Git and using GitHub

Unless you don’t like being able to work with other people and see the changes you made in the past

FIRST THING'S FIRST!

- Git ≠ 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

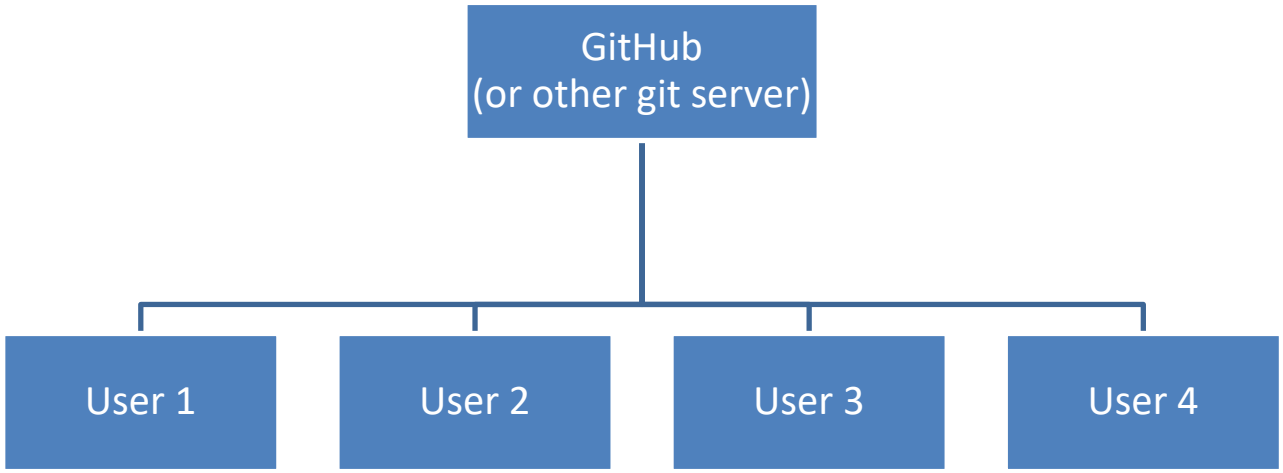
- There are pretty much two main ways to use Git
  - Command Lines
    - **Pros**: You are really forced to understand Git
    - **Cons**: You are really forced to understand Git
  - GUI Tools (GitHub Desktop, Git Extensions, etc)
    - **Pros**: Way easier to use and manage code
    - **Cons**: This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

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

9 demo/demo.cpp

View

@@ -18,13 +18,18 @@ void on_new_test(char* body) {

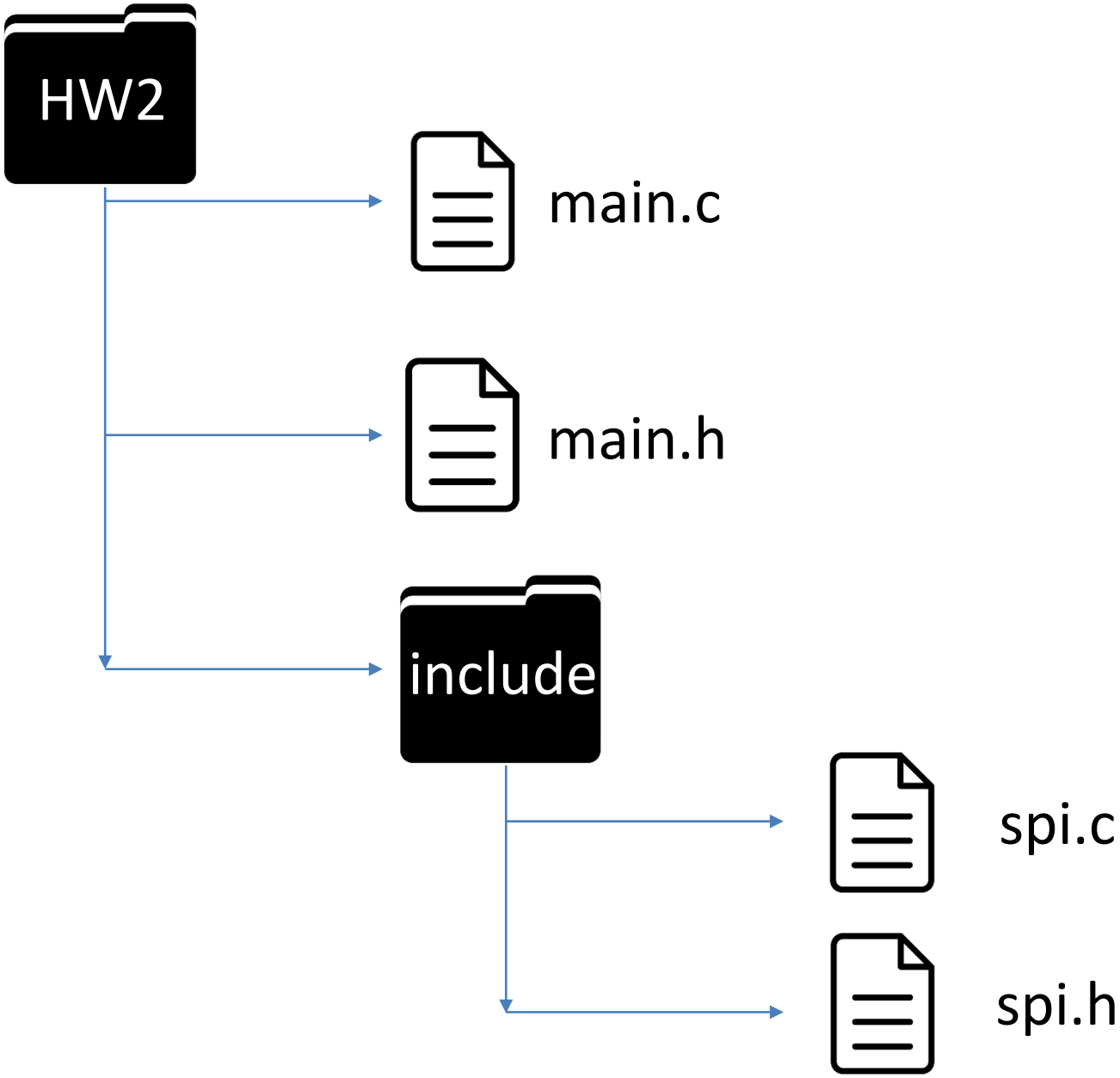
```
 void onJoin(int uid){ printf("Join: %d\n", uid); }
 void onLeave(int uid){ printf("Leave: %d\n", uid); }

-int main() {
+int main(int argc, char* argv[]) {

+  if (argc < 3) {
+    printf("\n/demo <ip> <port>\n\n");
+    exit(1);
+  }
+

   WebSocket client_socket;

   cout << "START" << endl;

-  client_socket.connectSocket("192.168.1.105", 5000);
+  client_socket.connectSocket(argv[1], atoi(argv[2]));

   client_socket.setEvent(1, on_new_type);
   client_socket.setEvent(2, on_new_color);
```

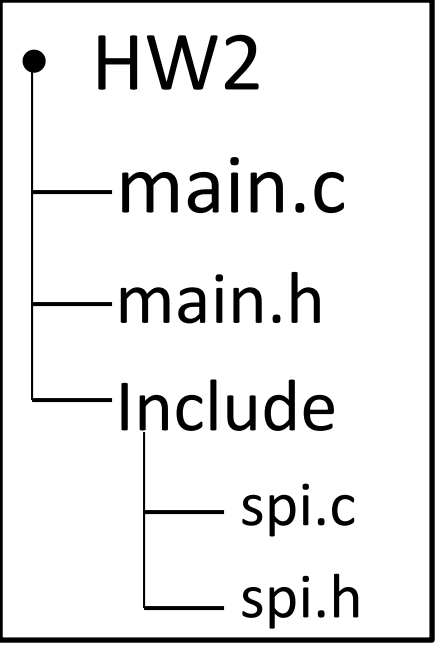
32 server/server.c

View

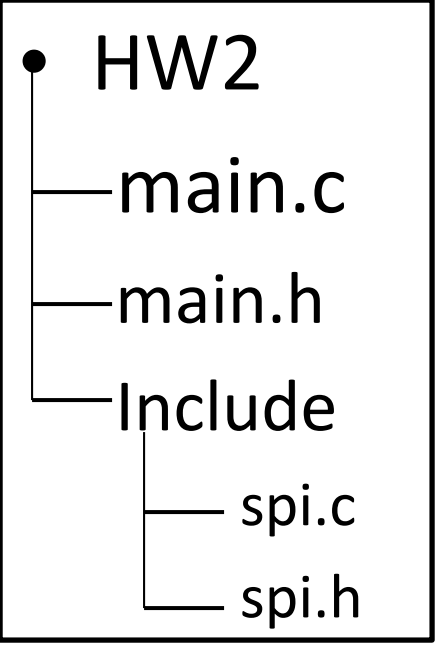
@@ -19,7 +19,7 @@

```
 #define MAX_CLIENTS 16
 #define DEFAULT_PORT 5000
 #define MAX_MESSAGE_BUFFER 1024
-#define MAX_MESSAGE_KEYS 16
+#define DEFAULT_MAX_KEYS 16
```


HW2
main.c
main.h
include
spi.c
spi.h

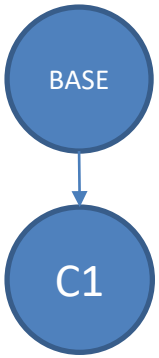


BASE

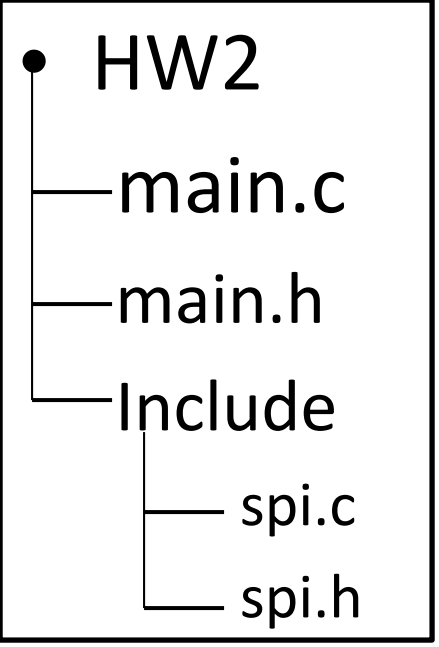


Change file

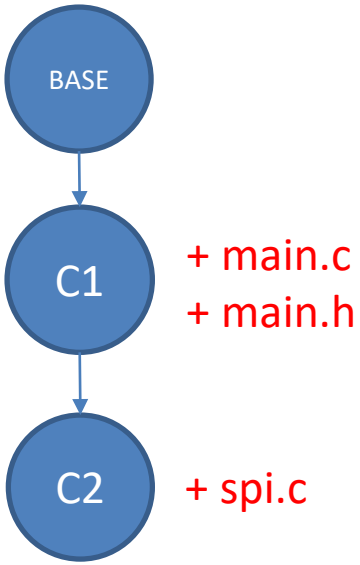
Change file

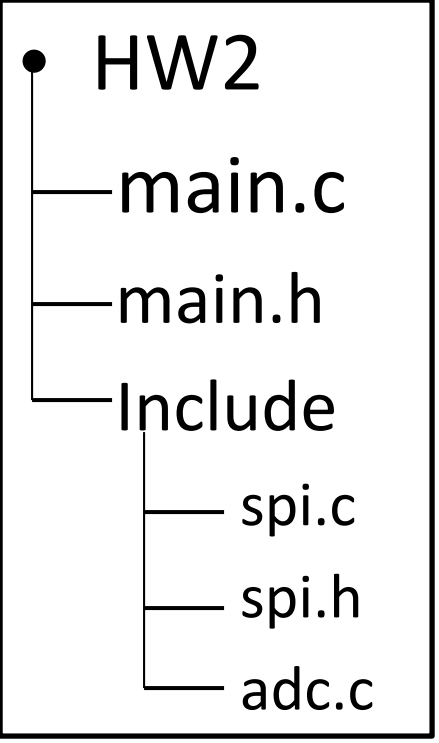


+ main.c
+ main.h

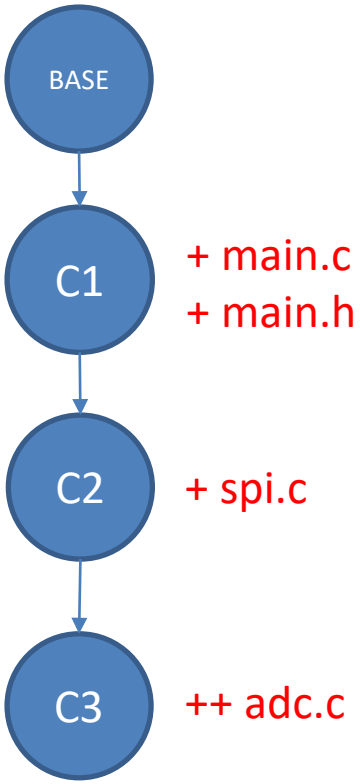

HW2
main.c
main.h
Include
spi.c
spi.h

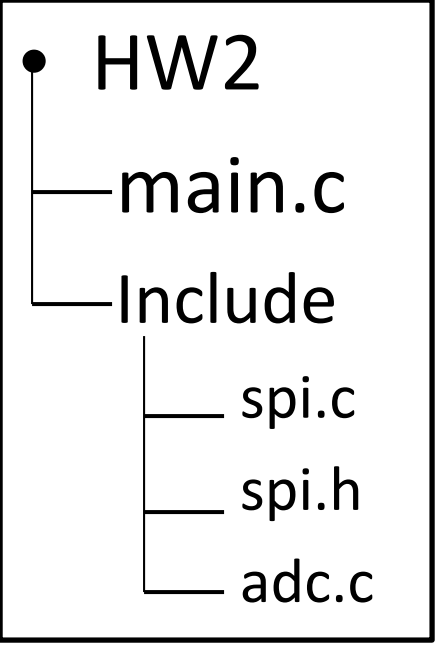
Change file


BASE
C1
+ main.c
+ main.h
C2
+ spi.c


HW2
main.c
main.h
Include
spi.c
spi.h
adc.c

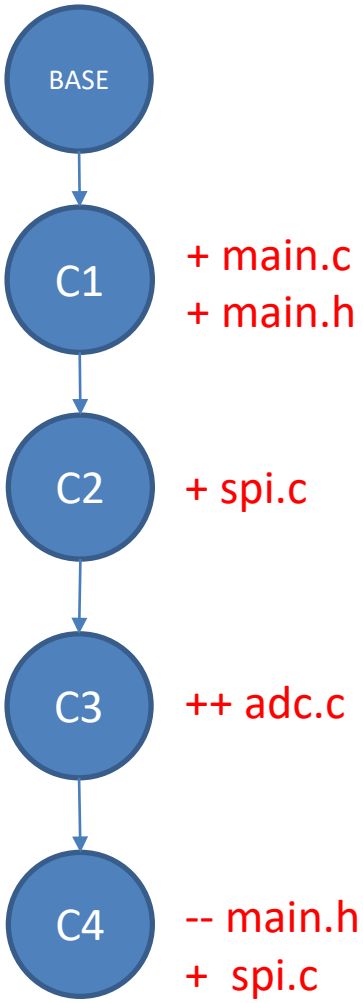
add file


BASE
C1
+ main.c
+ main.h
C2
+ spi.c
C3
++ adc.c



Removed file

Change file



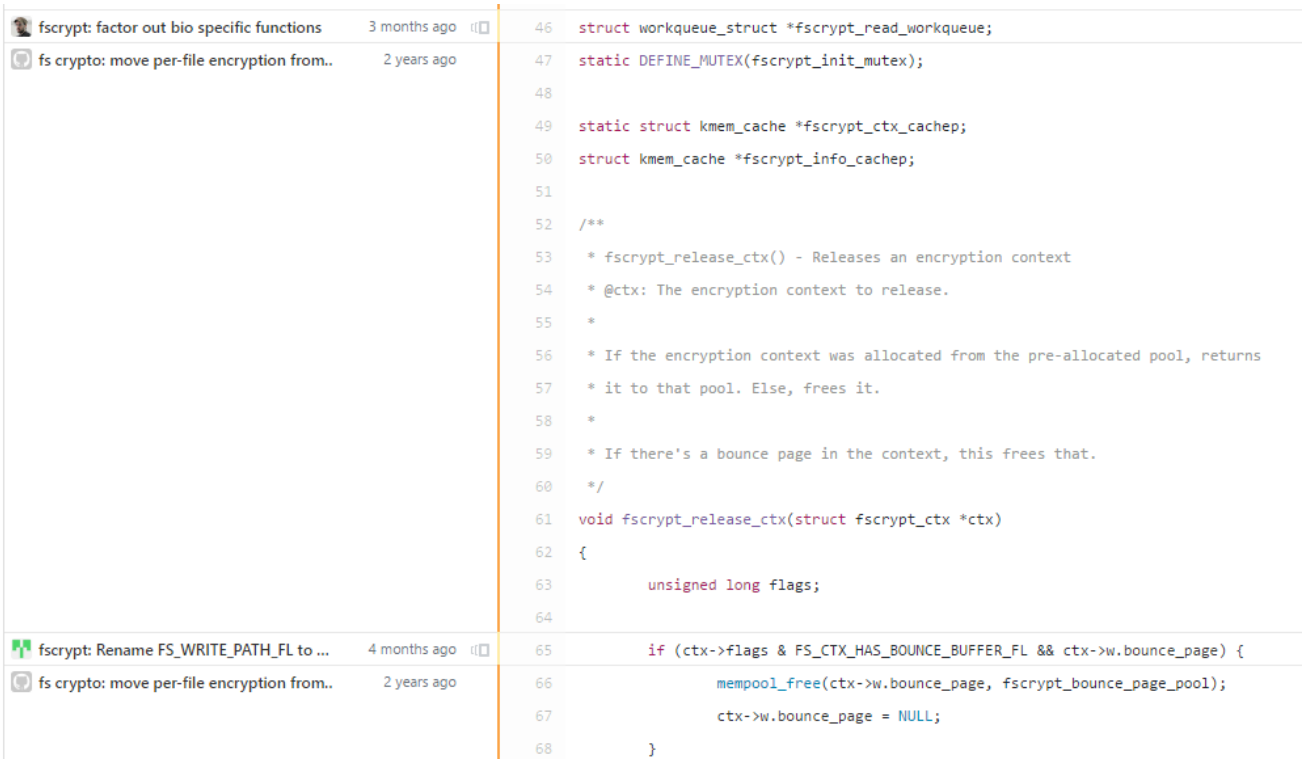
	BASE	C1	C2	C3	C4
main.c	v0	v1	v1	v1	v1
main.h	v0	v1	v1	v1	---
Include/spi.c	v0	v0	v1	v1	v2
Include/spi.h	v0	v0	v0	v0	v0
Include/adc.c	---	---	---	v0	v0

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

You can even “blame” others

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



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

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

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 101 – Workflow – Commit

- Take the “snapshot” of the folder
- Add a commit title
  - Optionally add a comment
- git commit –m “Best commit EVA”

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, .FileTypeICannotReadInNotepad)
- List all the folders and files that git will not recognize
- Almost all types of projects have a standard .gitignore template found on GitHub

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

```c
#include <stdio.h>
#include <stdlib.h>

#define VALUE 40

int main(int argc, char* arcv[]) {

    int a = 5;

    if ( a > 6 ) {
        printf("a is big");
    }

    return 0;

}
```

Commit from User 2

```c
#include <stdio.h>
#include <stdlib.h>

#define VALUE 40

int main(int argc, char* arcv[]) {

    int a = 5;

    if ( a > 4 ) {
        printf("a is small");
    }

    return 0;

}
```

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* arcv[]) {
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 >>>>>>> Commit/user2
17     }
18
19     return 0;
20
21 }
```

Change file to look the way you want and save

…simple, I know

GitHub GUI – Make new repo

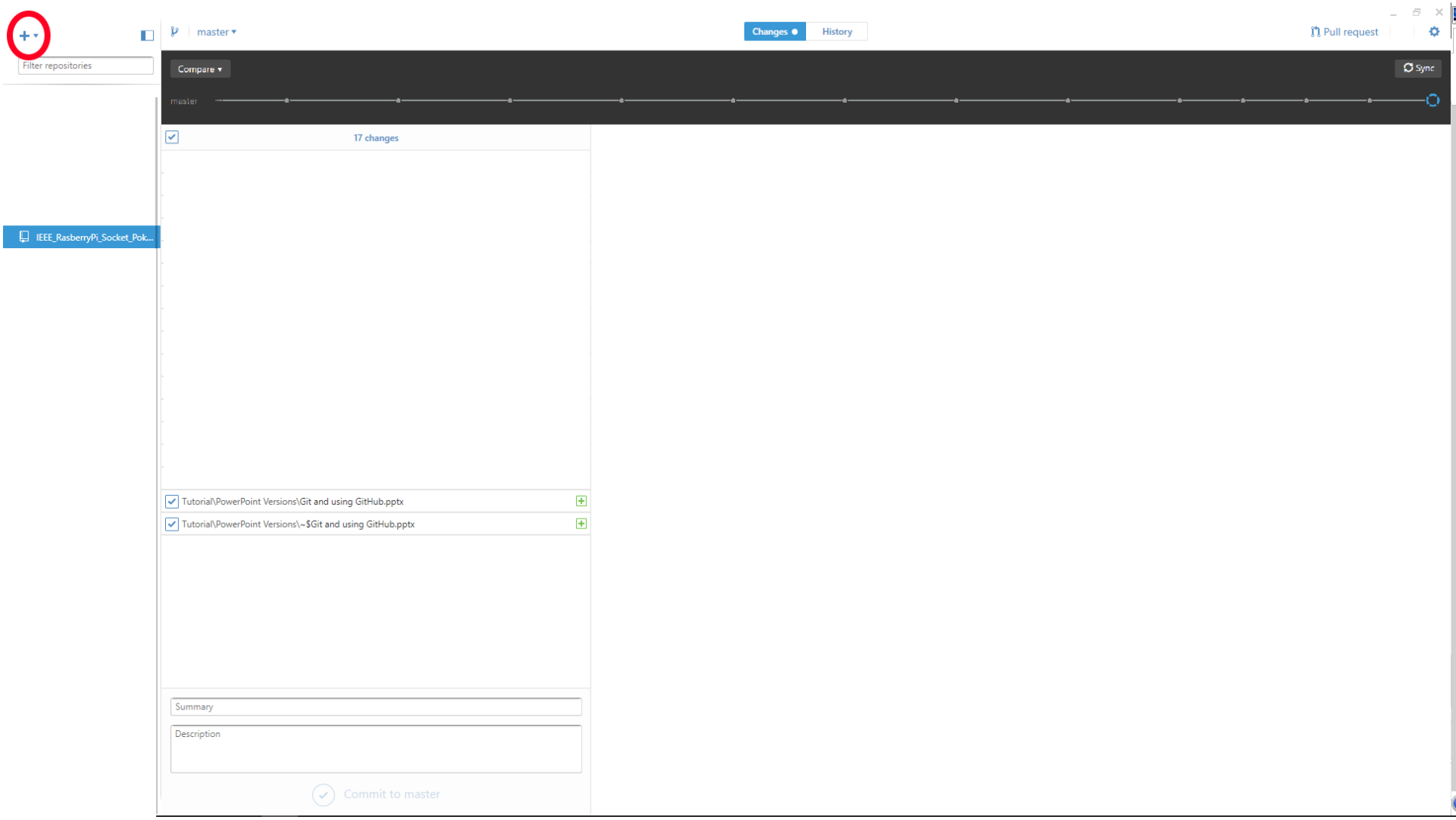
- Can either create online or bring it to local computer
- Start new repository and push to GitHub when ready (If using a private repo, why wait)
  - HUGE SIDE NOTE: Go here if you haven't before https://education.github.com/pack/offers and get your free private repositories
- Can take a current set of code and make it into a Git repo
  - Will have no history prior to initialization of git

How to use GUI

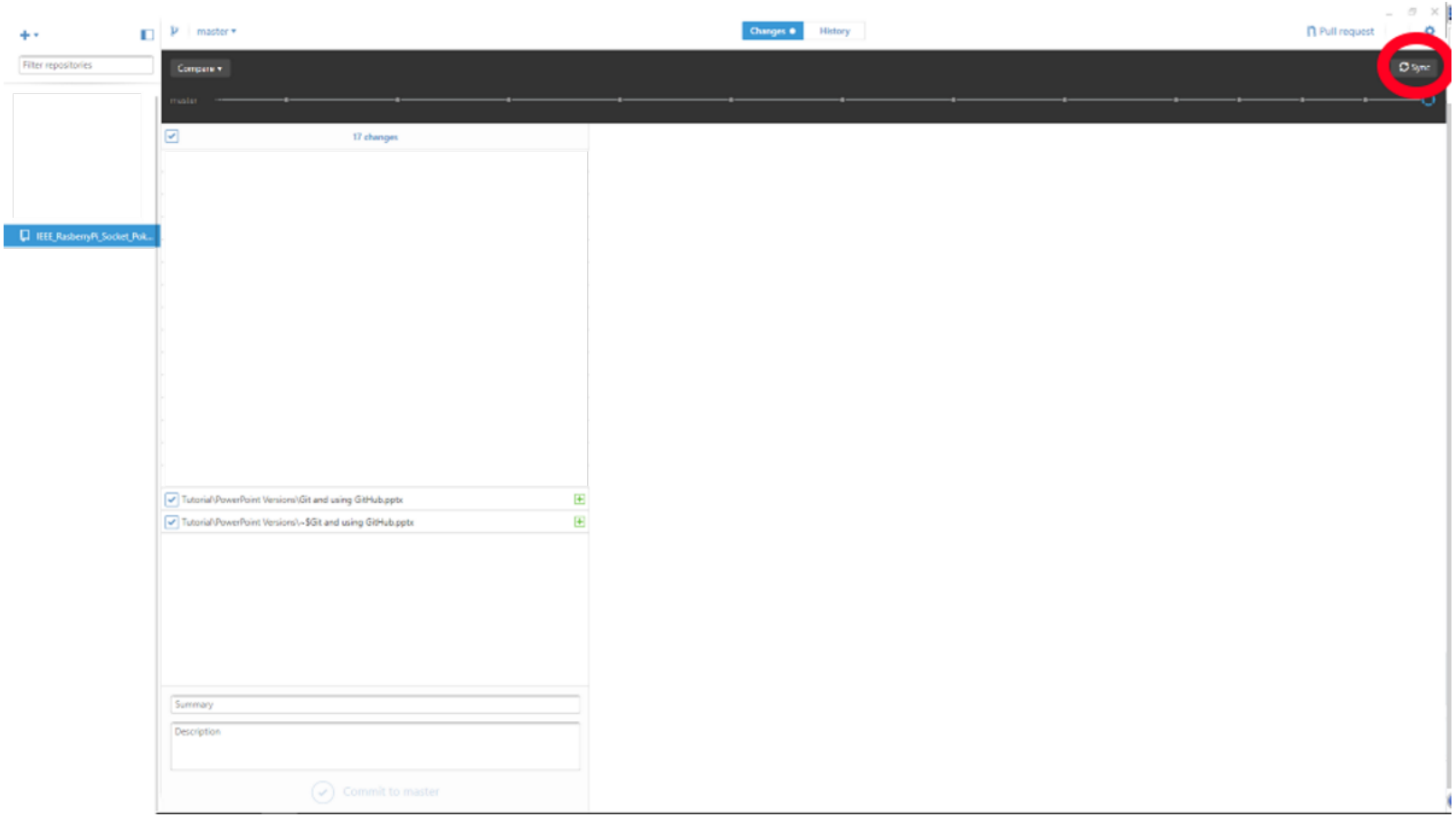
- If you want to learn more go here: https://guides.github.com/

- If you want to get this repo go here
- https://github.com/sjfricke/IEEE_RaspberryPi_Socket_Pokemon

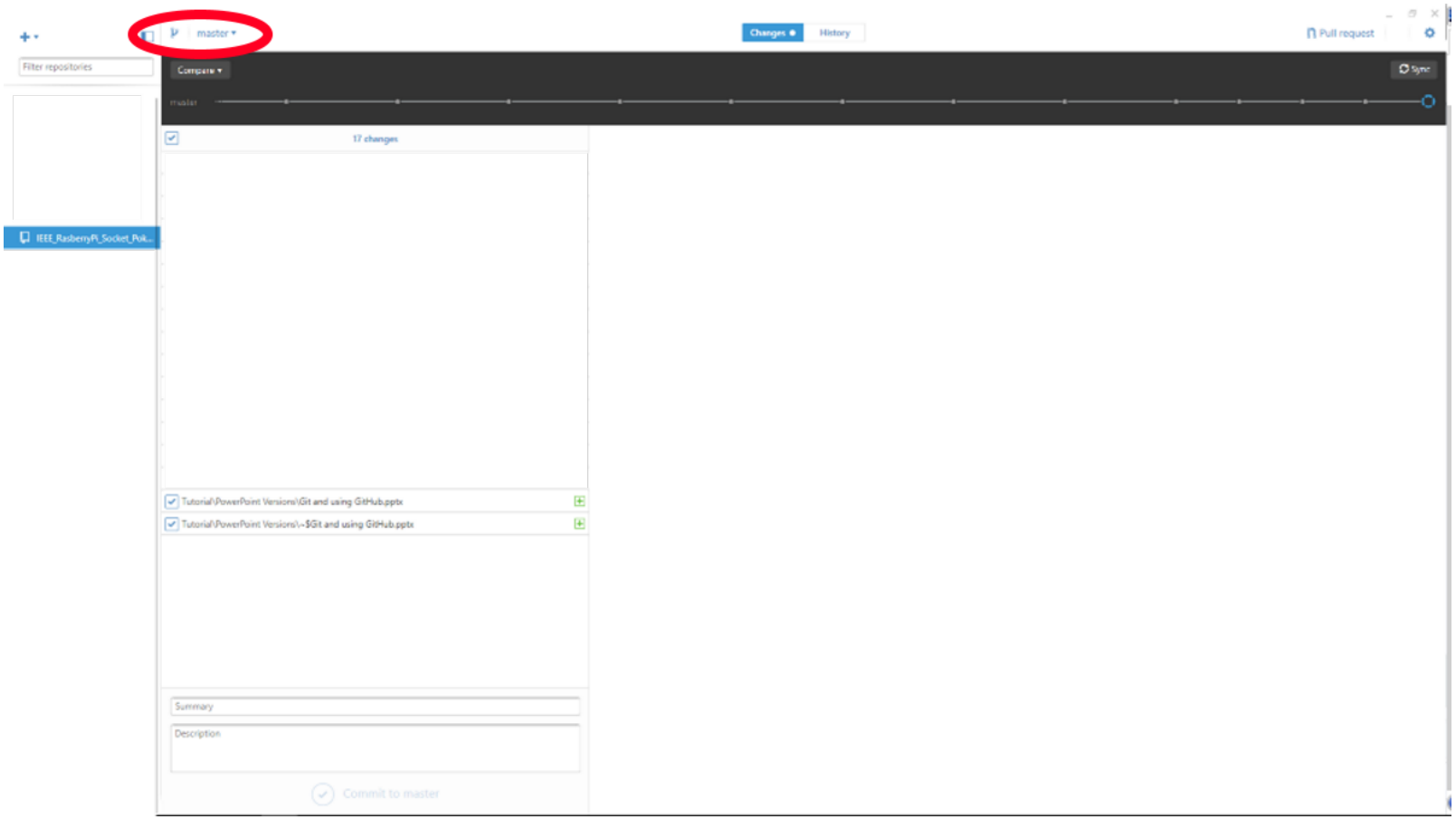
- Click the “Clone or Download” button and Clone it to your desktop (will open Desktop GUI for you)



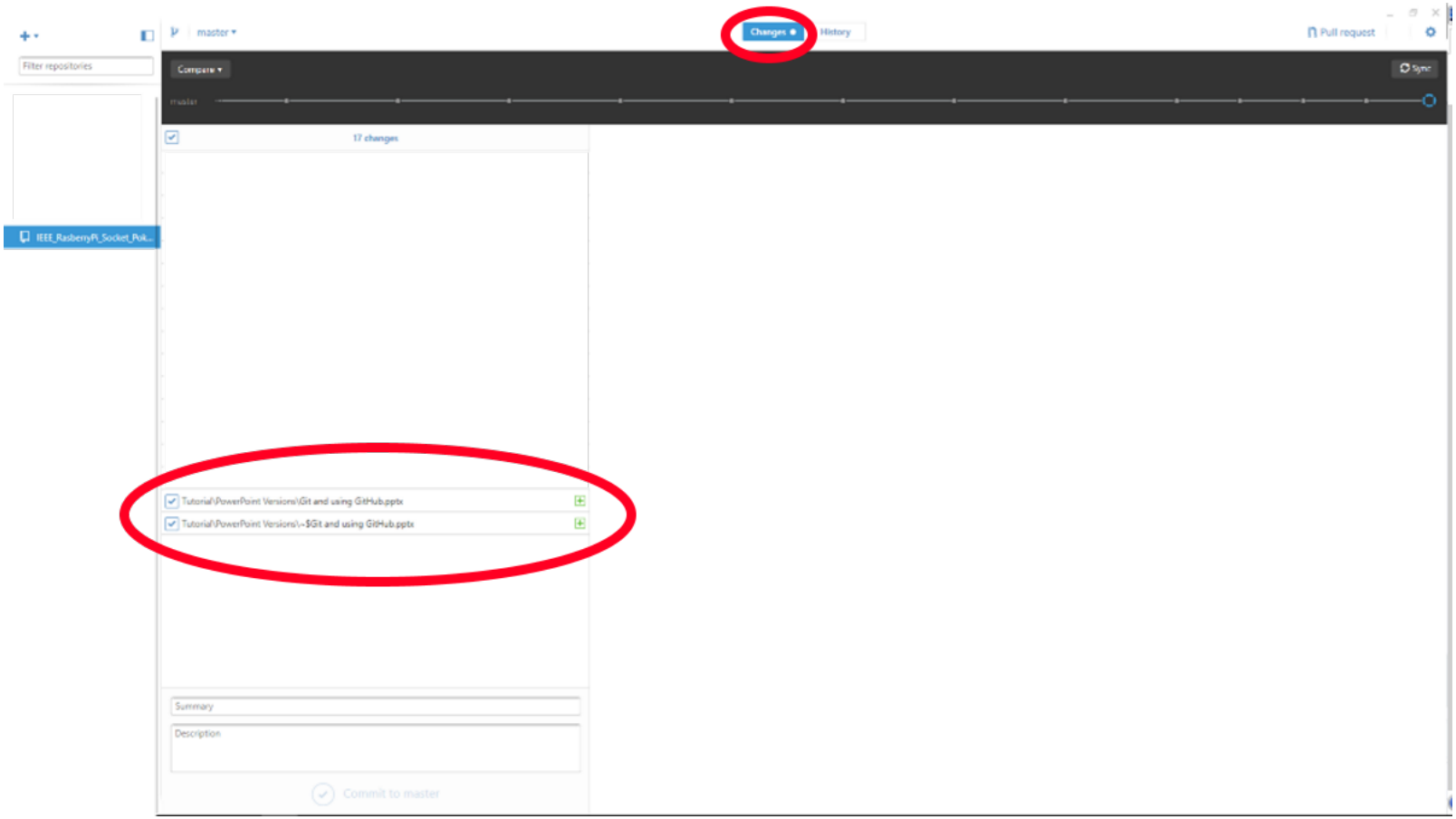
- Click here to add the Repo



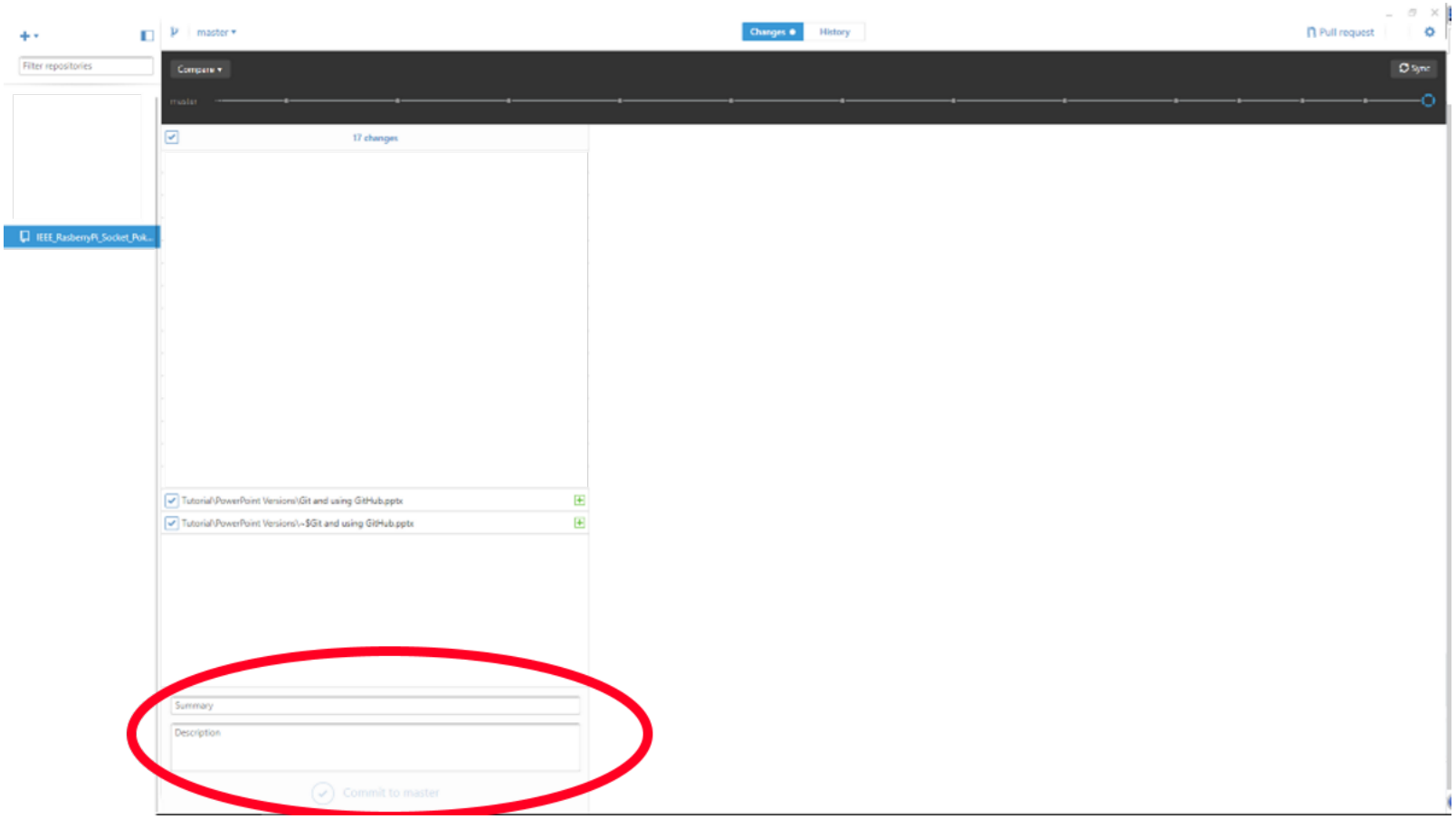
- Click here to sync with Repo
  - Use to get the latest version (ALWAYS Do this before you start!)
  - If you are a Collaborator you can use this to push to Server



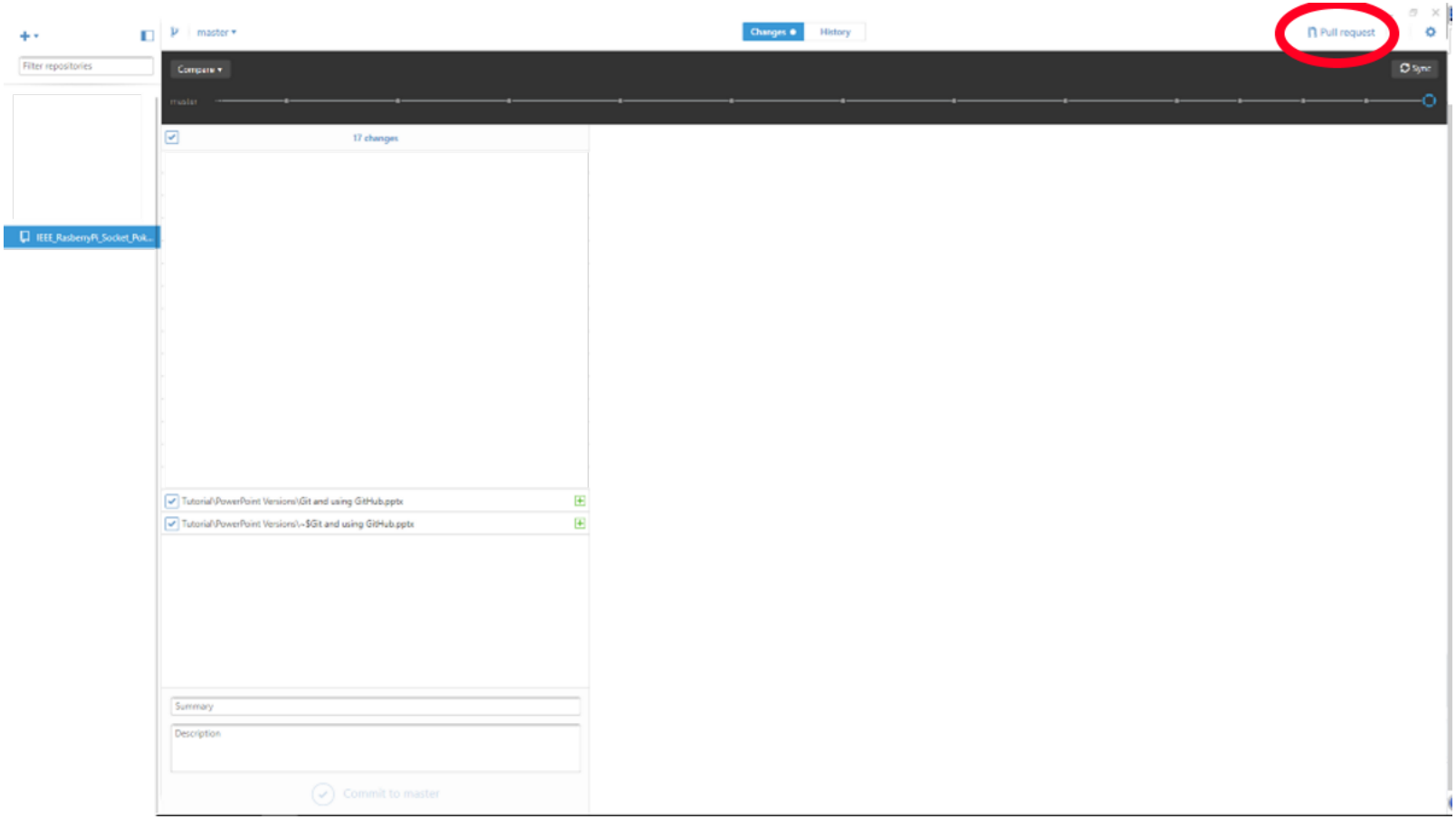
- Either Add a new branch or switch between branches of the project



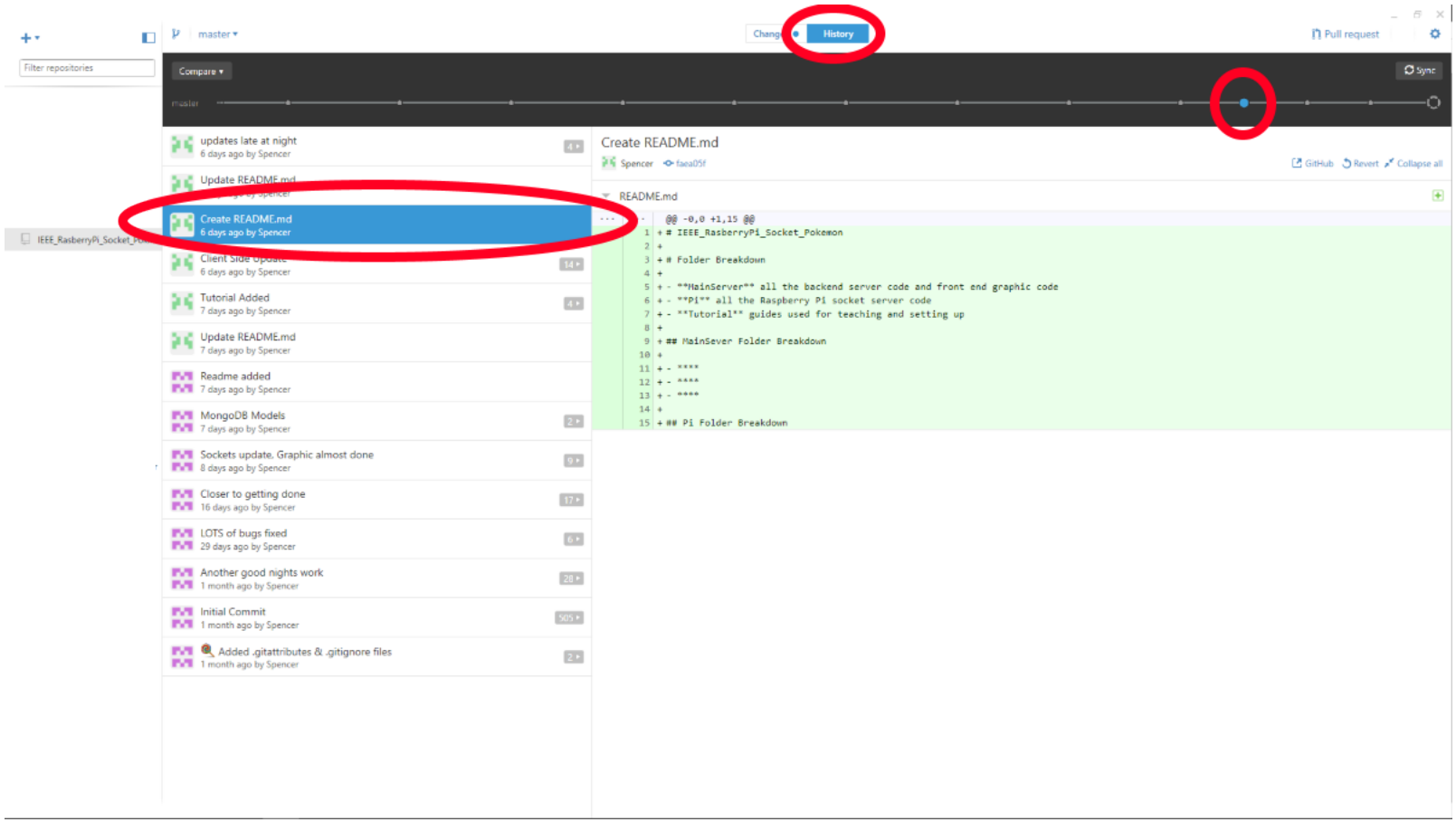
- When in “Change” screen you can select which files you are **Staging** and want to add to the new changes



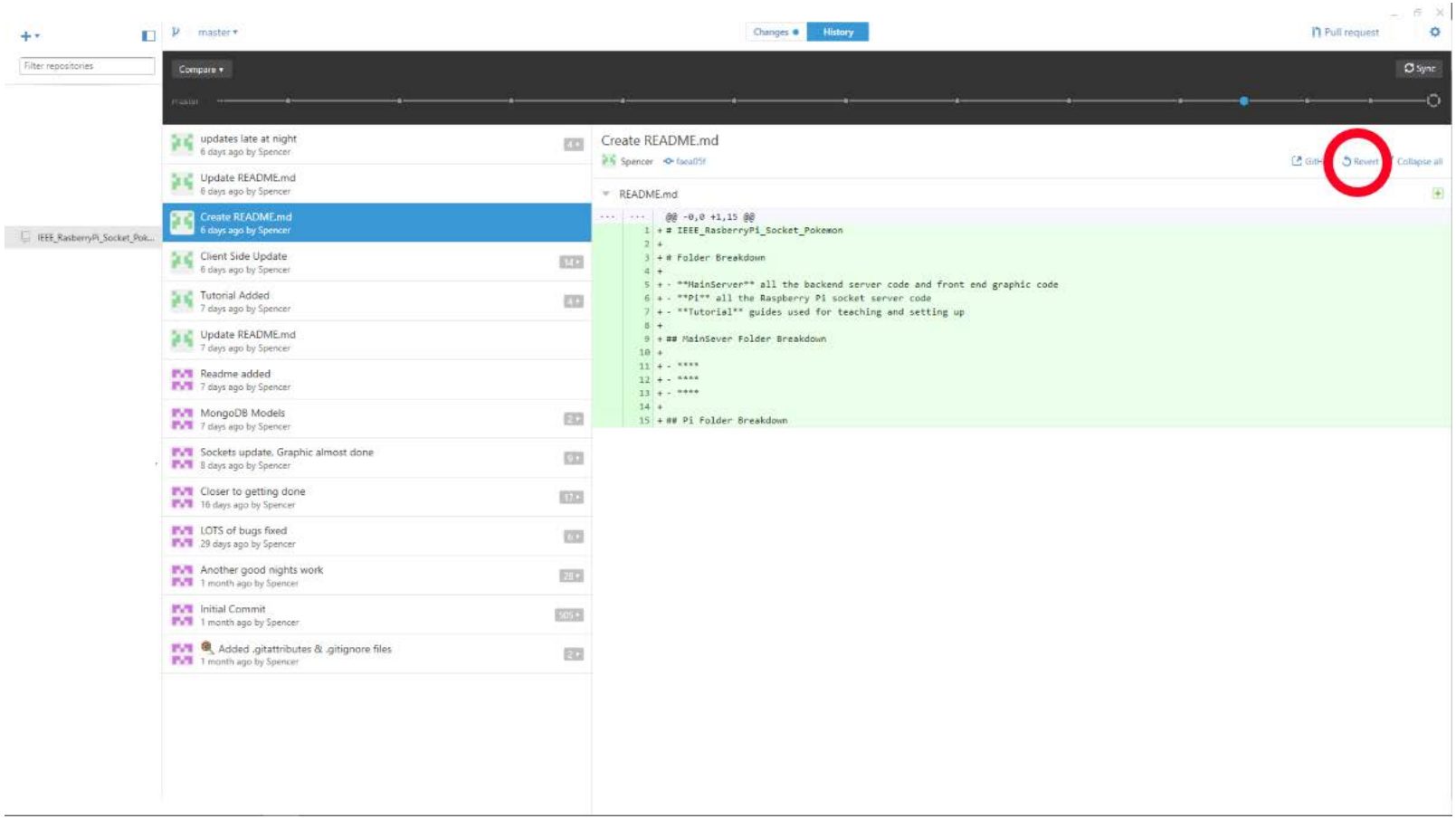
- Add a Summary and Description to your **Commit** and **Commit** the changes
  - Remember, this is only committed on your local machine until you push the changes to the server



- If your code is ready, you can send the **Pull Request** from here



- In the “History” screen you can see all the past **Commits** of the repository



- You can then **Revert** back to that point in the project… maybe start a new branch or see what you did or changed… this is WHY you use Version Control in the first place

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
- Think how awesome it is you can now work on code projects with someone else, granted they probably didn’t comment it correctly, but that’s a different slide show I am not writing

Best Practice

- These are the best two sites to practice with
  - https://try.github.io/levels/1/challenges/1
  - http://learngitbranching.js.org/

- Here is a repo you can mess with

  https://github.com/sjfricke/IEEE_Practice_Git