

GitHub Tutorials

for 2021 ASME-CIE Hackathon: Identifying, Extracting,
Analyzing Value from Large Unstructured Data Sets in
Mechanical Engineering

Anh Tran

Optimization and Uncertainty Quantification Department
Computer Science Research Institute
Sandia National Laboratories

August 13, 2021

Outline

- 1 Introduction
- 2 Hello World
- 3 Setup
- 4 Code Development
- 5 README.md
- 6 GitHub Desktop

What is GitHub?

Software development

Git is the free and open source distributed version control system that's responsible for everything GitHub related that happens locally on your computer.

- This cheat sheet is your friend,
- but other official guides are also available

Hello World

- go to <https://www.github.com>
- create an account (it's free!)
- create a new repository ("repo")
 - choose your favorite license for your implementation (you own your codes!)
 - write a README.md
- invite others to join your GitHub repo
- best use with [Atom](#) or [Sublime](#) text editor
- [Sublime Merge](#) or [Github Desktop](#) is also a very decent choice

GitHub Setup

- config to ~/.config

```
git config --global user.name "FirstName LastName"
git config --global user.email "a@b.com"
git config --global color.ui auto
git config --global core.editor "nano" # or your favorite editor
```

- (optional) create a long-term key to your own device (i.e. if somebody uses your laptop then they can get to your GitHub repo WITHOUT logins)

```
ssh-keygen -t rsa -b 4096 -C "a*****@gmail.com"
# when prompt, type id_rsaGitHub
# will generate id_rsaGitHub and id_rsaGitHub.pub
eval `ssh-agent -s` # start an ssh agent
ssh-add ~/.ssh/id_rsaGitHub # add ssh-key to ~/.ssh/config
# then add ssh public key into Git account through web interface
ssh -vT git@github.com

# expect a message like this
Hi ***! You've successfully authenticated, but GitHub does not provide shell access.
```

Git in action

- clone

```
git clone https://github.com/pytorch/pytorch.git # https
# git clone git@github.com:pytorch/pytorch.git # ssh - SSH required
# you can also switch mode in ./git/config in the local GitHub repo
```

- typical workflow (this is what you will use the most)

```
git add # be specific, e.g. git add testABC.py
# git add * # this is ok, but beware of your colleagues' concurrent work
# NEVER USE: git add * -f

git commit # or git commit -m "write some notes", git commit --amend
# git pull --rebase # git fetch # optional: only if there are conflicts

git push # or git push origin master
# or git stash: https://git-scm.com/docs/git-stash
```

- read logs from your teammates

```
git log
```

- remove; move (or rename)

```
git rm file.txt
git mv file.txt test/
```

Git in action

- see what have been changed between commits

```
git diff SHA1 SHA2  
git diff <commit hash> <filename>
```

- check status/branch

```
git status
```

- reverse a file to an earlier commit

```
git reset <commit hash> <filename>
```

Git in action (advanced)

- reset to previous version (advanced)

```
git reset --hard <SHA> # e.g. commit a5fdab97d911414660683c89b6cecd965b55ce16
```

- create a branch

```
git branch my_debug_branch
git checkout my_debug_branch

git checkout master
git merge my_debug_branch

# git branch -v
# git branch -list
```

- other helpful sources: [here](#)

README.md

- Pandoc/markdown style; official guide [here](#)
- small website design
 - simple text/code with hyper-links/references
 - code syntax highlight with support for a lot of languages
- text

```
It's very easy to make some words bold
and other words italic with Markdown.
You can even [link to Google!] (http://google.com)
```

- headers

```
# This is an <h1> tag
## This is an <h2> tag
##### This is an <h6> tag
```

- emphasis

```
*This text will be italic*
_This will also be italic_
**This text will be bold**
__This will also be bold__
_You can combine them_
```

README.md

● strikethrough

```
~~this~~
```

● list: unordered

```
* Item 1
* Item 2
  * Item 2a
  * Item 2b
```

● list: ordered

```
1. Item 1
1. Item 2
1. Item 3
  1. Item 3a
  1. Item 3b
```

● images

```
![GitHub Logo] (/images/logo.png)
Format: ![Alt Text] (url)
```

README.md

- hyperlink

```
http://github.com - automatic!  
[GitHub] (http://github.com)
```

- inline code

```
I think you should use an  
`<code>` element here instead.
```

- GitHub flavored markdown

```
```python  
def foo():
 if not bar:
 return True
...

```matlab  
function y = foo(x)  
    y = x  
end  
...`
```

GitHub Desktop (GUI): <https://desktop.github.com/>

The screenshot shows the GitHub Desktop interface. At the top, the menu bar includes File, Edit, View, Repository, Branch, and Help. Below the menu, the current repository is 'desktop', the current branch is 'esc-pr' (with commit #3972), and the 'Fetch origin' button shows it was last fetched 2 minutes ago.

The left sidebar displays a list of changes and commit history:

- Appease linter (iAmWillShepherd committed a day ago)
- Add event handler to dropdown compon... (iAmWillShepherd and Markus Olsson co...)
- Move escape behavior to correct compo... (iAmWillShepherd and Markus Olsson co...)
- Remove event handler from the branches.. (iAmWillShepherd and Markus Olsson co...)
- Merge branch 'master' into esc-pr (iAmWillShepherd committed a day ago)
- Merge pull request #4044 from desktop/... (Neha Batra committed a day ago)
- Merge pull request #4070 from desktop/... (Brendan Forster committed 2 days ago)
- bump to beta3 (Brendan Forster committed 2 days ago)
- Merge pull request #4057 from desktop/... (Brendan Forster committed 2 days ago)
- Merge pull request #4067 from desktop/... (Brendan Forster committed 2 days ago)
- Release to 1.1.0-beta2 (Neha Batra committed 2 days ago)

The main area shows a diff for the file 'app/src/ui/toolbar/dropdown.tsx'. The commit title is 'Add event handler to dropdown component', committed by iAmWillShepherd and Markus Olsson. The diff shows changes to the 'ToolbarDropdown' class, including a new state property and a new event handler.

```

@@ -145,6 +145,10 @@ export class ToolbarDropdown extends React.Component<
  this.state = { clientRect: null }
}

+ private get isOpen() {
+   return this.props.dropdownState === 'open'
+ }
+
+ private dropdownIcon(state: DropdownState): OcticonSymbol {
  // @TODO: Remake triangle octicon in a 12px version,
  // right now it's scaled badly on normal dpi monitors.
@@ -249,6 +253,13 @@ export class ToolbarDropdown extends React.Component<
}
}
}

+ private onFoldoutKeyDown = (event: React.KeyboardEvent<HTMLElement>) => {
+   if (!event.defaultPrevented && this.isOpen && event.key === 'Escape') {
+     event.preventDefault()
  }
}

```

Navigation icons are visible at the bottom right of the diff view.

GitHub Desktop (GUI): <https://desktop.github.com/>

- official docs:
<https://docs.github.com/en/free-pro-team@latest/desktop>
- install and configure GitHub Desktop:
<https://docs.github.com/en/free-pro-team@latest/desktop/installing-and-configuring-github-desktop>
- contributing and collaborating using GitHub Desktop:
<https://docs.github.com/en/free-pro-team@latest/desktop/contributing-and-collaborating-using-github-desktop>