

Version control with Git(Hub)

Blogdown + Hugo + Netlify

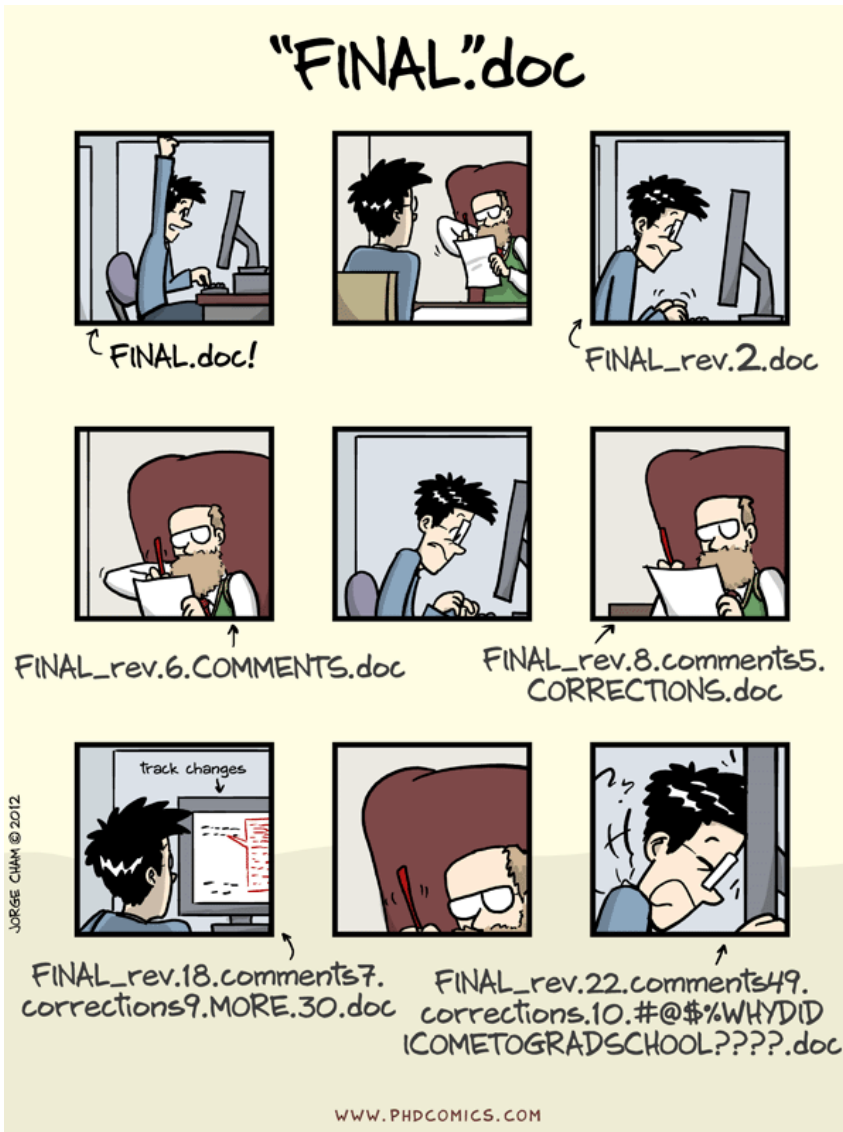
# Git + GitHub

## Git

- Git is a distributed version control system
- Think of it as Word's *Track Changes* + Dropbox
- Whenever you want to save changes, you **commit** your changes and git takes a snapshot of that version
- Unlike Word, Git keeps a full history of all versions you **committed**
- There is a (steep) learning curve, but it's worth it.

## GitHub

- GitHub is an online hosting platform that provides services built on top of the Git system. Similar platforms include **Bitbucket** and **GitLab**, but most people use Github
- Just like we don't *need* Rstudio to run R code, we don't *need* GitHub to use Git... But will make our lives so much easier

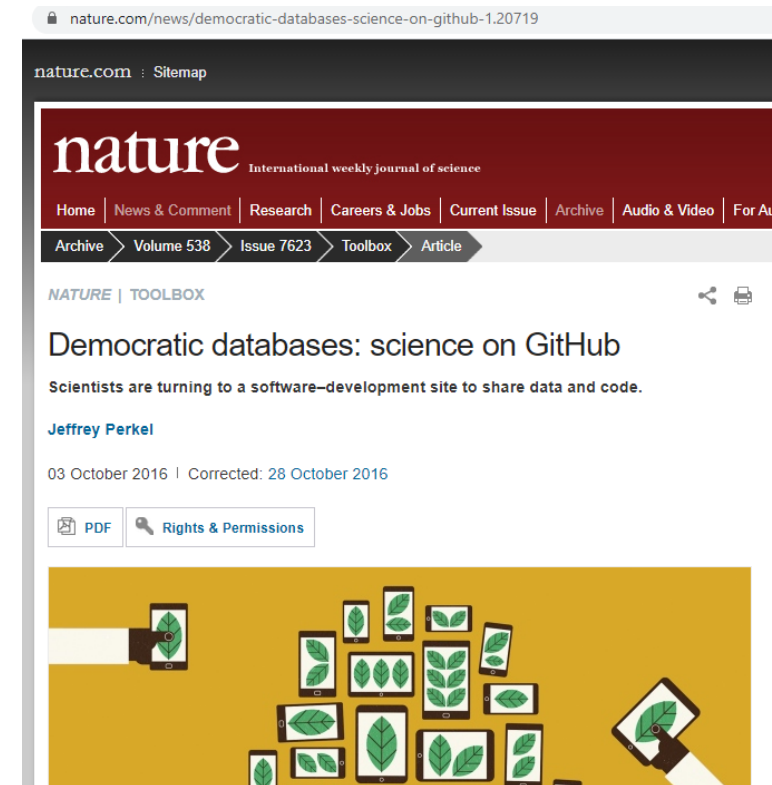
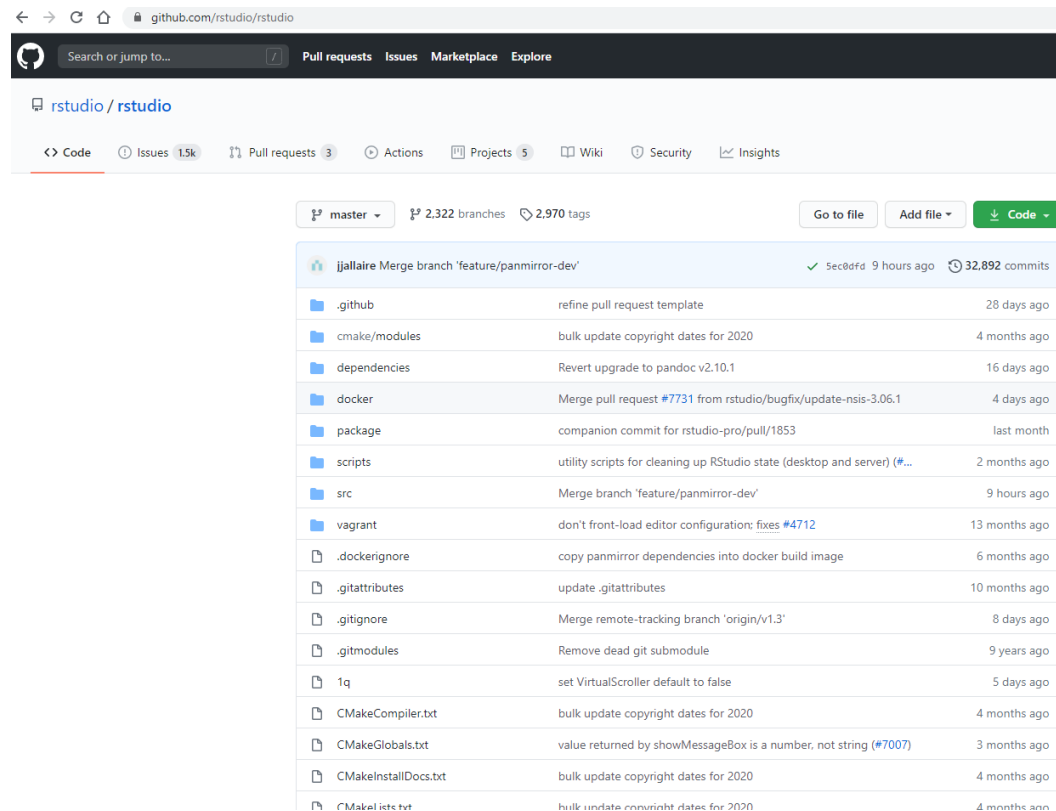


# Collaboration tool

A brilliant platform for collaboration

There's a high probability that your favourite app, program or package is built using Git-based tools. (e.g., RStudio)

Git(Hub) helps to operationalise the ideals of open science and reproducibility.

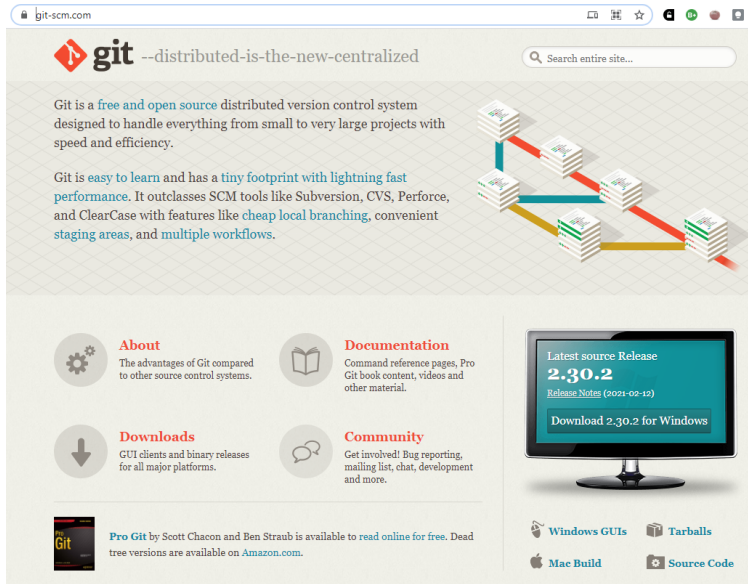


<https://github.com/rstudio/rstudio>

<https://www.nature.com/news/democratic-databases-science-on-github-1.20719>

# Local Git installation

## Windows



<https://git-scm.com/>

## macOS

**Option 1** (*highly recommended*): Install the Xcode command line tools (**not all of Xcode**), which includes Git.

Go to the shell and enter one of these commands to elicit an offer to install developer command line tools:

```
git --version
git config
```

Accept the offer! Click on "Install".

Here's another way to request this installation, more directly:

```
xcode-select --install
```

Install the Xcode command line tools

# Git + Rstudio configuration

## Chapter 7 Introduce yourself to Git

In the shell (Appendix A):

```
git config --global user.name 'Jane Doe'  
git config --global user.email 'jane@example.com'  
git config --global --list
```

substituting your name and **the email associated with your GitHub account**.

The [usethis package](#) offers an alternative approach. You can set your Git user name and email from within R:

```
## install if needed (do this exactly once):  
## install.packages("usethis")  
  
library(usethis)  
use_git_config(user.name = "Jane Doe", user.email = "jane@example.org")
```

# Git + RStudio

1. Create a new public repo, called **test**, on GitHub and initialise with a README.
2. Copy the HTTPS/SSH link (the green **Code** button).
3. Open up RStudio.
4. Navigate to *File -> New Project -> Version Control -> Git*
5. Paste your copied link into the "Repository URL:" box.
6. Choose the project path ("Create project as subdirectory of:") and click Create Project.
7. Look at the top-right panel in your RStudio IDE. Do you see the **Git** tab?
8. There should already be some files in there, which we'll ignore for the moment
9. Go to **Files** tab in the bottom-right panel and click on the README file.
10. Add some text like "Hello World!" and save (Ctrl/Cmd + S) the README.
11. Do you see any changes in the "Git" panel?

# Main Git operations

The four main Git operations, in this order, are:

## 1. Stage (or "add")

- Tell Git that you want to add changes to the repo history (file edits, additions, deletions, etc.)

## 2. Commit

- Tell Git that, yes, you are sure these changes should be part of the repo history. This is when you take a snapshot of your work as it is now. Git won't allow you to commit if you don't add a helpful, explanatory message

## 3. Pull

- Get any new changes made on the GitHub repo (i.e. the upstream remote), either by you on another machine or your collaborators.

## 4. Push

- Push any (committed) local changes to the GitHub repo

Always **pull first** from the upstream repo **before you push** any changes, even when working alone. It's a good habit that will save you troubles later on

# Git workflow: Distributed Version Control

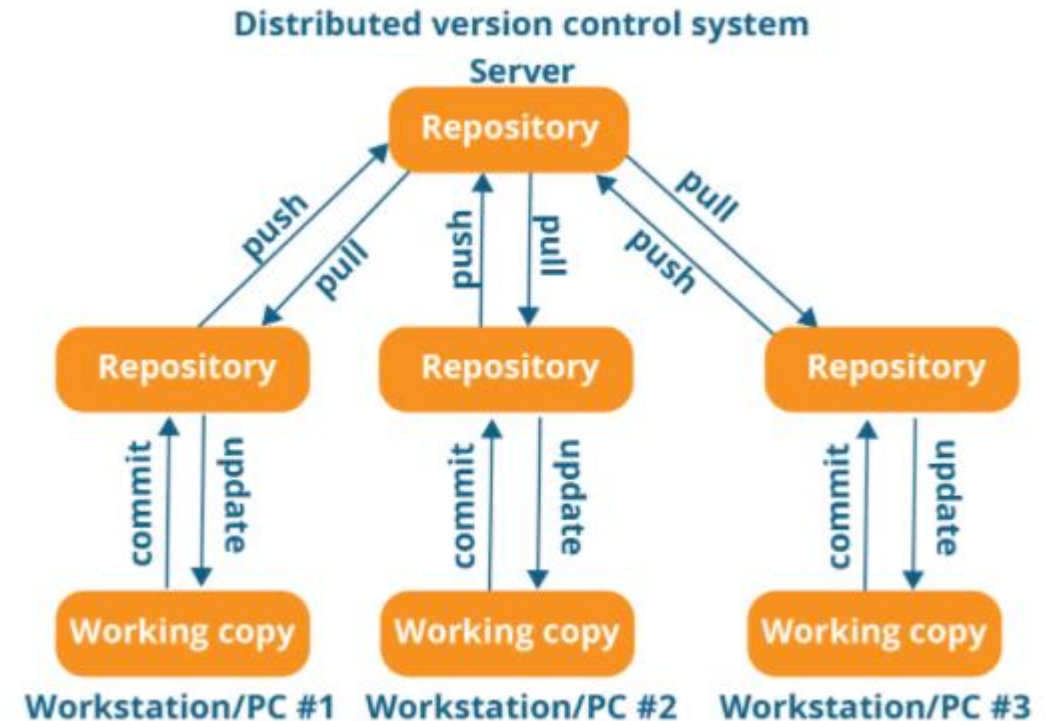
Creating the repo on GitHub first means that it will always be upstream of your (and other) working copies.

In a distributed version control, you clone a copy of the repository locally so that you are not working on the original file. You work on the cloned copy of the project, and once all the changes are finalised, you can commit and push changes to that original file.

GitHub acts as the central node in a distributed network, something especially valuable when you are collaborating on a project with others

If you would like to move an existing project to GitHub, create an empty repo there first, clone it locally, and then copy all your files across.

Github + RStudio Projects is a natural and great way to organise your work. They also solve absolute vs. relative path problems, since the **.Rproj** file acts as an anchor point for all other files in the repo and you never have to manually set your working directory.





# Git from the shell/terminal

Besides using the Rstudio Git panel and its GUI, you can also give Git commands from Rstudio shell/terminal.

## 1. Add (“stage”) a file or group of files:

You can use wildcard characters to stage a group of files (e.g. sharing a common prefix).

There are a bunch of useful flag options too:

**git add NAME-OF-FILE-OR-FOLDER**

Stage all files

**git add -A**

Stage updated files only (modified or deleted, but not new)

**git add -u**

Stage new files only (not updated)

**git add .**

## 2. Commit your changes

**git commit -m "Helpful message"**

## 3. Pull from the upstream repository (i.e. GitHub)

**git pull**

## 4. Push local changes that you committed to the upstream repo

**git push**

Clone the repo.

**git clone REPOSITORY-URL**

See the commit history (hit spacebar to scroll down or q to exit)

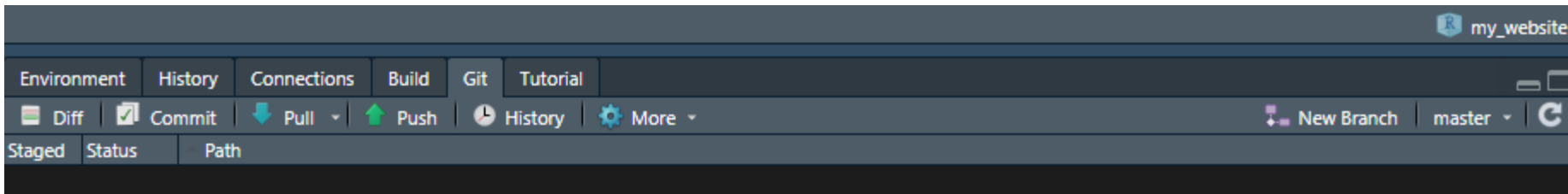
**git log**

See changes

**git status**

# Git Branches

- Branches allow you to take a snapshot of your existing repo and try out a new idea without affecting your main (i.e. "master") branch.
- Only when you (and your collaborators) are 100% satisfied, would you **merge** your work back into the master branch.
  - How bugs are caught and fixed.
  - How most new features in modern software and apps are developed.
  - You can use branches to try out new ideas and analyses
- If you aren't happy, then you can just delete the branch and continue as if it never existed.



- Create a new branch on your local machine and switch to it **git checkout -b NAME-OF-YOUR-BRANCH**
- Push new branch to GitHub **git push origin NAME-OF-YOUR-BRANCH**
- List all branches on your local machine **git branch**
- Switch back to the master branch **git checkout master**
- Delete a branch **git branch -d NAME-OF-YOUR-BRANCH**

# Merging Branches and Pull Requests

## 1. Local changes


- Commit your final changes to the new branch (say we call it "new-idea").
- Switch back to the master branch: **git checkout master**
- Merge in the new-idea branch changes: **git merge new-idea**
- Delete the new-idea branch (optional): **git branch -d new-idea**


## 2. Remote changes (e.g., pull requests on GitHub)

- Pull requests are a way to notify collaborators — or yourself! — that you have completed a feature.
- You write a summary of all the changes contained in the branch.
- You then assign suggested reviewers of your code — including yourself potentially — who are then able to approve these changes ("Merge pull request") on GitHub.


# Forks

A fork is an independent copy of the repo under your GitHub account. Forking a repository allows you to freely experiment with changes without affecting the original project. To fork a repo on GitHub just click the "Fork" button in the top-right corner of said repo.

 [kostis-christodoulou](#) / [github-practice-am01](#)

 Watch ▾

1

 Star

0

 Fork

54

Once you fork a repo, you are free to do anything you want to it.

Forking in combination with pull requests is actually how much of the world's software is developed.

In our case, when you added your names to the portfolio website list, you did the following:

1. Outside user X forks [kostis-christodoulou/github-practice-am01](#) repo. She adds a new feature; her name and url for the webpage, or fixes a bug she's identified. She **1. commits her changes** and then **2. issues an upstream pull request**.
2. I am notified and can then decide whether to merge X's contribution with the main project.

# Merge conflicts

- Person 1 (P1): Invite Person 2 (P2) to join you as a collaborator on the "test" repo. (See *Settings* tab of your repo.)
- P2: Clone P1's repo to your local machine. Change into a new directory first or give it a different name (P1\_test) to avoid conflicts with your own test repo. Git tracking will still work if you change the repo name locally. Make some edits to the README (e.g. delete lines of text and add your own). Stage, commit and push these changes.
- P1: Make your own changes to the README on your local machine. Stage, commit, pull, and then try to push your committed changes. P1 should encounter a **merge conflict** error. `git status` in the shell/terminal should come back with  
Unmerged paths:  
(use "git add <file>..." to mark resolution)  
\* both modified: README.md
- Git is protecting P1 by refusing the merge. It wants to make sure that you don't accidentally overwrite all of your changes by pulling P2's version of the README. Let us edit README

# README

Some text here.

<<<<<< HEAD

Text added by Partner 2.

=====

Text added by Partner 1.

>>>>>> 8dd2b2aaa67fac14469bda3caa08c75cd616b1d1

More text here.

<<<<<< HEAD Indicates the start of the merge conflict.

===== Indicates the break point used for comparison.

>>>>>> <long string> Indicates the end of the lines that had a merge conflict.

Fixing conflicts is a simple matter of (manually) editing the README file.

Delete the lines of the text that you don't want and then delete the special Git merge conflict symbols.

Once done, you can [stage](#), [commit](#), [pull](#) and finally [push](#) your changes to GitHub repo

# Line endings and different operating systems

During collaboration with a colleague on a project, you may find cases where Git is highlighting differences on seemingly unchanged sentences.

If that is the case, check whether your partner is using a different operating system to you. The "culprit" is the fact that Git evaluates an invisible character at the end of every line. This is how Git tracks changes.

- For Linux and MacOS, that ending is "LF"
- For Windows, that ending is "CRLF"

To solve this OS incompatibility, open up the shell/terminal and enter

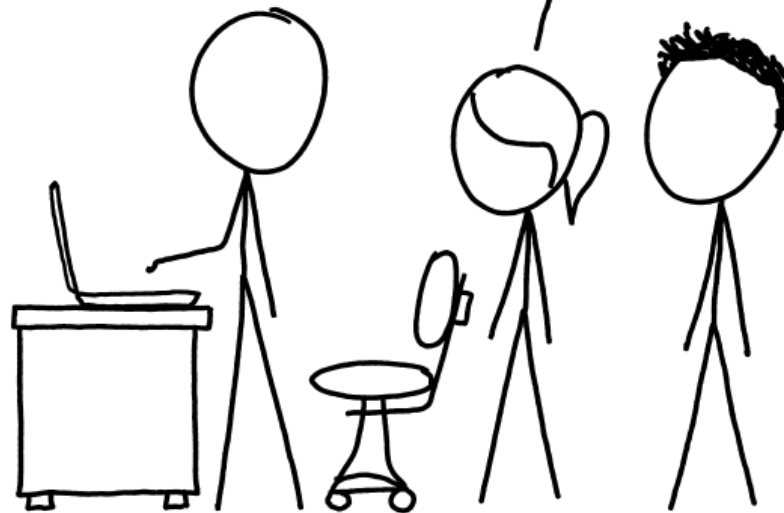
|         |   |
|---------|---|
| macOS   | <b><code>git config --global core.autocrlf input</code></b> |
| Windows | <b><code>git config --global core.autocrlf true</code></b>  |

<https://docs.github.com/en/github/using-git/configuring-git-to-handle-line-endings>

THIS IS GIT. IT TRACKS COLLABORATIVE WORK  
ON PROJECTS THROUGH A BEAUTIFUL  
DISTRIBUTED GRAPH THEORY TREE MODEL.

COOL. HOW DO WE USE IT?

NO IDEA. JUST MEMORIZE THESE SHELL  
COMMANDS AND TYPE THEM TO SYNC UP.  
IF YOU GET ERRORS, SAVE YOUR WORK  
ELSEWHERE, DELETE THE PROJECT,  
AND DOWNLOAD A FRESH COPY.



# Blogdown, hugo, your website

## Steps to follow to get our website

1. Create a new public repo, called test, on GitHub and initialise with a README.
2. Copy the HTTPS/SSH link (the green Code button).
3. Open up RStudio.
4. Navigate to File -> New Project -> Version Control -> Git
5. Paste your copied link into the "Repository URL:" box.
6. Choose the project path ("Create project as subdirectory of:") and click Create Project.
7. Look at the top-right panel in your RStudio IDE. Do you see the Git tab?
8. There should already be some files in there, which we'll ignore for the moment
9. Go to Rstudio console (bottom-left) and type
  - `library(blogdown)`
  - `install_hugo()`
  - `hugo_version()`
10. Go to <https://themes.gohugo.io/> to choose your favourite theme. We use theme Forty, but you can choose anything you like
11. All hugo themes are on github, so to use them you need to note the USER/NAME address.



# Github USER/REPO address

## Hugo Themes

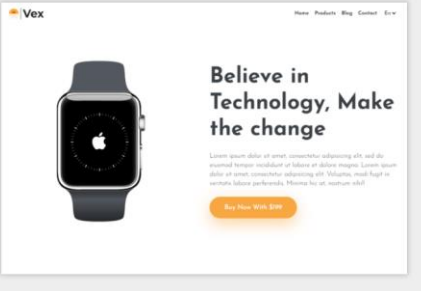
**Vex**

Vex by Themefisher ported to Hugo

Author: Themefisher  
Minimum Hugo Version: 0.62.2  
Updated: 2020-09-06  
License: CC-BY-3.0

Tags: onepage bootstrap ecommerce single product product themefisher

[Download](#) [Demo](#) [Homepage](#)




**Forty**

A portfolio/blog website built for companies or personal freelancers.

Author: Marcus Virginia  
Minimum Hugo Version: 0.55  
Updated: 2019-04-29  
License: Creative Commons Attribution 3.0

Tags: portfolio company contact form google analytics blog

[Download](#) [Demo](#) [Homepage](#)




**Kross Hugo**

Hugo port of the Themefisher's Kross Template

Author: Themefisher  
Minimum Hugo Version: 0.64.0  
Updated: 2020-09-06  
License: MIT

Tags: landing-page fast light white modern themefisher hugo-theme hugo-templates bootstrap blog responsive clean simple creative contact-form custom-themes mobile minimalist pages resume portfolio google analytics customizable flexbox presentation product theme typography

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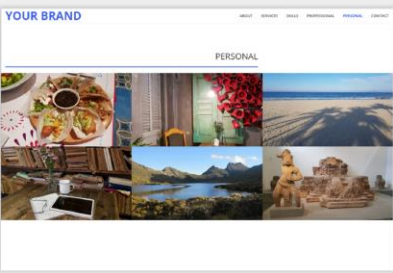
**MyPortfolio**

A portfolio HUGO theme for developers and creatives.

Author: 2-REC  
Minimum Hugo Version: 0.44  
Updated: 2020-07-25  
License: Apache License 2.0

Tags: portfolio blog responsive personal business projects bootstrap

[Download](#) [Demo](#) [Homepage](#)



github.com/themefisher/vex-hugo

Search or jump to...

themefisher / vex-hugo

Code Issues Pull requests Actions Projects Wiki Security Insights

master 1 branch 1 tag Go to file Add file Code

somratpro Merge branch 'master' of https://github.com/themefisher/vex-hugo c8f9db 2 days ago 79 commits

|             |   |              |
|-------------|---|--------------|
| archetypes  | Upload of all the files                               | 3 years ago  |
| assets      | added terms and privacy page and optimize v2.0 update | 2 months ago |
| exampleSite | added terms and privacy page and optimize v2.0 update | 2 months ago |
| images      | initialize version 2.0.0                              | 2 months ago |

github.com/MarcusVirg/forty

Search or jump to...

MarcusVirg / forty

Code Issues 5 Pull requests 2 Actions Projects 1 Wiki Security Insights

master 1 branch 0 tags Go to file Add file Code

MarcusVirg Merge pull request #26 from funkydan2/master dceas7 on Apr 30, 2019 44 commits

|             |  |               |
|-------------|--|---------------|
| archetypes  | Initial Commit   | 3 years ago   |
| exampleSite | Merge branch 'master' of https://github.com/MarcusVirg/forty | 3 years ago   |
| images      | Initial Commit   | 3 years ago   |
| layouts     | Update list.html   | 17 months ago |

github.com/themefisher/kross-hugo

Search or jump to...

themefisher / kross-hugo

Code Issues Pull requests Actions Projects Wiki Security Insights

master 1 branch 0 tags Go to file Add file Code

somratpro change contact email address 68c2ba3 2 days ago 56 commits

|             |   |               |
|-------------|---|---------------|
| archetypes  | initialize template                                       | 16 months ago |
| assets      | added favicon and redesigned blog and project single page | 2 months ago  |
| exampleSite | remove extra file   | 2 days ago    |
| images      | modified theme.toml, readme.md and footer copyright       | 16 months ago |
| layouts     | added favicon and redesigned blog and project single page | 2 months ago  |

github.com/2-REC/hugo-myportfolio-theme

Click to go back, hold to see history

2-REC / hugo-myportfolio-theme

Code Issues Pull requests Actions Projects Wiki Security Insights

master 1 branch 0 tags Go to file Add file Code

2-REC Fixed 'raw HTML omitted' when using markdownify 60786c5 on Jul 25 126 commits

|             |   |               |
|-------------|---|---------------|
| TODO        | TODO tasks updated                              | 10 months ago |
| archetypes  | Updated images fields                           | 2 years ago   |
| exampleSite | Fixed 'raw HTML omitted' when using markdownify | 2 months ago  |
| images      | Added borders to screenshots                    | 2 years ago   |

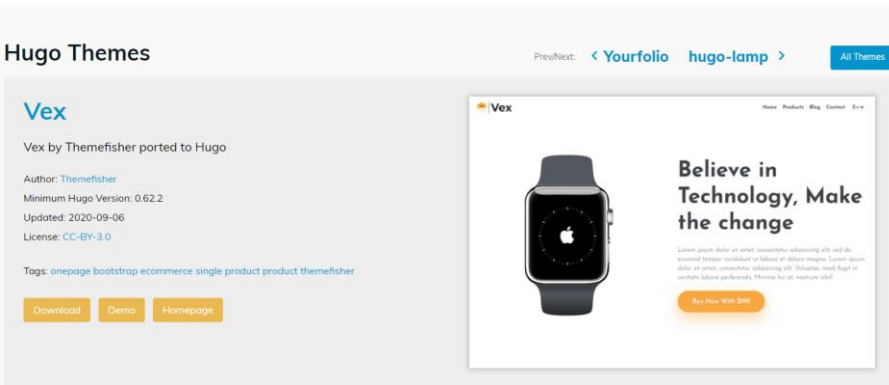
<https://github.com/themefisher/vex-hugo>

<https://github.com/MarcusVirg/forty>

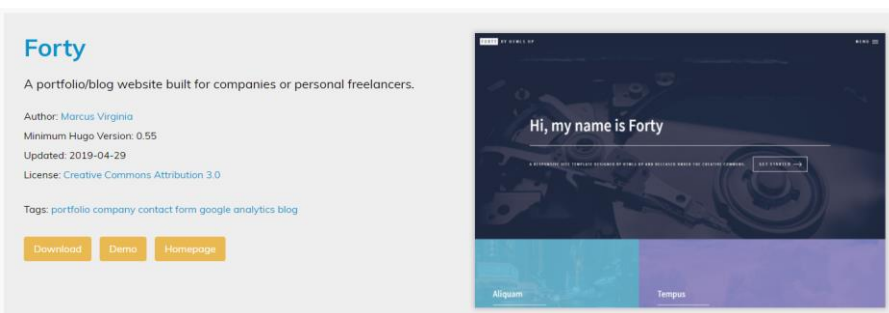
<https://github.com/themefisher/kross-hugo>

<https://github.com/2-REC/hugo-myportfolio-theme>

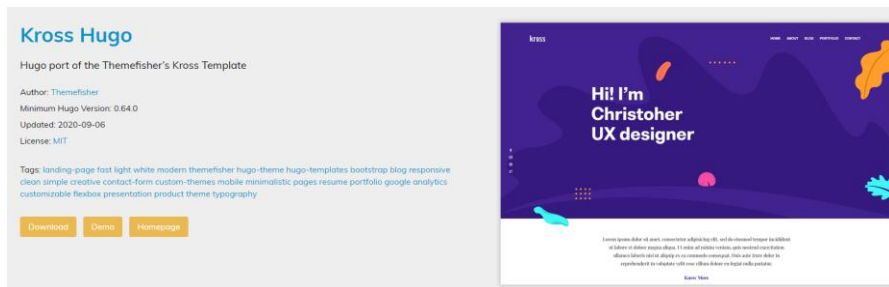
# Build a template site with your chosen theme



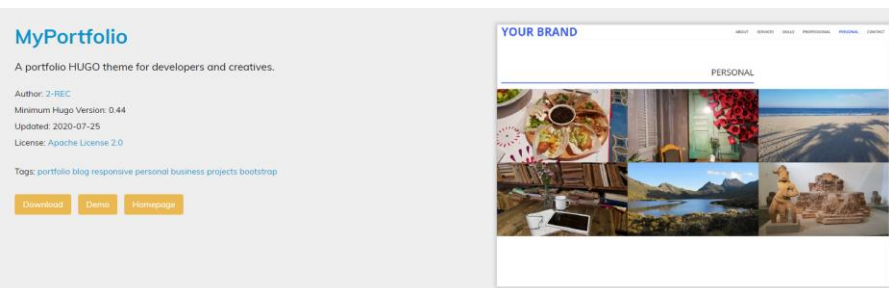
```
blogdown::new_site(theme = "themefisher/vex-hugo",  
  sample = TRUE,  
  theme_example = TRUE,  
  empty_dirs = TRUE,  
  to_yaml = TRUE)
```



```
blogdown::new_site(theme = "MarcusVirg/forty",  
  sample = TRUE,  
  theme_example = TRUE,  
  empty_dirs = TRUE,  
  to_yaml = TRUE)
```



```
blogdown::new_site(theme = "themefisher/kross-hugo",  
  sample = TRUE,  
  theme_example = TRUE,  
  empty_dirs = TRUE,  
  to_yaml = TRUE)
```



```
blogdown::new_site(theme = "2-REC/hugo-myportfolio-theme",  
  sample = TRUE,  
  theme_example = TRUE,  
  empty_dirs = TRUE,  
  to_yaml = TRUE)
```



**serve\_site()  
Add-in**

**commit + push  
to GitHub**



**Continuous  
Deployment**

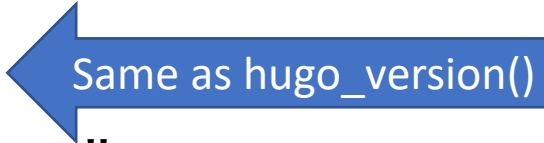


**public/**

## For continuous deployment, netlify.toml

```
[build]
  publish = "public"
  command = "hugo"
```

```
[build.environment]
  HUGO_VERSION = "0.81.0"
  HUGO_ENABLEGITINFO = "true"
```



Same as hugo\_version()

```
[context.production.environment]
  HUGO_ENV = "production"
```

```
[context.branch-deploy.environment]
  HUGO_VERSION = "0.81.0"
```

```
[context.deploy-preview.environment]
  HUGO_VERSION = "0.81.0"
```