

Git and GitHub Workshop

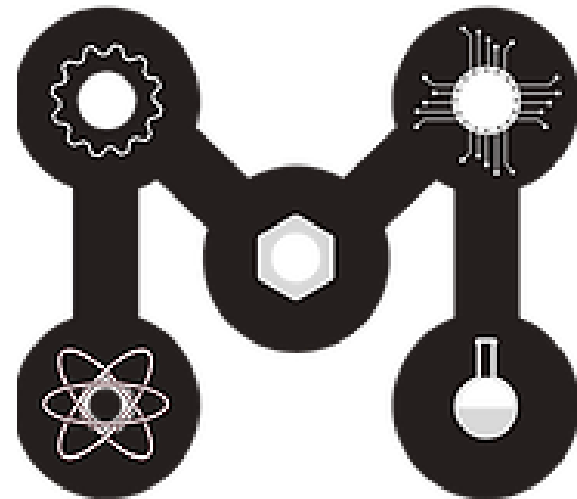
Be not afraid of Git

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IMITLESS

FIRST THING'S FIRST!

- Git \neq GitHub



- Git is **Form** of Version Control Software
 - AKA source control
 - Many other forms
- GitHub is a place to host your Git Repositories online
 - Other websites offer this too like BitBucket

Ways to use Git

- There are pretty much two main ways to use Git
 - Command Lines
 - **Pros:** You are really forced to understand Git
 - **Cons:** You are really forced to understand Git
 - GUI Tools (GitHub Desktop, Git Extensions, etc)
 - **Pros:** Way easier to use and manage code
 - **Cons:** This is how you look to some people

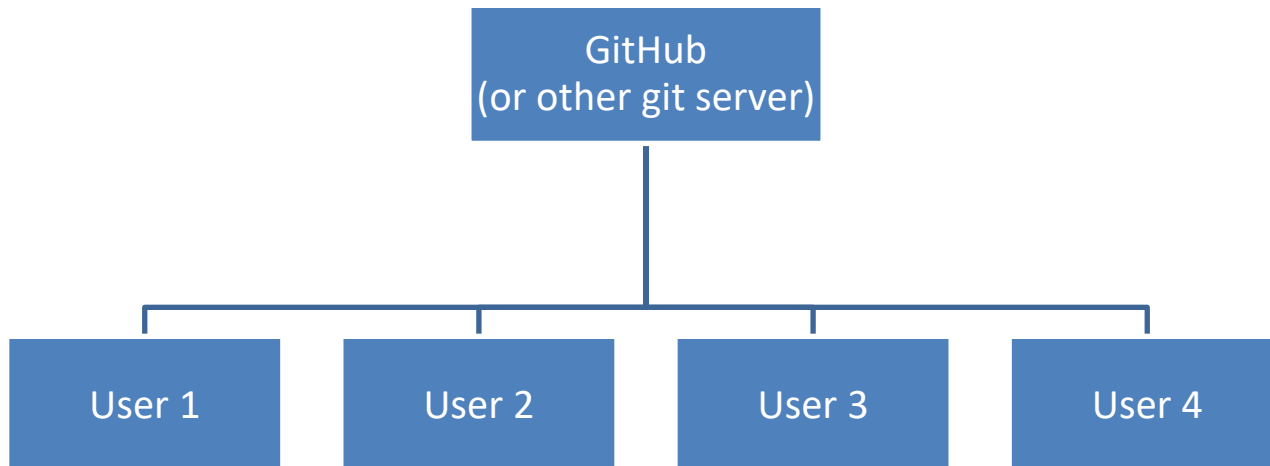


Gotta Get Git

- Command Line
 - <https://git-scm.com/downloads>
 - Git Bash is just a Windows side application that opens a command prompt with Git
- GitHub Desktop GUI (what I recommend at first)
 - <https://desktop.github.com/>
- Make a GitHub account too!
 - Use Student email if possible

Git 101- What happens to code

- Repository (the code) is saved on local computer
- Repositories can then be **Pushed** to a remote server where other people can push too

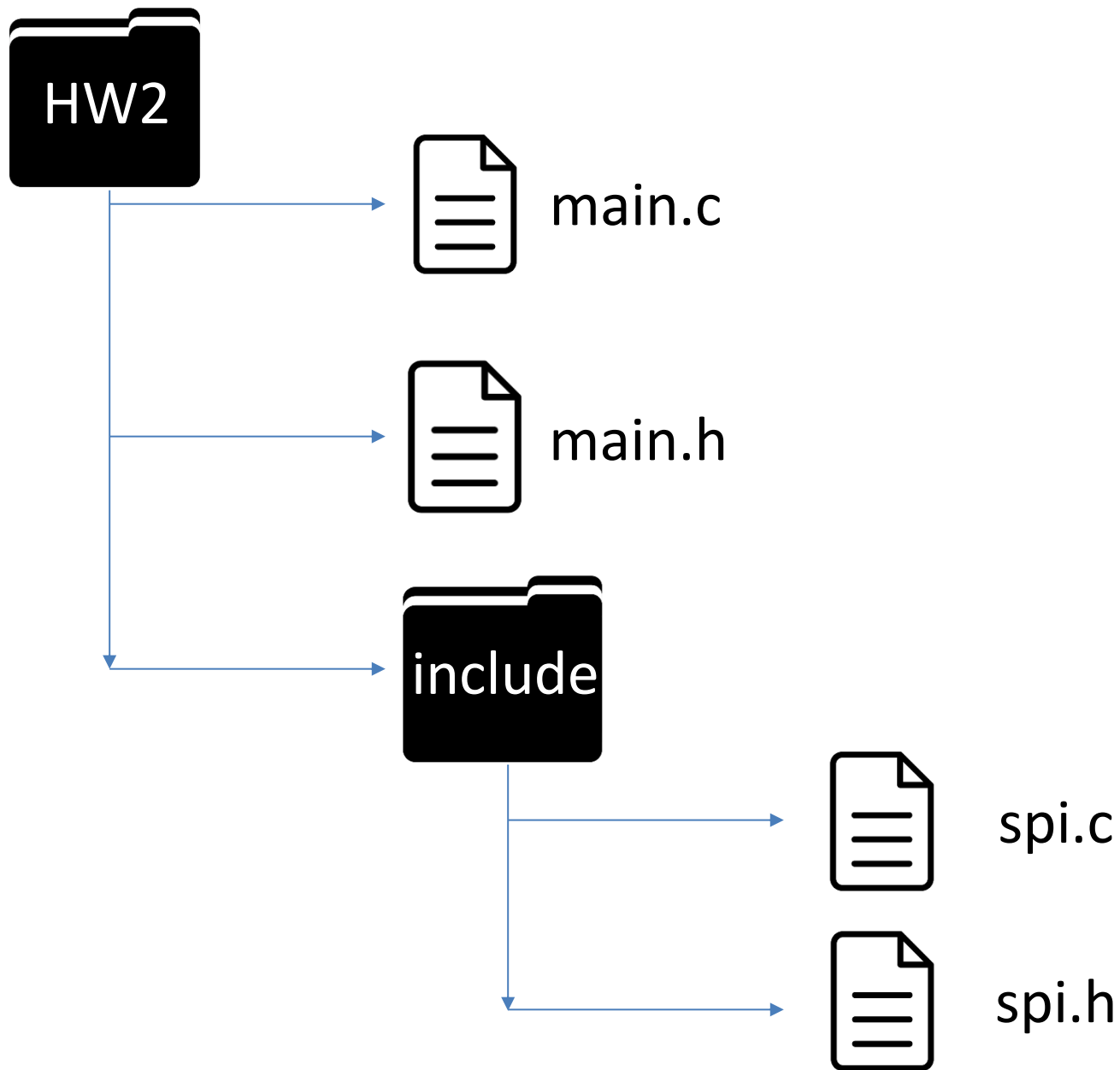


How Git Works

- Keeps tracks of difference in lines of files

The screenshot displays a code diff tool interface with two panels. The top panel shows the diff for 'demo/demo.cpp', and the bottom panel shows the diff for 'server/server.c'. Each panel has a 'View' button in the top right corner. The diff tool uses color-coding: red for deletions, green for additions, and blue for context lines. In the 'demo/demo.cpp' diff, lines 21-22 are highlighted in red, indicating deletions. In the 'server/server.c' diff, line 22 is highlighted in red, indicating a deletion.

```
9 demo/demo.cpp
@@ -18,13 +18,18 @@ void on_new_test(char* body) {
18 void onJoin(int uid){ printf("Join: %d\n", uid); }
19 void onLeave(int uid){ printf("Leave: %d\n", uid); }
20
21 -int main() {
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27 - client_socket.connectSocket("192.168.1.105", 5000);
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29 client_socket.setEvent(1, on_new_type);
30 client_socket.setEvent(2, on_new_color);
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• HW2

— main.c

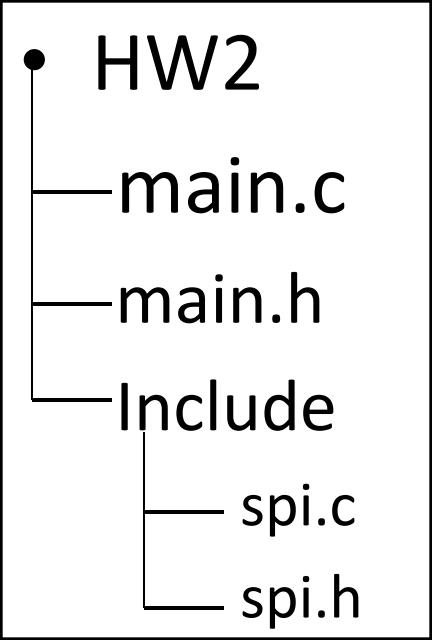
— main.h

— Include

— spi.c

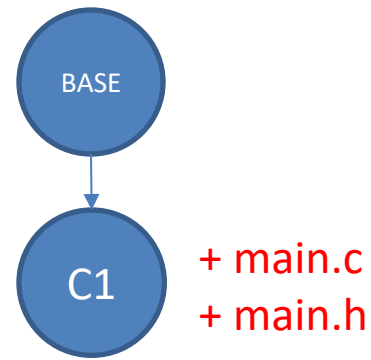
— spi.h

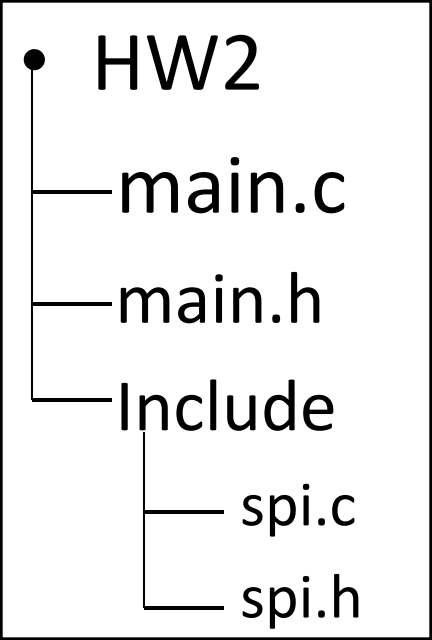
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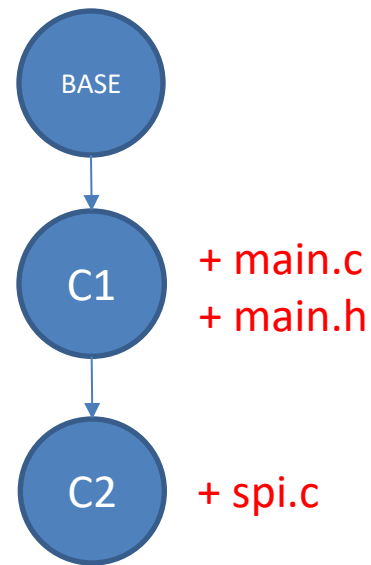
Change file

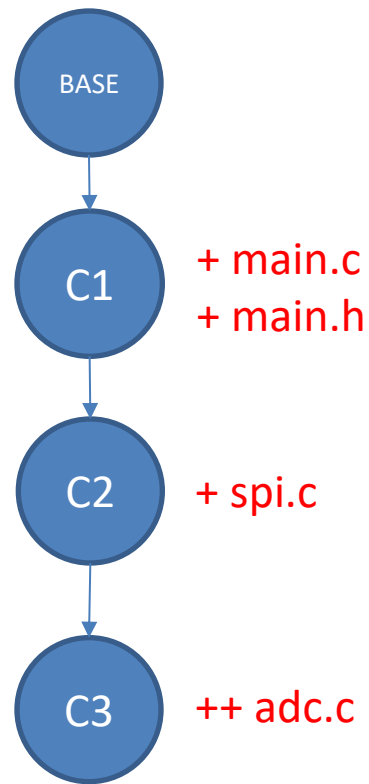
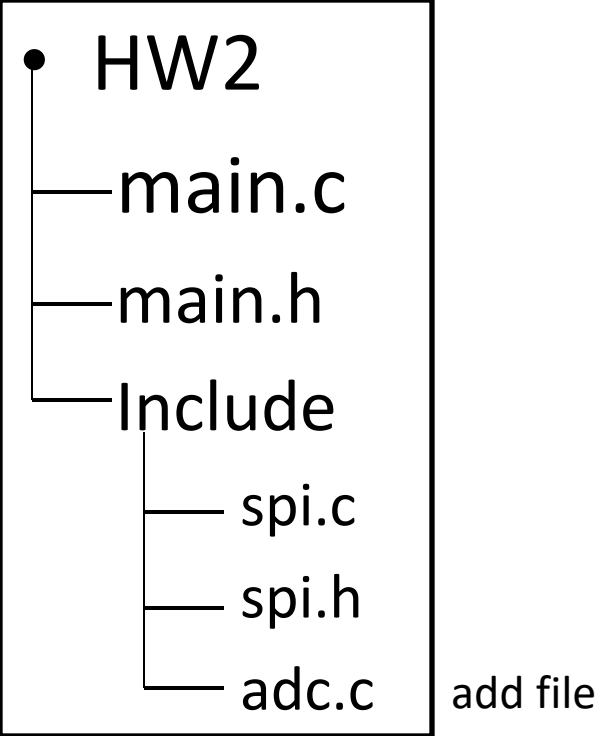
Change file

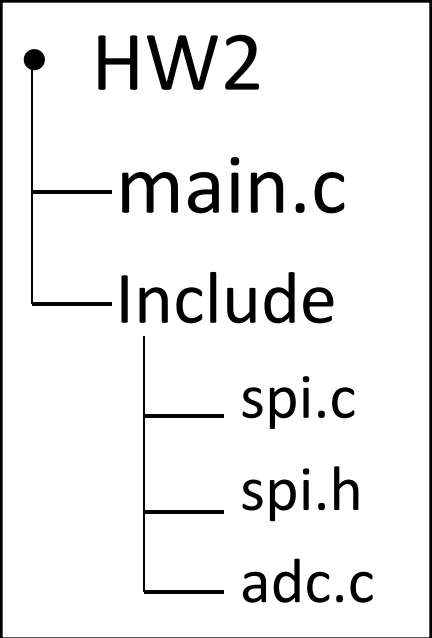




Change file

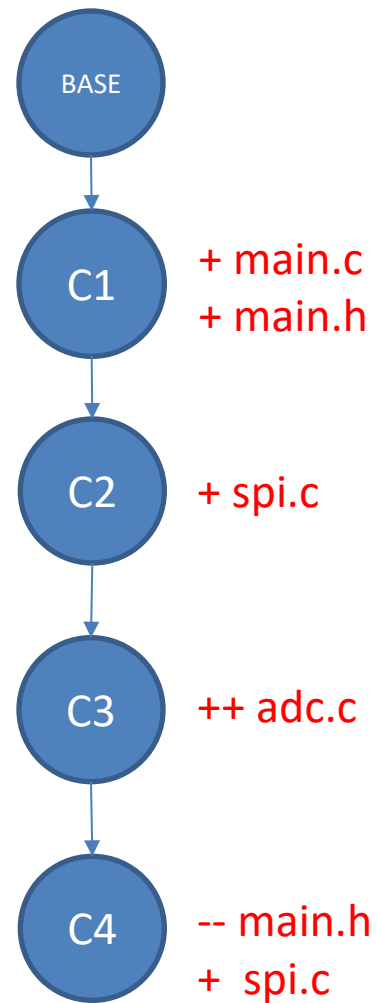






Removed file

Change file





main.c

v0

v1

v1

v1

v1

main.h

v0

v1

v1

v1

Include/spi.c

v0

v0

v1

v1

v2

Include/spi.h

v0

v0

v0

v0

v0

Include/adc.c

v0

v0

It Remembers

...so you don't have too

- Git saves all past **Committed** saves in a .git file in the repository
- New people can go back to ANY old **Commit** made during life of repository
- It's the history of the project

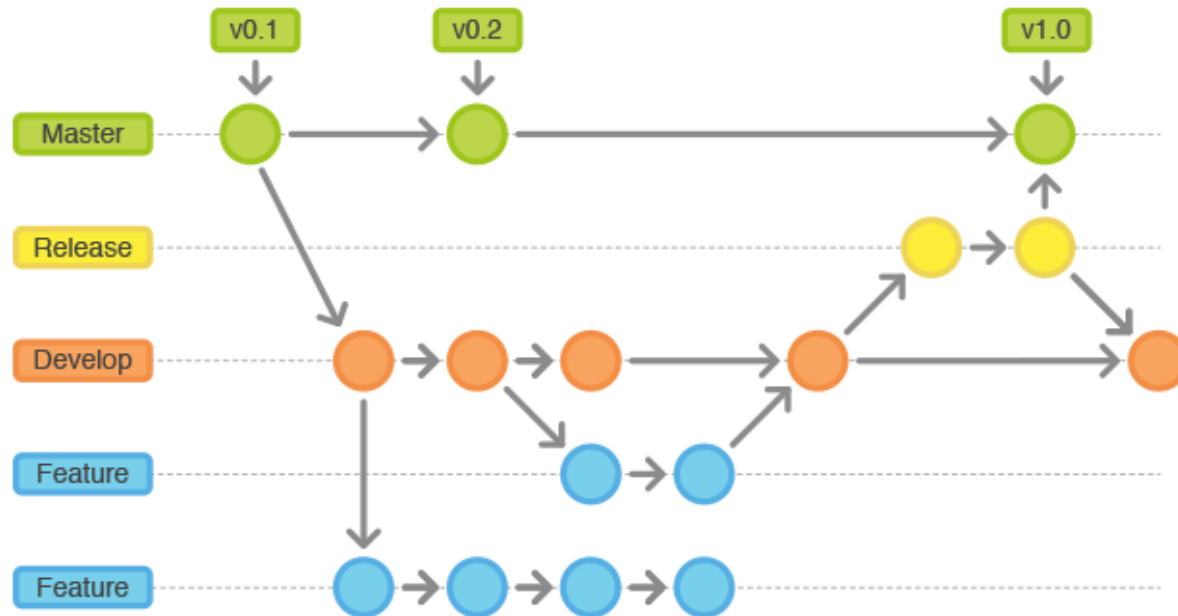
You can even “blame” others

- Git’s blame feature allows you to see each line last change

Commit	Author	Time	Code
fscrypt: factor out bio specific functions	3 months ago	46	<code>struct workqueue_struct *fscrypt_read_workqueue;</code>
fs crypto: move per-file encryption from..	2 years ago	47	<code>static DEFINE_MUTEX(fscrypt_init_mutex);</code>
		48	
		49	<code>static struct kmem_cache *fscrypt_ctx_cache;</code>
		50	<code>struct kmem_cache *fscrypt_info_cache;</code>
		51	
		52	<code>/**</code>
		53	<code> * fscrypt_release_ctx() - Releases an encryption context</code>
		54	<code> * @ctx: The encryption context to release.</code>
		55	<code> *</code>
		56	<code> * If the encryption context was allocated from the pre-allocated pool, returns</code>
		57	<code> * it to that pool. Else, frees it.</code>
		58	<code> *</code>
		59	<code> * If there's a bounce page in the context, this frees that.</code>
		60	<code> */</code>
		61	<code>void fscrypt_release_ctx(struct fscrypt_ctx *ctx)</code>
		62	<code>{</code>
		63	<code> unsigned long flags;</code>
		64	
fscrypt: Rename FS_WRITE_PATH_FL to ...	4 months ago	65	<code>if (ctx->flags & FS_CTX_HAS_BOUNCE_BUFFER_FL && ctx->w.bounce_page) {</code>
fs crypto: move per-file encryption from..	2 years ago	66	<code> mempool_free(ctx->w.bounce_page, fscrypt_bounce_page_pool);</code>
		67	<code> ctx->w.bounce_page = NULL;</code>
		68	<code>}</code>

Git 101 - Branches

- Branches let you work on the code in your own crazy direction and **Merge** it back later
- Example: Make a “New-Feature” branch and when it is ready, **Merge** back to the Master Branch



Git 101 – Workflow

- **Fetch/Pull**
- Make your edits
- **Stage** your changes
- **Commit** your work
- **Push**

Git 101 – Workflow - Fetch

- If you have not cloned the repo
`git clone https://the.git.repo.git`
- Get the latest updates before working
`git pull`
- Don't make folder then git clone
 - Cloning makes a new folder for you

Git 101 – Workflow - Edit

- Add, remove, edit all the files you want

Git 101 – Workflow - Stage

- Add the files you want to commit
- This allows you to choice **what** to commit

`git add -A`

- Will add all difference

`git add main.c`

- Just adds main.c

`git add myFolder/*`

- Adds entire folder

Git 101 – Workflow – Commit

- Take the “snapshot” of the repo
- Add a commit title

```
git commit -m “Best commit EVA”
```

- Optionally add a comment

```
git commit -m “Best commit EVA” -m “Here is more  
details”
```

Git 101 – Workflow - Push

- When ready, push changes to server
`git push`

GitHub Permissions

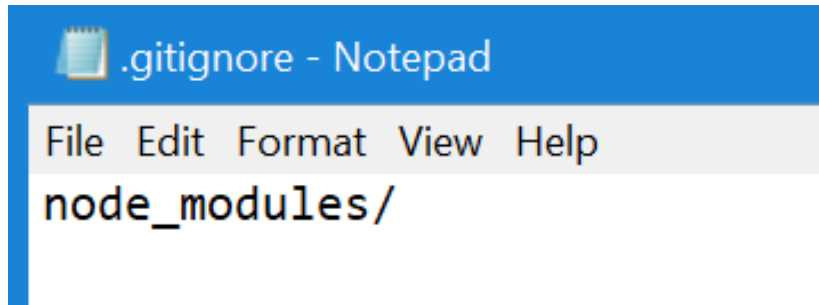
- For a project you can always just download the code and do what you want.
- If you want to make changes, either **Clone** or **Fork** the Repository
 - You can then send a **Pull Request** that will let someone in charge of Repo check your changes and **Merge** it
- If you set someone as a **Collaborator** they can **Push** code without having to submit a **Pull Request**

Almost Forgot about .gitignore

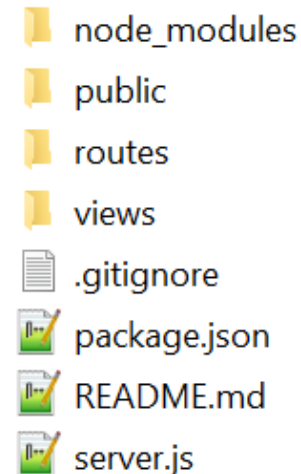
- Git is not the best with Binary files (.mp3, .pdf, .exe, .FileTypeCannotReadInNotepad)
- List all the folders and files that git will not recognize
- Almost all types of projects have a standard .gitignore template found on GitHub

.gitignore example

- We don't want the node_modules folder committed
- Add it to .gitignore



```
.gitignore - Notepad
File Edit Format View Help
node_modules/
```



Merge Conflicts

- Not that scary
- Happens when same lines are altered in two different commits
- Debunking the myth that merge conflicts are hard

Commit from User 1

```
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  #define VALUE 40
5
6  int main(int argc, char* argv[]) {
7
8      int a = 5;
9
10     if ( a > 6 ) {
11         printf("a is big");
12     }
13
14     return 0;
15
16 }
```

Commit from User 2

```
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  #define VALUE 40
5
6  int main(int argc, char* argv[]) {
7
8      int a = 5;
9
10     if ( a > 4 ) {
11         printf("a is small");
12     }
13
14     return 0;
15
16 }
```

Merge Conflict will need to be resolved before able to merge

Just open the file in text editor

The Merge Conflict File

```
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  #define VALUE 40
5
6  int main(int argc, char* argv[]) {
7
8      int a = 5;
9
10     <<<<<< commit/user1
11     if ( a > 4 ) {
12         printf("a is small");
13     }
14     if ( a > 6 ) {
15         printf("a is big");
16     }
17     >>>>>> Commit/user2
18
19     return 0;
20
21 }
```

Change file to look the way you want and save

...simple, I know

GitHub GUI – Make new repo

- Can either create online or bring it to local computer.
- Start new repository and push to GitHub when ready.
- Can take a current set of code and make it into a Git repo.
 - Will have no history prior to initialization of git

Recap

- Get Repository (**Clone**) or Sync it (**Fetch**)
- Know which **Branch** you are in
- Make your changes
- Set which changes you are **Staging**
- **Commit** the changes
- When ready, Sync or send a Pull Request

Time to get some practice!

tinyurl.com/GitWorkshopIEEE