appengine

OK

Cancel

PROCESSOR_A... AMD64

New...

Edit...

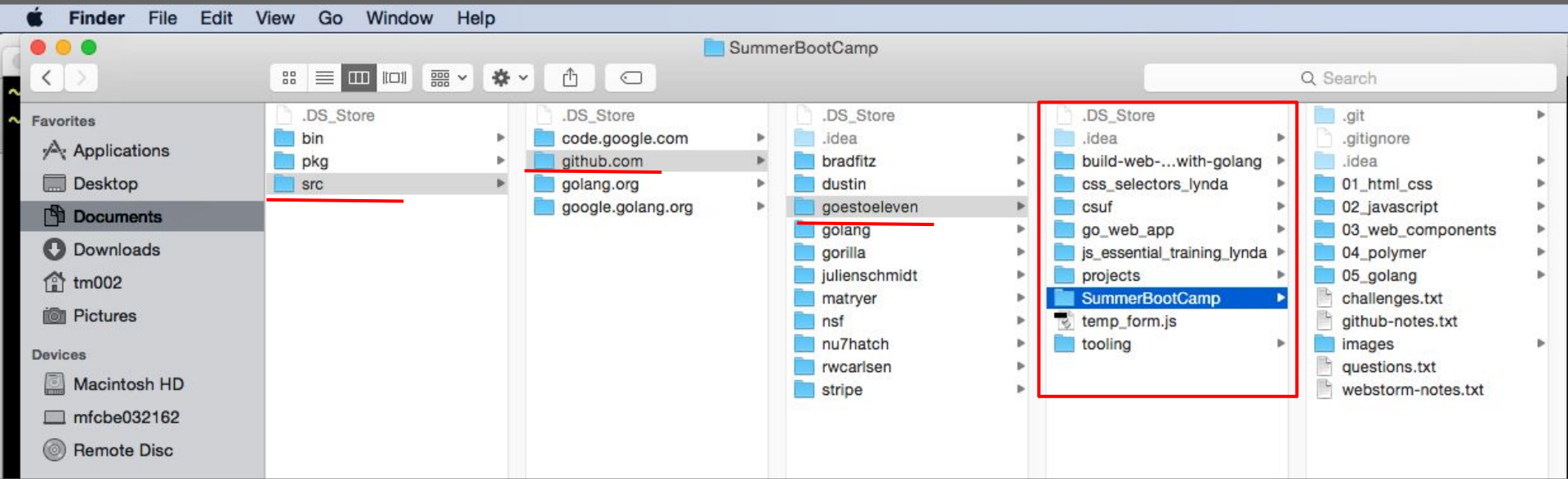
Delete

OK

Cancel

repos

workspace organized for vcs



Review

- Geniuses: Rob Pike, Ken Thompson, Robert Griesemer
- SHA1 checksum
 - **openssl sha1 [full path to file]**
- **go version**
- **go env**
- go commands
 - <https://golang.org/cmd/go/>
- **go help**
- **workspaces**
- **path variables**
 - aka environment variables
- **GOPATH**
- **GOROOT**
- .bash_profile
- .bashrc
- repos & workspace

Review Questions

SHA1

What is SHA1, how is it used, and how can it tell you if you have received the file that a sender intended?

go version

What does **go version** do?

go env

What does **go env** do?

Path Variables

What are path variables?

What are path variables also sometimes called?

GO ROOT

What is **GO ROOT** and where should it point?

GO PATH

What is **GO PATH** and where should it point?

Go Workspace

What should be the file structure of your go workspace?

Go Modules

- go module is the new way to create your workspace
- see the videos in this course to learn about go modules