Introduction to GIT

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1. Agenda

1. What is GIT?
2. History
3. Collaboration
4. Feature Branches
5. Vocabulary
6. GitHub
7. Remote Repository Commands
8. Lets GIT our hands dirty ...
9. Closer look at Commits
10. Merging

1. What is GIT?

- Version Control System (VCS)
- **GIT helps us manage our project‘s files**

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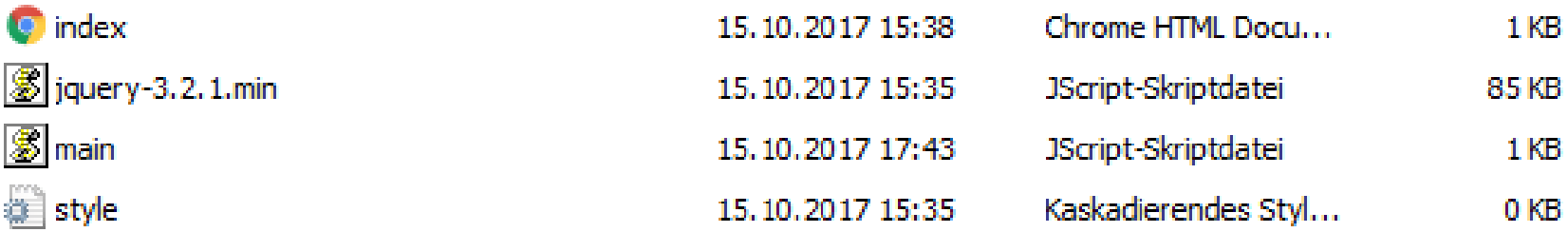


1. What is GIT?

- What does GIT do, that makes managing our files easier?

1. History
2. Collaboration
3. Feature branches

2. History

- GIT keeps track on every change that we make on our files

1. History

Oct. 2017: We have a file **banners.css**

Dec.2017: We do some changes in **banners.css**

Jan.2018: Our page breaks for some reason!

We take a look at banners.css from Oct. 2017 and see, that we **removed** the lines

„ float: left;

padding: 2rem;

margin: 2rem; “

1. History

- GIT provides seeing the **history** of a file
- GIT provides **reverting** changes

1. History

- GIT provides seeing the **history** of a file
- GIT provides **reverting** changes

-> Nothing is ever lost

-> Nothing is ever final

2. Collaboration

- Creating something **alone**:
  - You
  - Your Files

2. Collaboration

- Creating something **alone**:
  - You
  - Your Files
- Creating something **in a team**:
  - You
  - Your Team members
  - Your Files
  - Your Team members‘ files

2. Collaboration

- Creating something **alone**:
  - **EASY**
- Creating something **in a team**:
  - **NOT SO EASY**

2. Collaboration

You want to write a book „mybook.docx“ about your home country with your friend.

2. Collaboration

You want to write a book „mybook.docx“ about your home country with your friend.

You: „Can you please check Chapter 4 and write something?“

Your buddy: „Okay, I need two days for that.“

2. Collaboration

Right after sending the Email to your friend ...

1. Now you see a few typos in your copy of the book and you fix them.
2. You have an idea of what images you would use for Chapter 1 and you insert them.

Now your friend does not work with the most updated version of your book anymore.

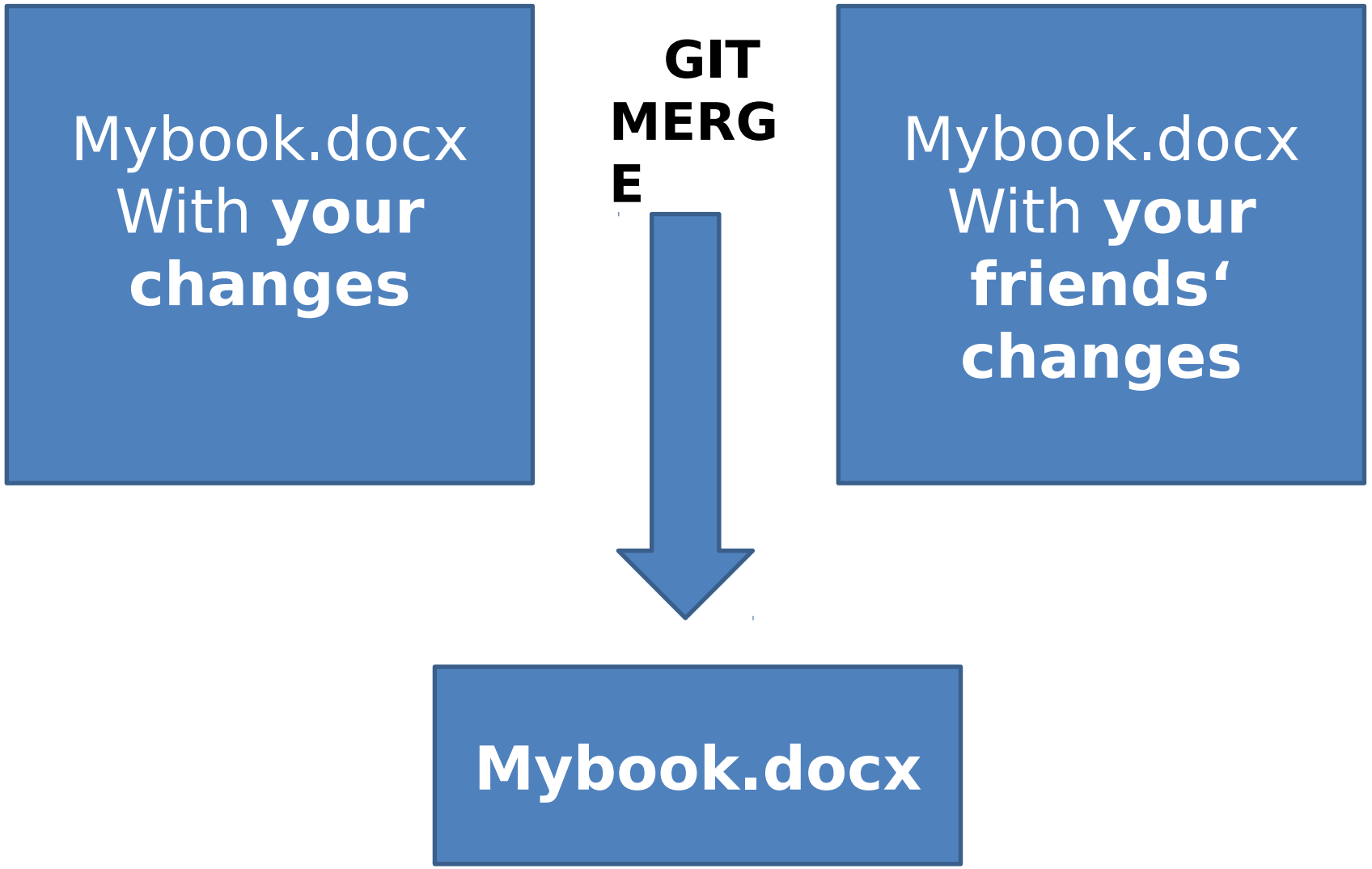
2. Collaboration

After two days your friend sends you back his copy.

Mybook.docx
With **your changes**

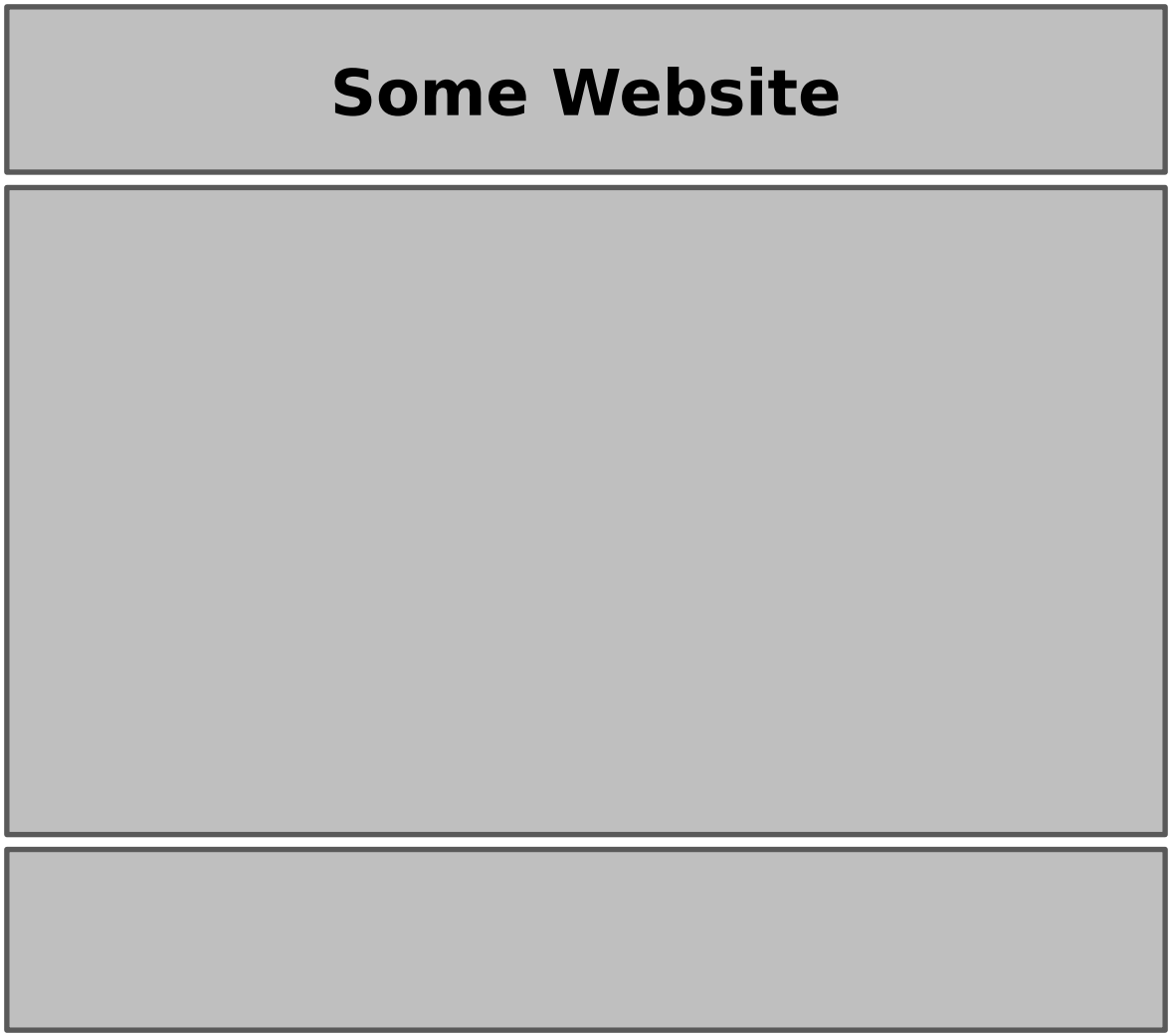
Mybook.docx
With **your friends‘ changes**

2. Collaboration



3. Feature Branches

Task #1
-> Redesign Header



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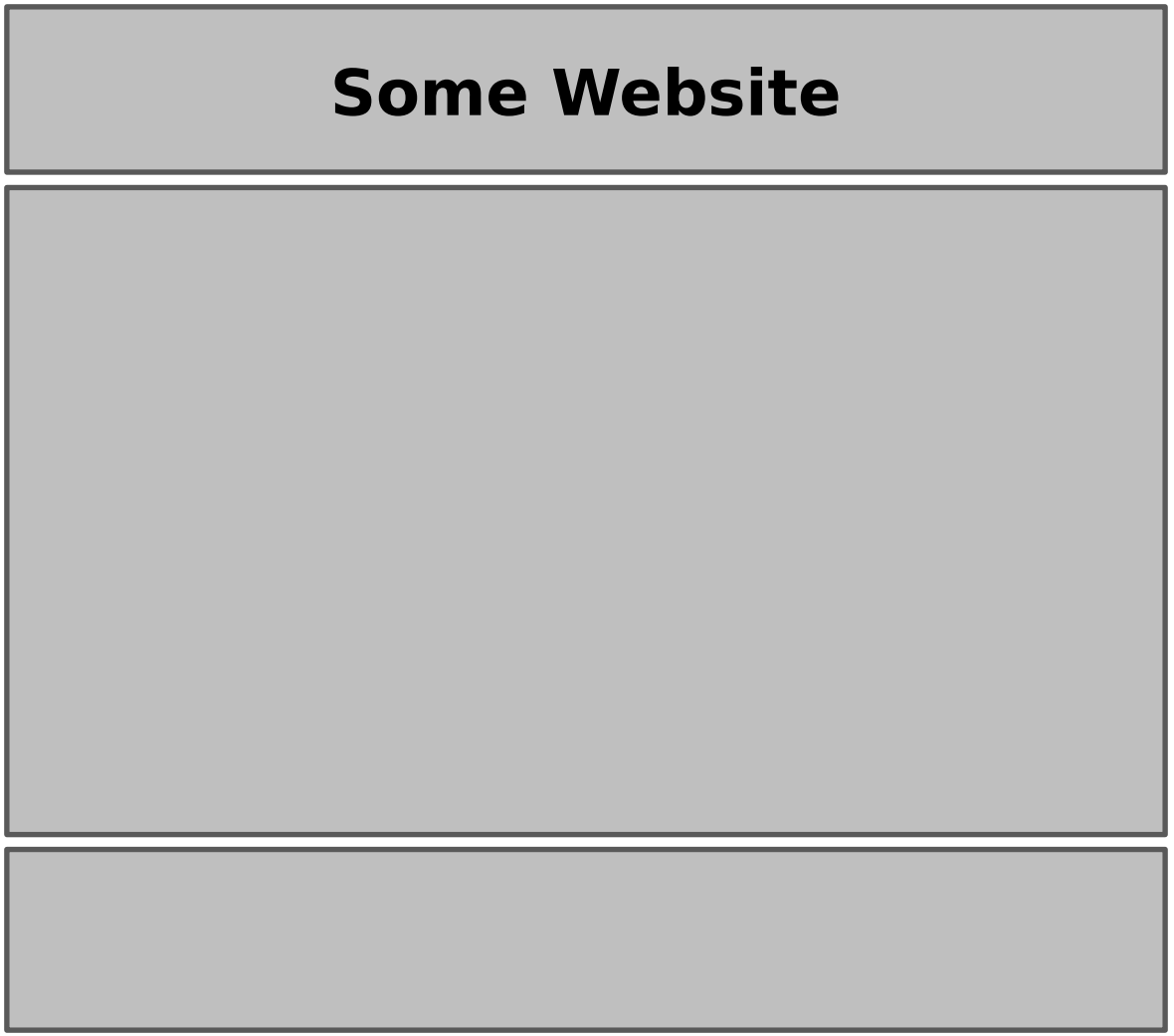
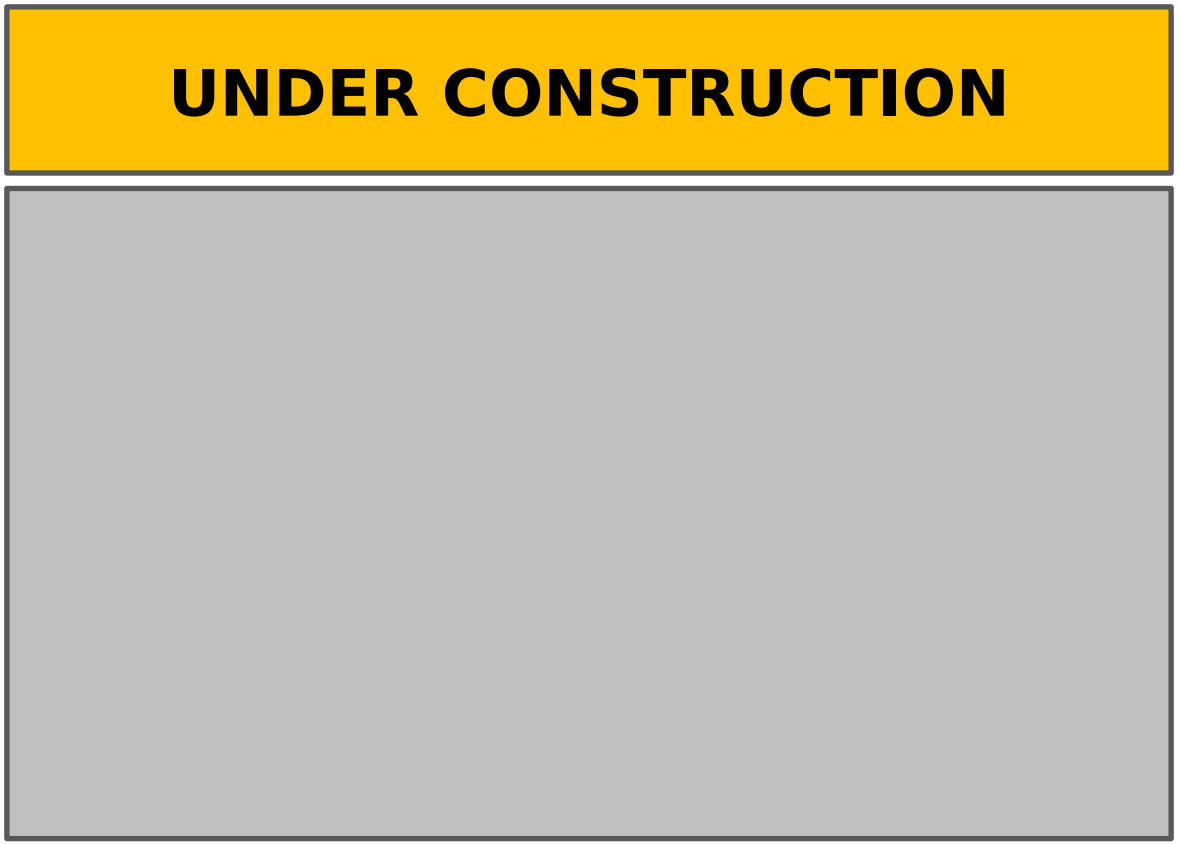


Task #2
-> Redesign Footer

Day 1

Task #1
-> Redesign Header



Task #2
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Day 2

Task #1
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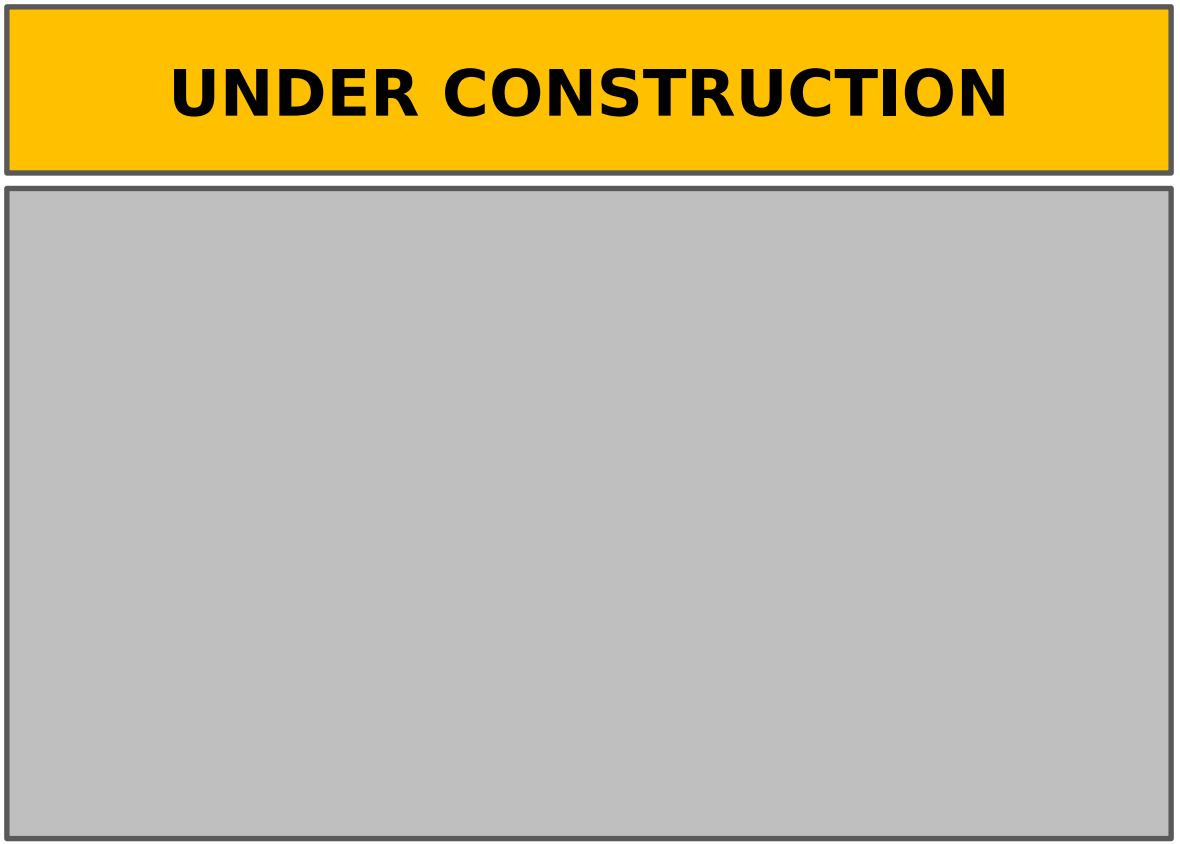

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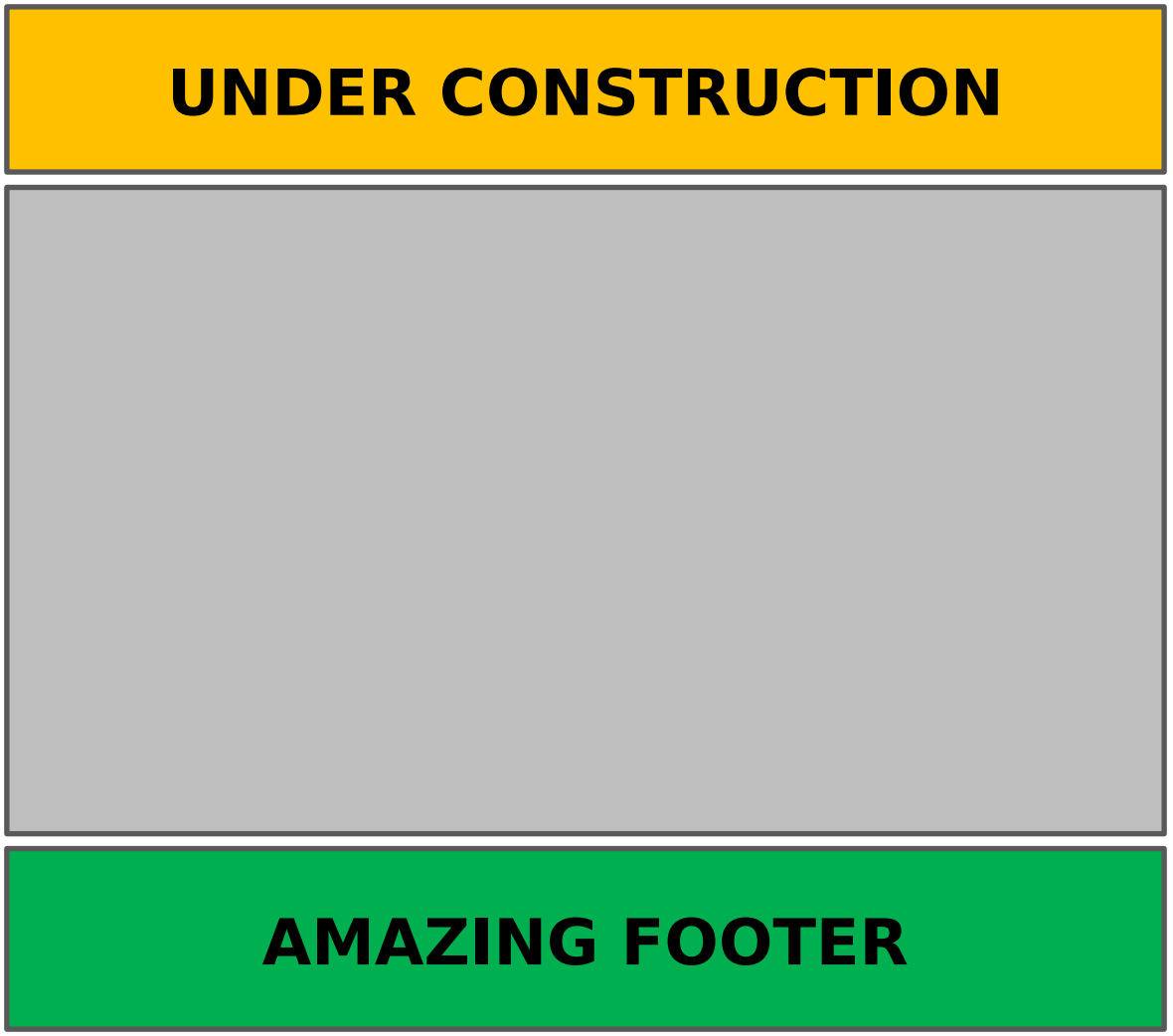
-> Redesign Footer

End of Day 2

Task #1
-> Redesign Header



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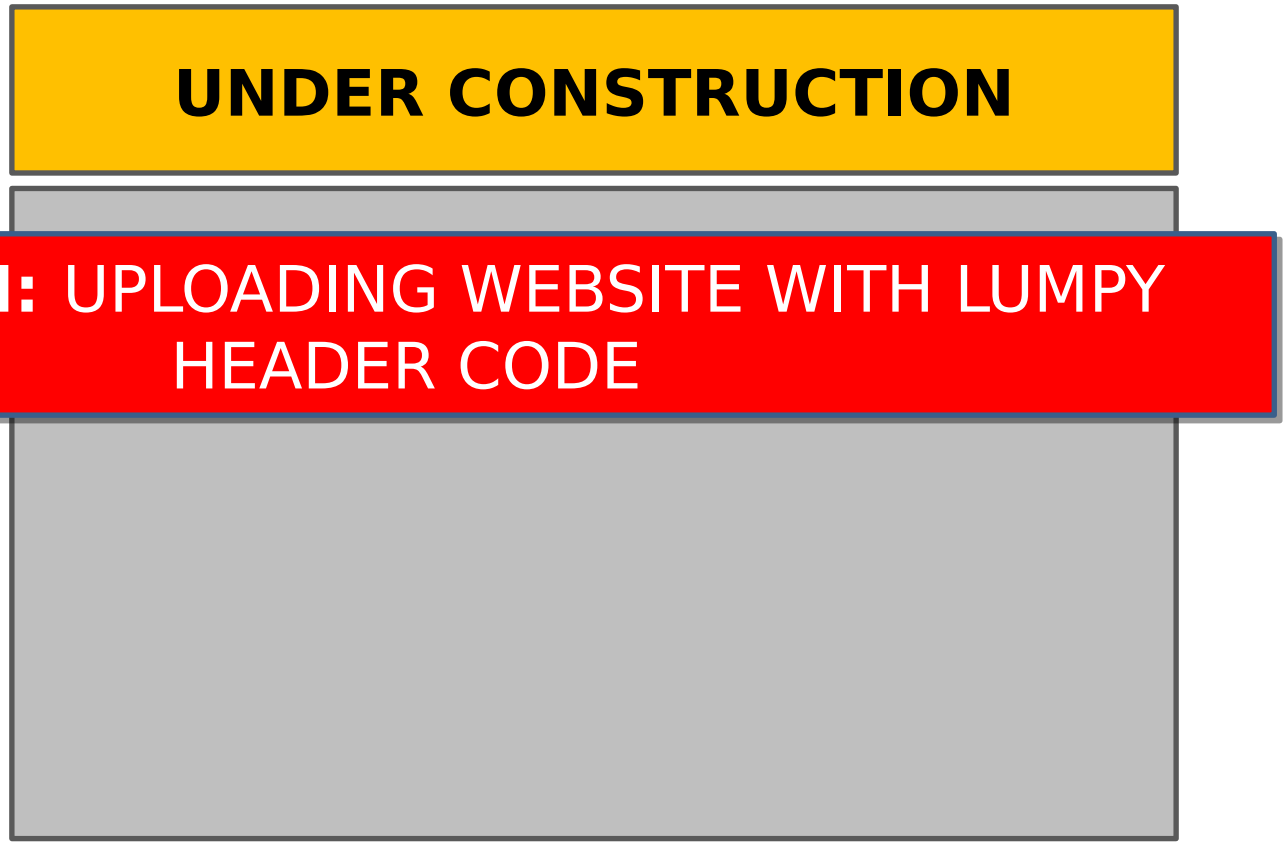

PROBLEM: UPLOADING WEBSITE WITH LUMPY HEADER CODE

Task #2
-> Redesign Footer

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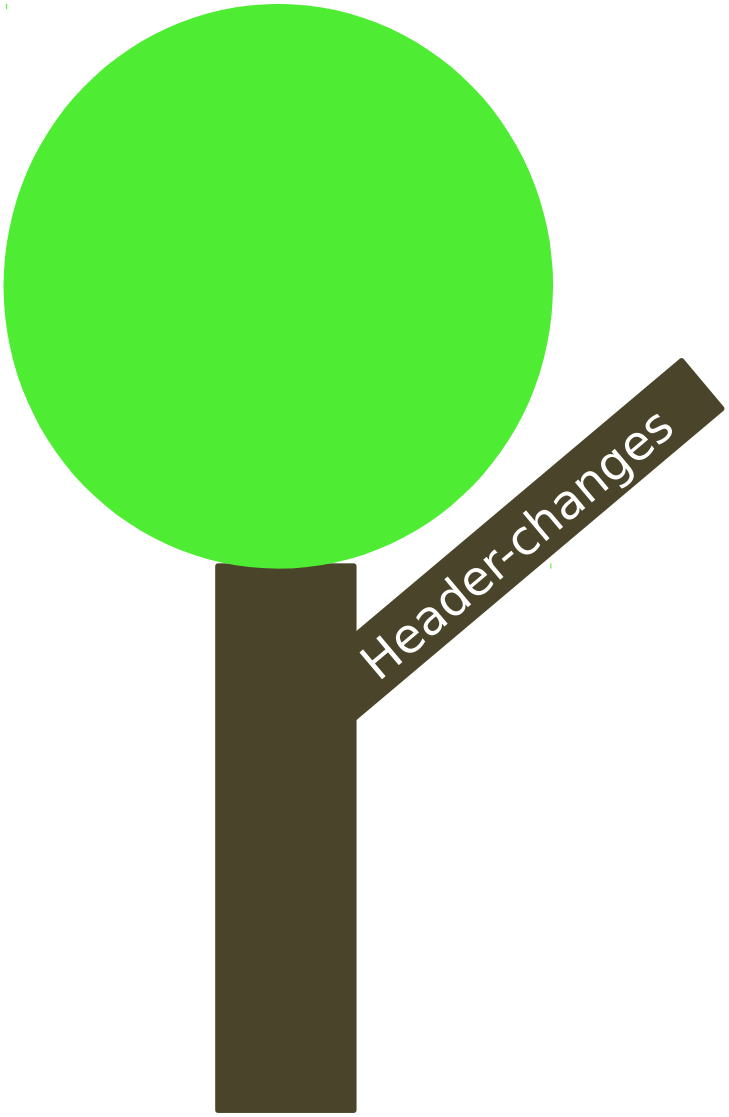

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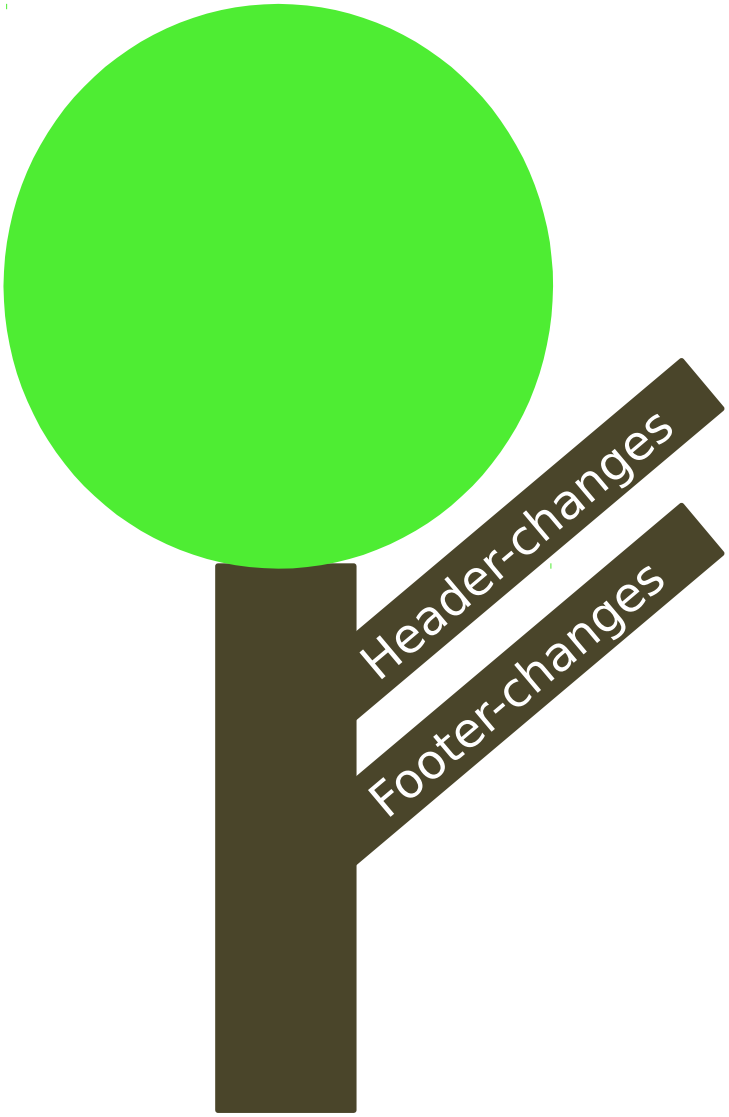

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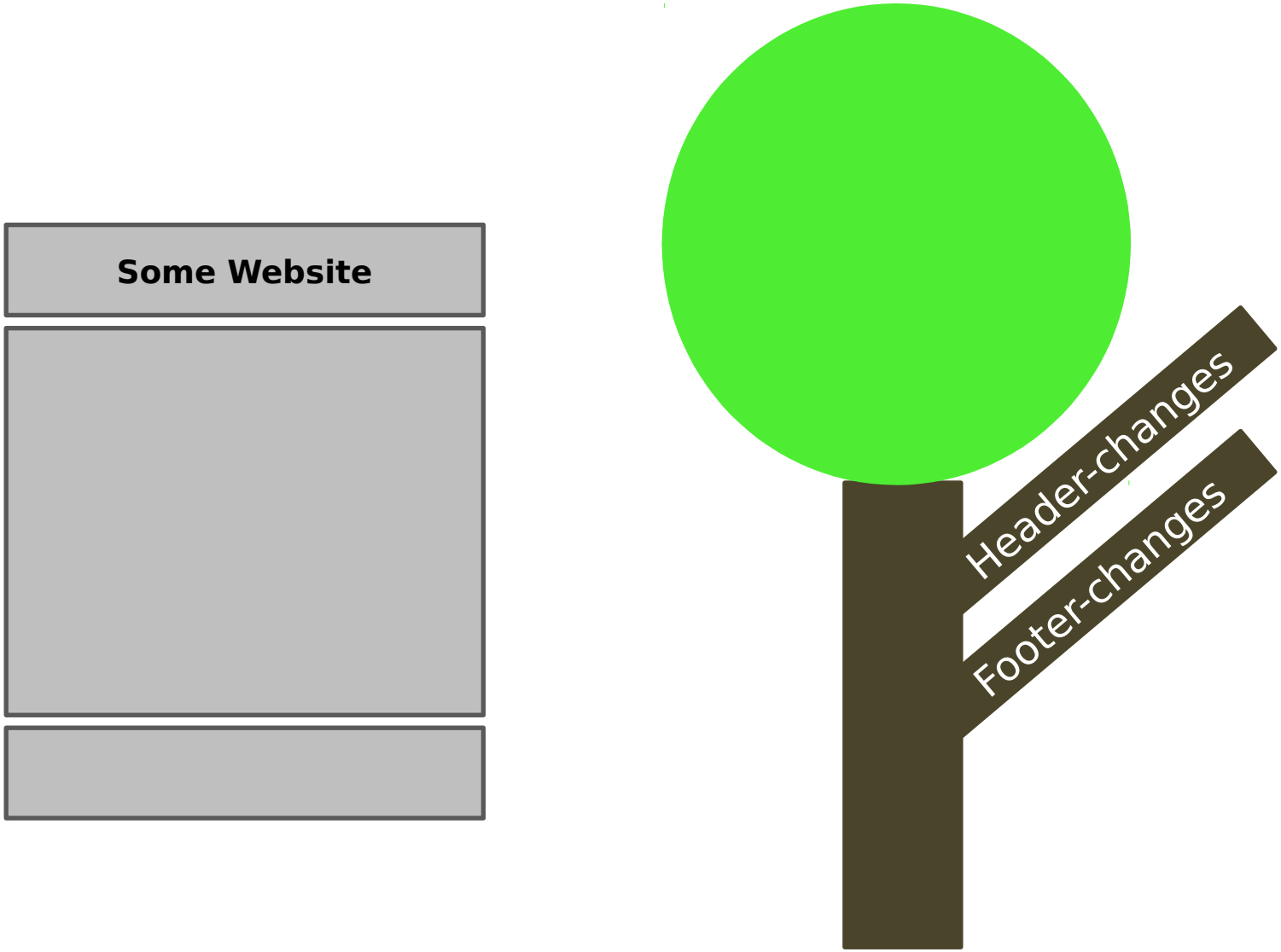

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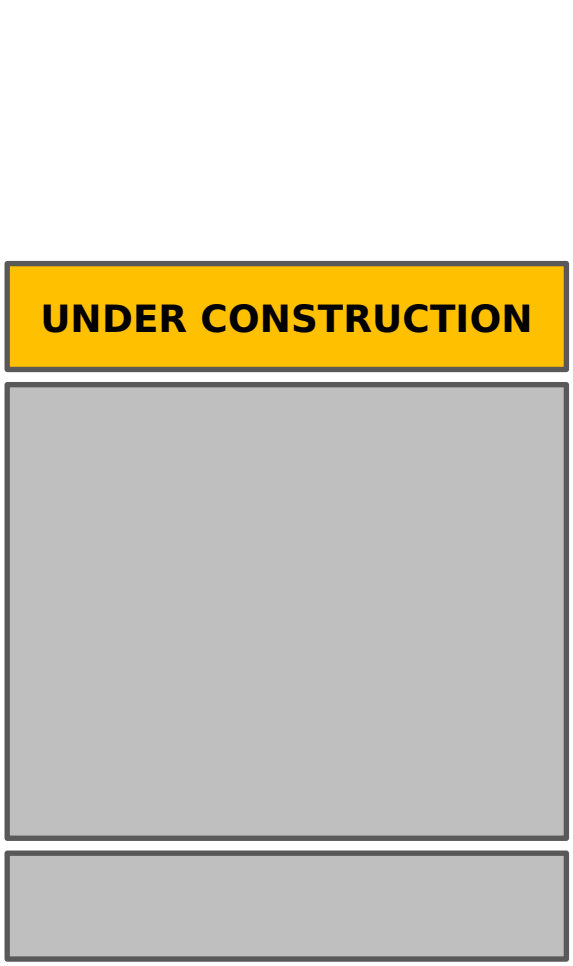

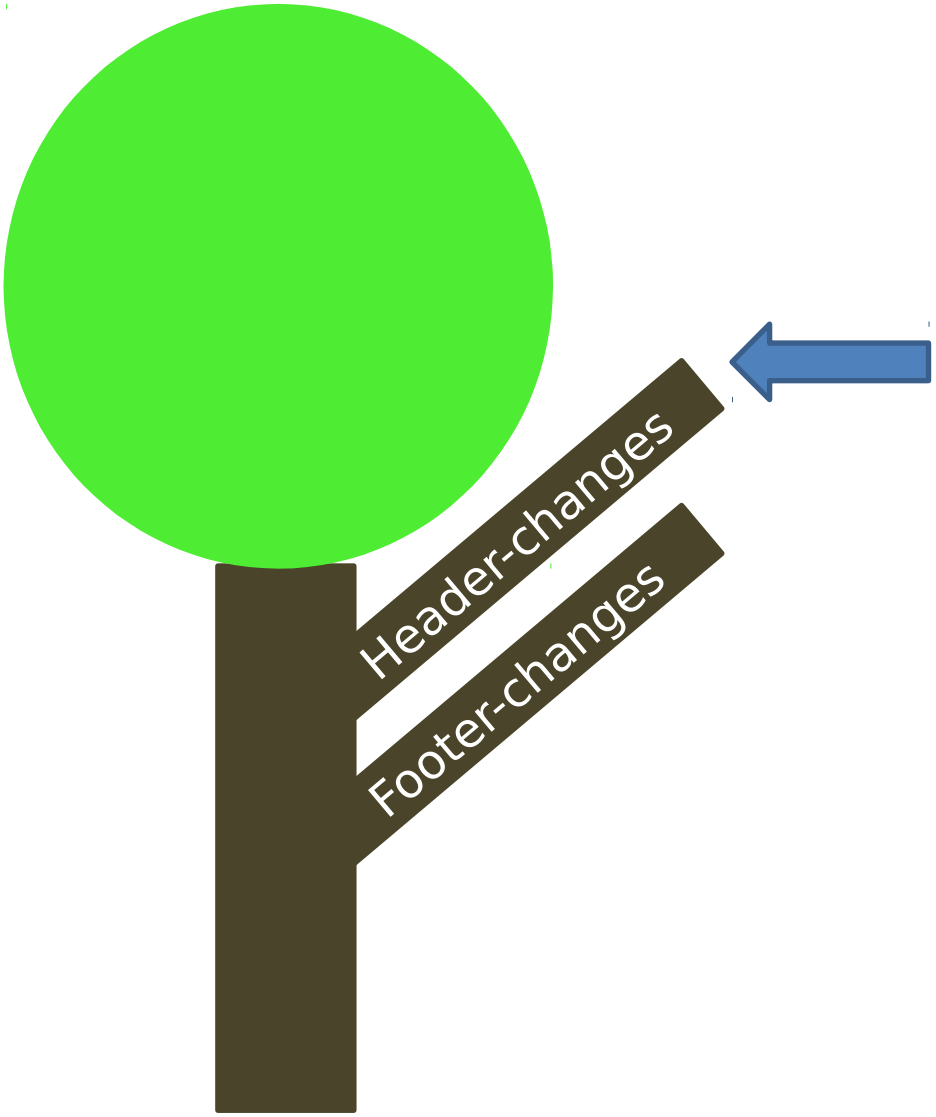

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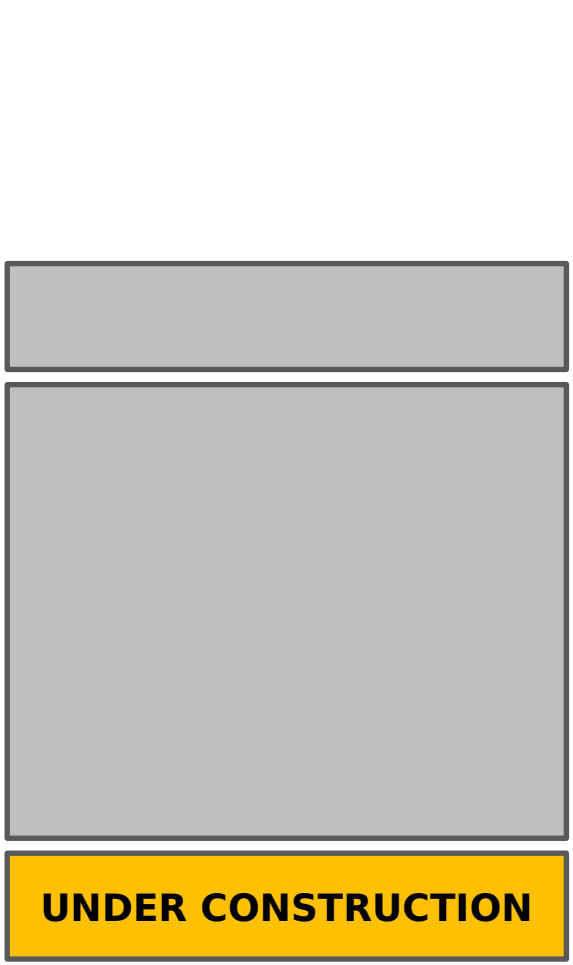

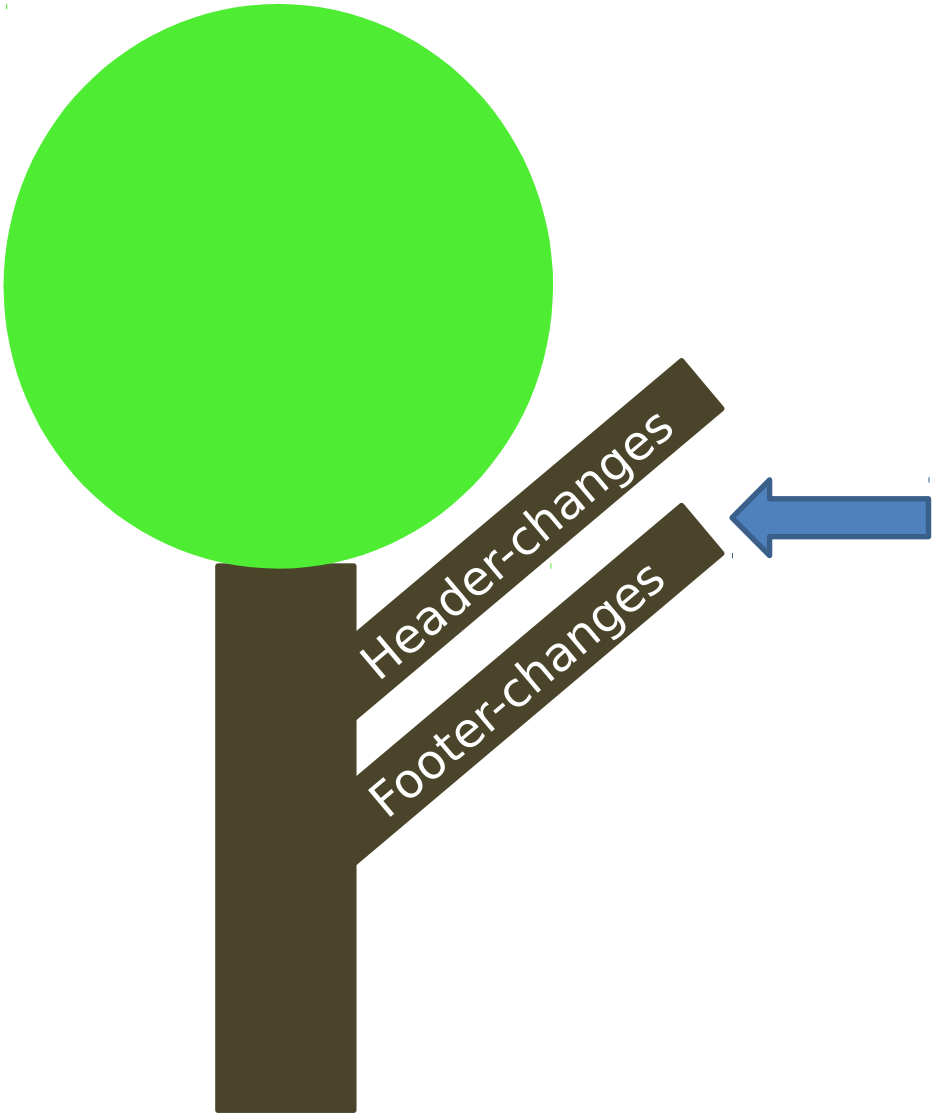

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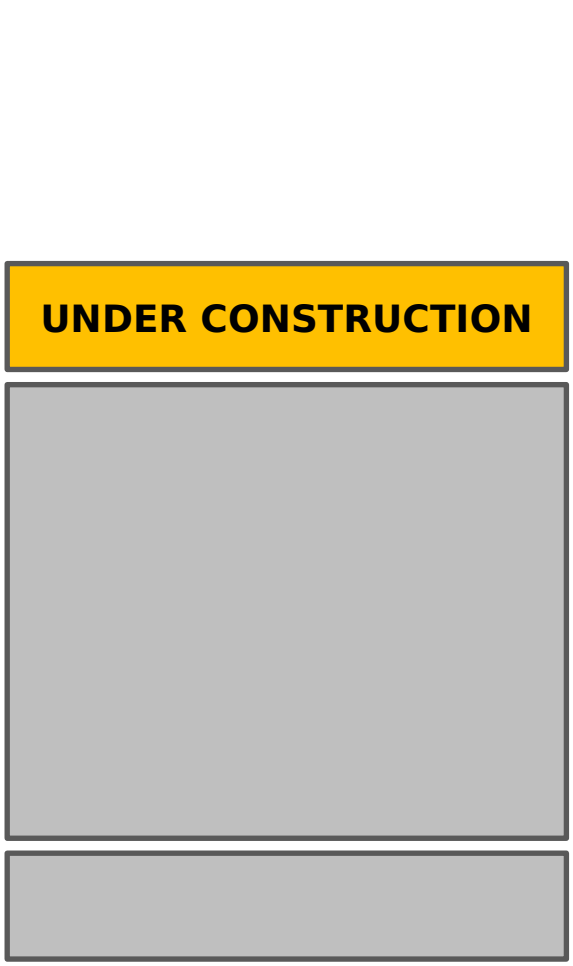

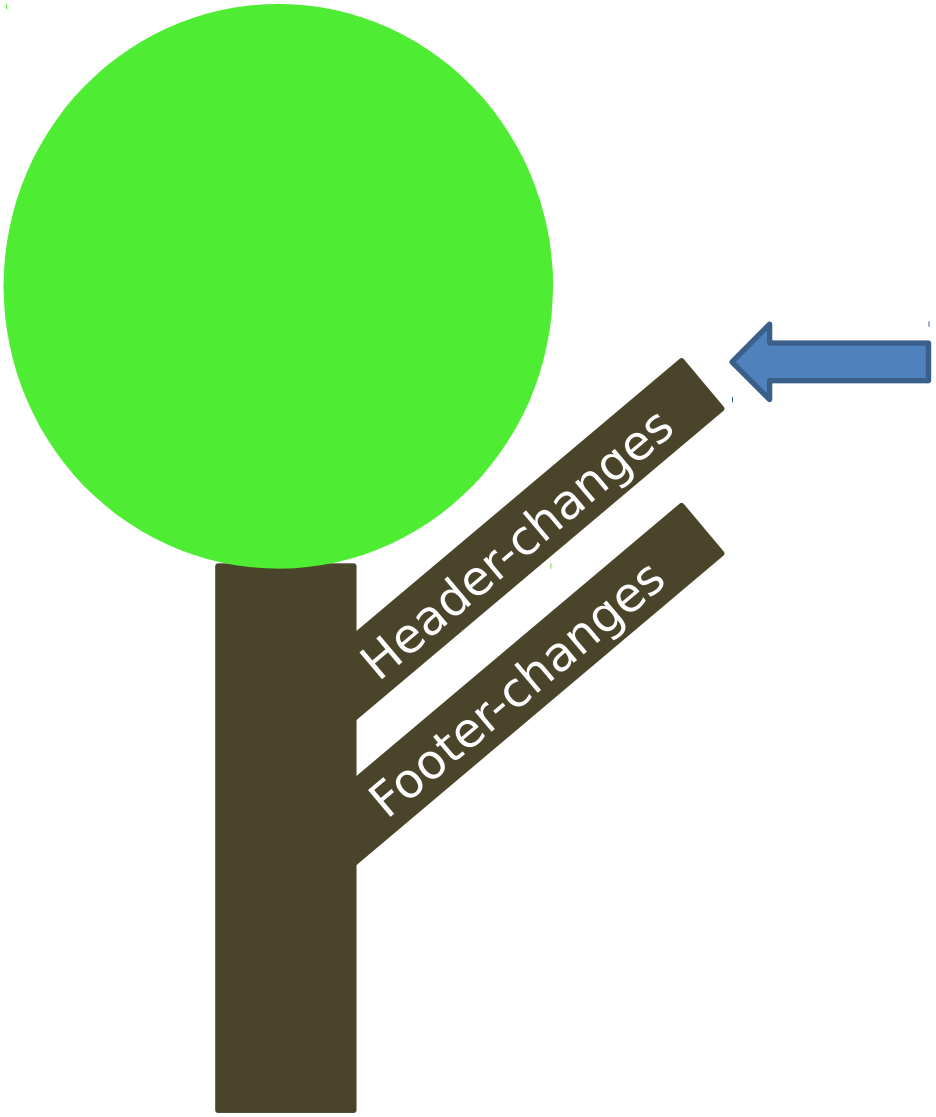

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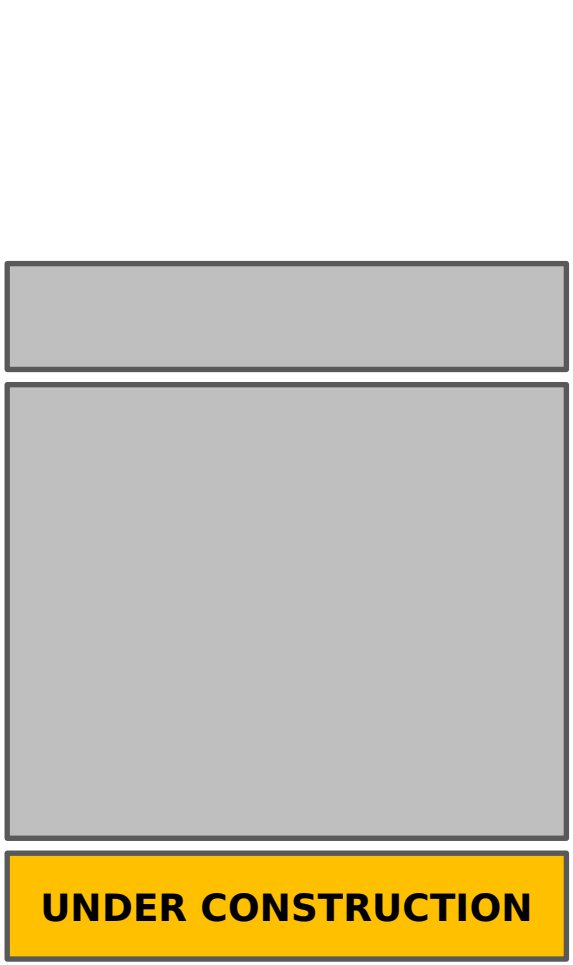

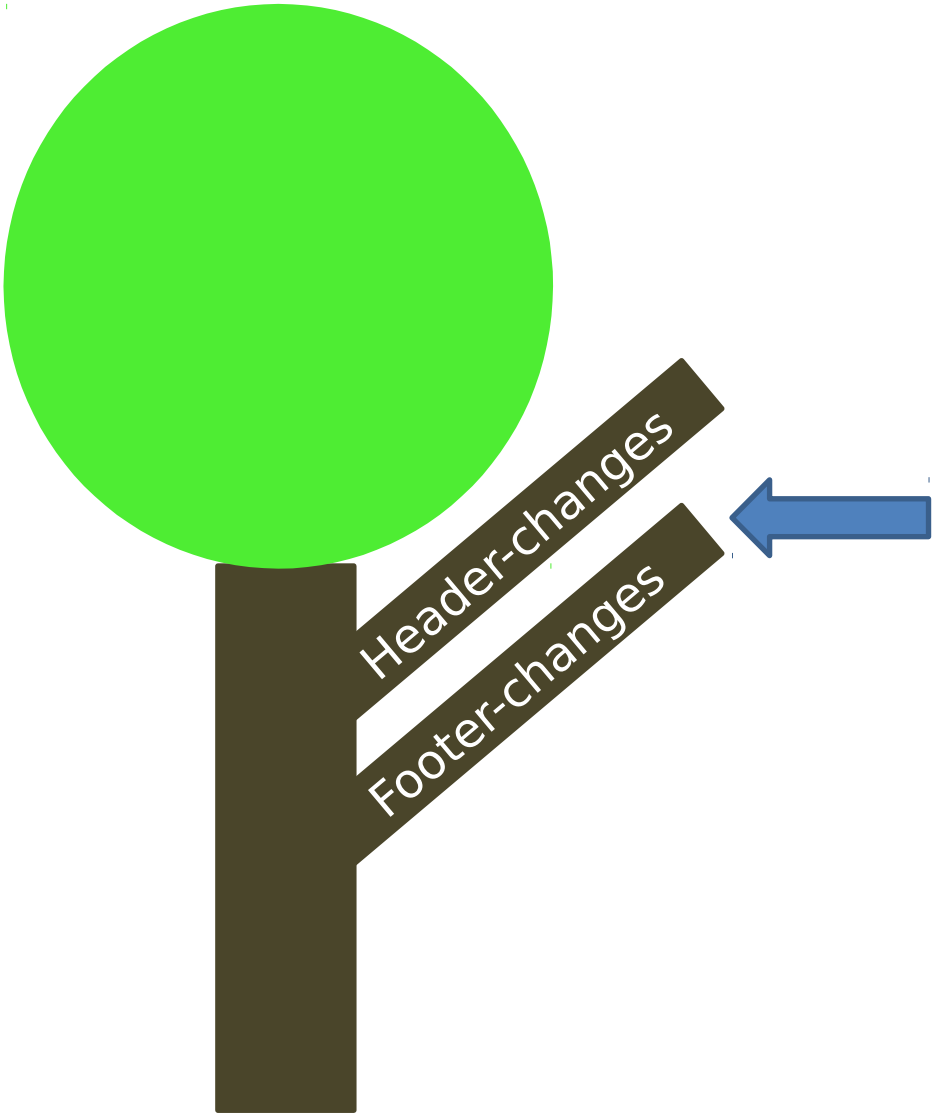

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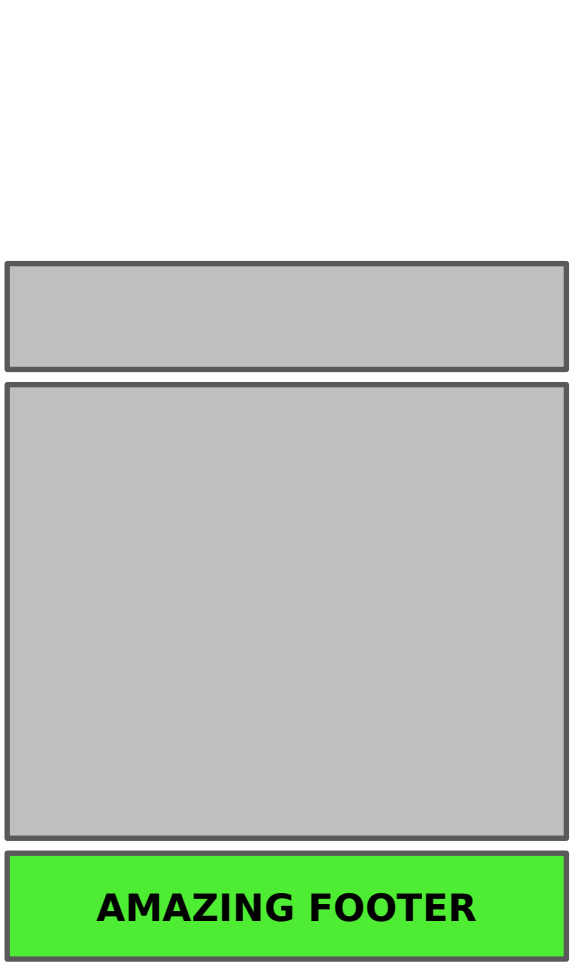

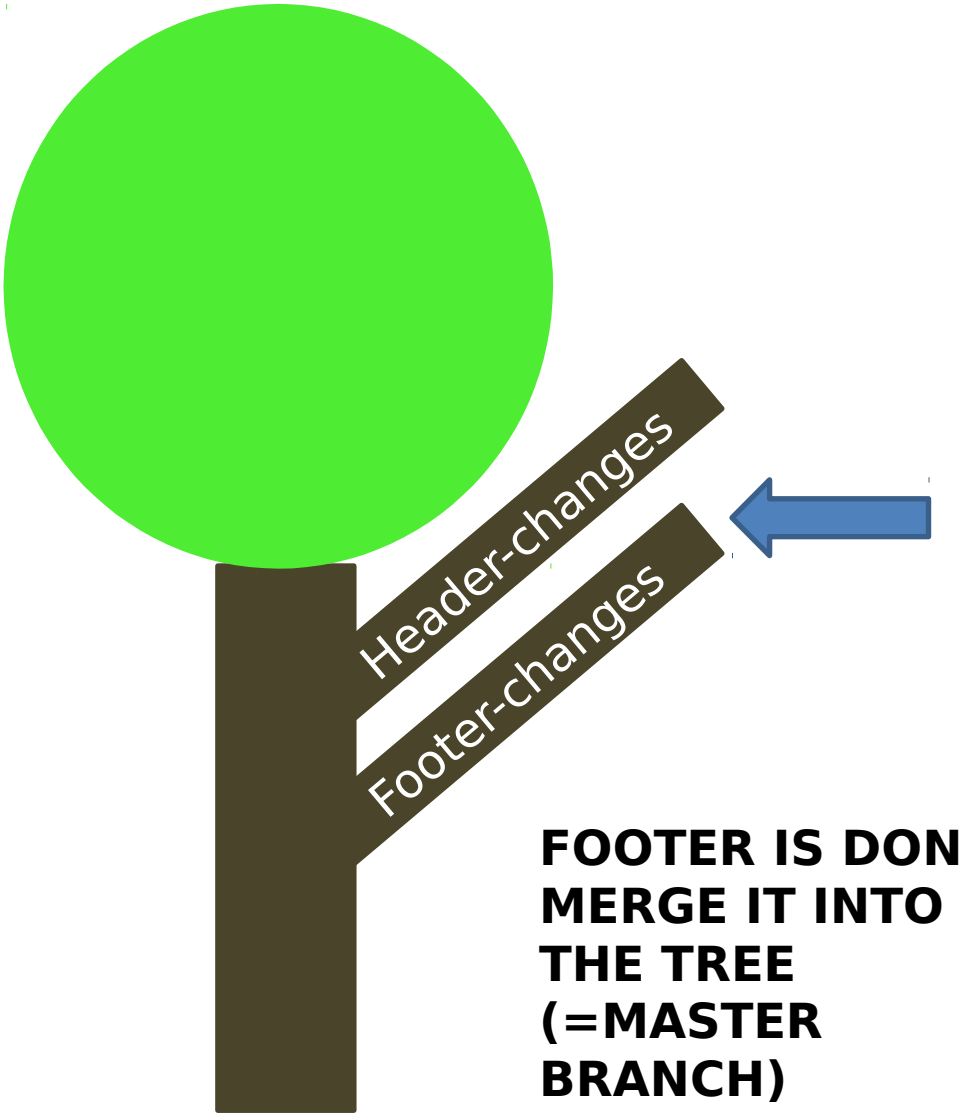

FOOTER IS DONE. MERGE IT INTO THE TREE (=MASTER BRANCH)

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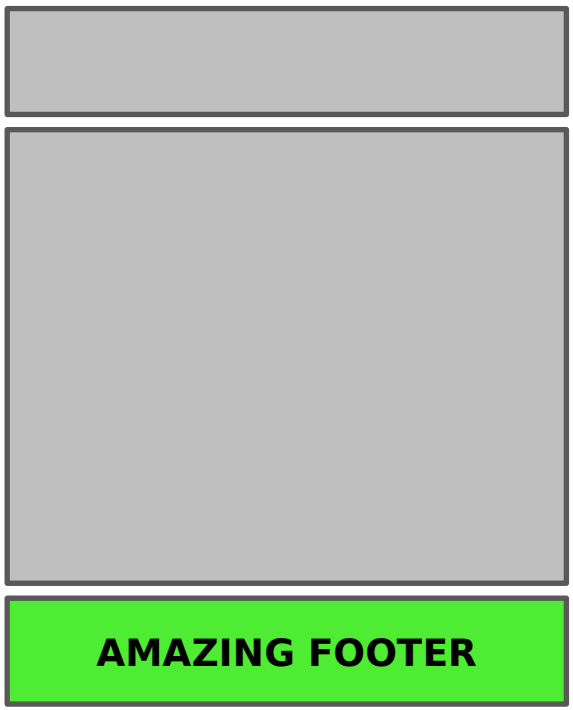

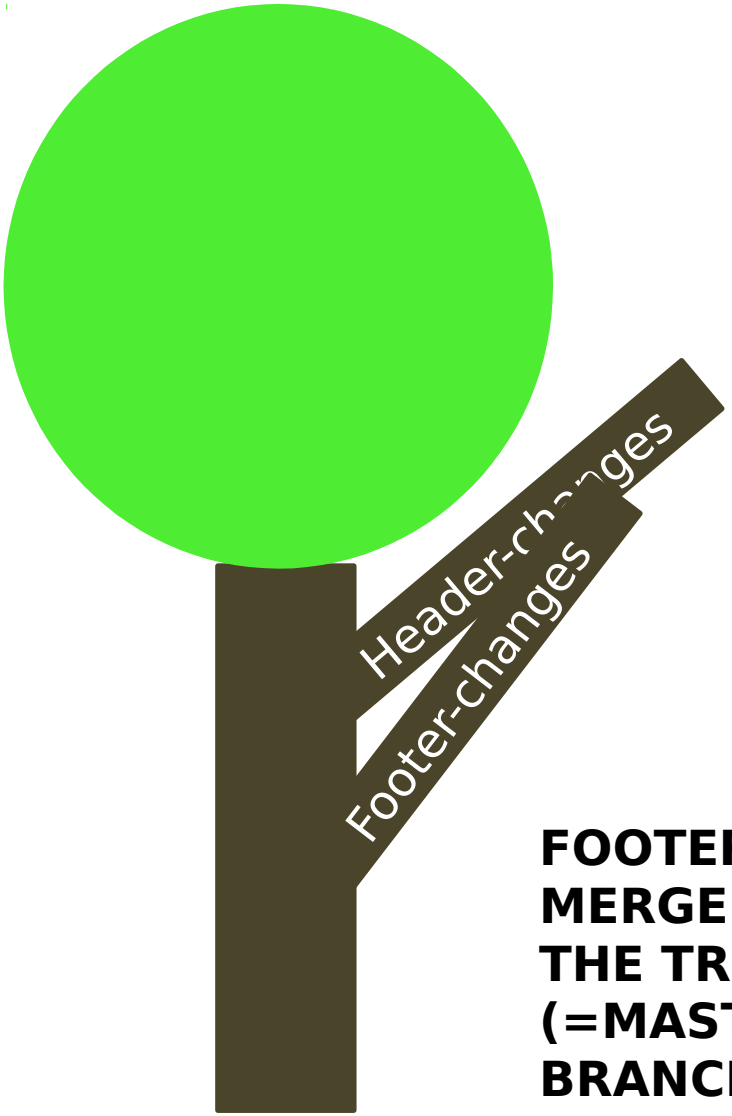

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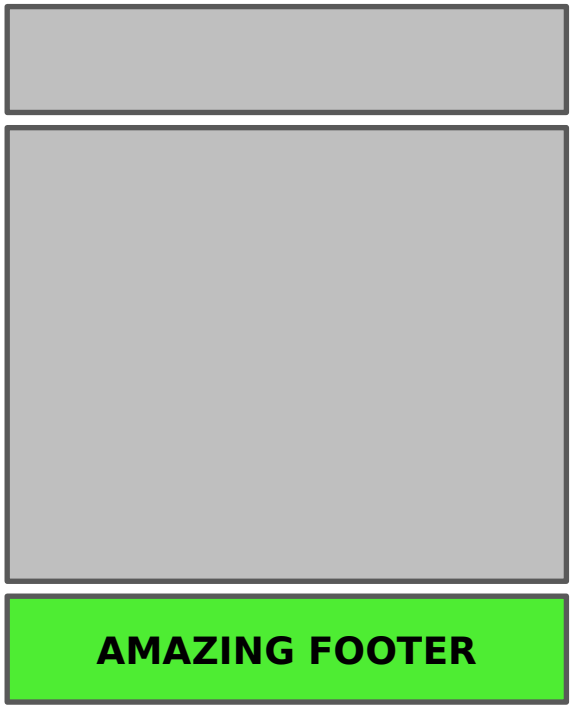

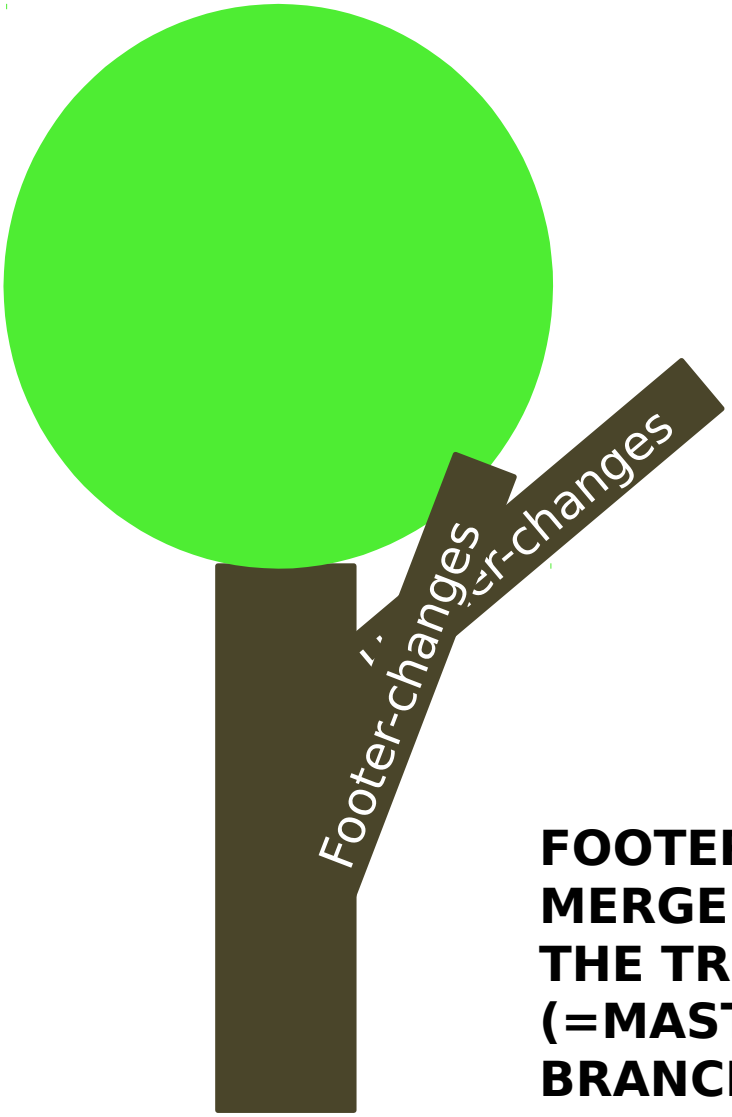

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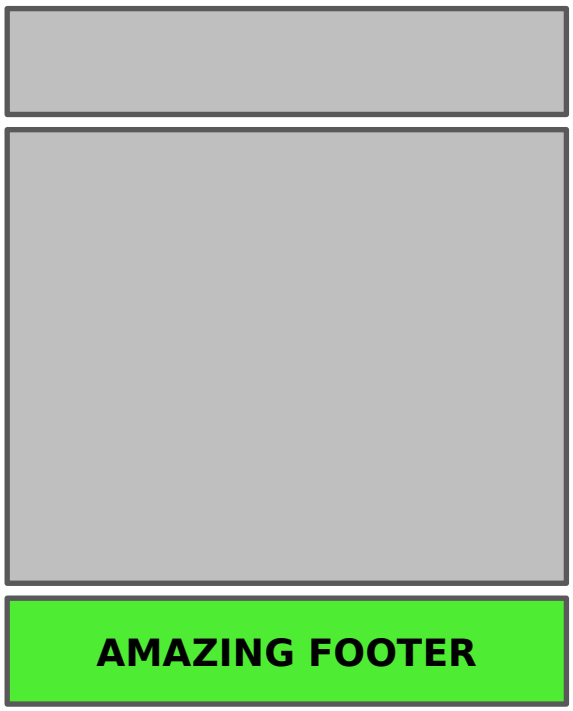

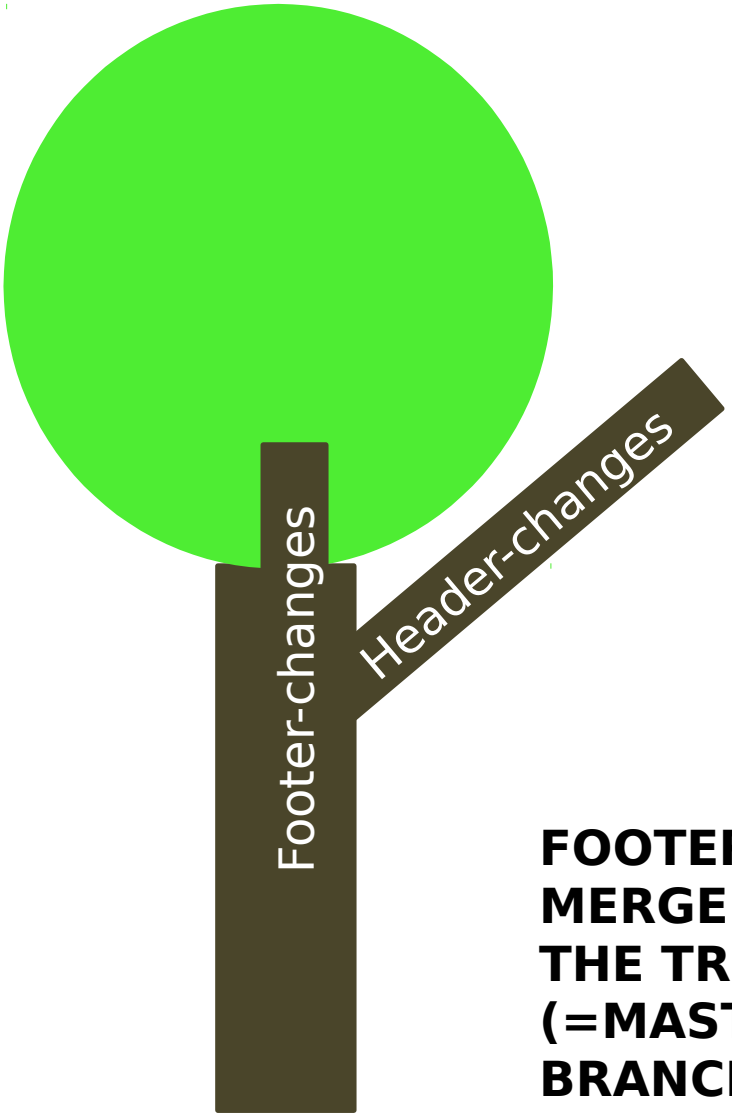

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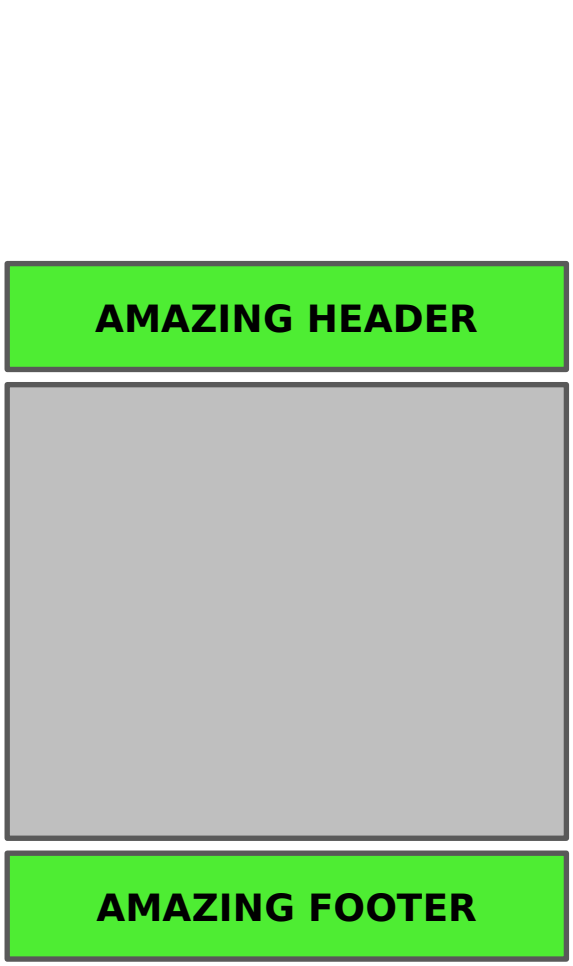

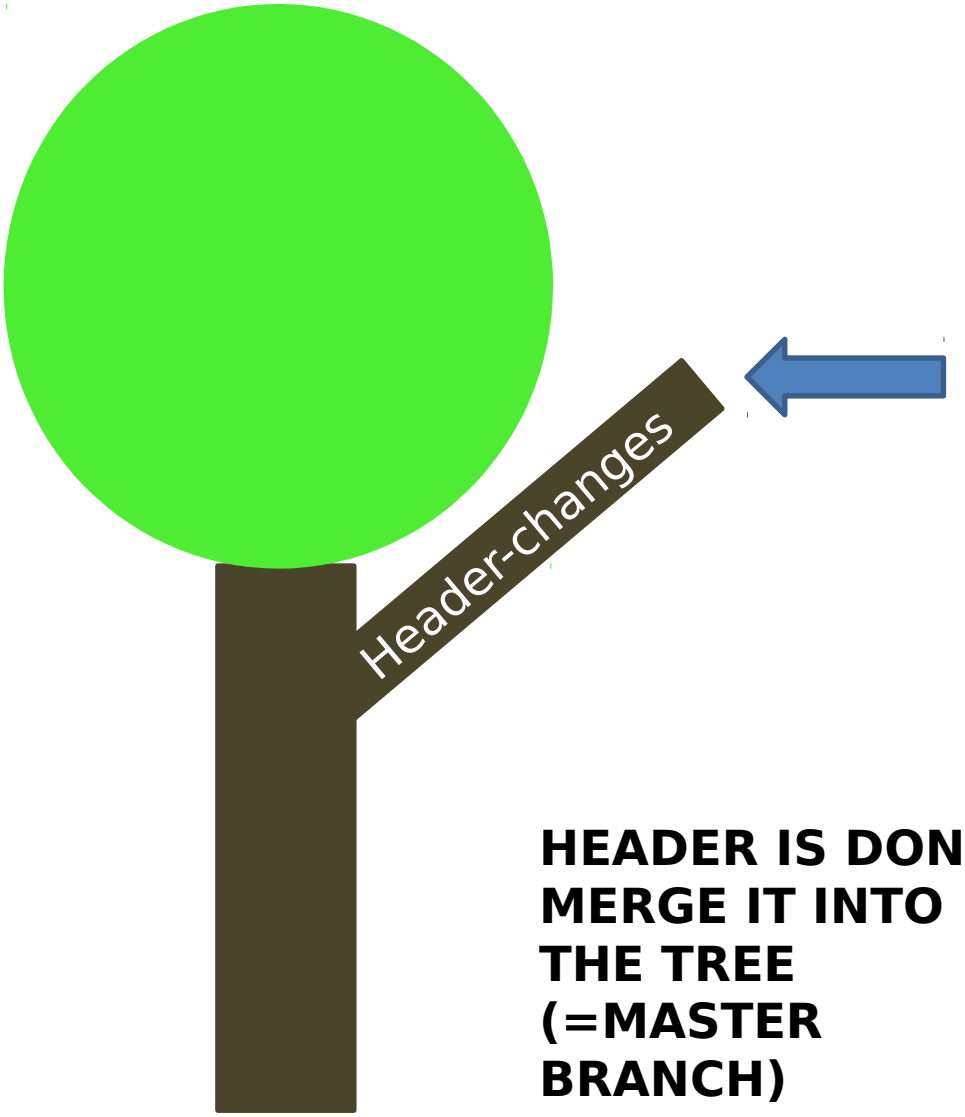

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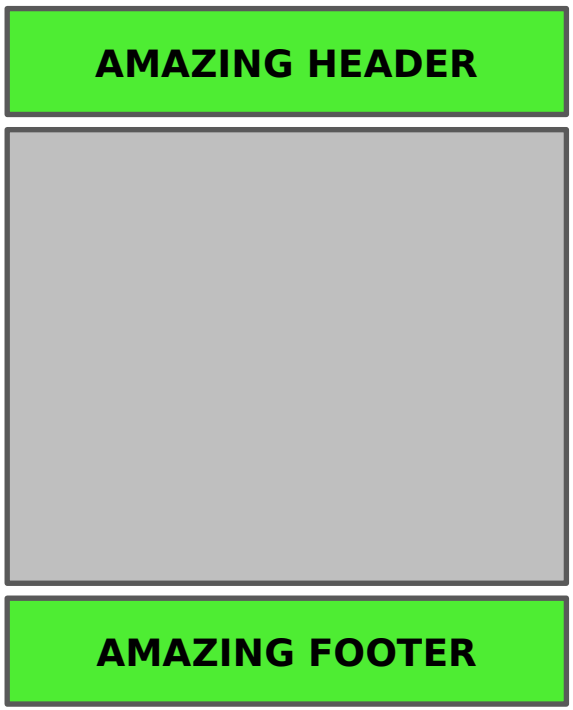

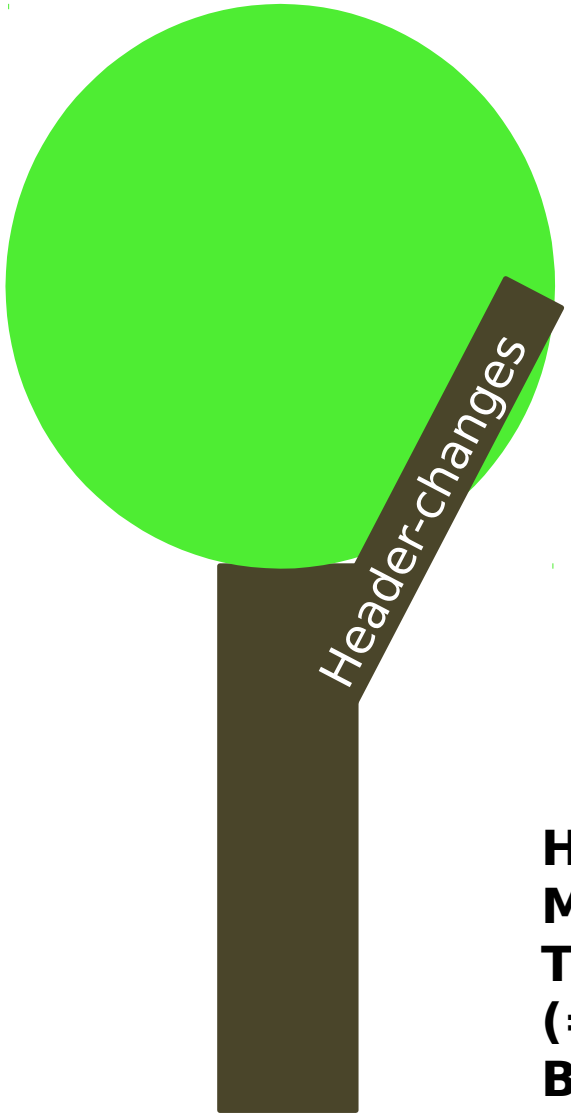

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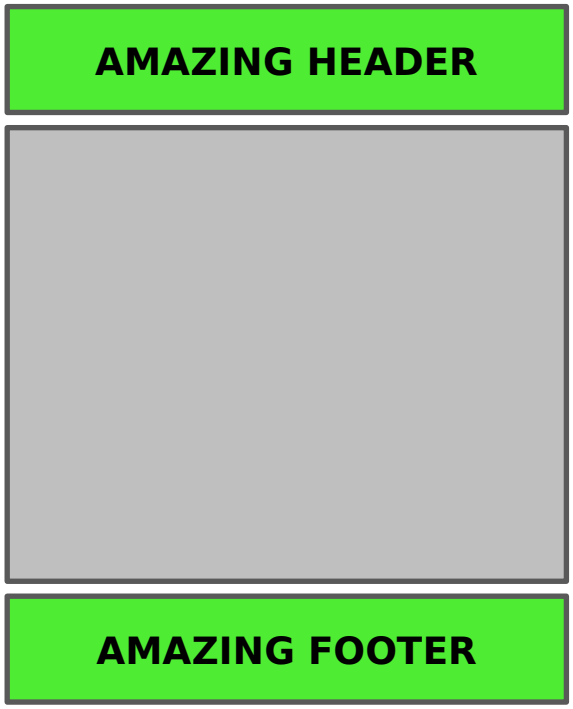

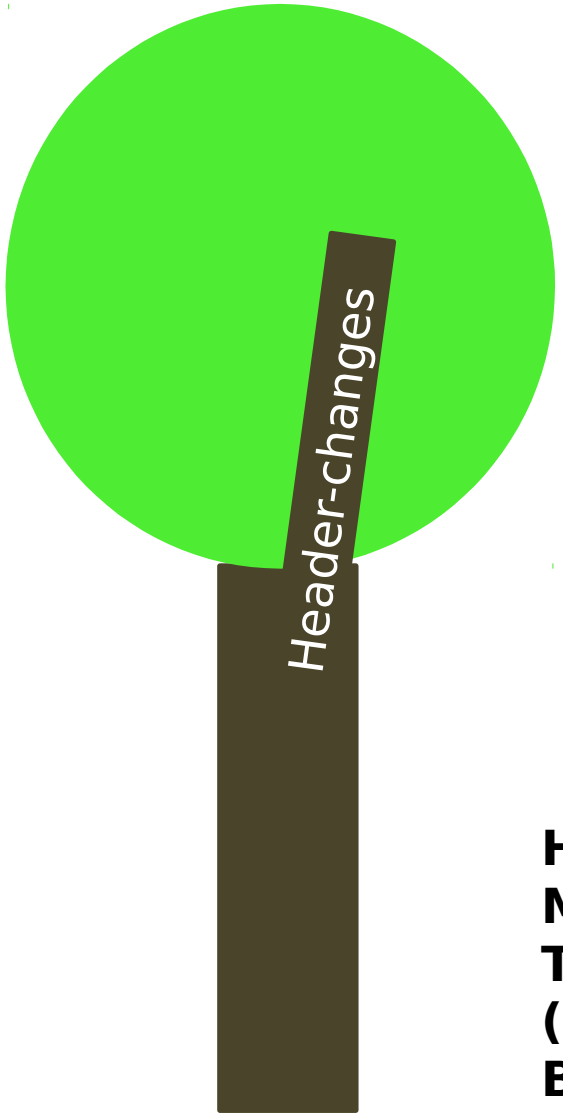

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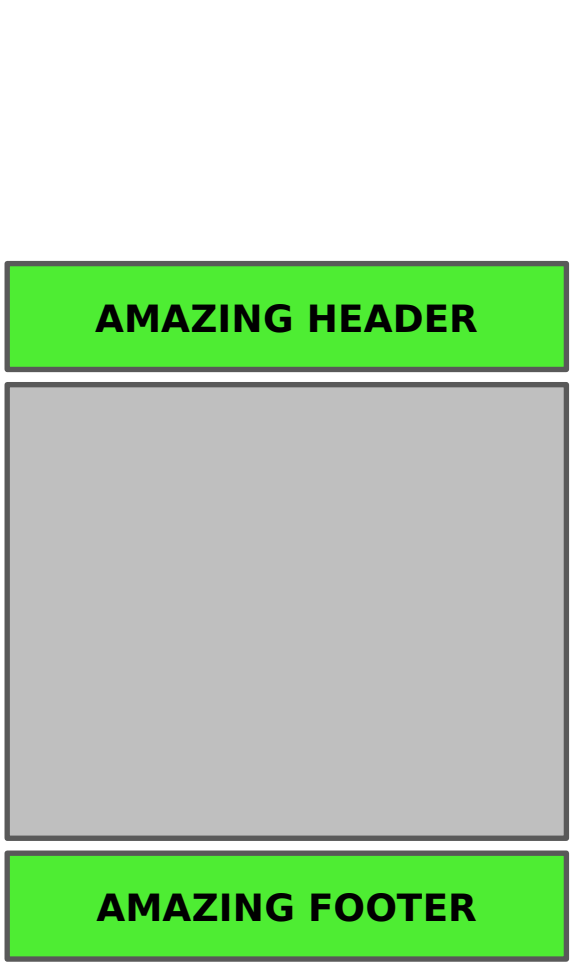

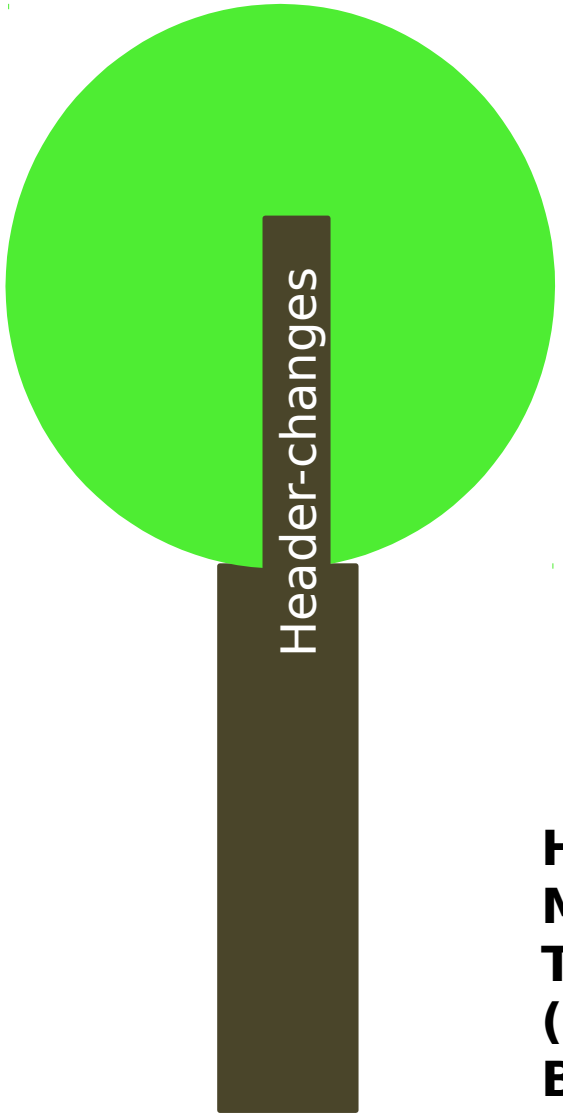

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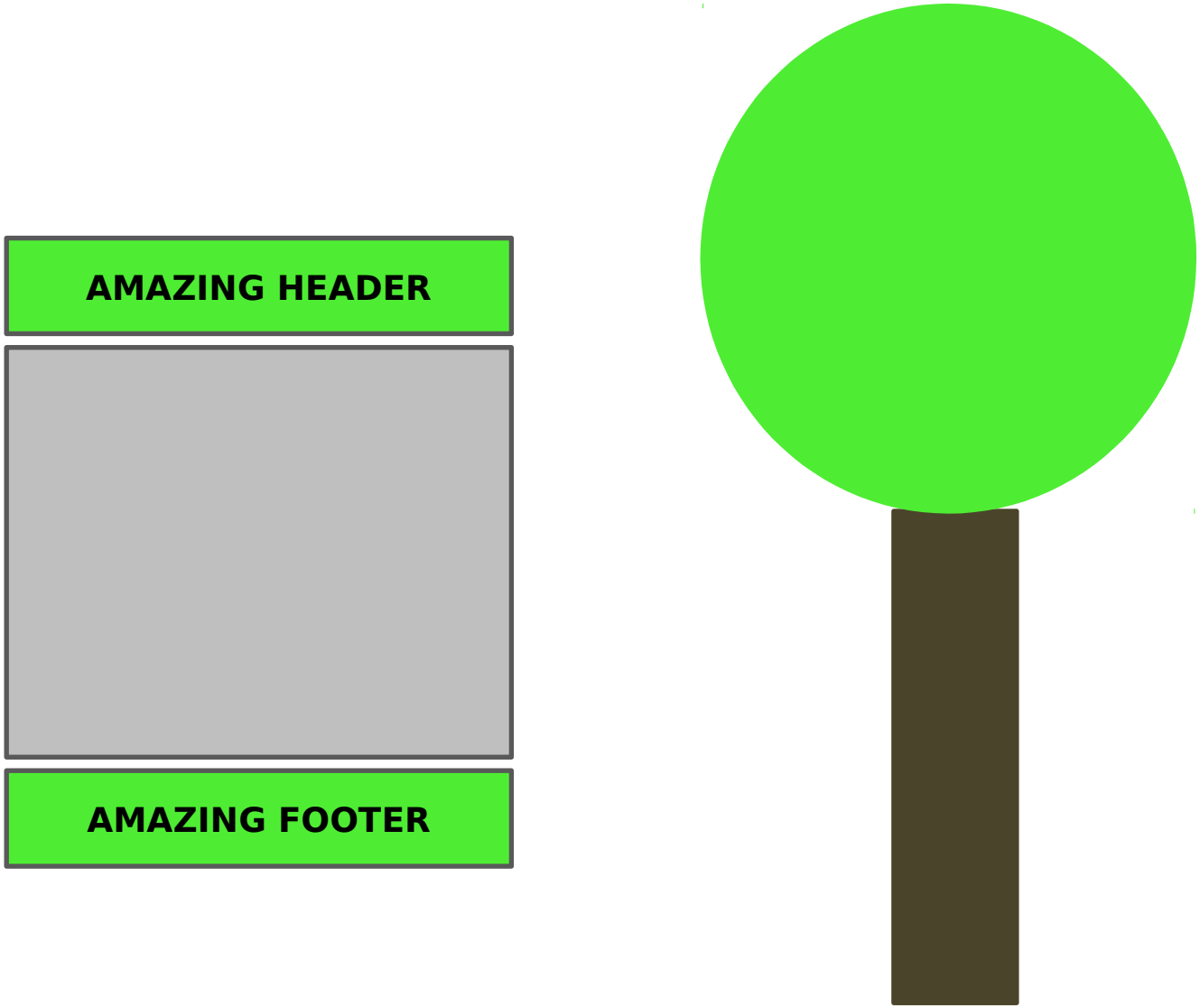

Review

- What are the three core functions of GIT?

Review

- What are the three core functions of GIT?
  - History
  - Collaboration
  - Feature Branches

4. Vocabulary Time-Out

- **Repository?**

4. Vocabulary Time-Out

- **Repository**
  - Working directory, your project files folder
  - GIT's job is to keep track of any changes here

4. Vocabulary Time-Out

- **Repository**
  - Working directory, your project files folder
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- **Commit?**

4. Vocabulary Time-Out

- **Repository**
  - Working directory, your project files folder
  - GIT's job is to keep track of any changes here
- **Commit**
  - GIT does not save changes in its history, until we actively commit those changes **= "GIT's way of saving"**
  - In a text-editor, we hit "Save" or CTRL+S and then save it.
  - In GIT, nothing gets saved into history until we hit **COMMIT**

4. Vocabulary Time-Out

- **Before we commit … we STAGE!**
- **STAGING** = we prepare something,
  - like if you want to sell a house,
  - first you have to prepare it,
  - make it nice and clean then you sell it.

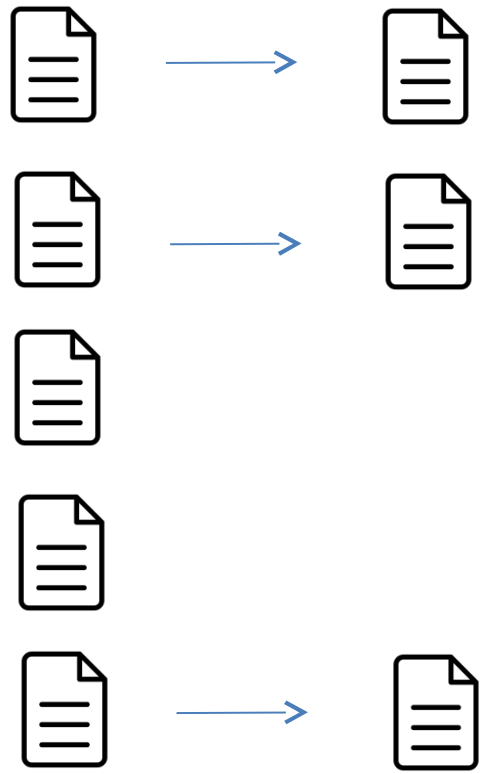
Index.html – before staging

Index.html – staged and ready to commit

Git States

Working Directory

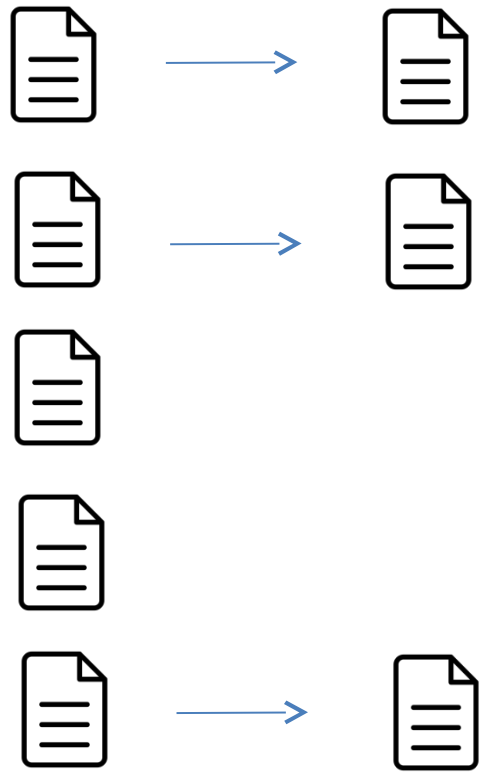
Modified Files



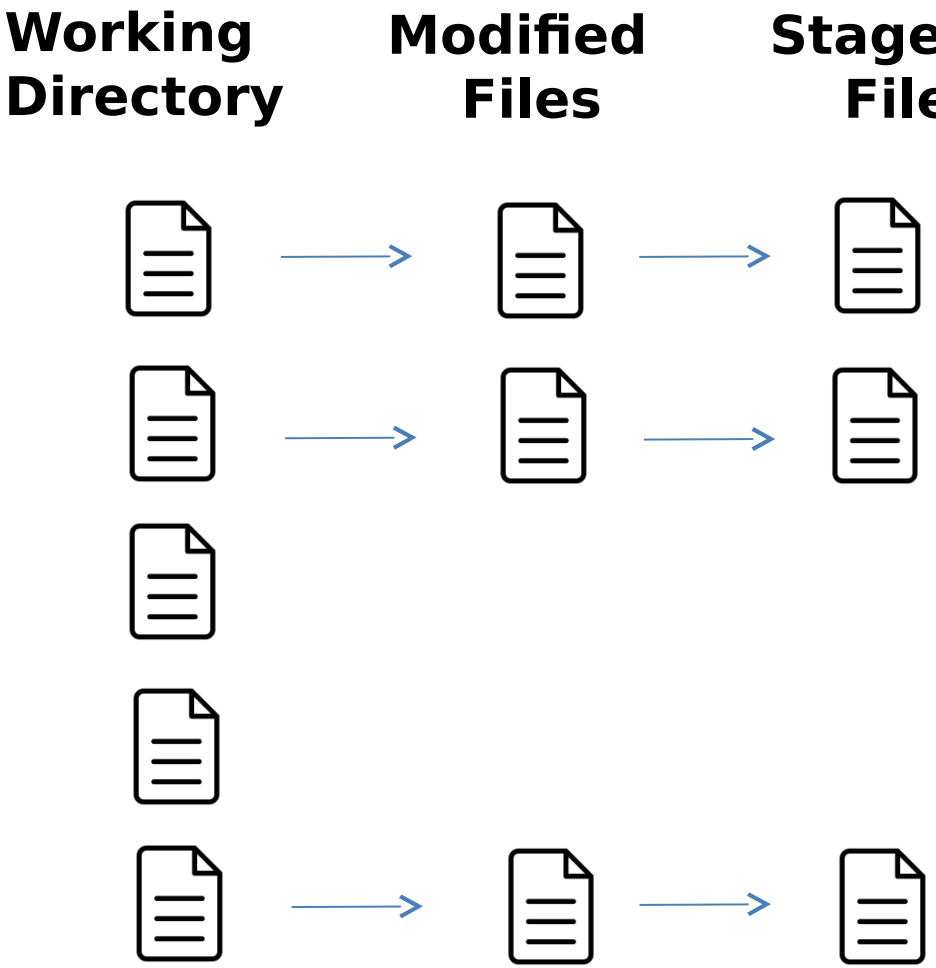
Git States

Working Directory

Modified Files



Git States



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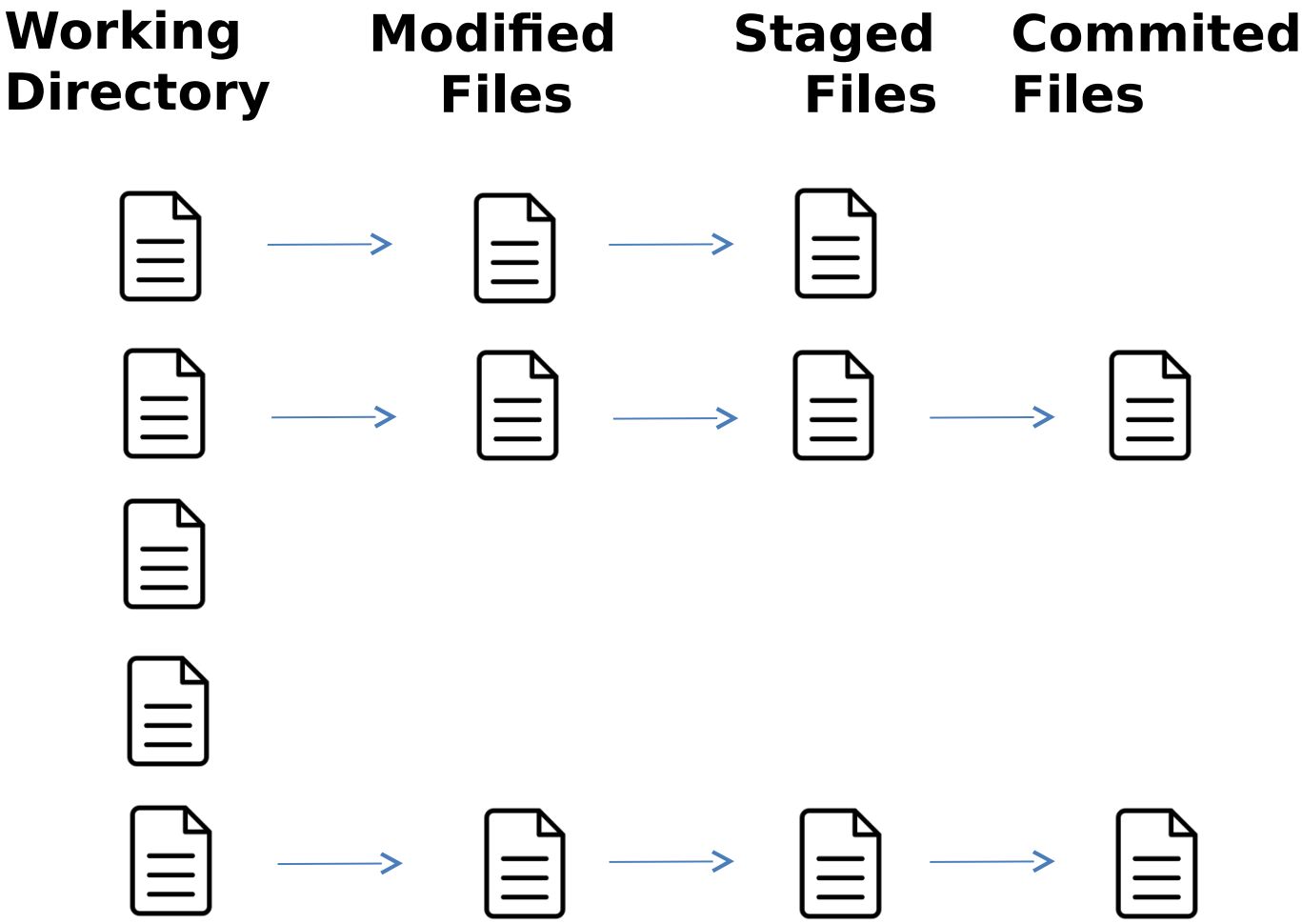
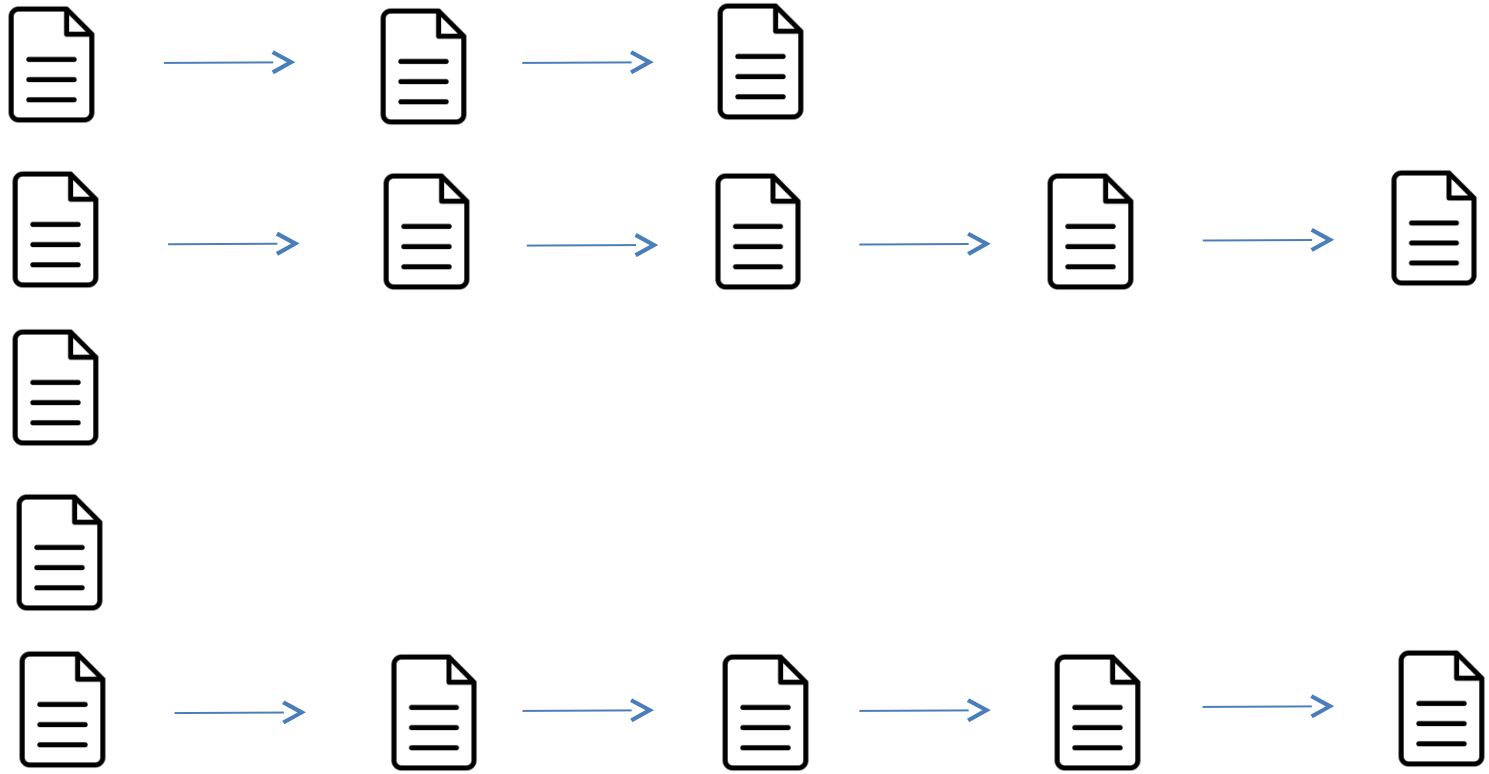
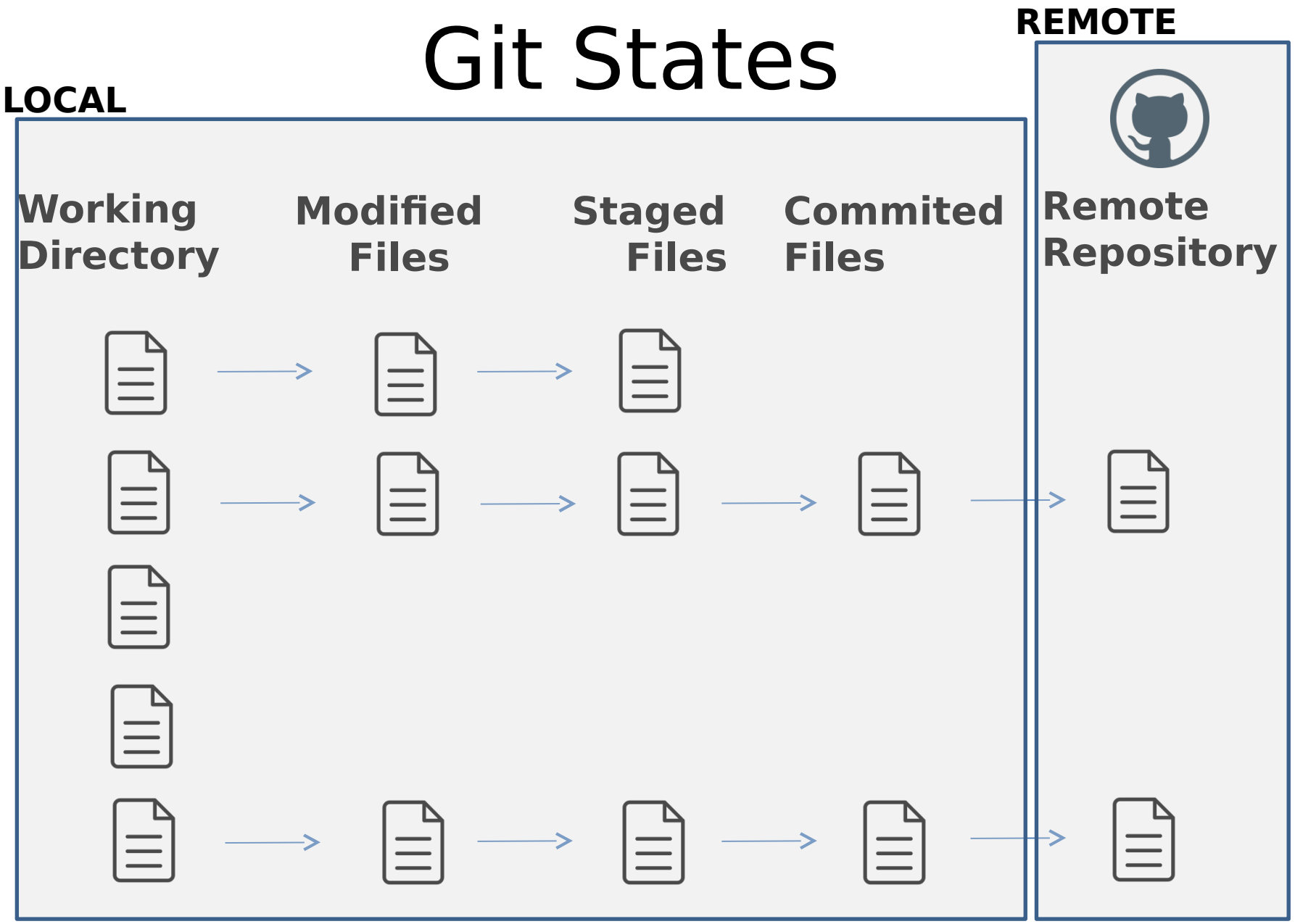

Working Directory
Modified Files
Staged Files
Commited Files

Git States

Working Directory | **Modified Files** | **Staged Files** | **Commited Files** | **Remote Repository**



Git States


LOCAL
REMOTE
Working Directory
Modified Files
Staged Files
Commited Files
Remote Repository

5. GitHub

- = Your Remote Repository on the web
- Free: Public Repositories
- Premium: Public + Private Repositories

- Public: Everybody can see your code
- Private: You decide who can see your code

- BitBucket.com: Free Private Repositories

6. Remote Repository Commands

- Clone
  - Download an entire remote repository as a local repository
- Fork
  - Download an entire remote repository as another remote repository
- Push
  - Uploading/Pushing our local repository to the remote server
- Pull
  - Downloading/Pulling the remote repository‘s latest changes into our local repository

Closer look at commits

- **A commit** contains:
  - A state of a directory
  - A pointer to its antecedent commit
- **A commit** is:
  - Identified by a **ref**
- **HEAD** is a pointer that is always pointing at the commit you are currently working on.

Ok ...

8. Lets **GIT** our hands dirty

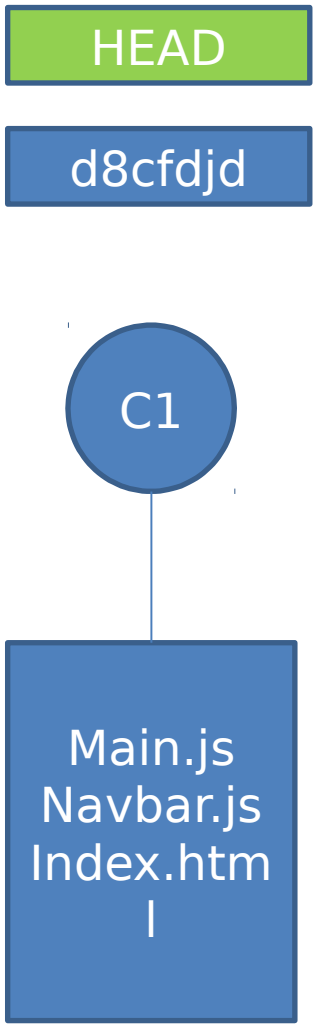
Preparations

http://blogs.pdmlab.com/alexander.zeitler/articles/installing-and-configuring-p4merge-for-git-on-ubuntu

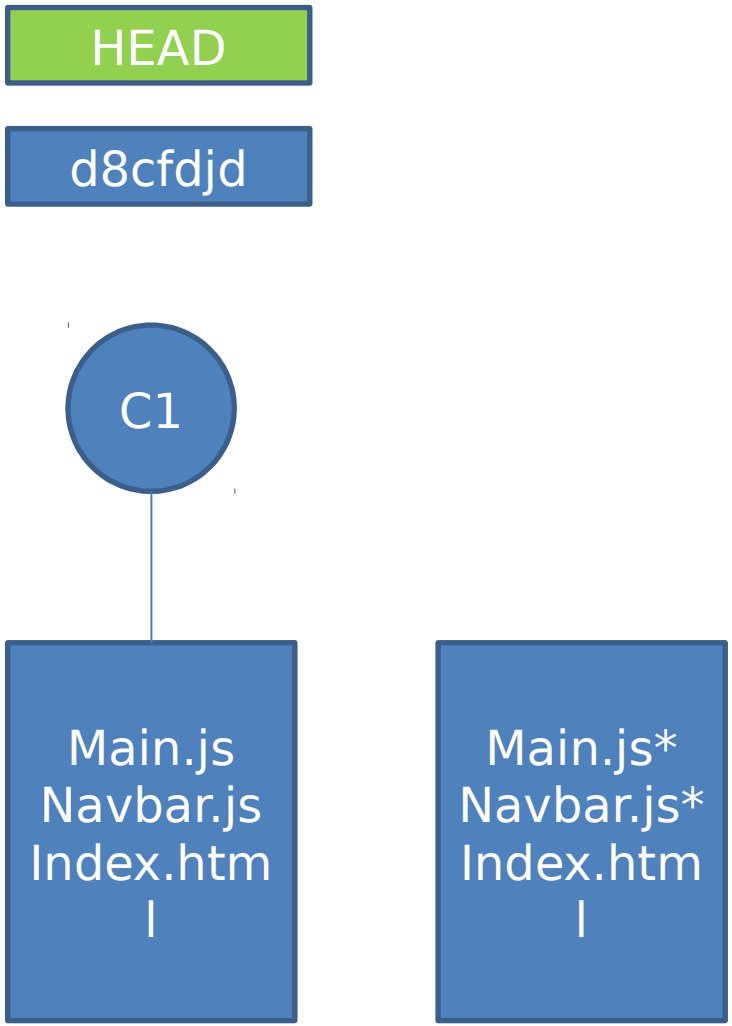
Let us install P4Merge together ...

Closer look at commits

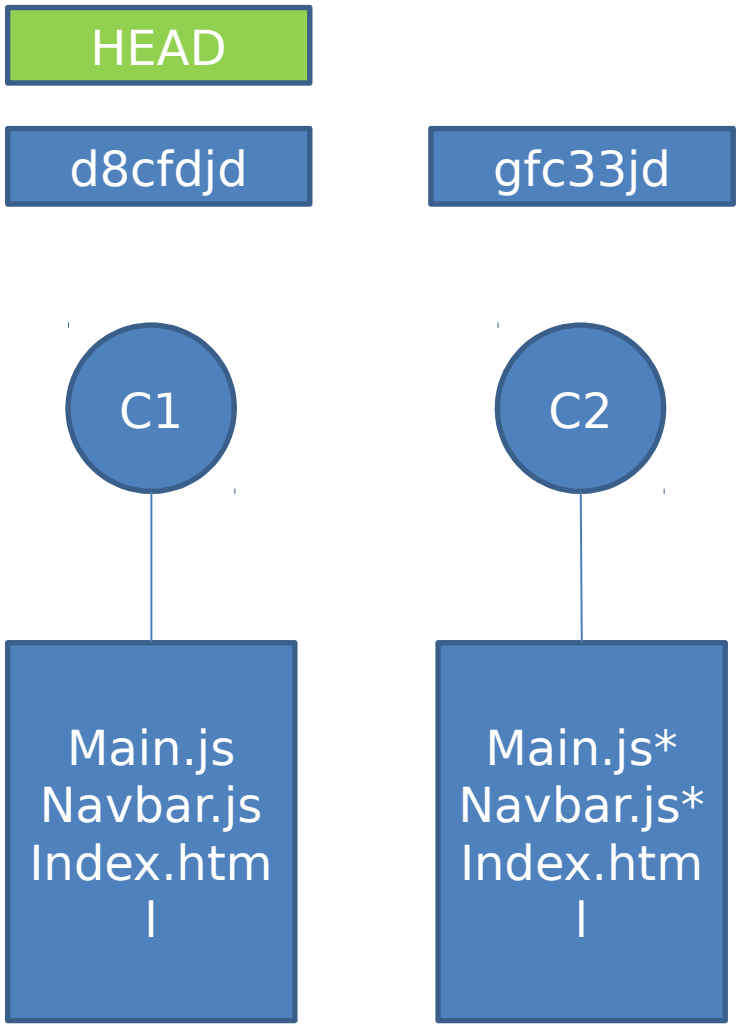
Closer look at commits



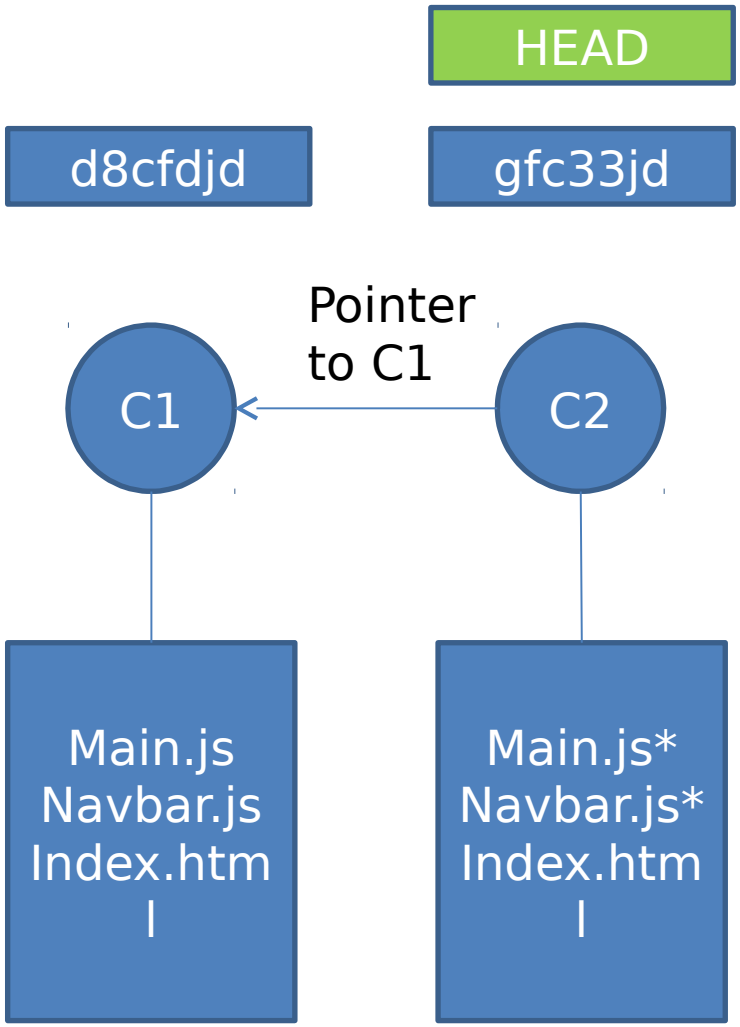
Closer look at commits



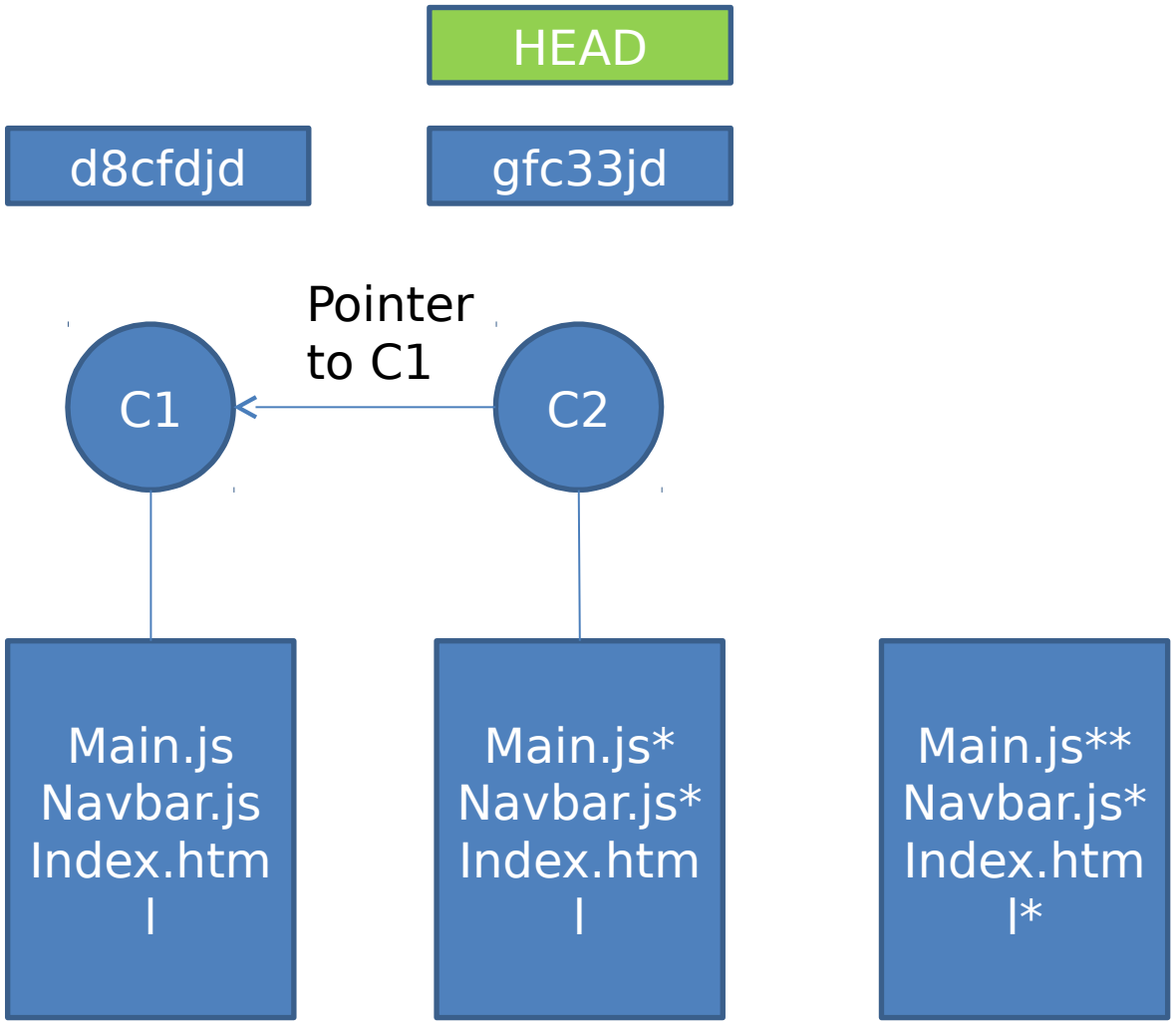
Closer look at commits



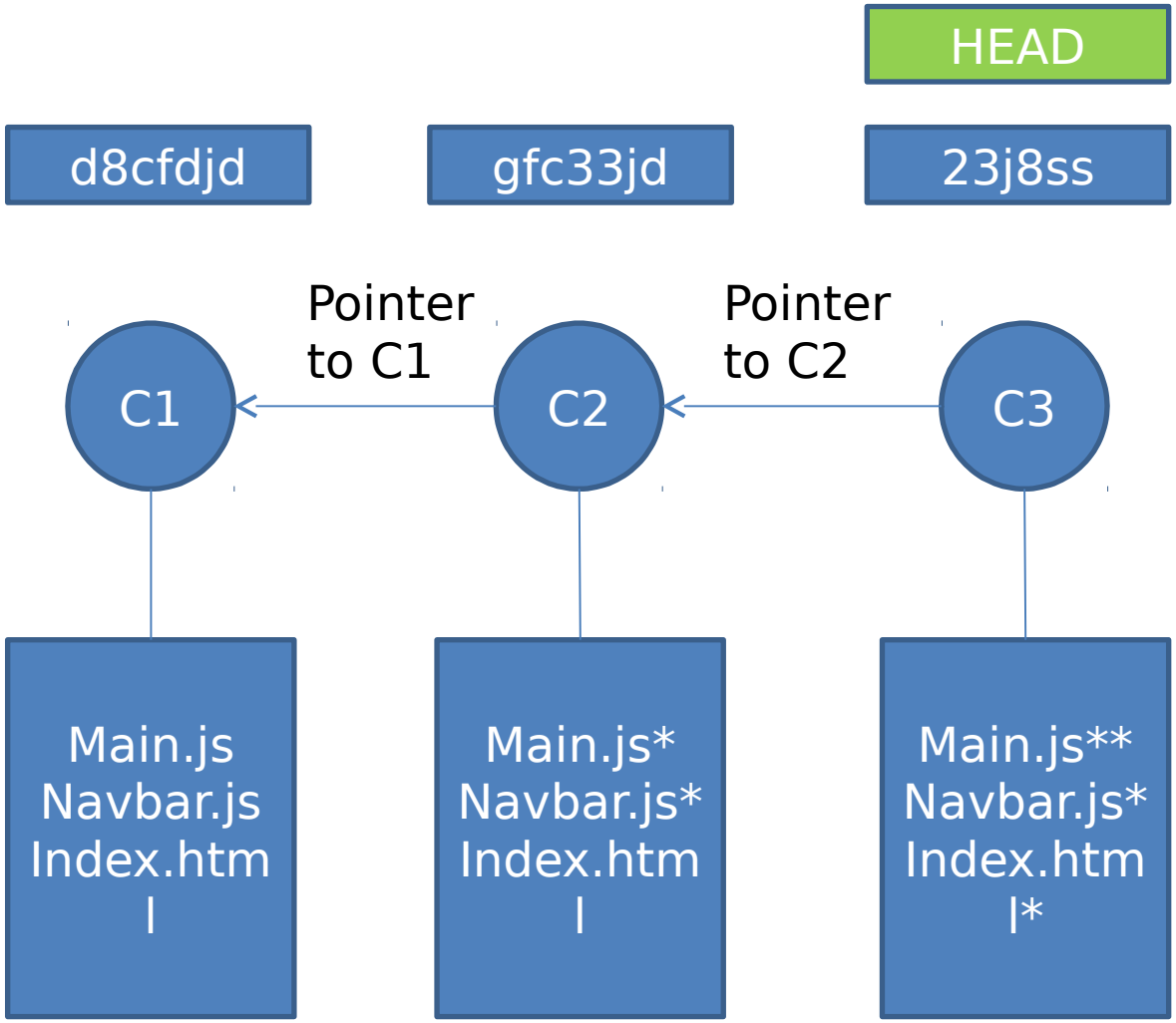
Closer look at commits



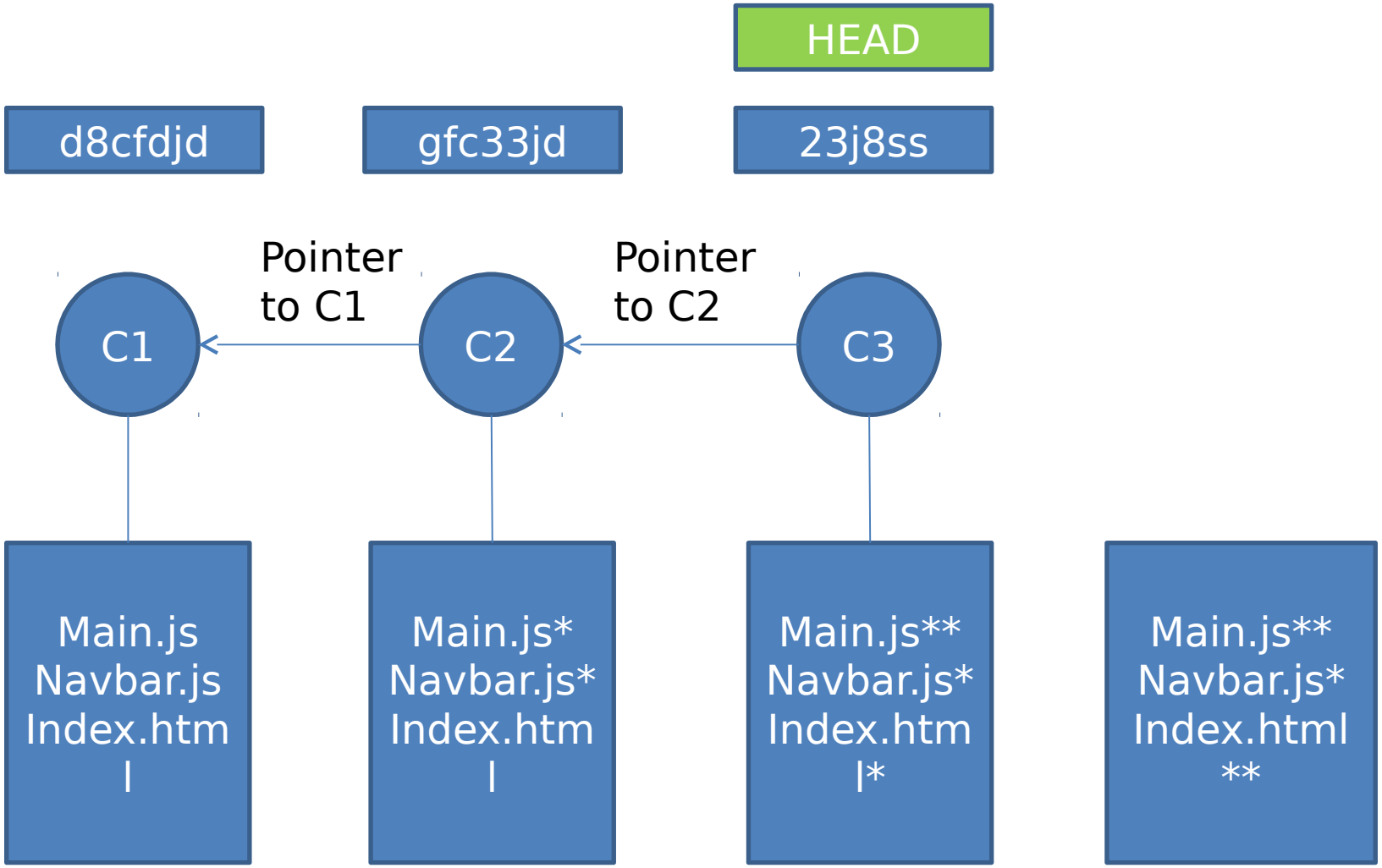
Closer look at commits



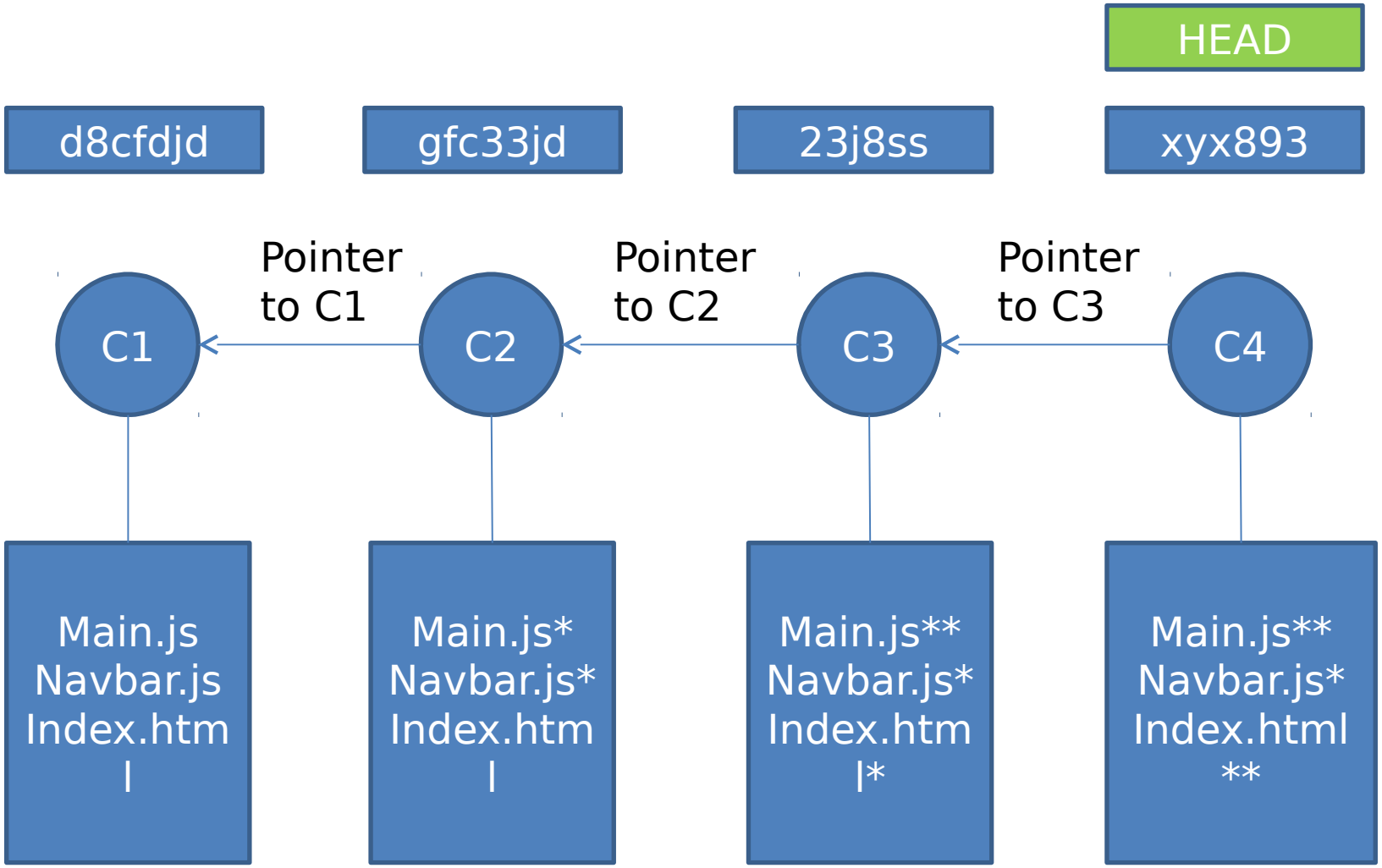
Closer look at commits



Closer look at commits



Closer look at commits



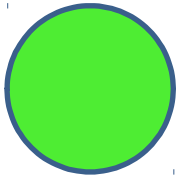
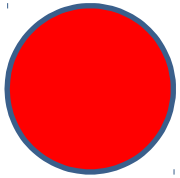
git add

	New Files	Modified Files	Deleted Files
git add –u		X	X
git add .	X	X	
git add -A	X	X	X

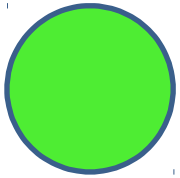
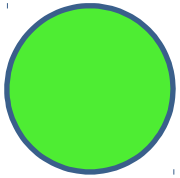
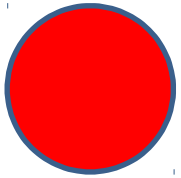
Git States

Working Directory	Staged Files	Commited Files	Remote Repository

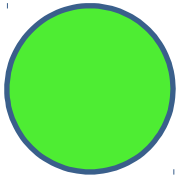
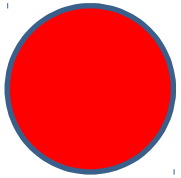
git diff

Working Directory	Staged Files	Commited Files	Remote Repository
			

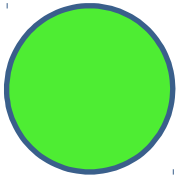
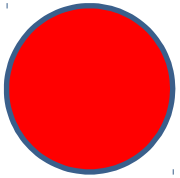
git diff HEAD~1

Working Directory	Staged Files	Commited Files	Remote Repository
			

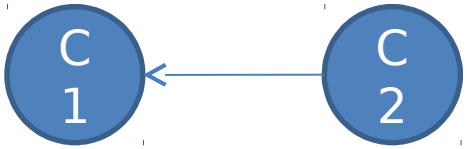
git diff --staged

Working Directory	Staged Files	Commited Files	Remote Repository
			

git diff master origin/master

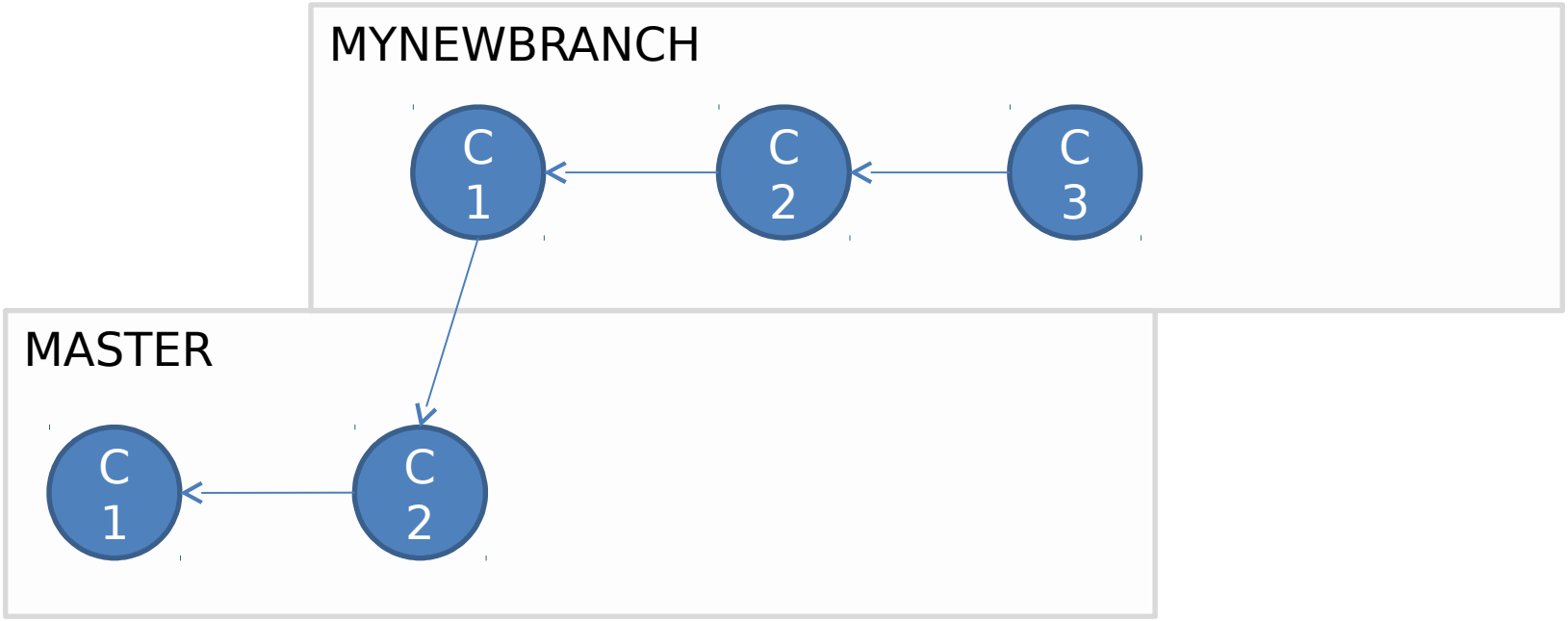
Working Directory	Staged Files	Commited Files	Remote Repository
			

Our branches so far ...

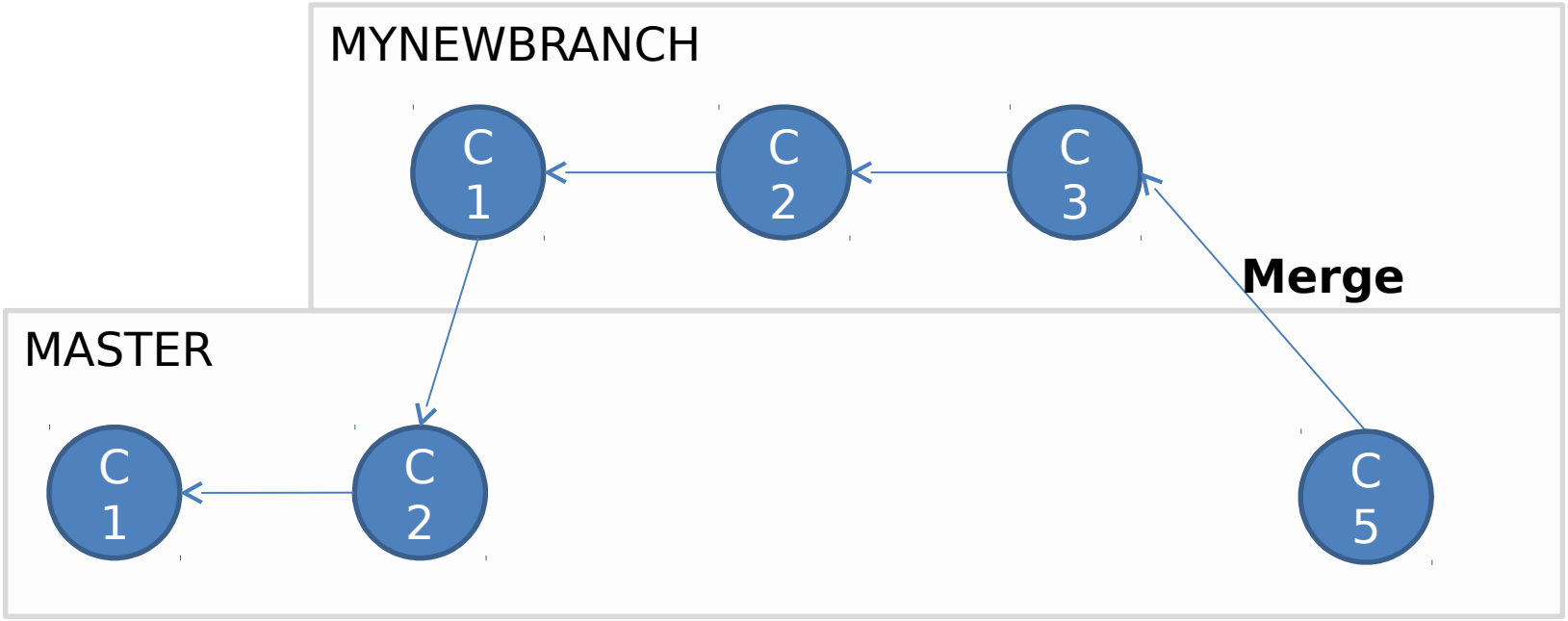


Our branches so far ...

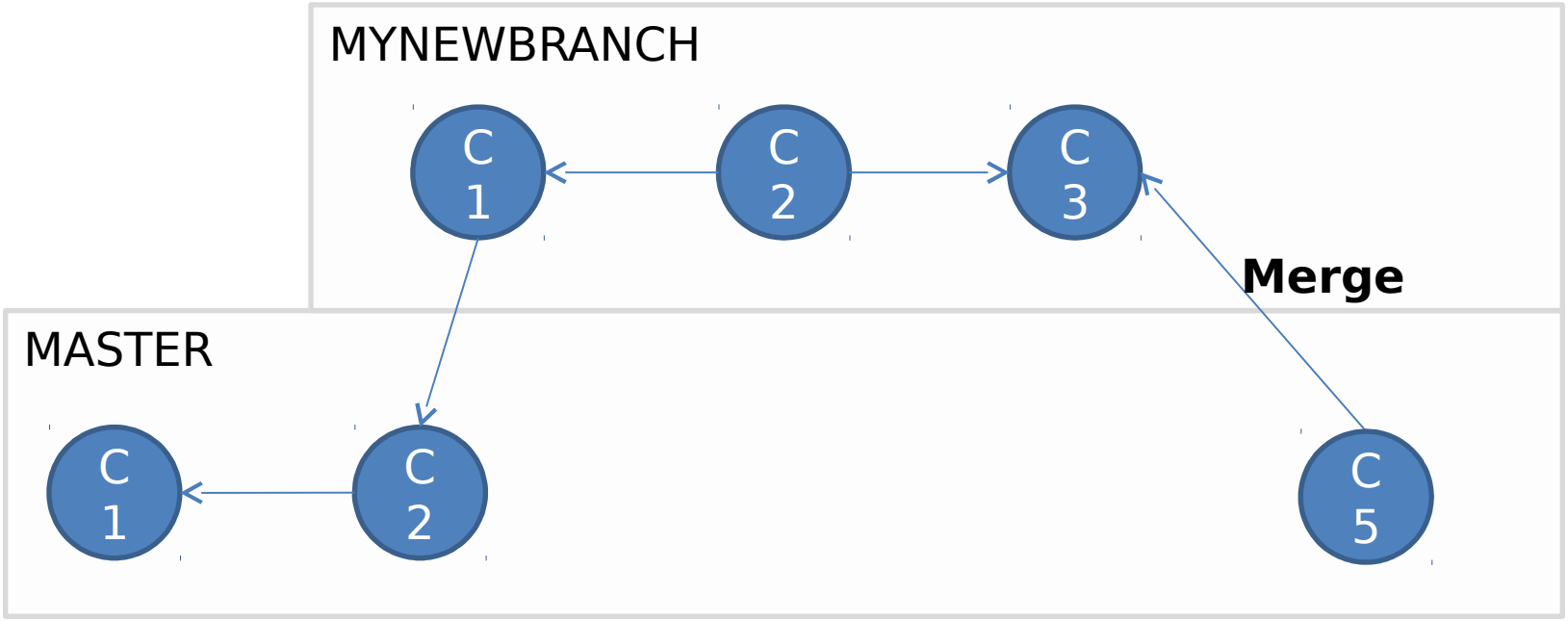
We need a new branch



We need a new branch



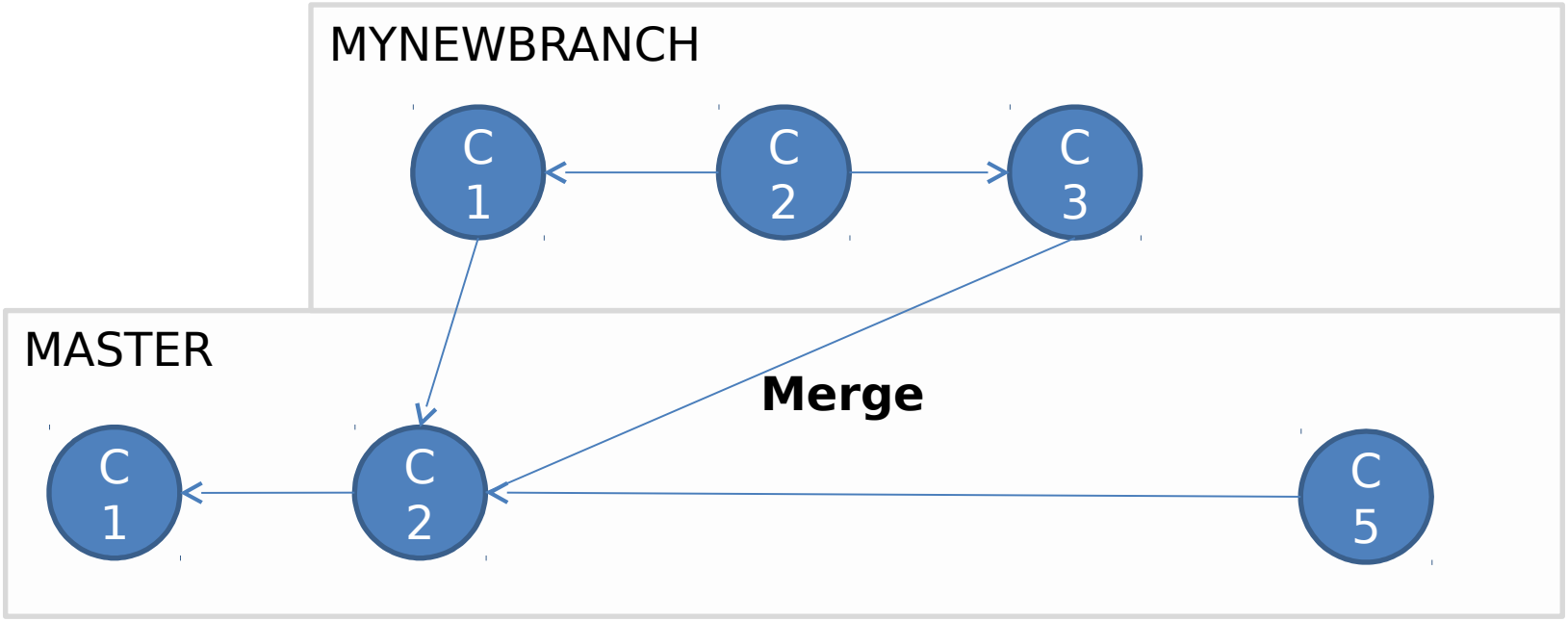
Fast Forward Merges



FAST FORWARD :

- Git sees two branches as one branch
- Only makes sense of no commits have been done on the master‘s branch meanwhile

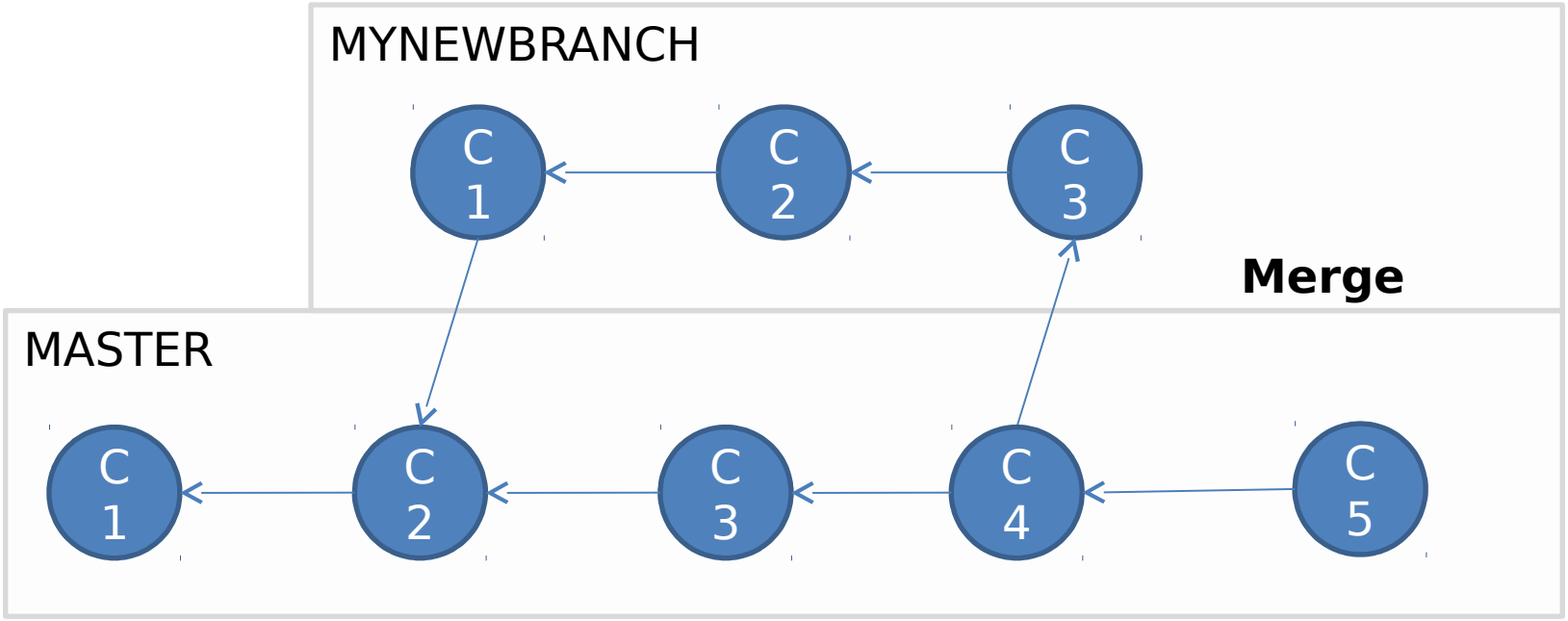
Disabled Fast Forward Merges



Disabled FAST FORWARD :

- C3 will be merged into C2

Disable Fast Forward Merges / Automatic Merges



Disabled FAST FORWARD :

- C3 will be merged into C4

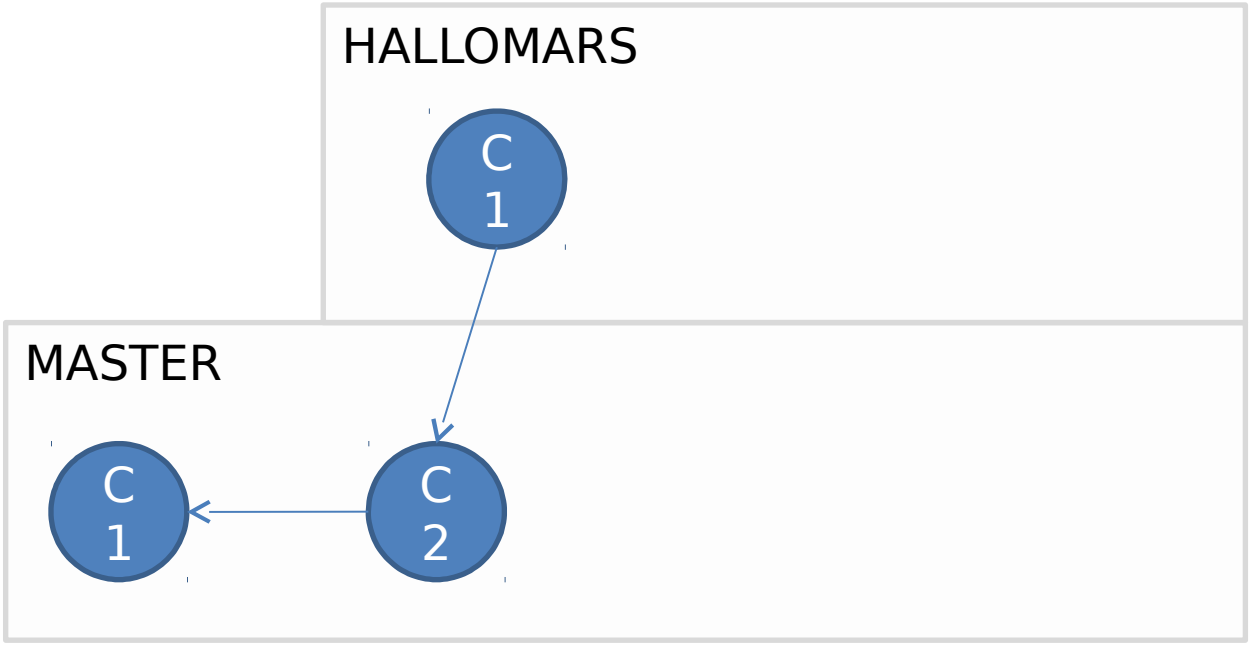
Merge Conflicts

Master C1 -> File index.html has been created

Merge Conflicts

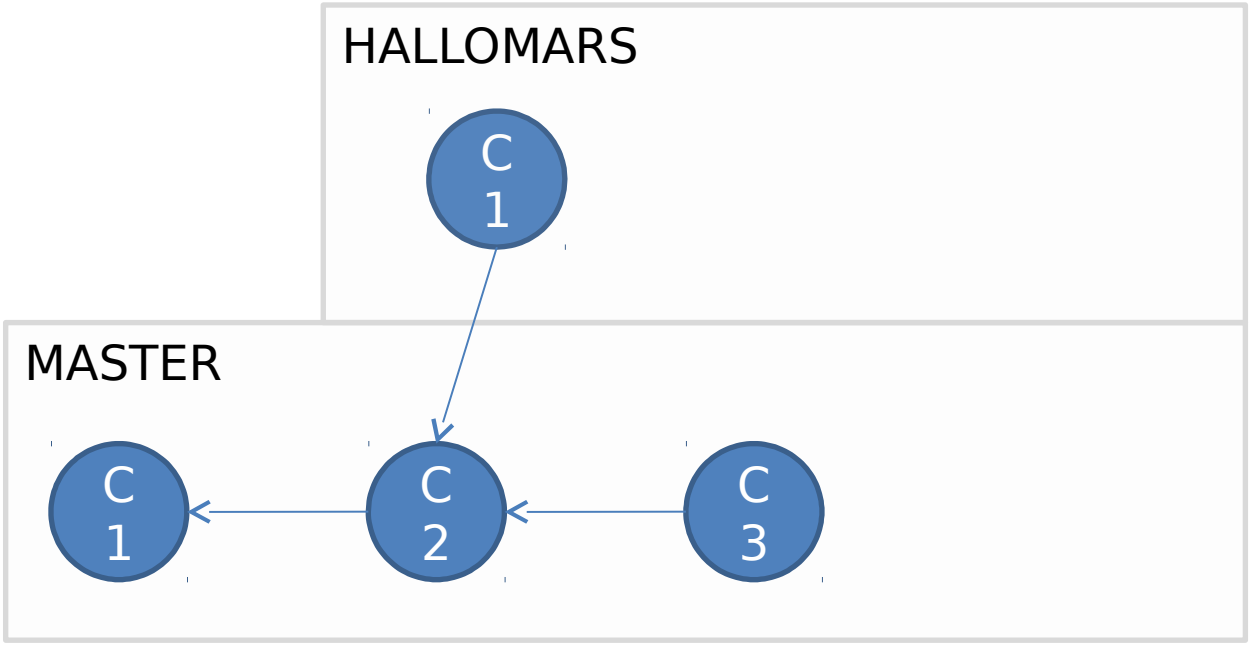
Master C2 -> We added **<h1>Hallo </h1>** to index.html on line 1

Merge Conflicts



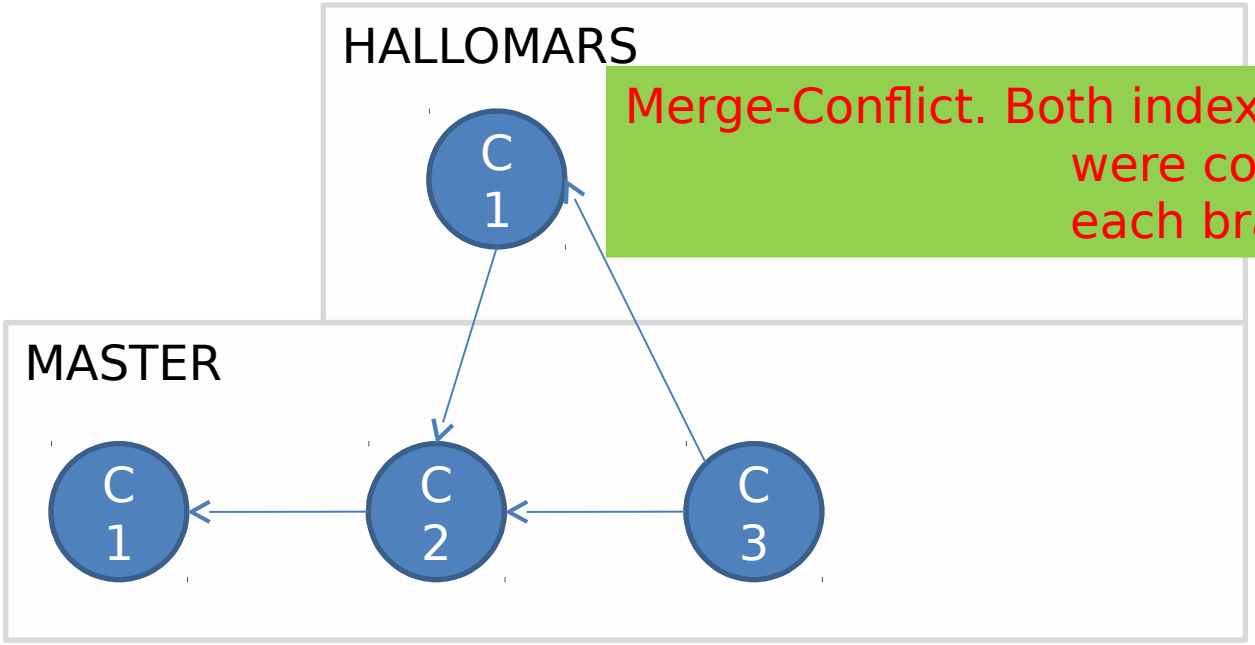
HalloMars C1 -> We changed line to **<h1>Hallo Mars</h1>**

Merge Conflicts



Master C3 -> We changed line to **<h1>Hallo World</h1>**

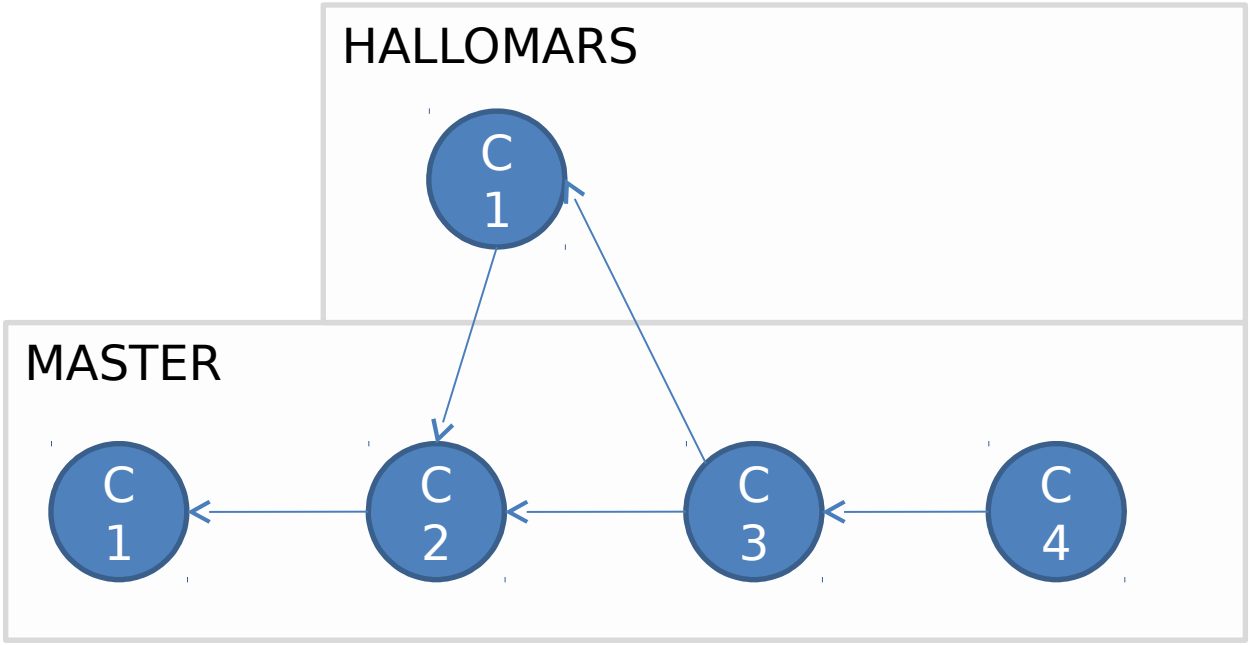
Merge Conflicts



Merge-Conflict. Both index.html versions were commited at least once each branch

Master C4 -> Merge HalloMars C1 into Master C3

Merge Conflicts



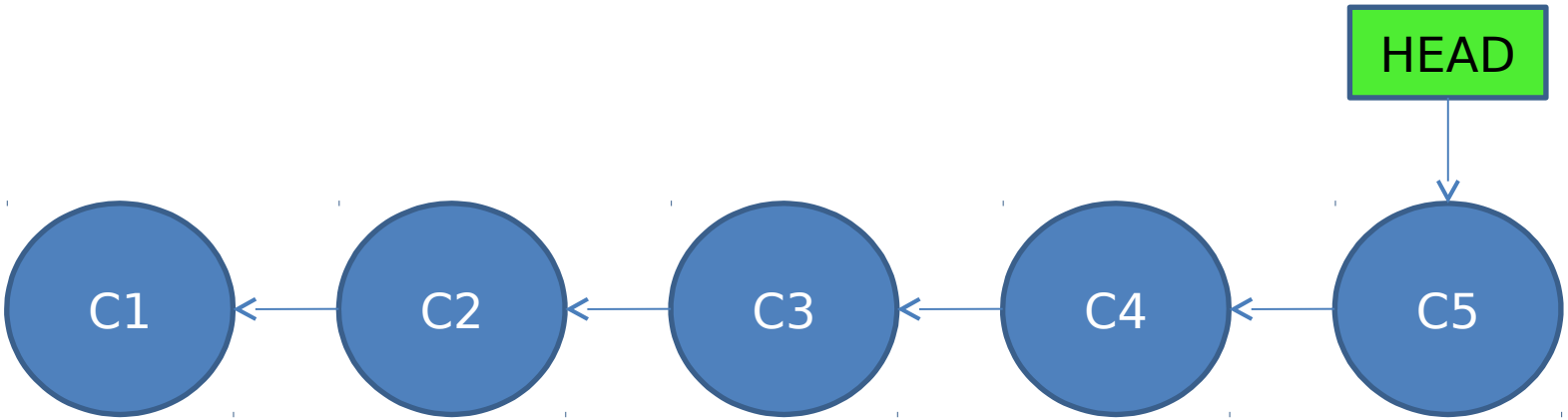
Master C4 -> Decided for Master C3 version.

Reverting Changes

- **Unstage files**
  - git reset <filename>
  - git reset .
- **Undo Changes** in the working directory
  - git checkout -- <filename>
  - git checkout -- .

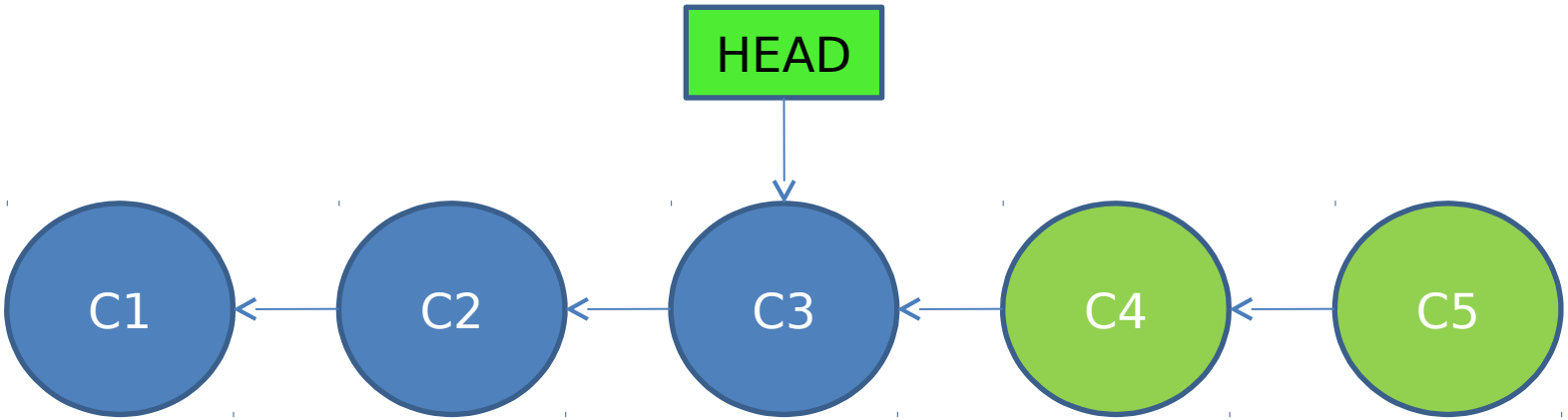
Reverting Changes

- **<u>Our goal</u>**: we want to get back to C3



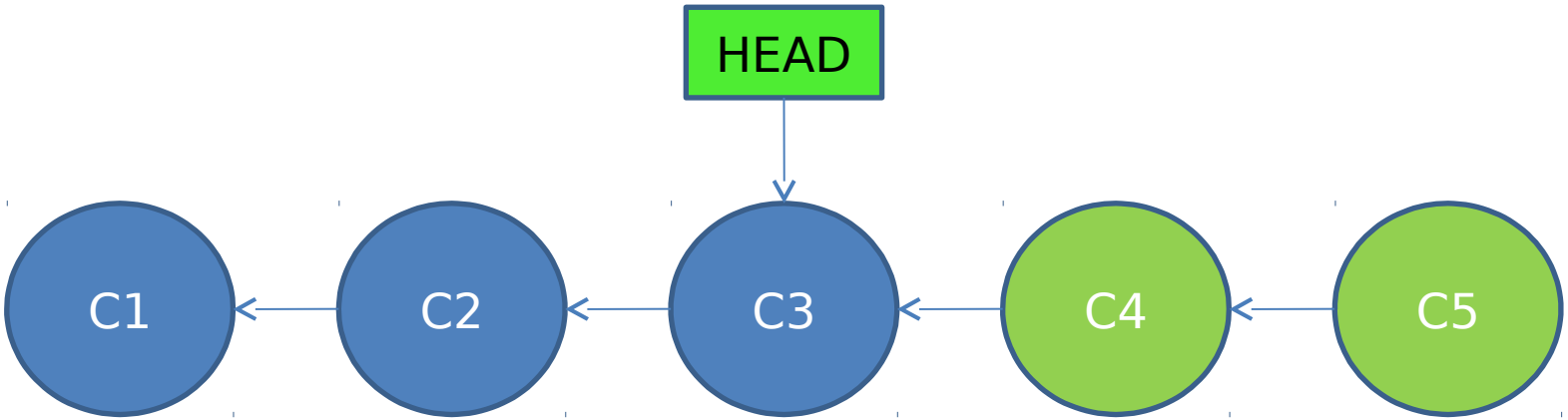
Reverting Changes

- **Option 1: Hard Reset**
  - We just move our head back to C3 and ignore the following commits



Reverting Changes

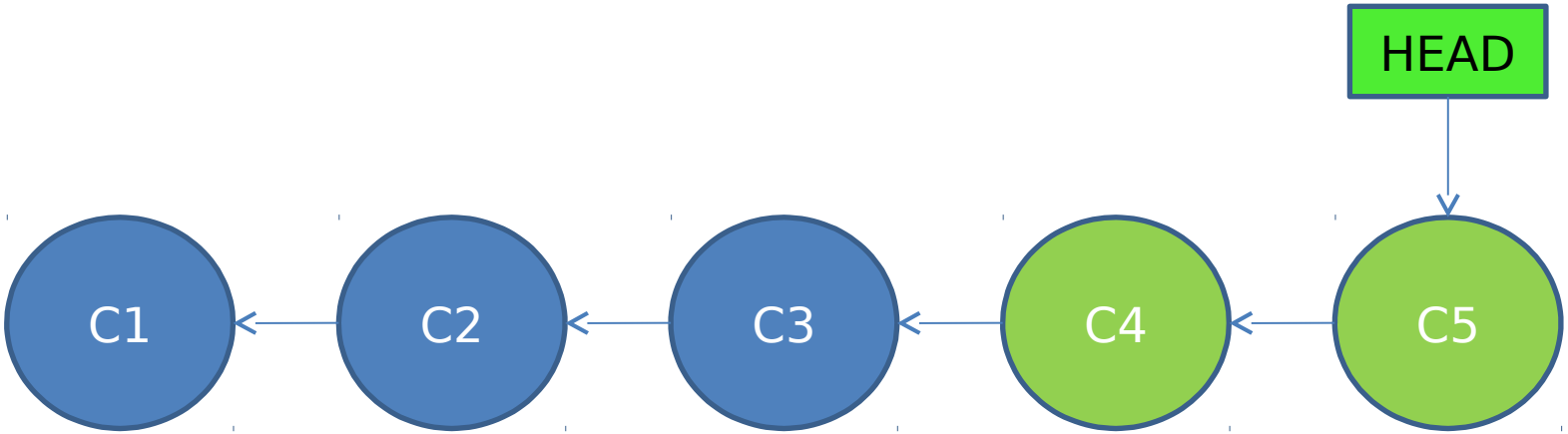
- **Option 1: Hard Reset**
  - We just move our head back to C3 and ignore the following commits



Problem: If the commits C4 and C5 are already in the remote repository, pushing does not work anymore!

Reverting Changes

- **Option 2: Branching with Checkout**
  - We checkout



7. Remote and Local Repository Commands