WEEK 3

MACHINE LEARNING OPERATIONS

UNLIMITED

Presented by **Asst. Prof. Dr. Tuchsanai Ploysuwan**

Week 3
Branches and Working with Others

Week 3 Branches and Working with Others

- **Week 3 Topics:**
  - Master/Main Branch and Branches
  - Understanding HEAD
  - Git Branch Commands:
    - **git branch**, **git switch**, **git checkout**
  - Delete or Rename Branch
  - Merging Branches and Conflicts
  - Exercise and Solution

Week 3
Branches

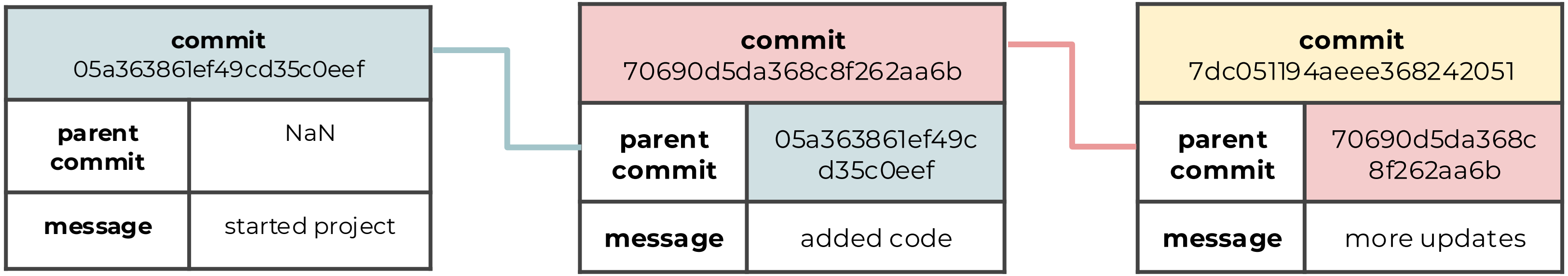
Week 3 Branches and Working with Others

- **Commit Process**
  - As we create commits, we are linking to a parent commit, showing the log of the commit history.

commit 05a363861ef49cd35c0eef	
parent commit	NaN
message	started project

Week 3 Branches and Working with Others

- **Commit Process**
  - As we create commits, we are linking to a parent commit, showing the log of the commit history.



commit 05a363861ef49cd35c0eef	
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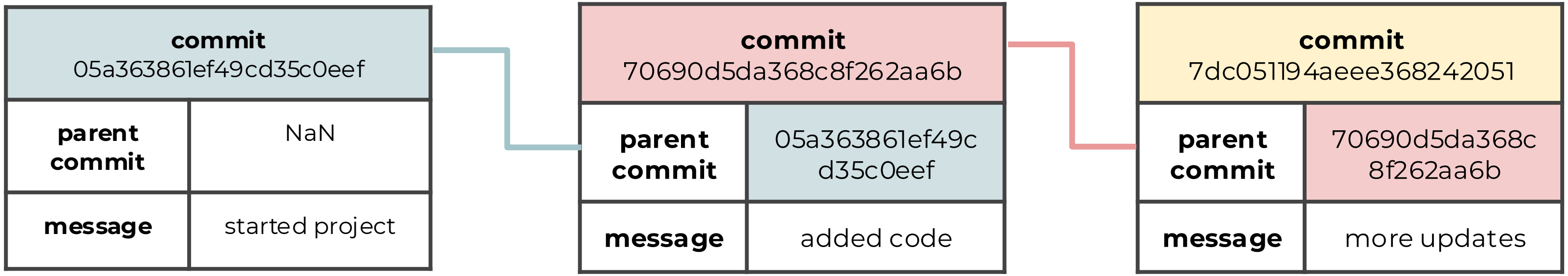
commit 70690d5da368c8f262aa6b	
parent commit	05a363861ef49cd35c0eef
message	added code

commit 7dc051194aeee368242051	
parent commit	70690d5da368c8f262aa6b
message	more updates

Week 3 Branches and Working with Others

- **Commit Process**
  - As we need incorporate the workflows of others or be able to focus on new updates without breaking old code, we need **branches**.



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Week 3 Branches and Working with Others

- **Branches**
  - A branch represents an independent line of development.
  - Branches serve as an abstraction for the edit/stage/commit process.
  - They are a way to request a brand new working directory, staging area, and project history.

Week 3 Branches and Working with Others

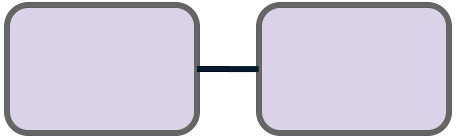
- **Branches**
  - Branches are just pointers to commits.
  - When you create a branch, all Git needs to do is create a new pointer, it doesn’t change the repository in any other way.
  - Let’s explore why branches are useful for workflows...

Week 3 Branches and Working with Others

- **Branches**

Week 3 Branches and Working with Others

- Branches



Week 3 Branches and Working with Others

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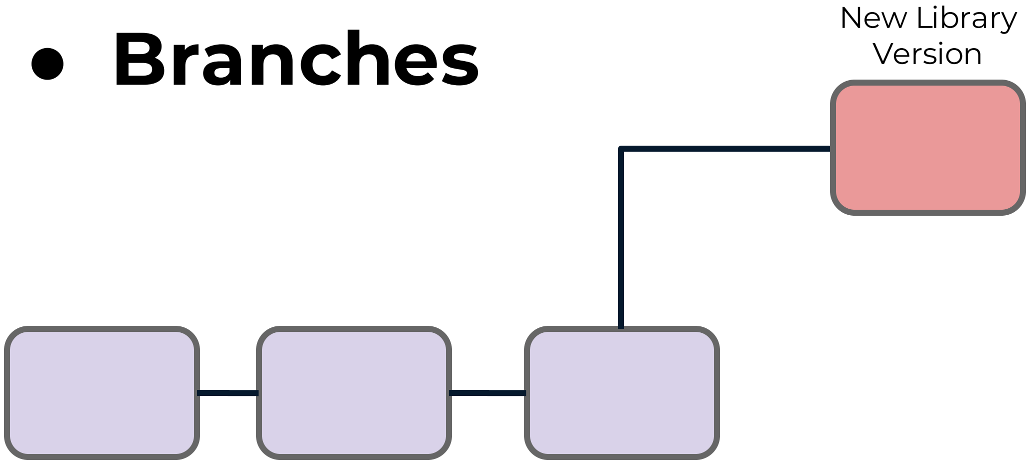

Week 3 Branches and Working with Others

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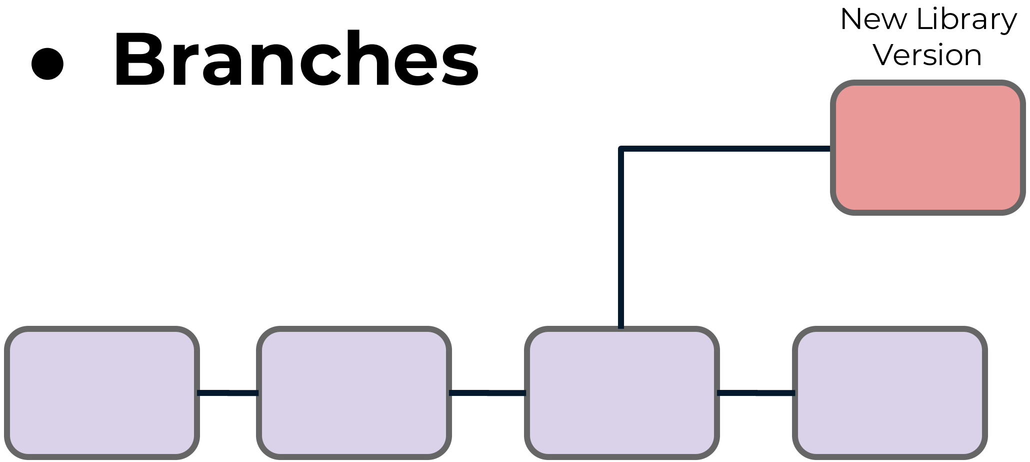

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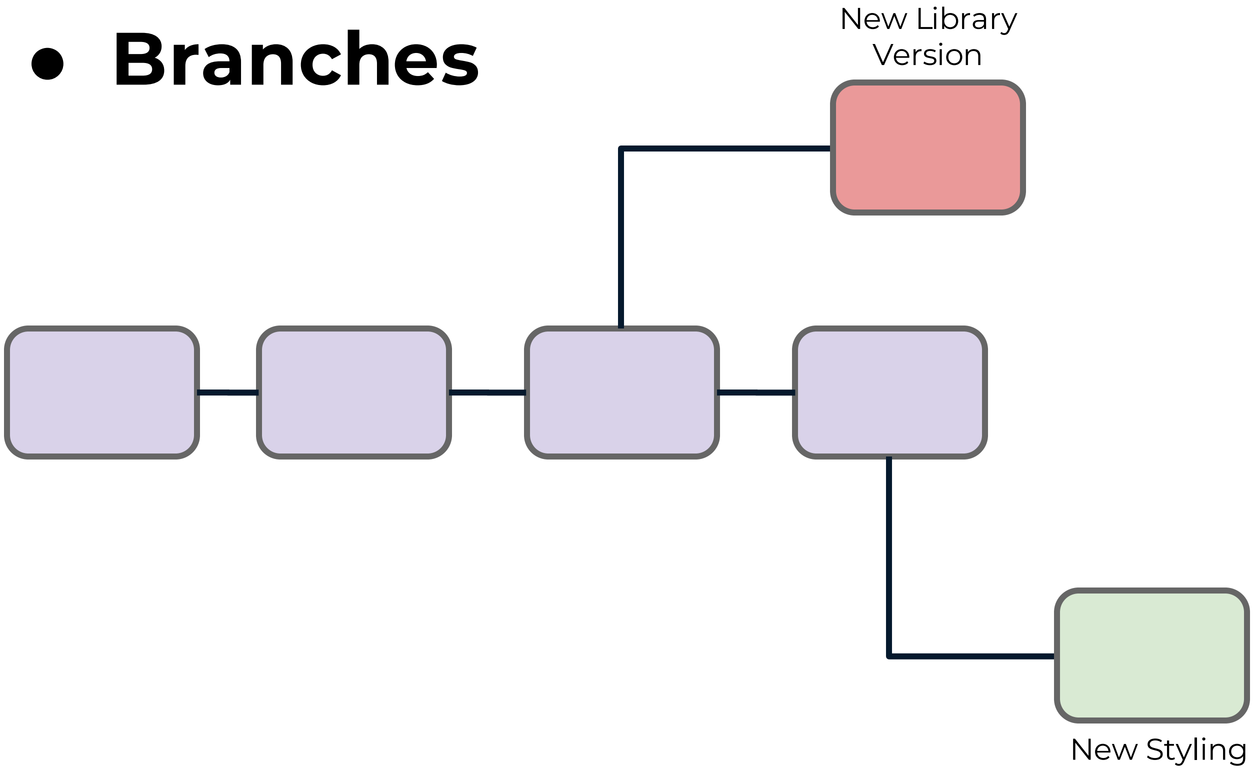

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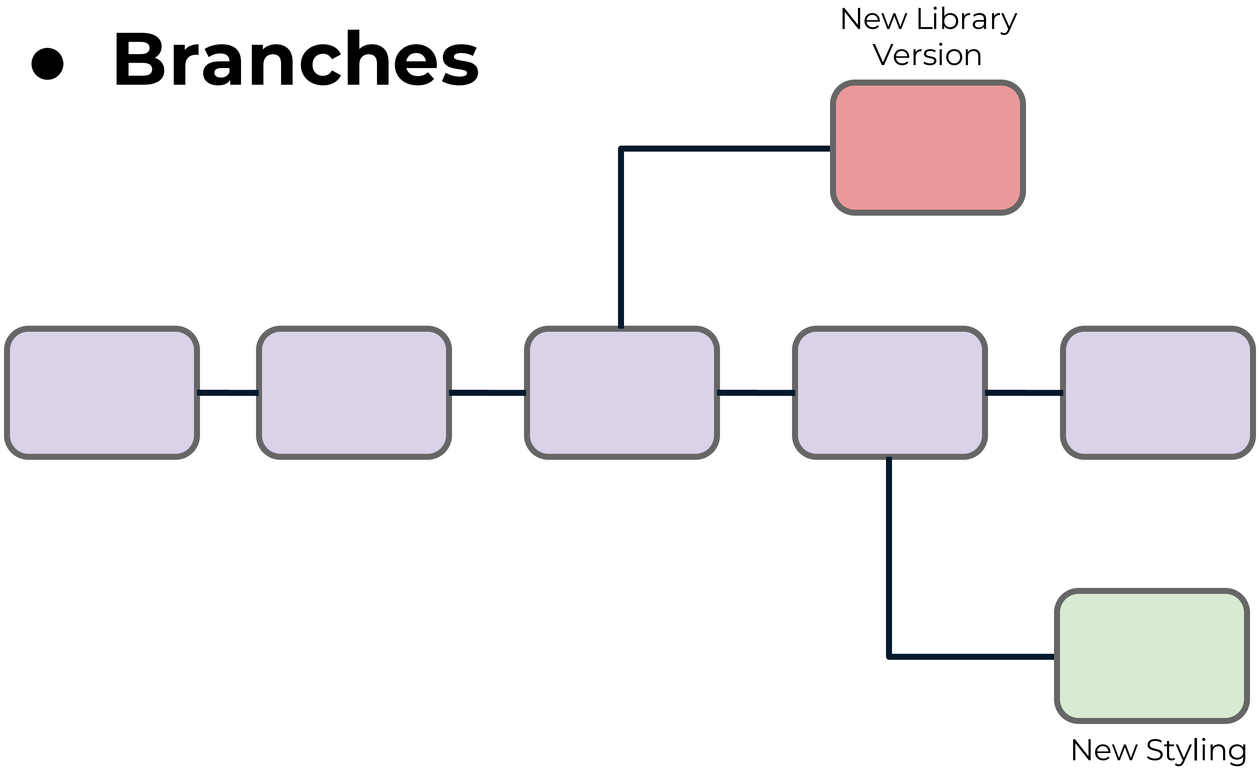

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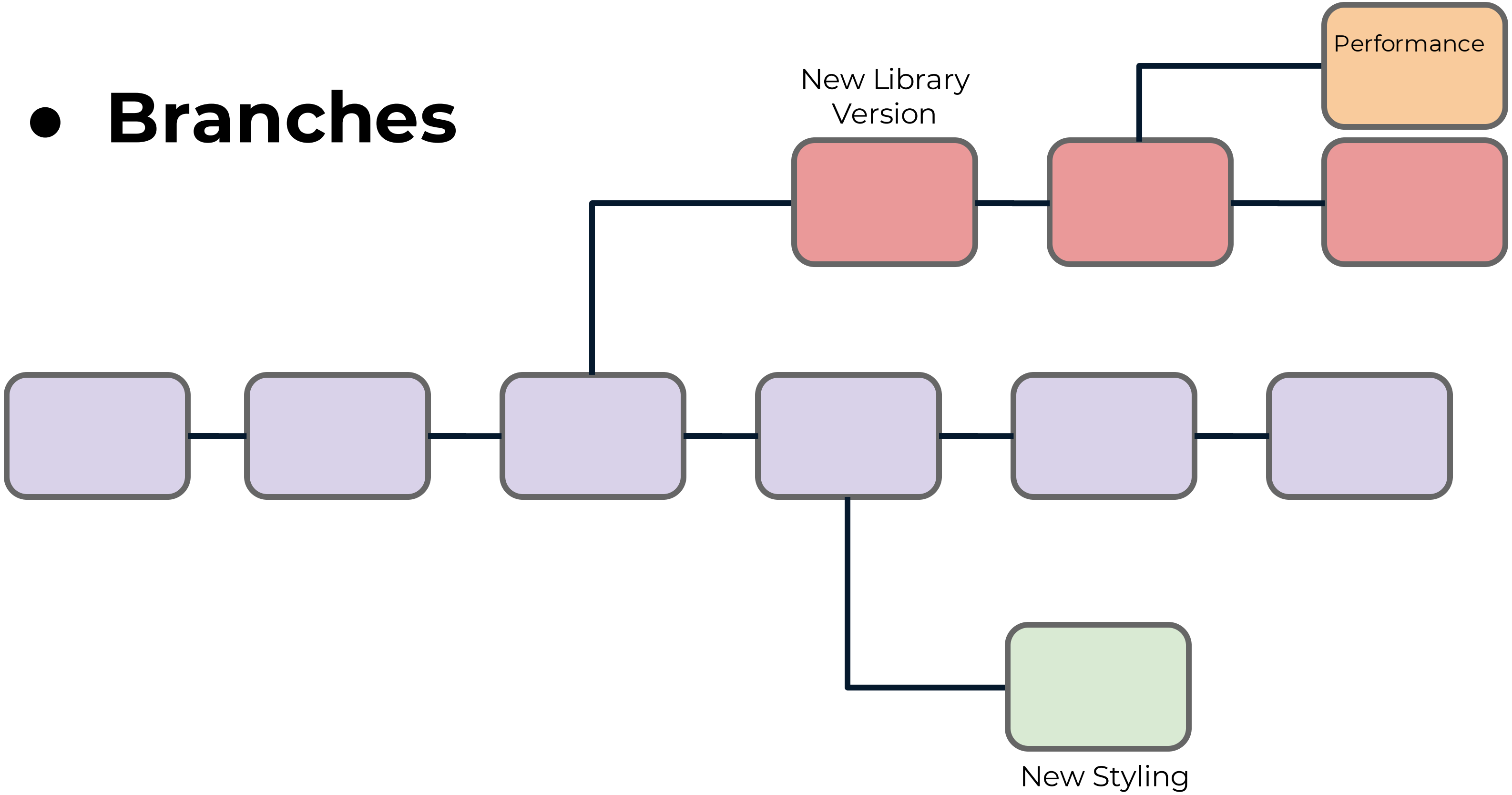

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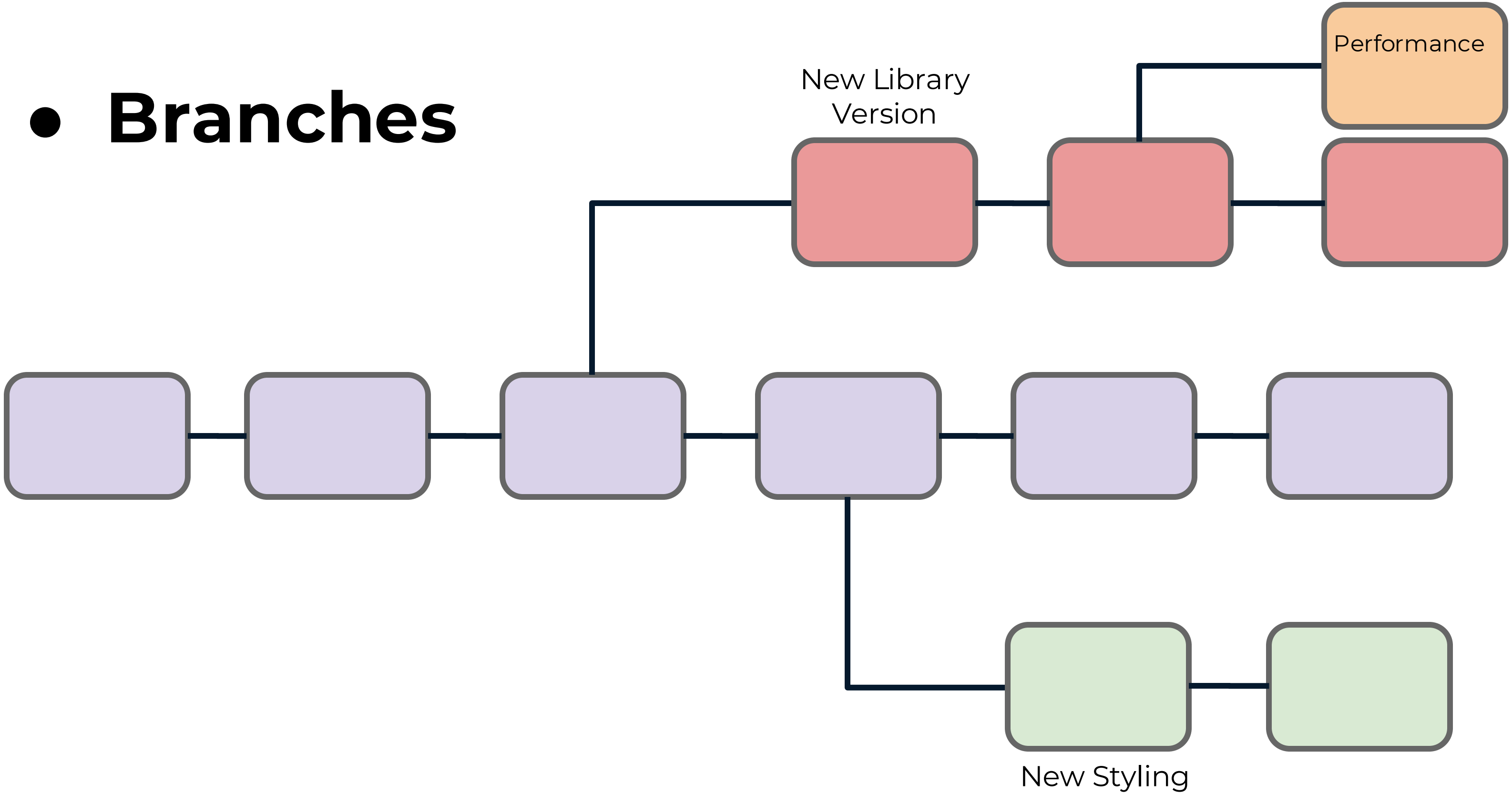

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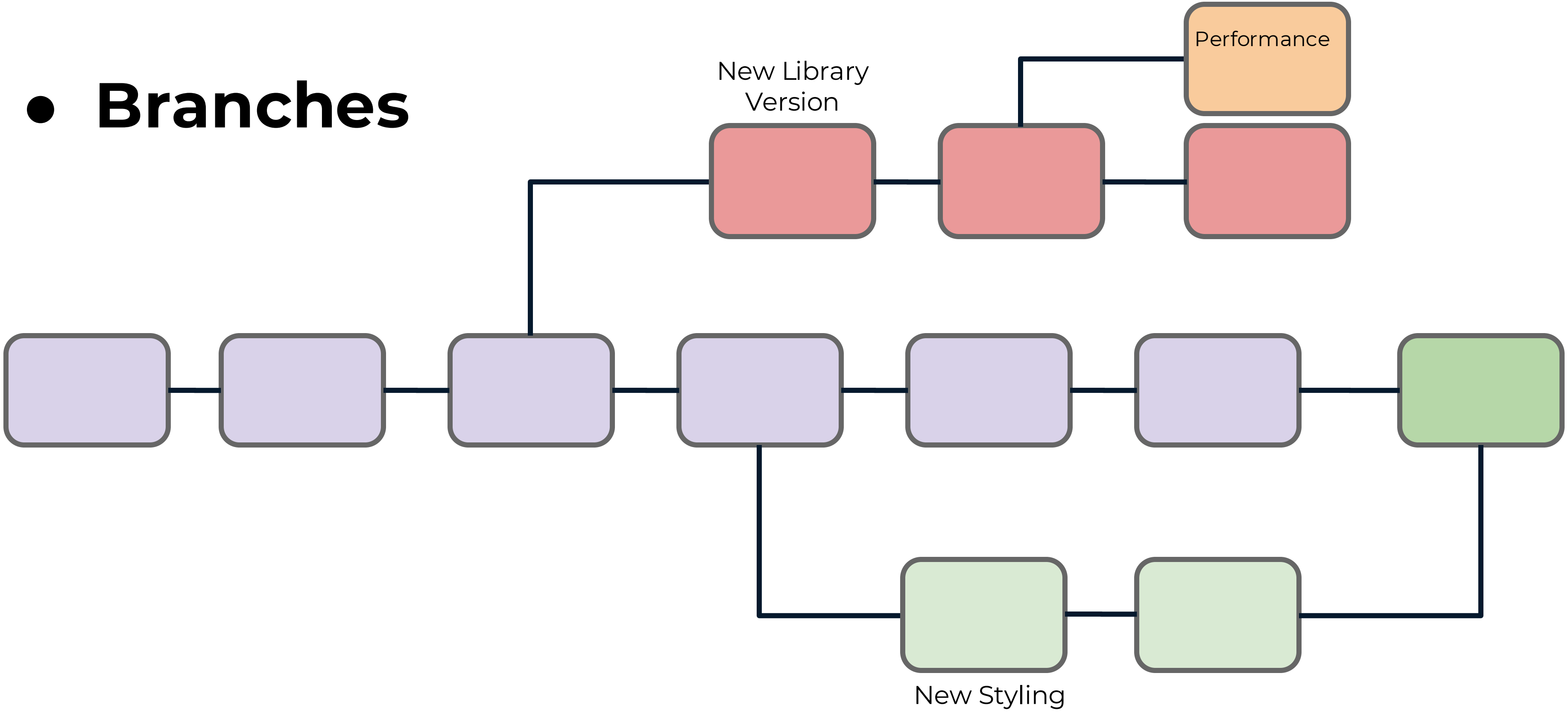

Week 3 Branches and Working with Others

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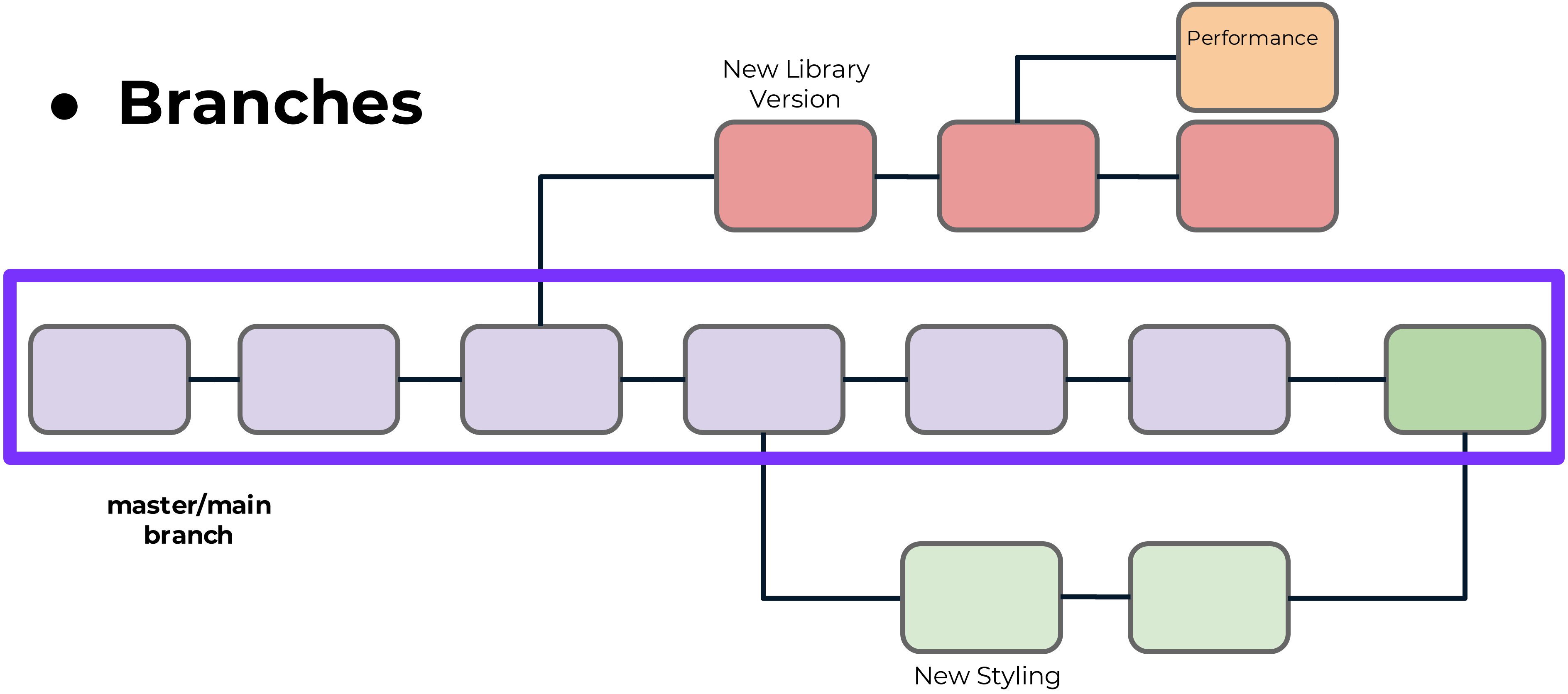
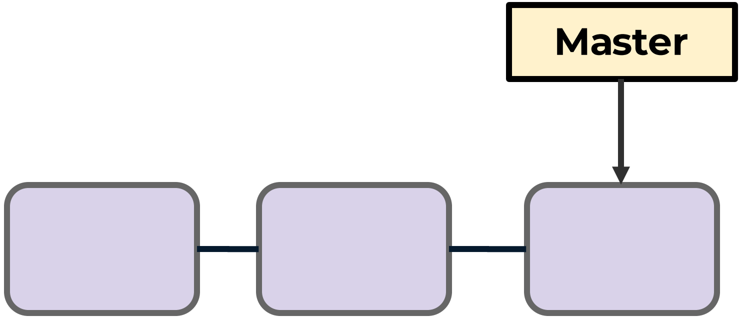


Week 3 Branches and Working with Others

- **Creating a New Branch**
  - Before we conclude, let’s quickly go into more detail about what happens when first create a new branch.
  - Branches are just pointers to commits.
  - When you create a branch, all Git needs to do is create a new pointer, it doesn’t change the repository in any other way.

Week 3 Branches and Working with Others

- **Creating a New Branch**



Week 3 Branches and Working with Others

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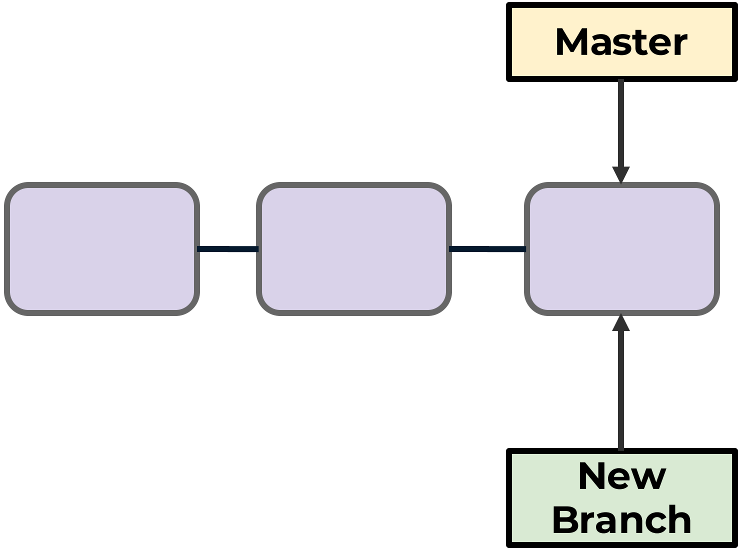

Week 3 Branches and Working with Others

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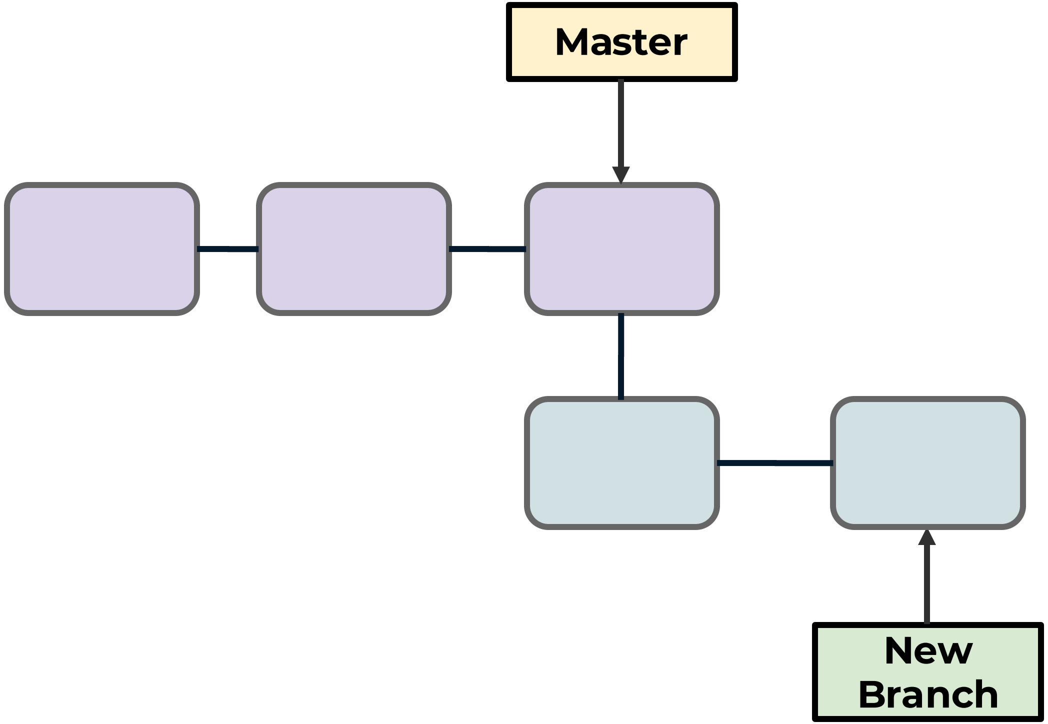


Week 3 Branches and Working with Others

- Now that we’ve seen how branches point to commits, we need to learn about HEAD.
- HEAD will help us understand what we are currently “viewing” or where we are “located” in regards to branches and commits.

Week 3 Branches and Working with Others

- **Up Next:**
    - We’ll explore and visualize specific actions and commands related to branches, including **HEAD, git checkout, git branch, git switch**, and more.

Week 3
Understanding HEAD

Week 3 Branches and Working with Others

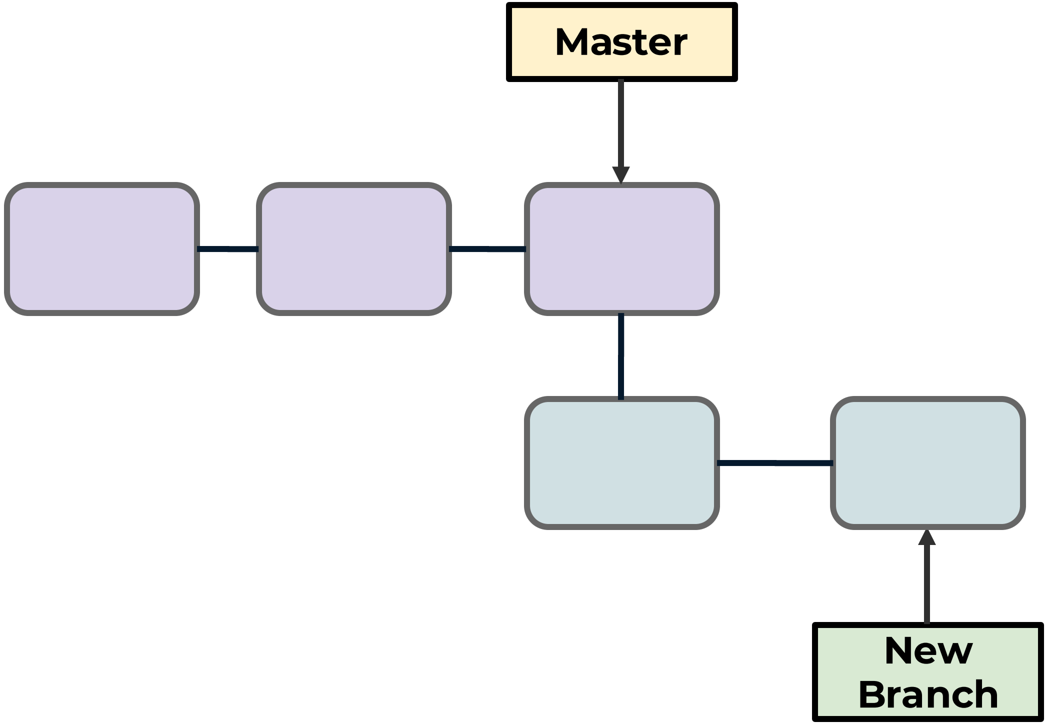
- **Branches**
  - As we work more with branches, you will probably notice a term show up during your commits: **HEAD**.
  - When viewing the most recent commit using **git log** you may see:
    - **commit 05as..3e2 (HEAD -> master)**

Week 3 Branches and Working with Others

- **HEAD**
  - In all of our examples so far, HEAD has always been pointing to the most recent commit in the master branch.
    - **HEAD -> master**

Week 3 Branches and Working with Others

- **Recall we have branch points (references)**



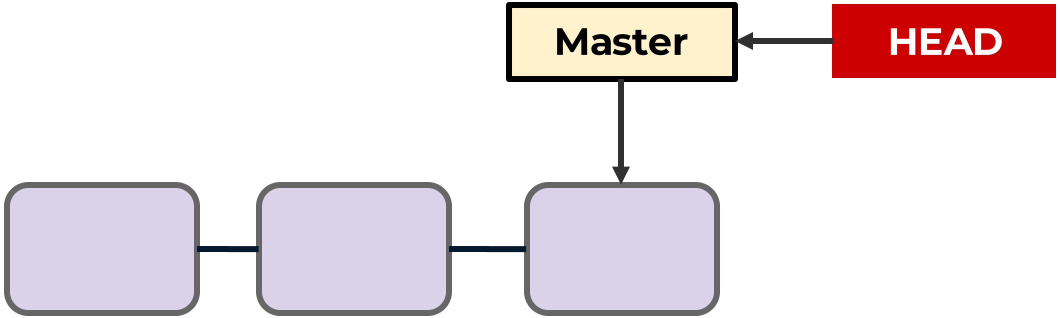
Week 3 Branches and Working with Others

- **Branches and Commits**
  - Git stores a branch as a reference to a commit.
  - In this sense, a branch represents the tip of a series of commits—it's not a container for commits.
  - The history for a branch is extrapolated through the commit relationships.

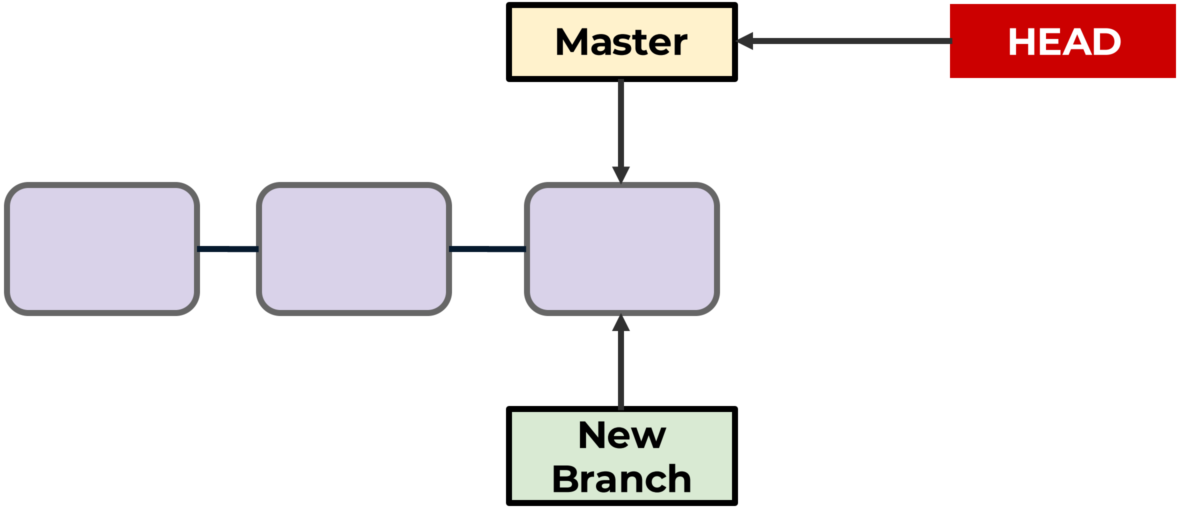
Week 3 Branches and Working with Others

- **HEAD**
  - A HEAD is simply a reference to a commit object.
  - We can think of HEAD as pointing to a specific commit in a branch that we are currently viewing.

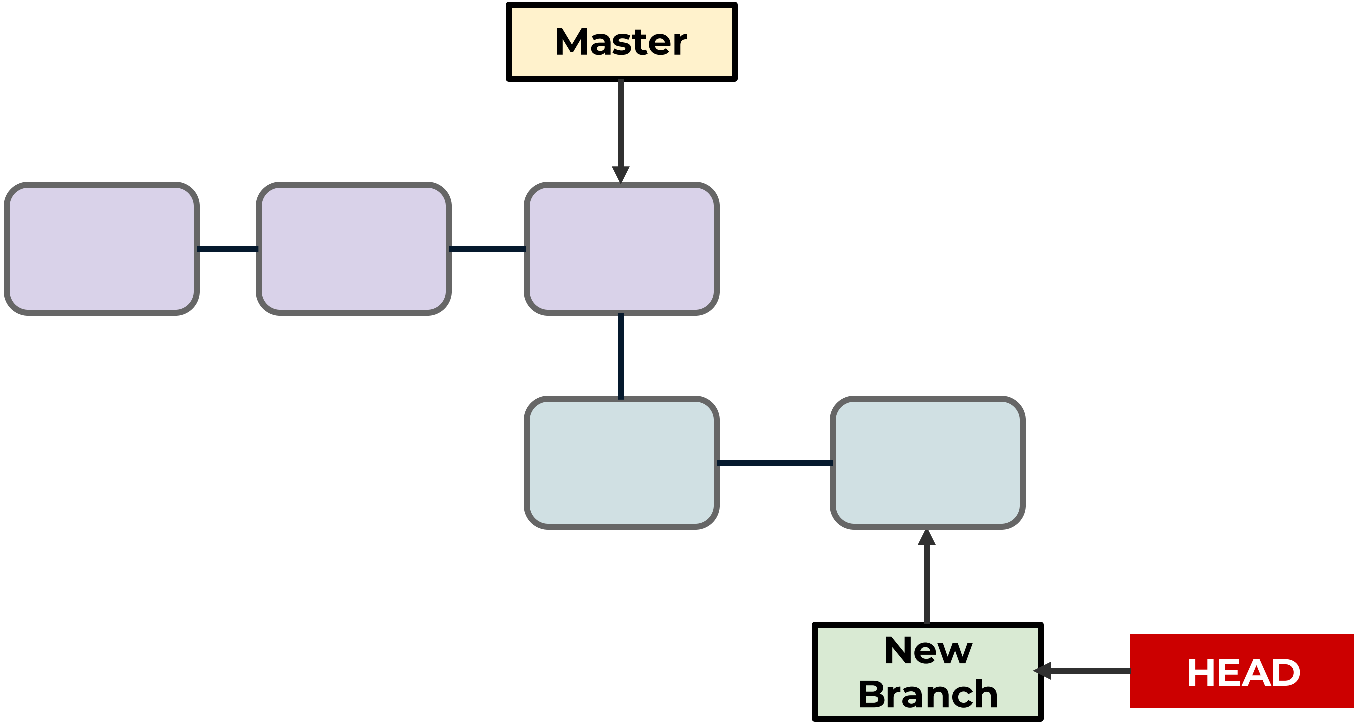
Week 3 Branches and Working with Others



Week 3 Branches and Working with Others



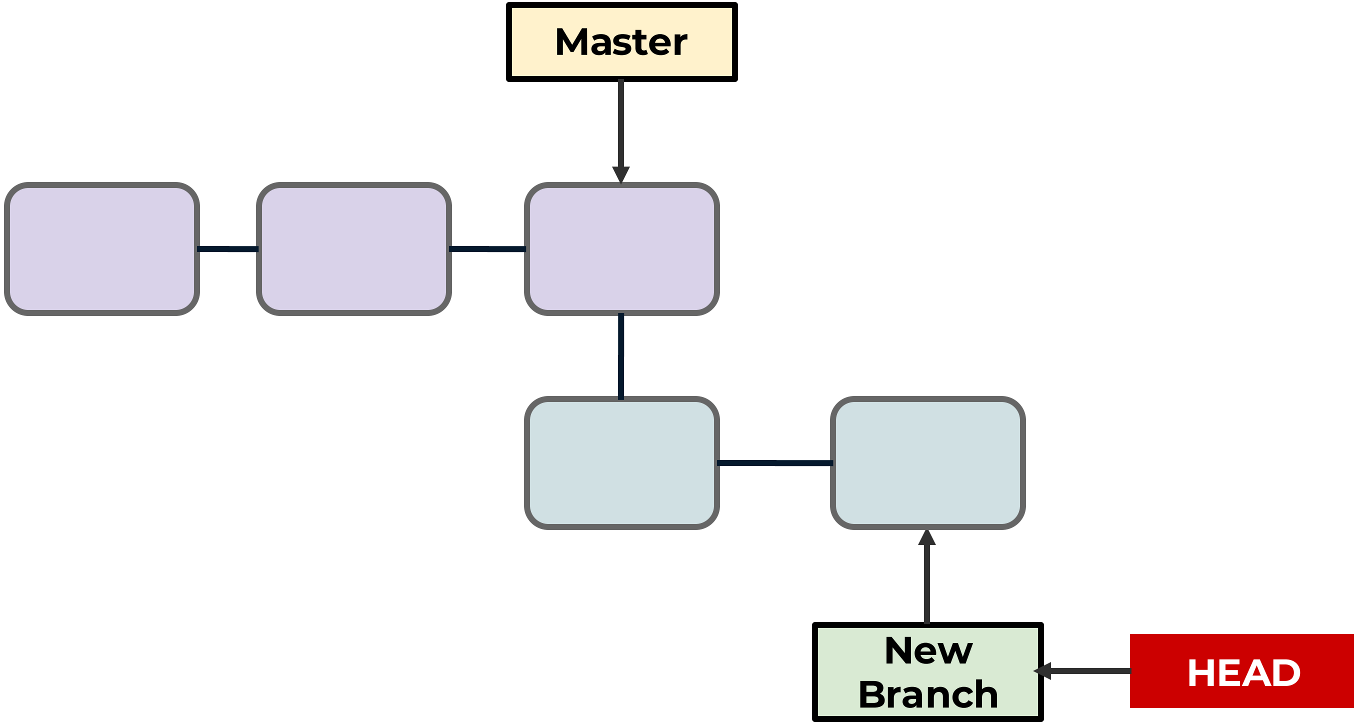
Week 3 Branches and Working with Others



Week 3 Branches and Working with Others

- We can think of these branches as just references to a commit.
- Using HEAD tells us which branch reference we are currently “checking out”.
- We can always switch back out HEAD to some other branch (which is a pointer to a commit reference).

Week 3 Branches and Working with Others



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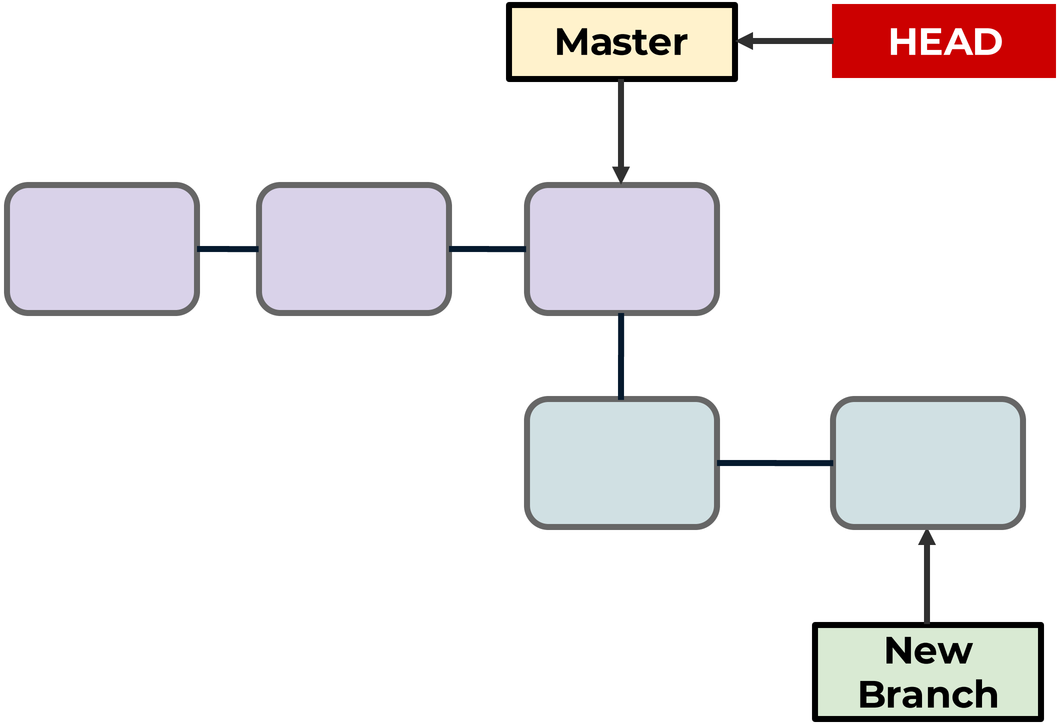


Master

HEAD

New Branch

Week 3 Branches and Working with Others

- **Up Next:**
  - Now that we understand the theory behind branches and HEAD, let’s begin to explore the actually commands that let us create branches and navigate between them.

Week 3
Git Branch Commands

Week 3 Branches and Working with Others

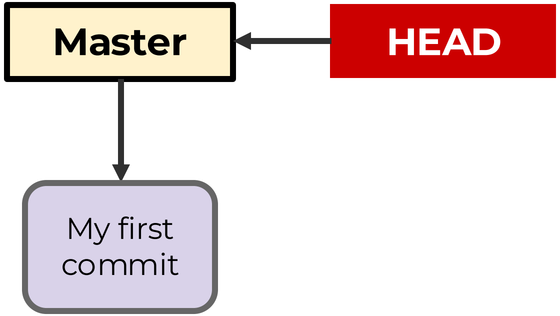
- **Git Branch Commands**
  - Create a New Repo
  - Add File
  - Create a New Branch
    - **git branch <branch_name>**
  - Report Branches
    - **git branch**
  - Switch Branches
    - **git switch or git checkout**

Week 3 Branches and Working with Others

- **Git Branch Commands**
  - Add and Commit Changes on New Branch
  - Use **git log** and **git switch** to explore differences between branches.

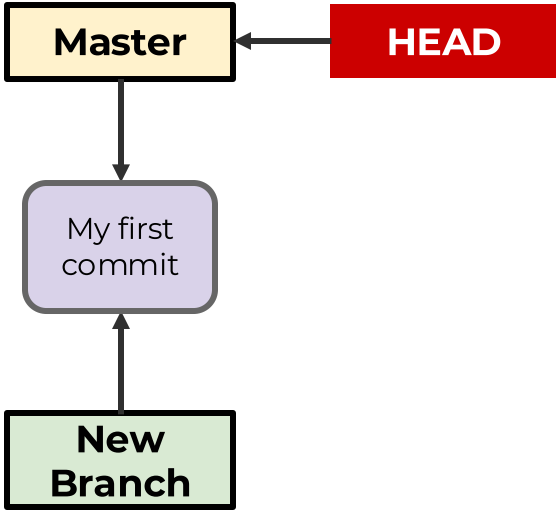
Week 3 Branches and Working with Others

- **git init, git add, git commit**



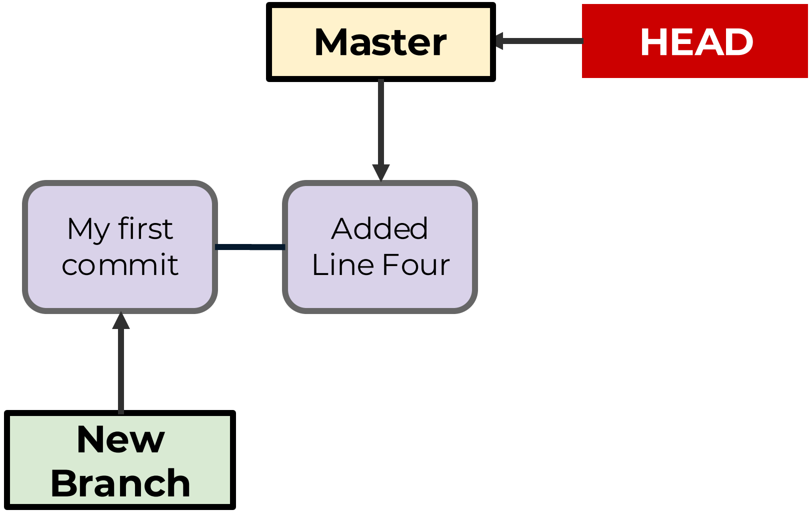
Week 3 Branches and Working with Others

- **git branch new_branch**



Week 3 Branches and Working with Others

- **git add, git commit, git log**



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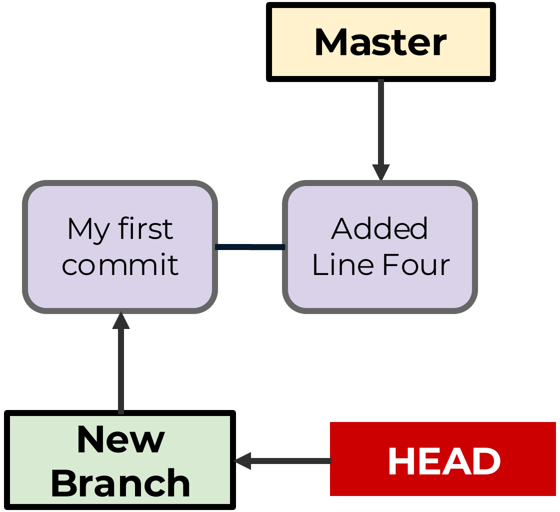
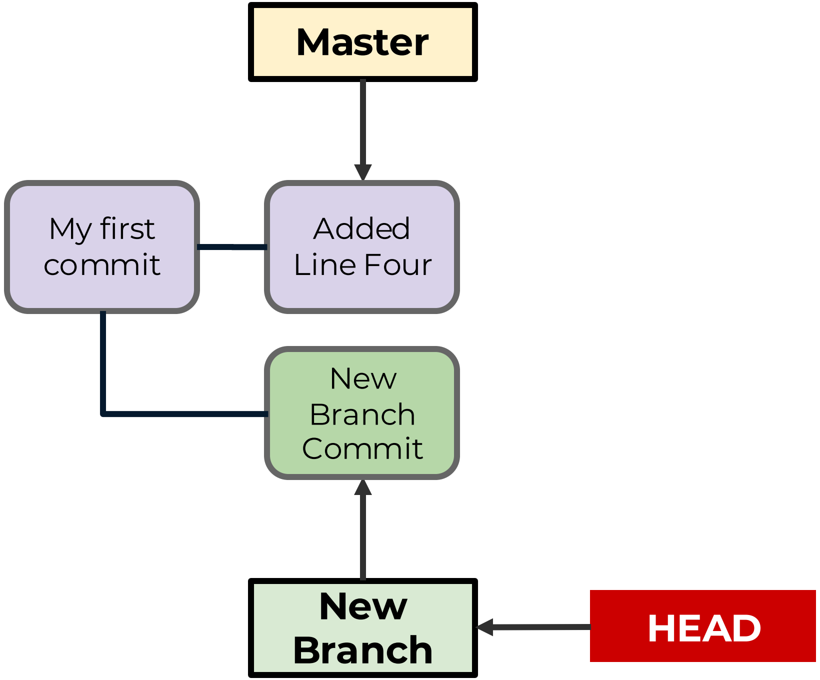


- git switch new_branch
or git checkout new_branch

Week 3 Branches and Working with Others

- **git add , git commit, git log**



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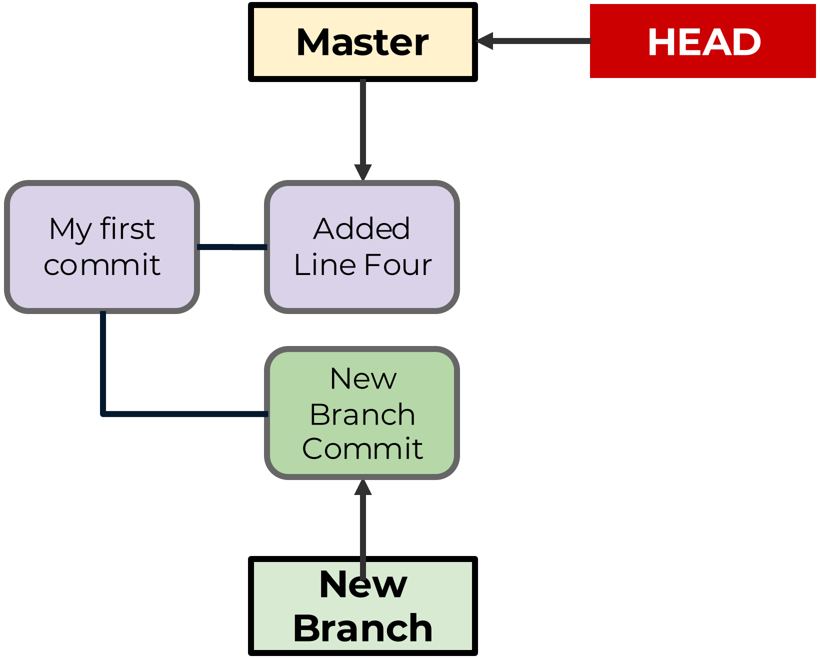


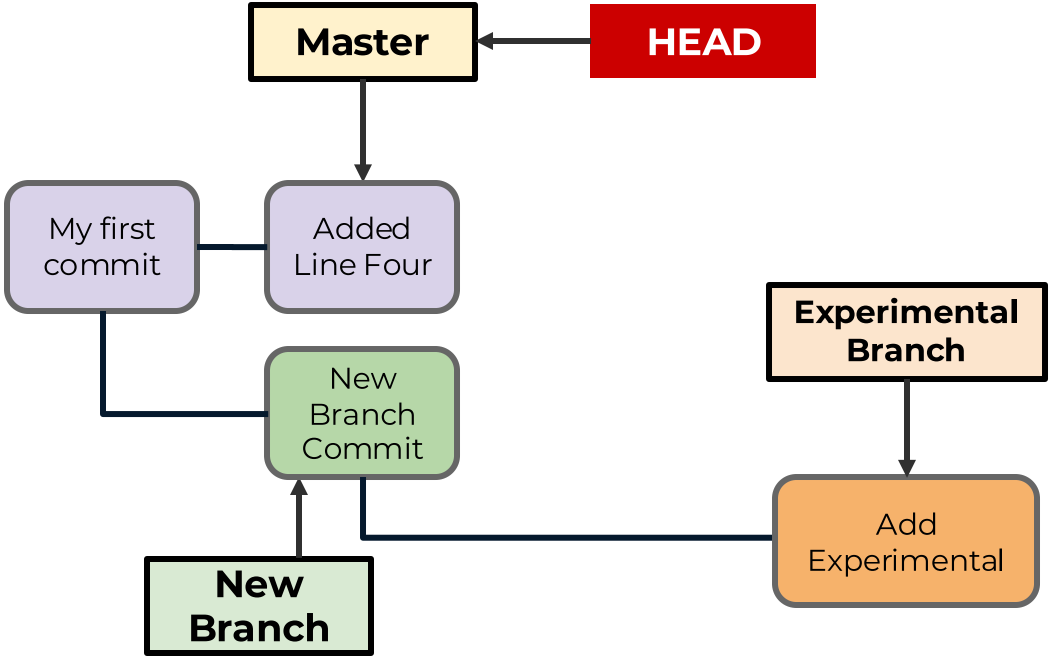
- **git switch master**

or git checkout master

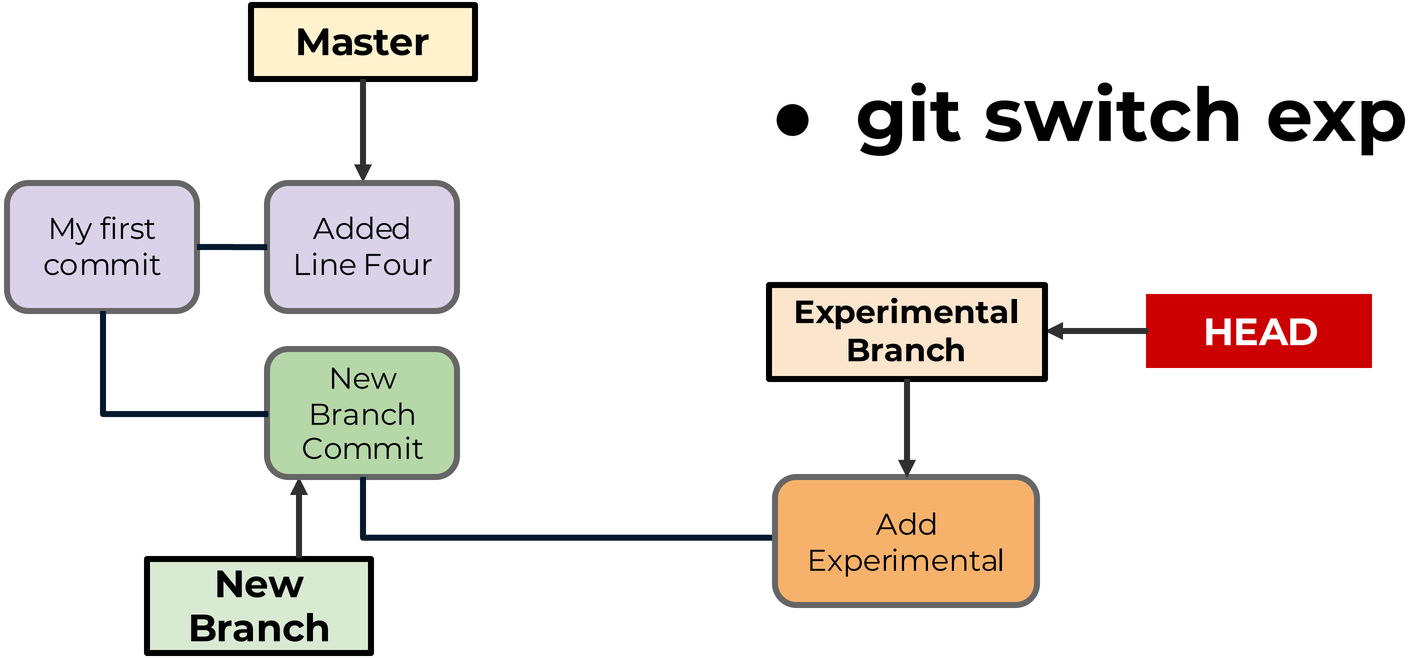
Week 3
Delete and Rename Branches

Week 3 Branches and Working with Others

- **Previously:**



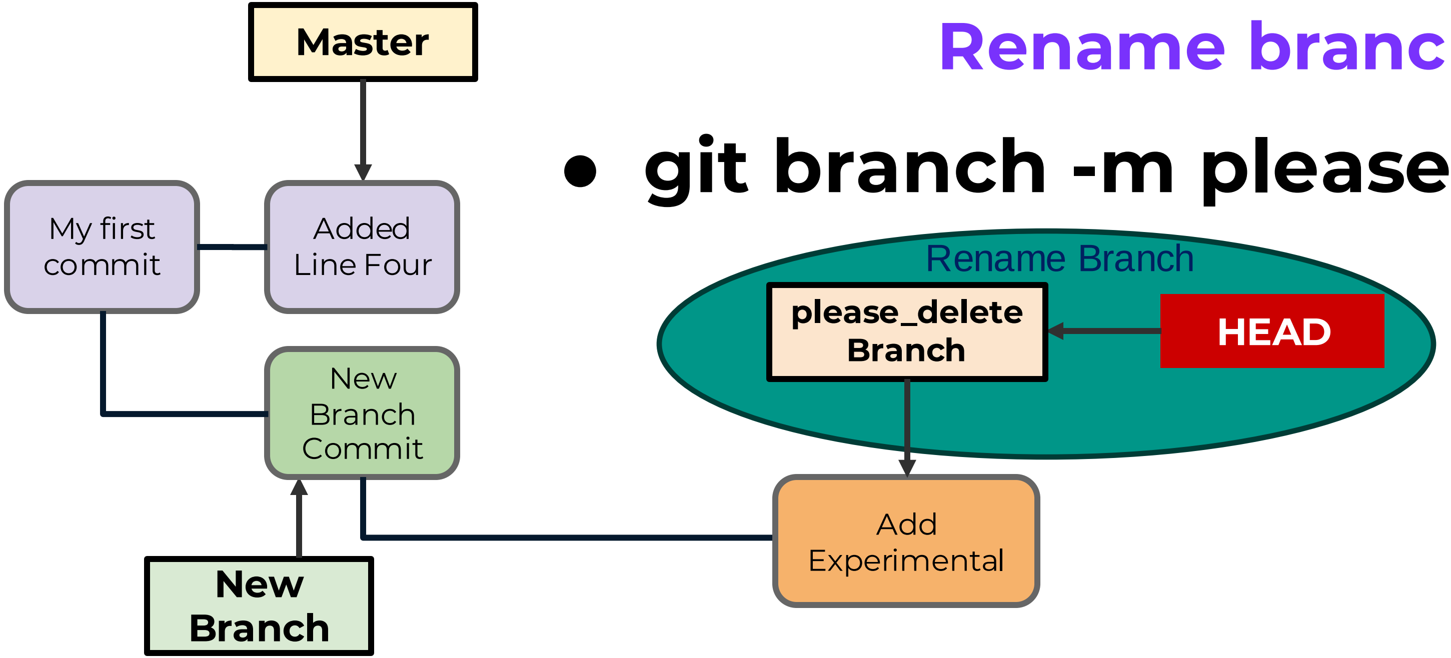
Week 3 Branches and Working with Others



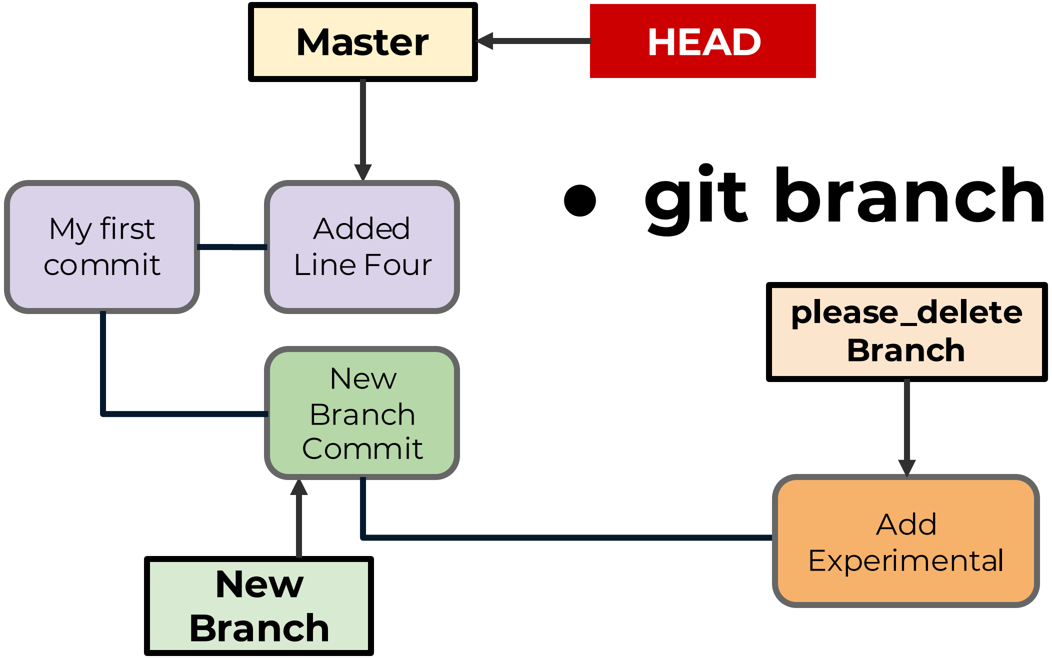
- **git switch experimental**

Rename branch

- git branch -m please_delete



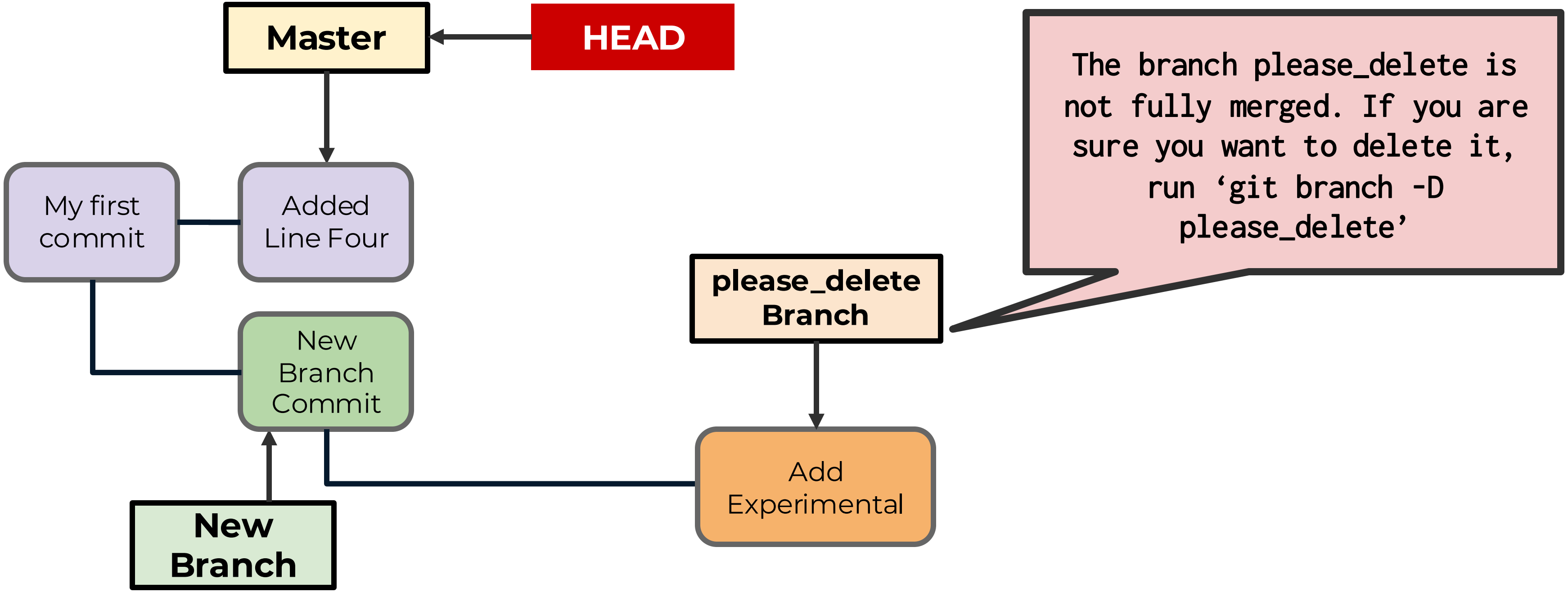
Week 3 Branches and Working with Others



- **git branch -d please_delete**

Week 3 Branches and Working with Others

- **git branch -d please_delete**



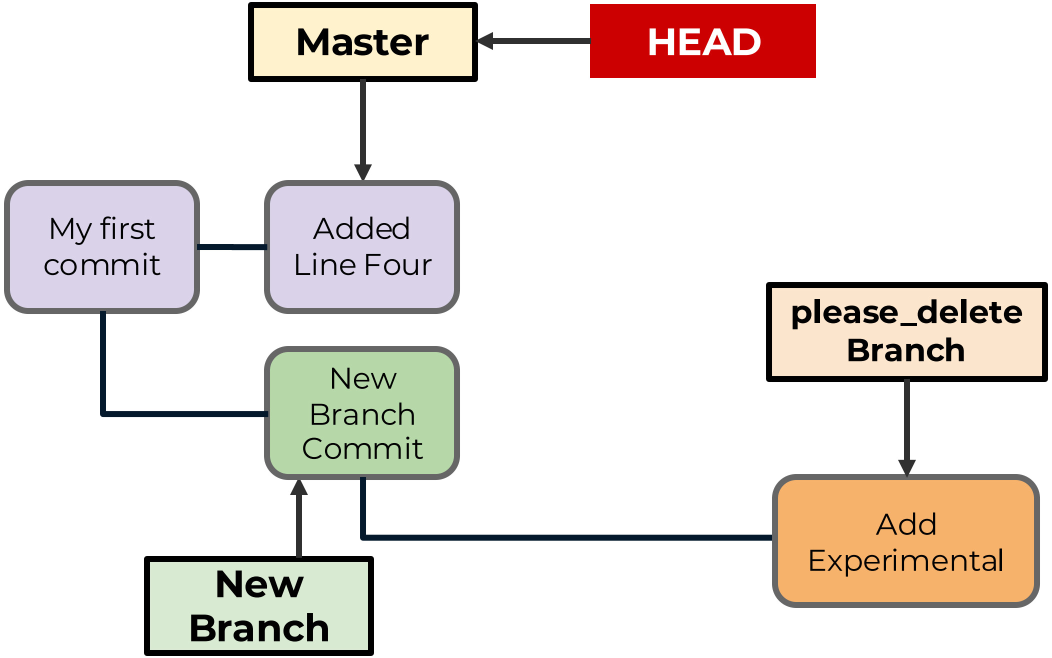
The branch please_delete is not fully merged. If you are sure you want to delete it, run 'git branch -D please_delete'

Week 3 Branches and Working with Others

- **Deleting a Branch**
    - **git branch -d branch_to_delete_name**
        - You can not delete a branch you are checked out at.
        - You also will get a warning if the branch is not merged.
            - You can confirm you want to do this anyways with **-D**

Week 3 Branches and Working with Others

- **git branch -D please_delete**



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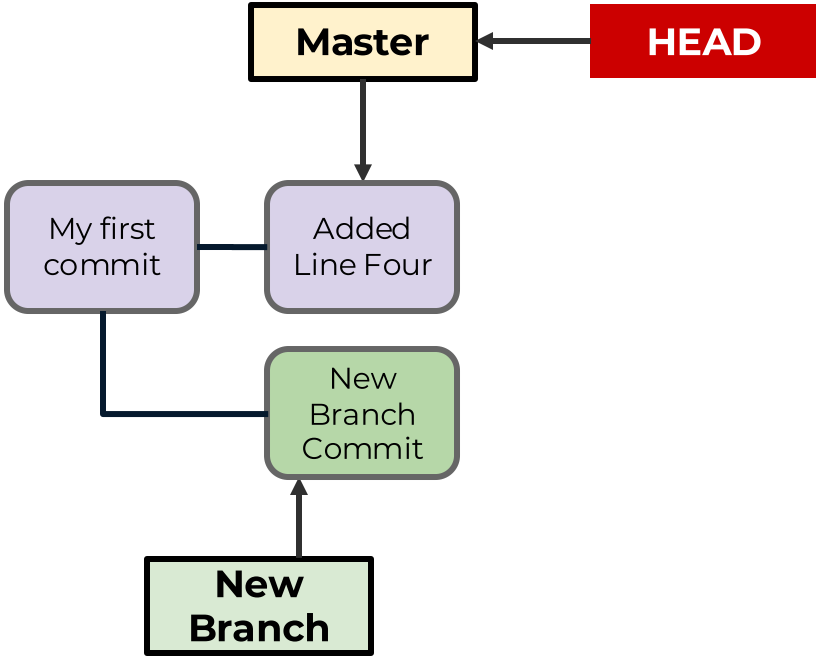
Week 3 Branches and Working with Others

- **git branch -D please_delete**



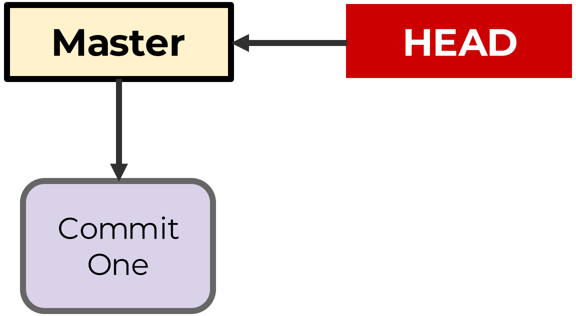
Week 3
Merging Branches and Conflicts

Week 3 Branches and Working with Others

- Now that we understand creating new branches, let’s shift focus to merging branches back together.
- Let’s explore a simple type of merge, where a new branch is created, but the original branch it stemmed from has no additional commits.
  - This is known as a “fast-forward” merge

Week 3 Branches and Working with Others

- “Fast Forward” Merge



Week 3 Branches and Working with Others

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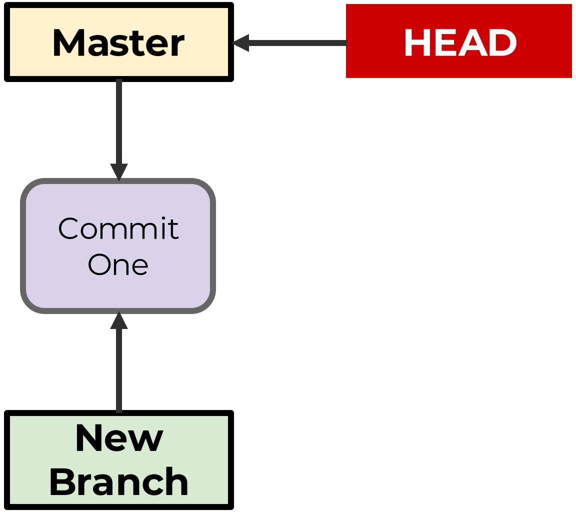

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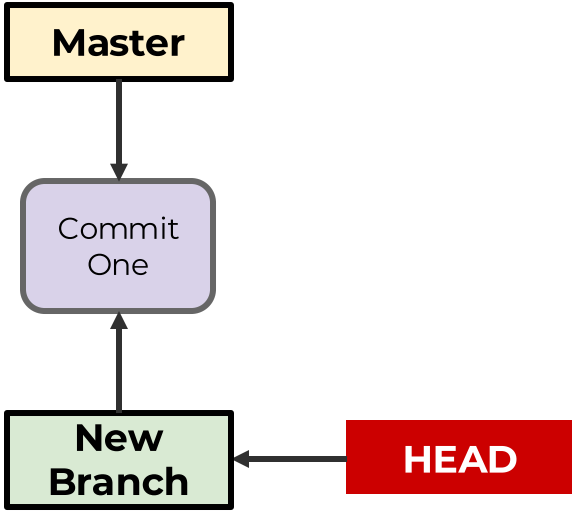

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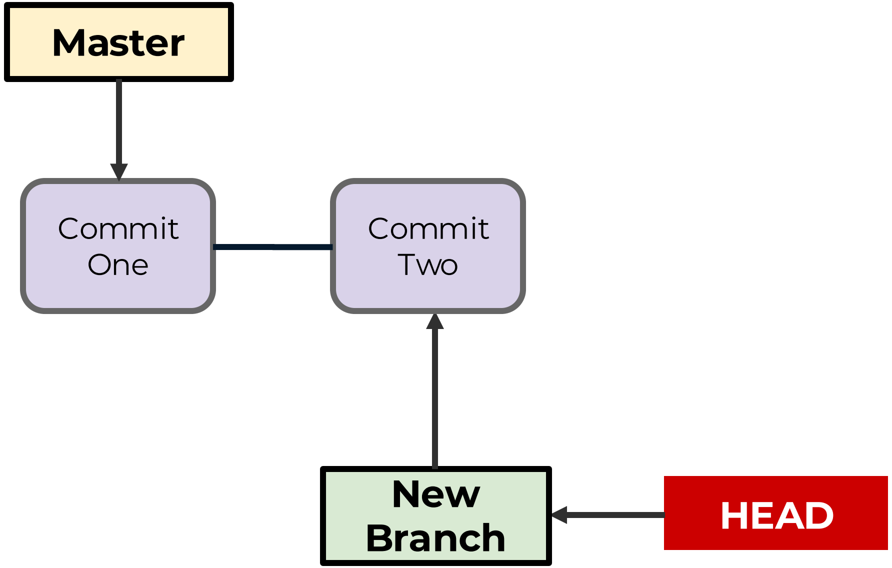

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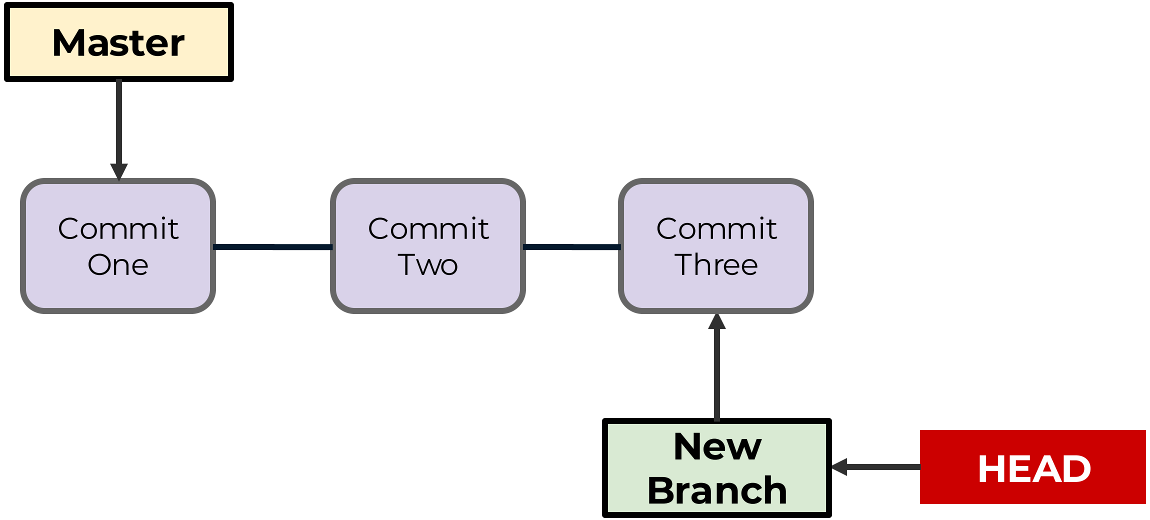

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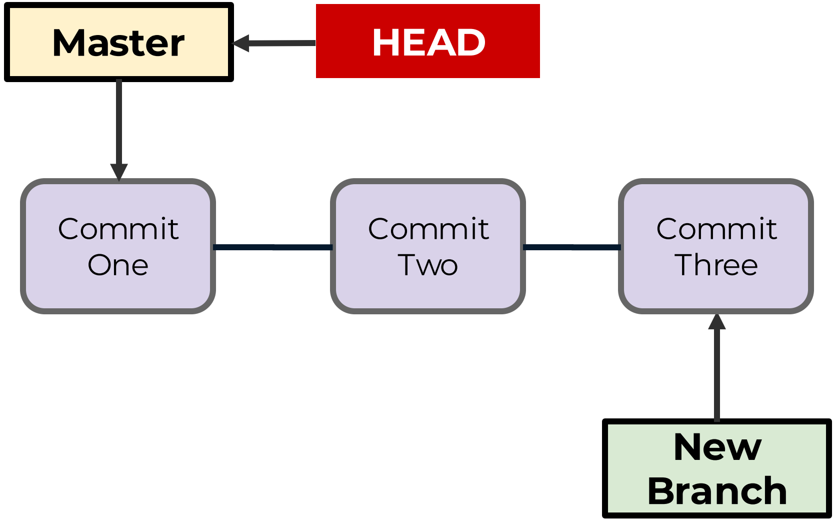
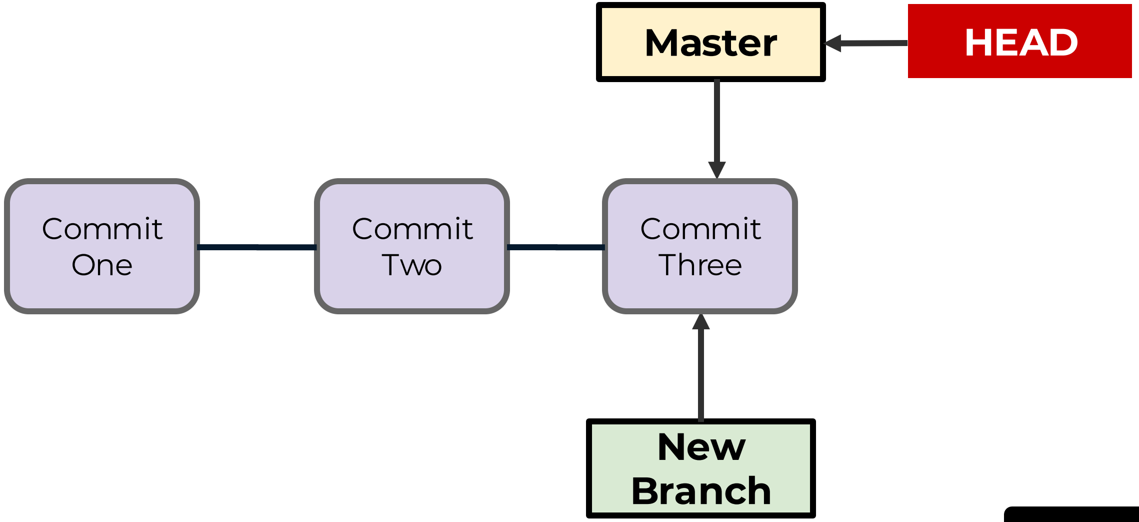


```
>> git switch master
```

Week 3 Branches and Working with Others

- “Fast Forward” Merge



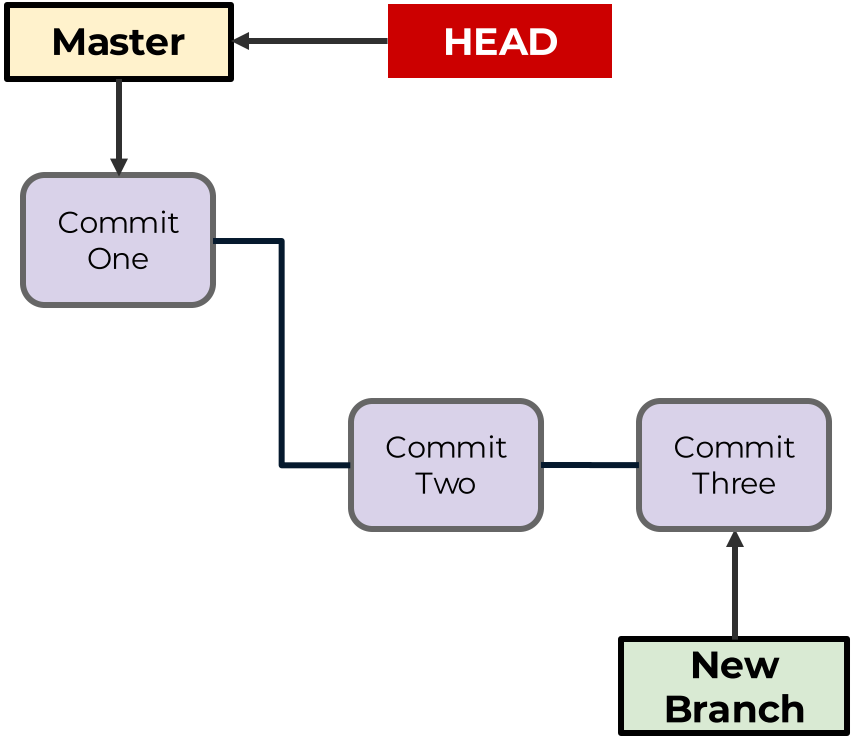
```
>> git merge new_branch
```

Week 3 Branches and Working with Others

- Now let’s explore what happens for a merge where we have different commits in the branches.

Week 3 Branches and Working with Others

- **Git Merge**



Week 3 Branches and Working with Others

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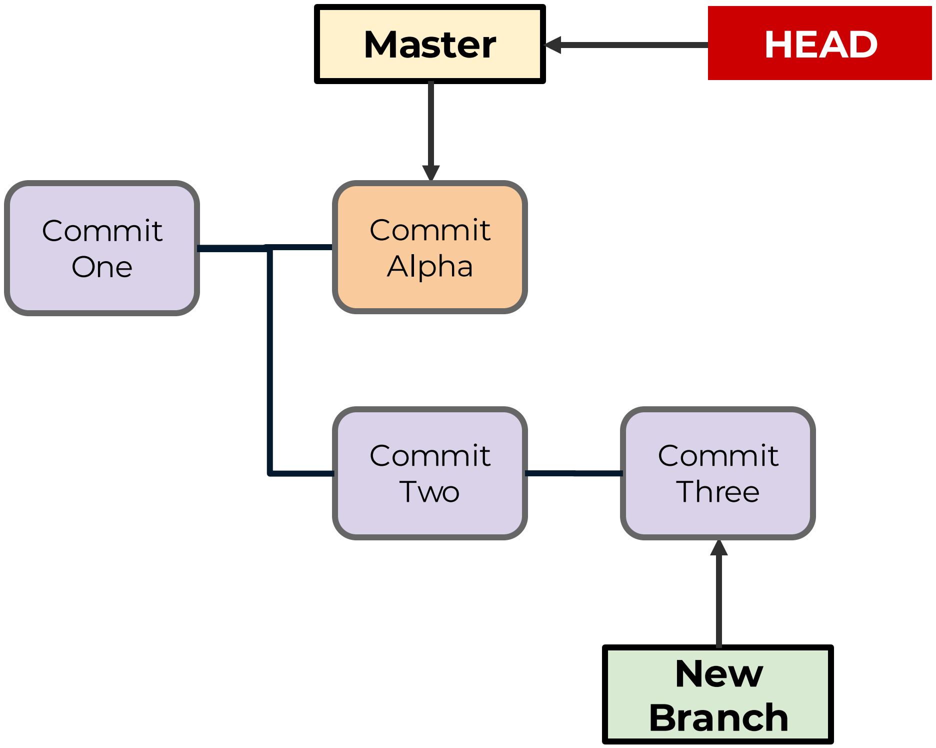


Master

HEAD

Commit One

Commit Alpha

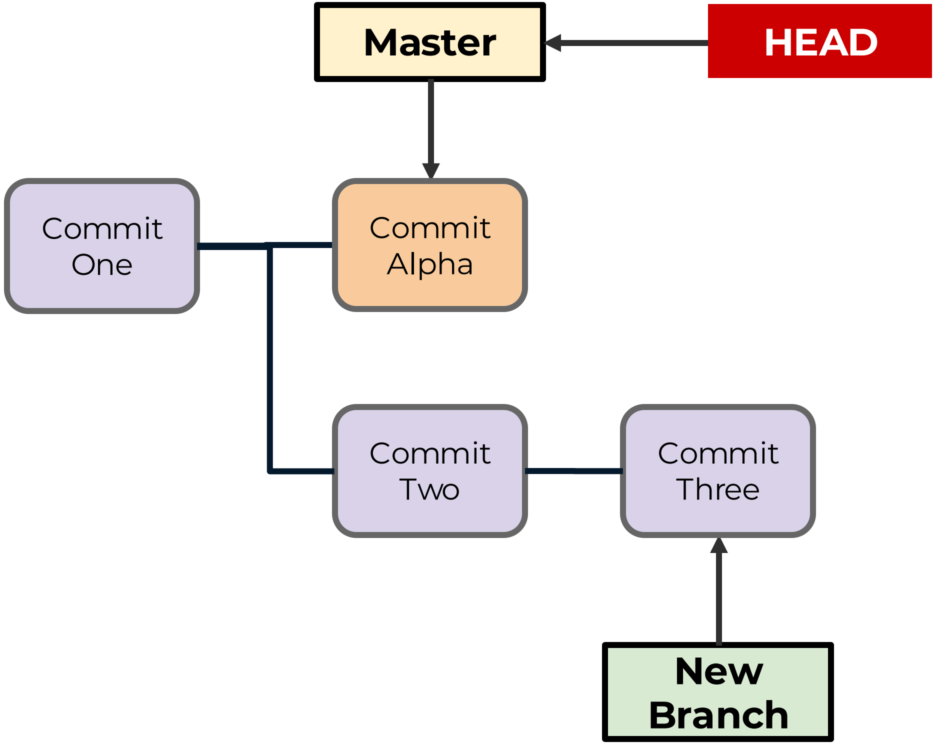
Commit Two

Commit Three

New Branch

Week 3 Branches and Working with Others

- **Git Merge**



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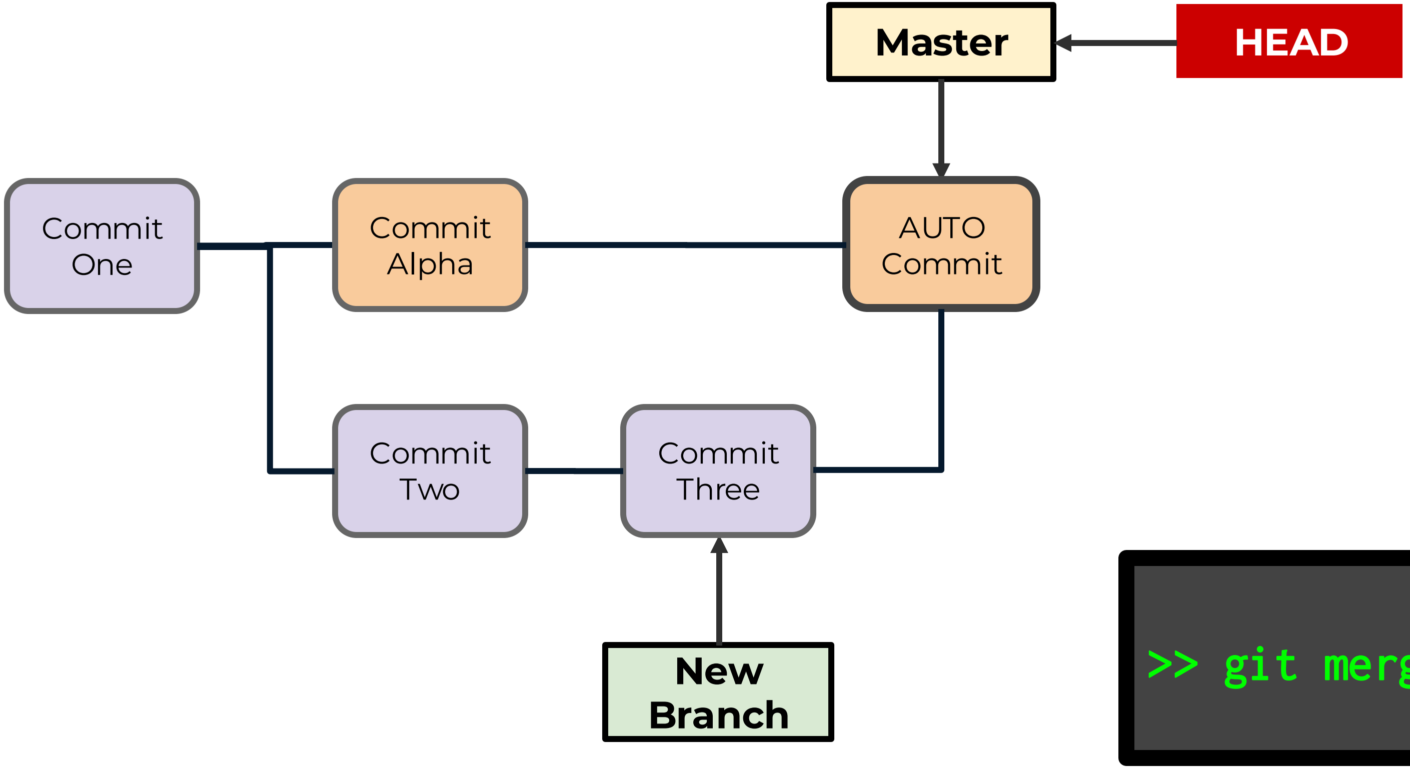
Week 3 Branches and Working with Others

- **Git Merge**



```
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```
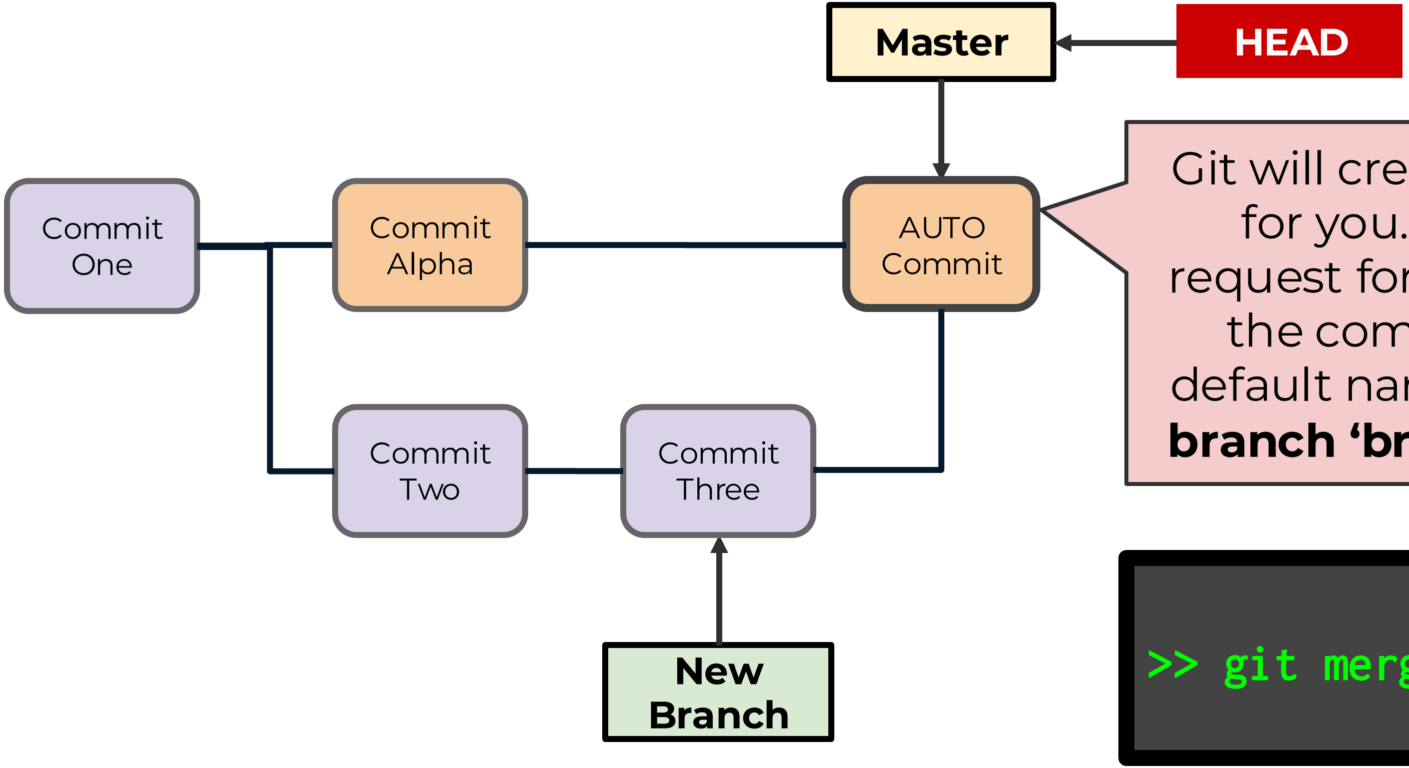

Week 3 Branches and Working with Others

- **Git Merge**



Git will create a commit for you. It will also request for you to name the commit, with a default name of “**Merge branch ‘branch_name’**”

```
>> git merge new_branch
```

Week 3 Branches and Working with Others

- Git creates the new commit for us, and will attempt the merge.
- Sometimes there are no conflicts, for example:
    - The branch only focused on files not in the receiving branch, thus the merge simply adds the new files to the receiving branch.

Week 3 Branches and Working with Others

- Git will try to automatically create the merge, and can do so in cases where no information from a specific branch would be lost, for example:

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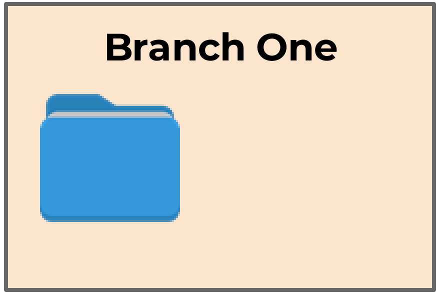

Branch One

Week 3 Branches and Working with Others

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Branch One

Branch Two

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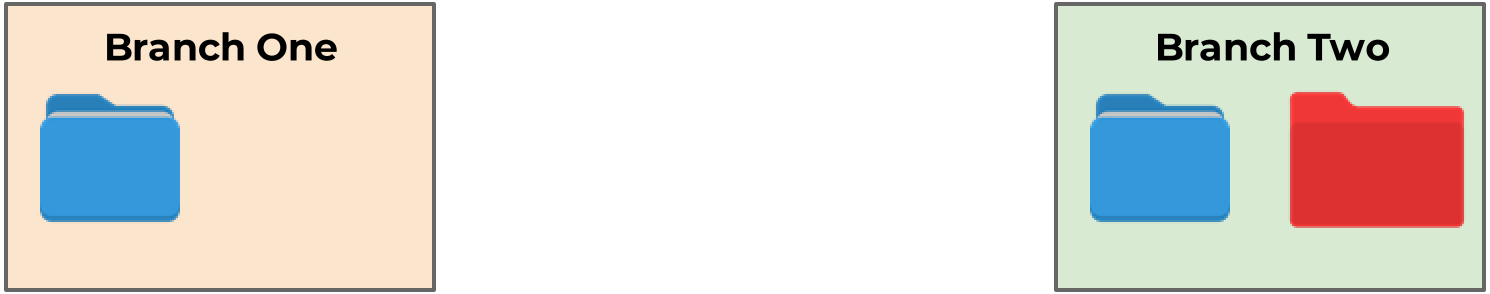

Branch One

Branch Two

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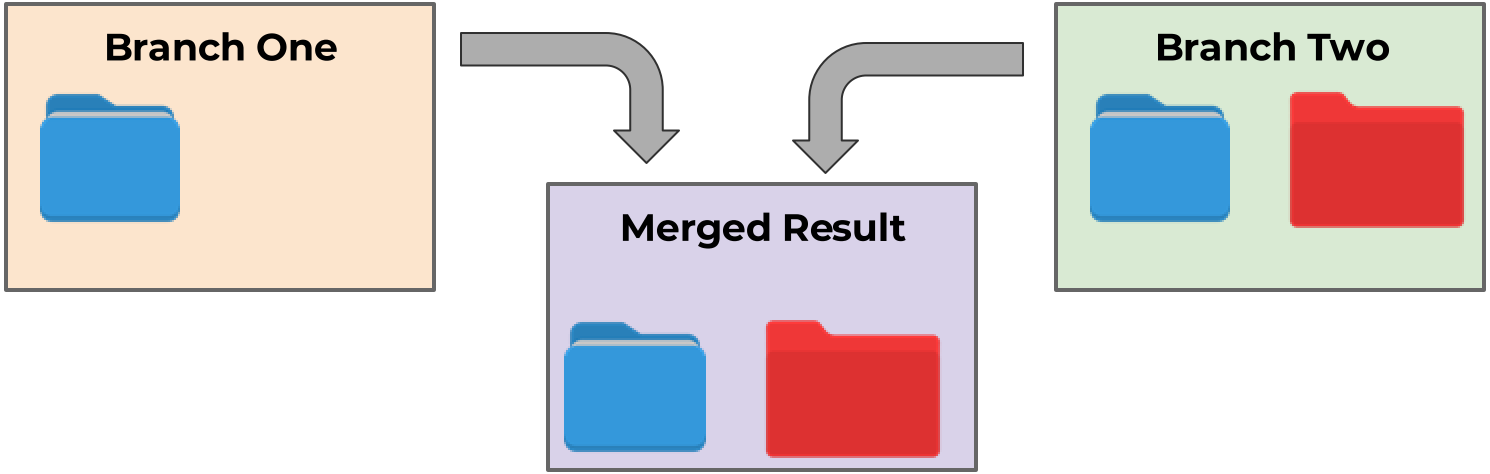

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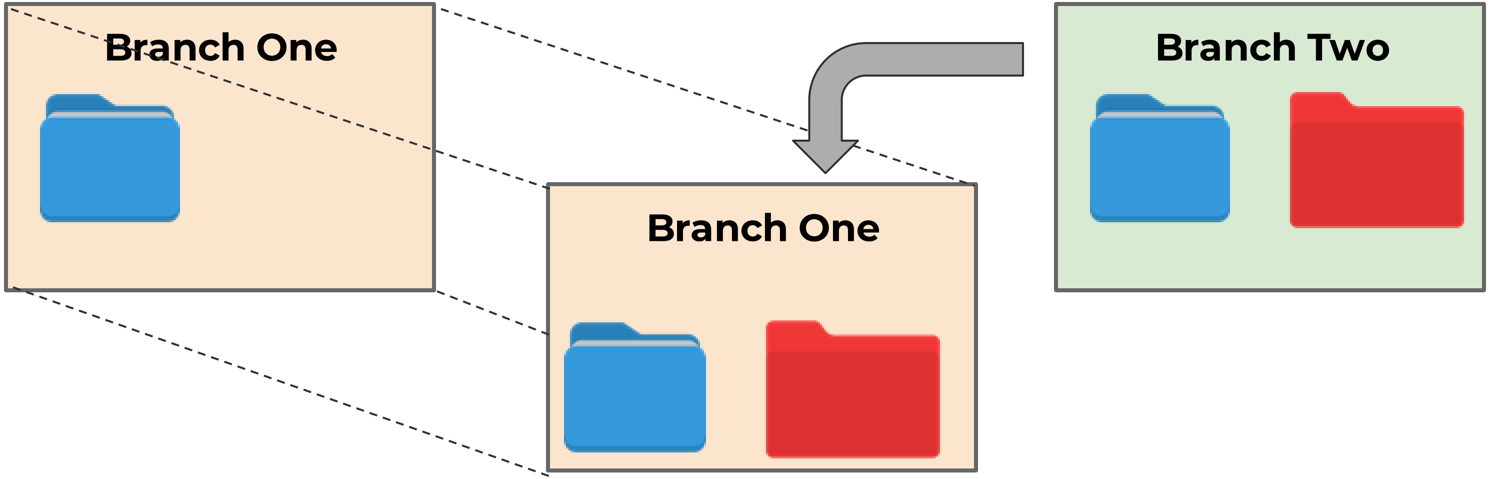
Branch One
Branch One
Branch Two