

# Announcements

- Exam grades are published
  - Questions until Friday 12:00, 30/09/2022
  - Register for the resit exam
- Project
  - Group registration until 10:30 today

# Versioning system

Github

# Lecture plan

- Basic git concepts
- Common git commands
- Workflows with Git

# Versioning system

## Why

- Progress tracking
- Historical references
- Collaboration
  - Multiple developers working on the same project

# Terminologies

- Working directory
- Repository
  - Snapshots of the working directory, controlled by git
- Commit
- Branch
- Merging

# Commit

- A snapshot of a repository
- Associated with a hash code for reference
  - **7a35d29e**be684065261f7597fe64dd991be70dcb
- The next commit is *linked* with the previous commit
- Has a message to describe changes been made

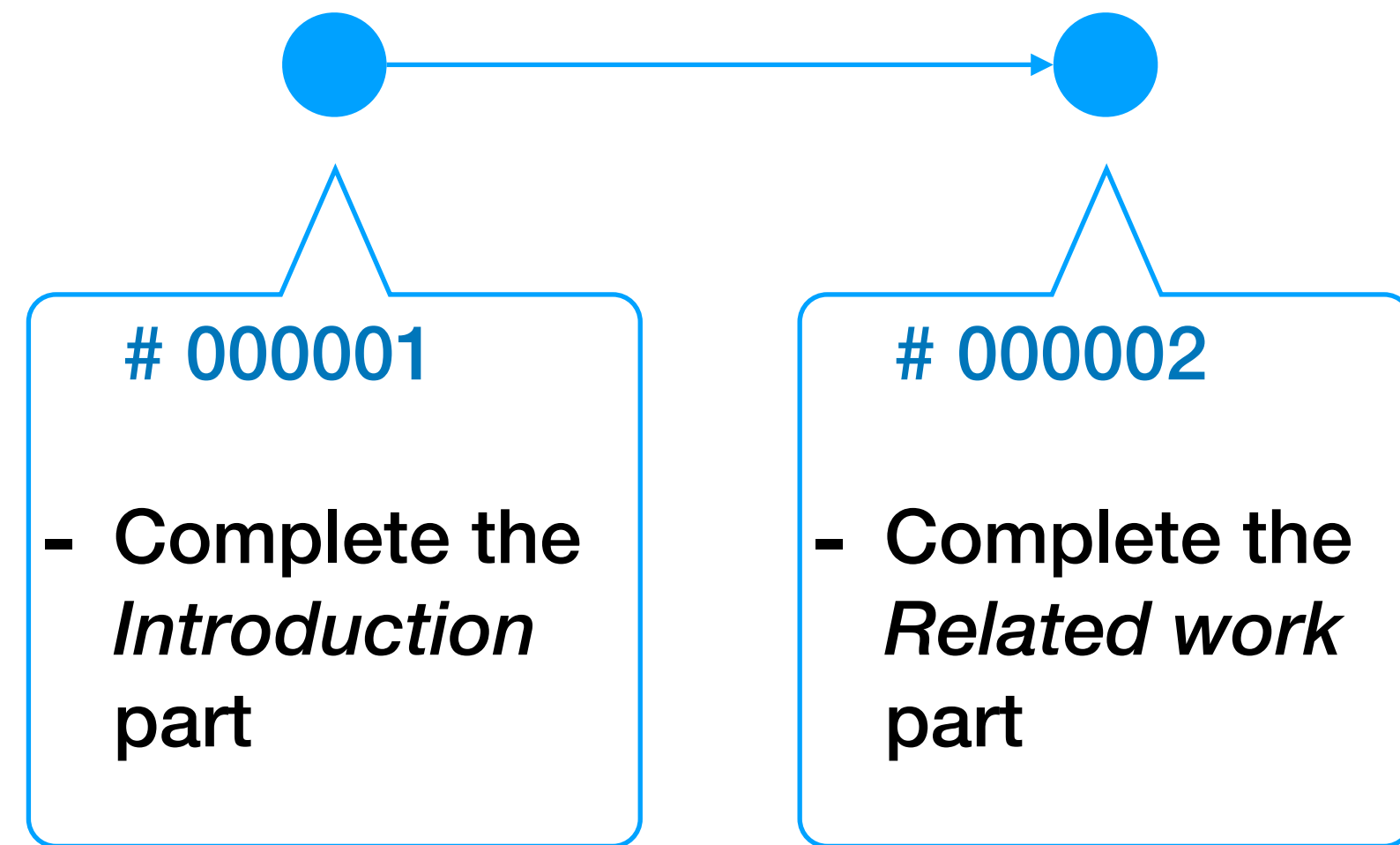
# Commit



# 000001

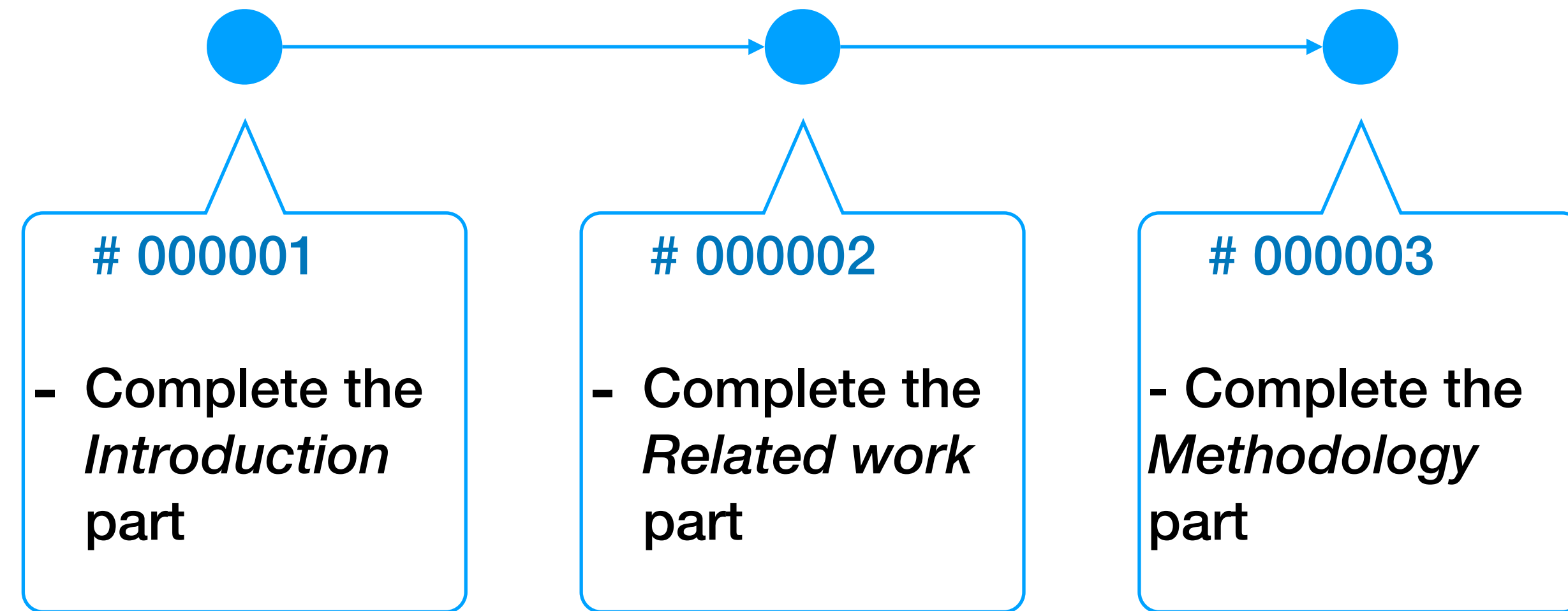
- Complete the *Introduction* part

# Commit

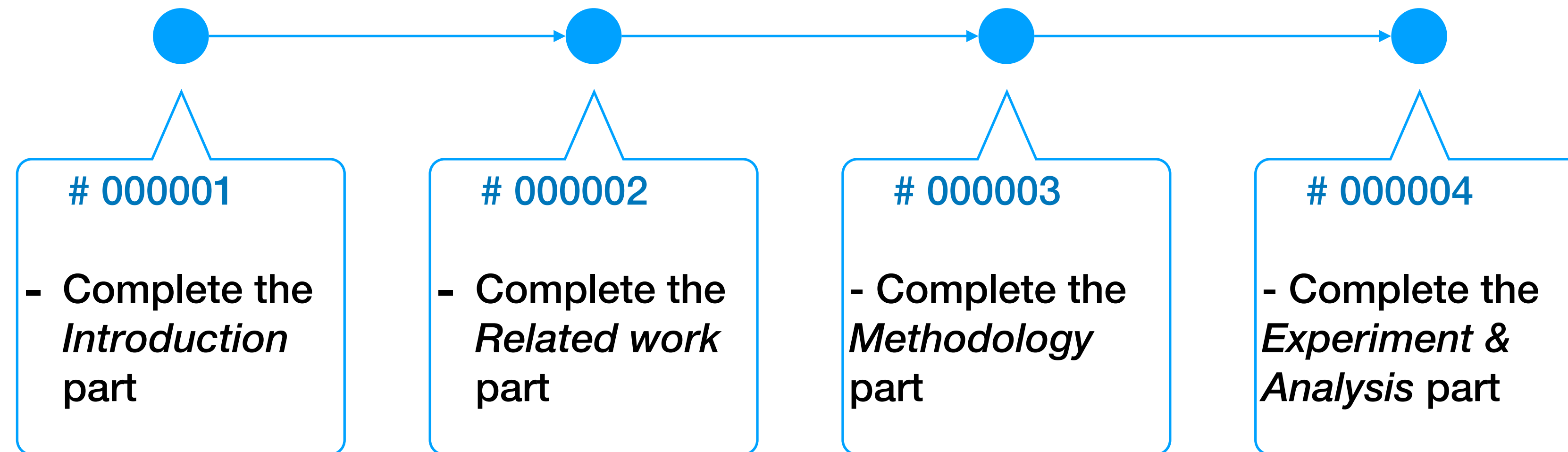




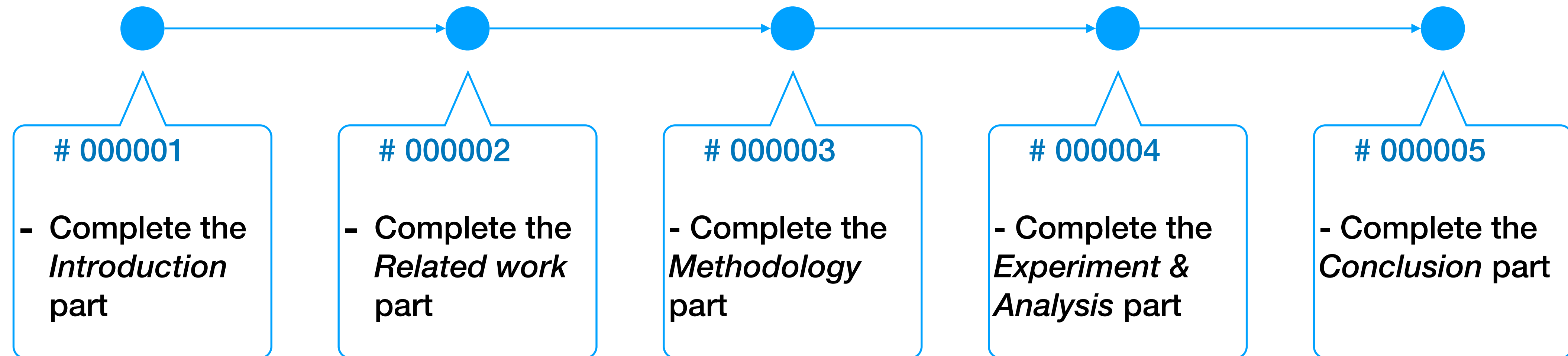
# Commit



# Commit



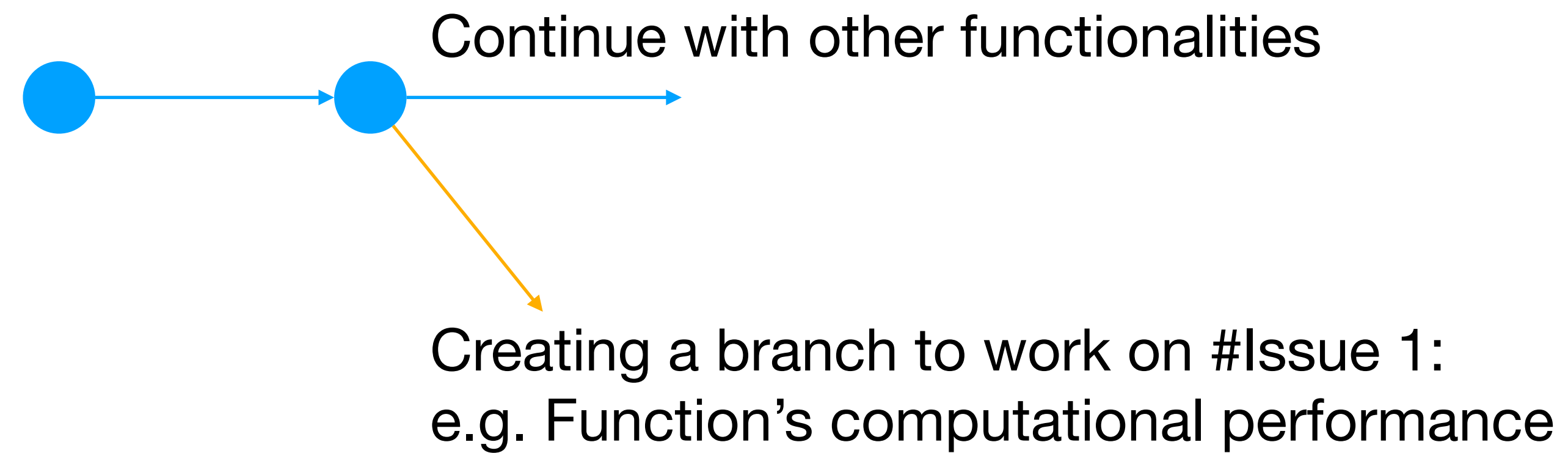
# Commit



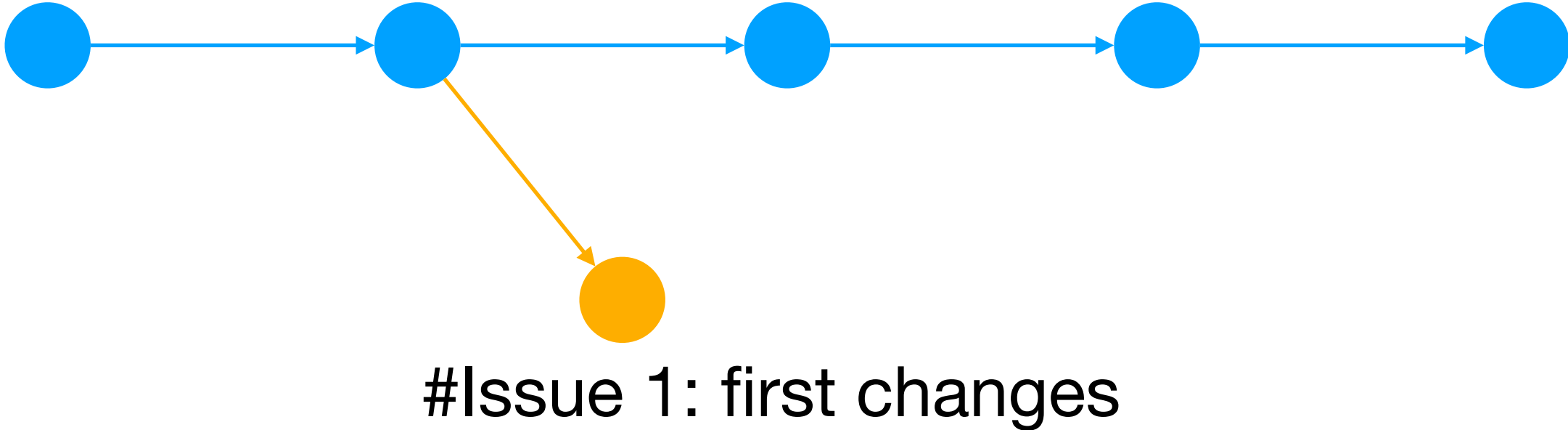
# Branch

- A branch is a *parallel* copy of a repository
- Parallel working on multiple tasks of a project
  - Without disrupting each other

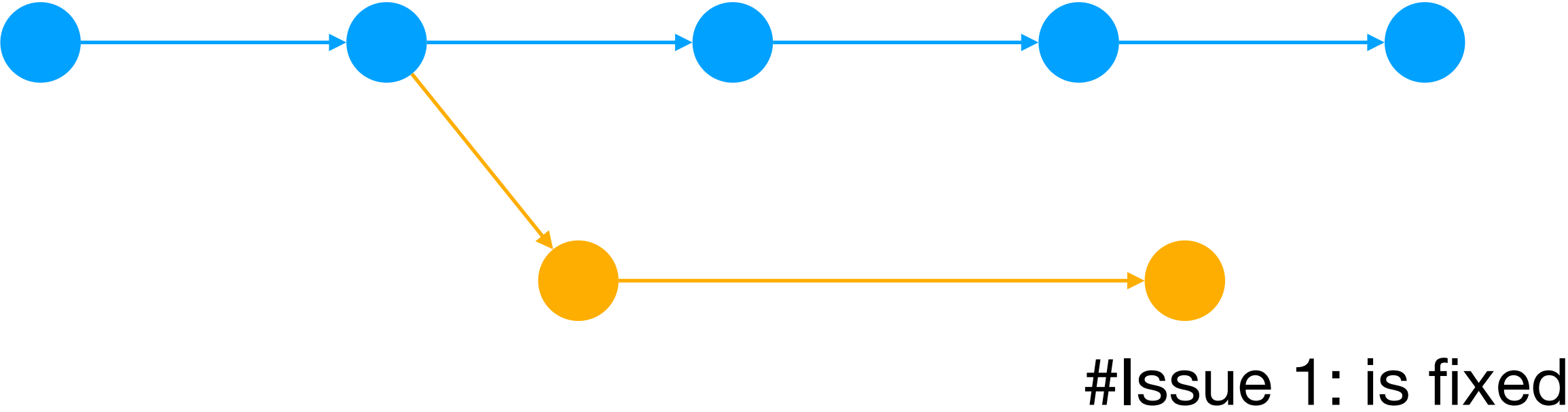
# Branch



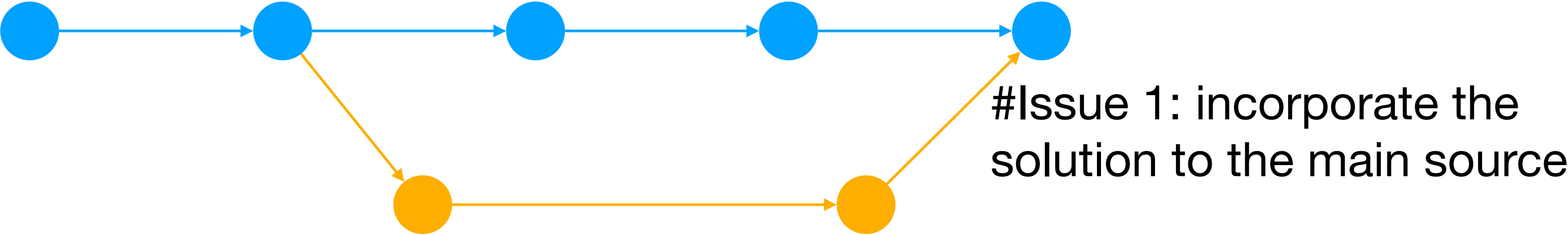
# Branch



# Branch



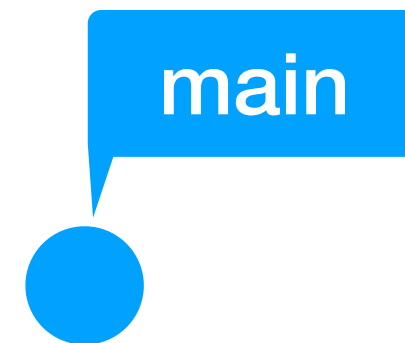
# Branch





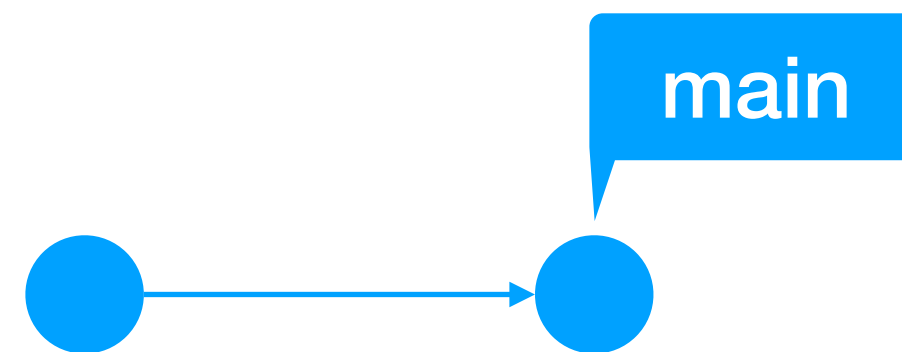
# Branch

- Branch is given a name
  - Label
  - Pointer



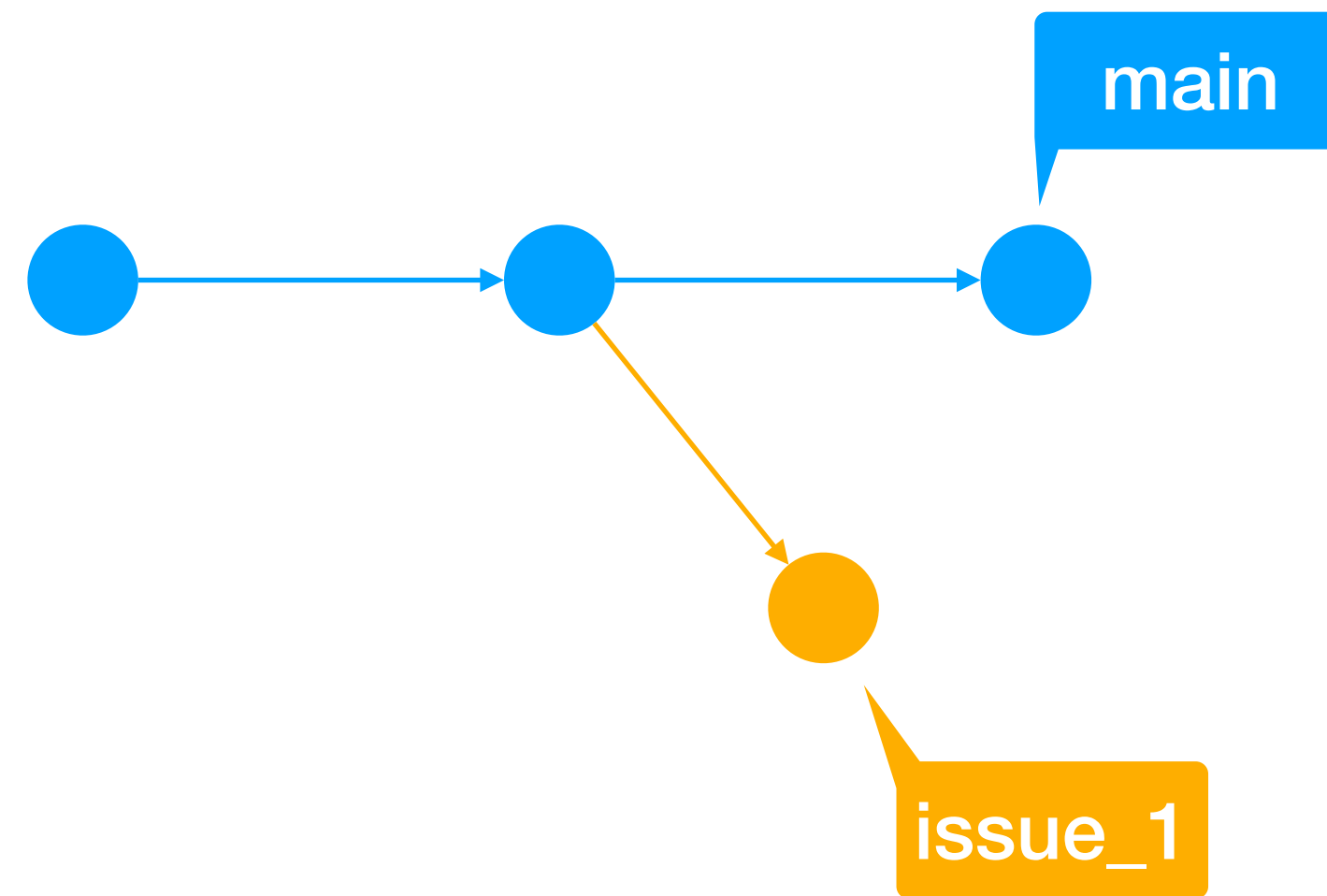
# Branch

- Branch is given a name
  - Label
  - Pointer



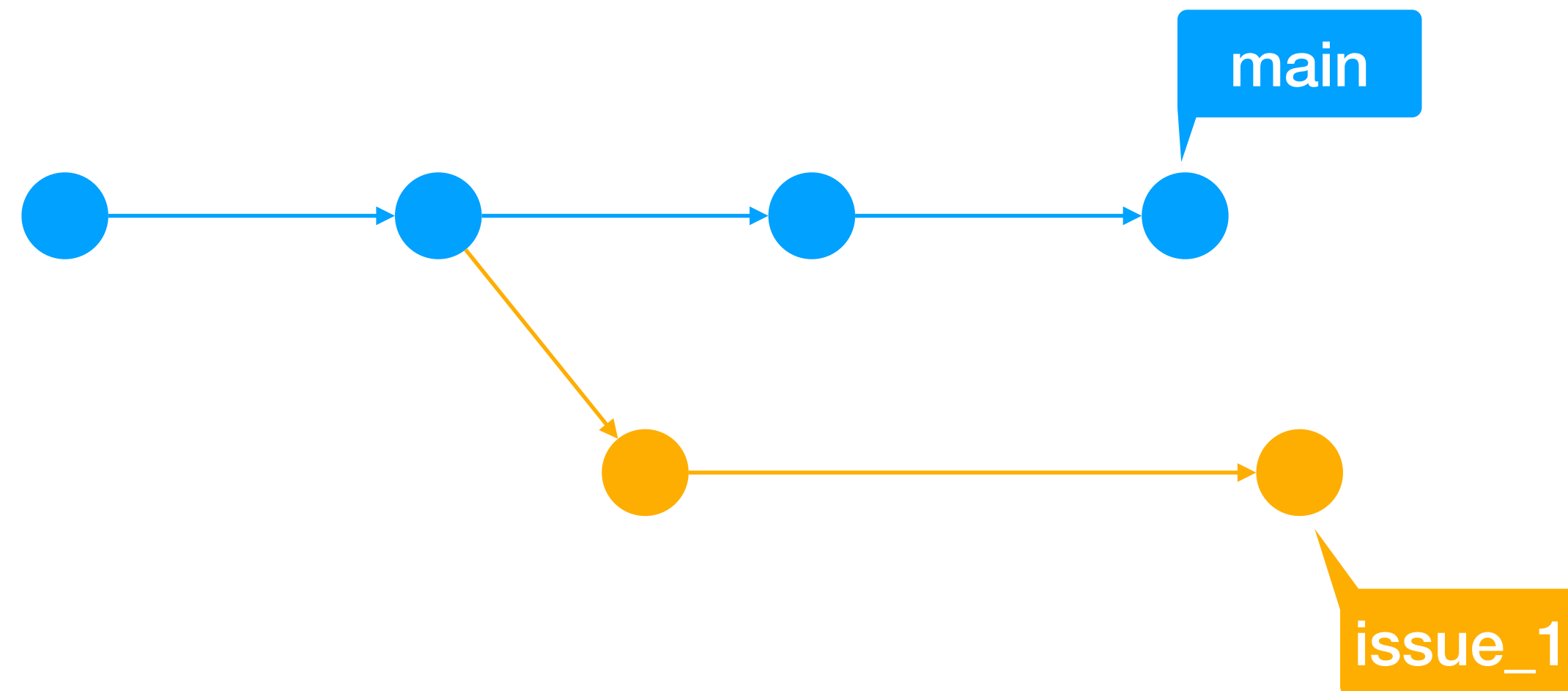
# Branch

- Branch is given a name
  - Label
  - Pointer



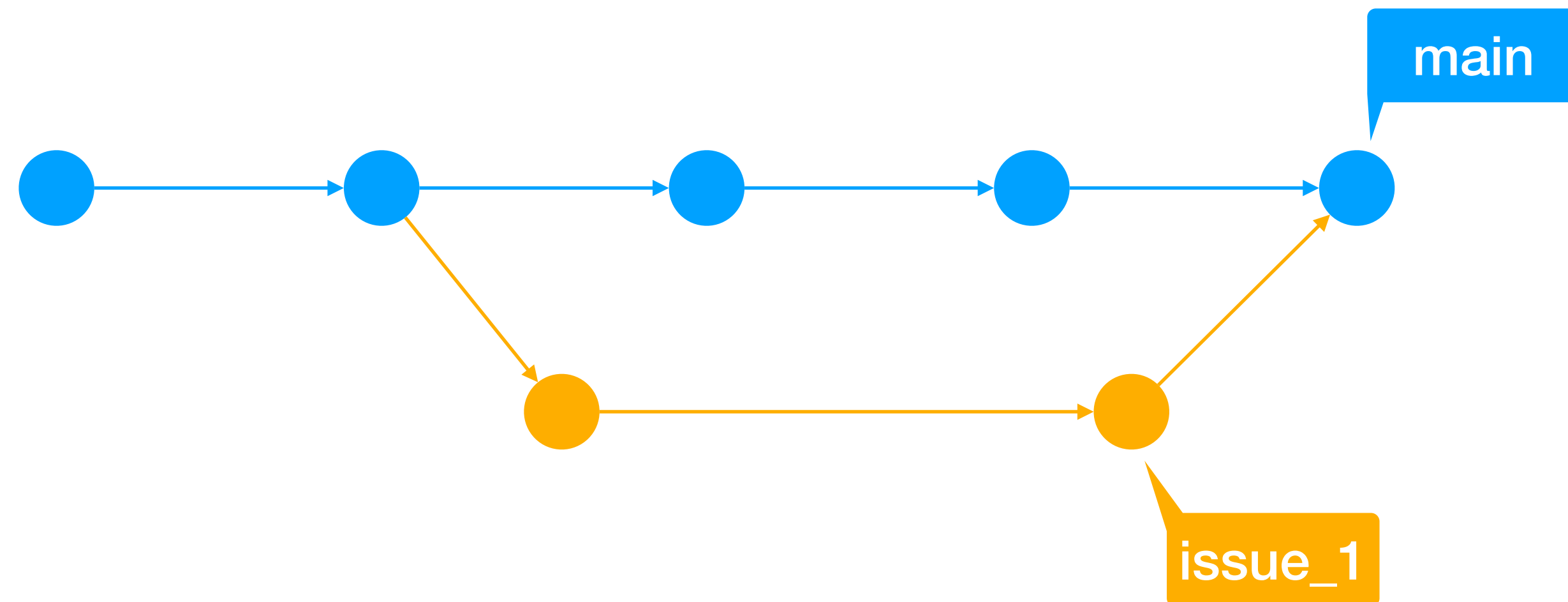
# Branch

- Branch is given a name
  - Label
  - Pointer



# Branch

- Branch is given a name
  - Label
  - Pointer



# Commit

## Phases

- Working directory stores files
- Local repository keeps tracks of snapshots of the files (or the working directory)
- Staging area is a layer in between, temporarily keeps files ready to be stored in the local repository

Local repository

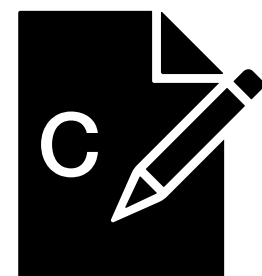
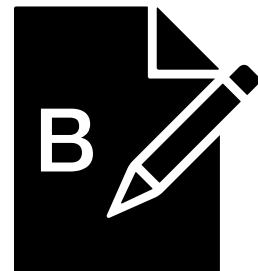
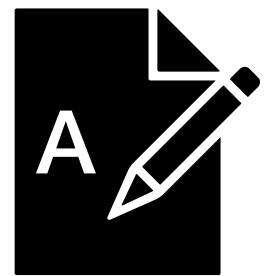
Staging area

Working directory

# Commit

## Phases

Working directory



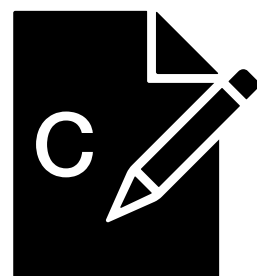
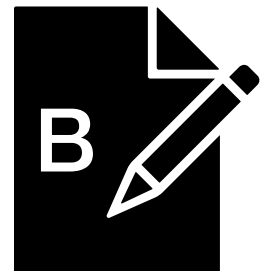
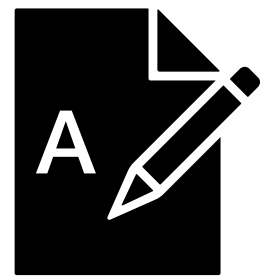
Staging area

(Local) repository

# Commit

## Phases

Working directory



git add  
B

Staging area

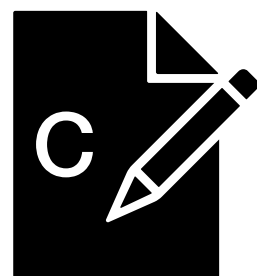
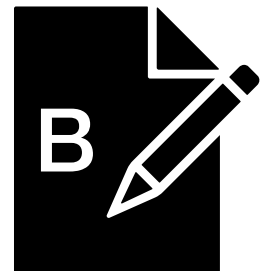
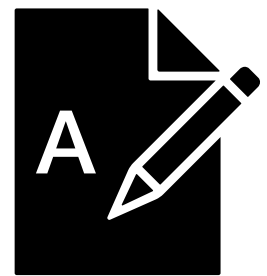
(Local) repository



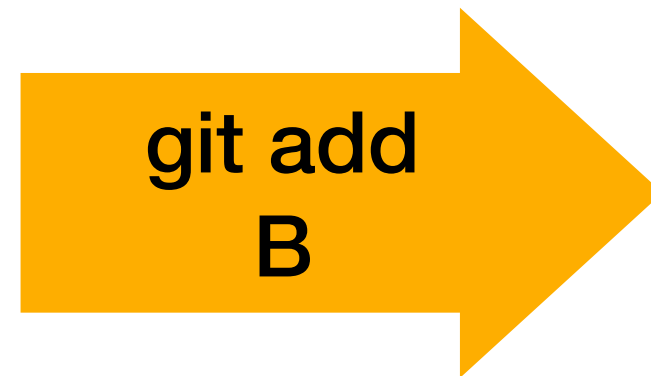
# Commit

## Phases

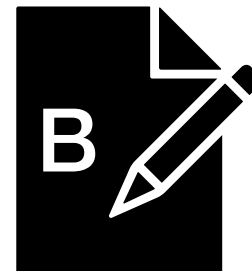
Working directory



git add  
B



Staging area

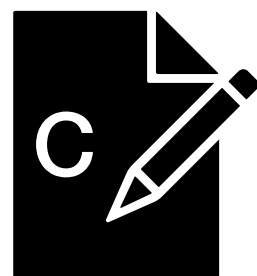
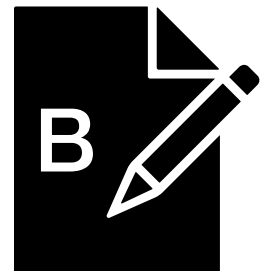
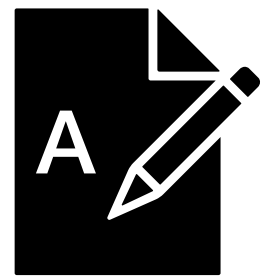


(Local) repository

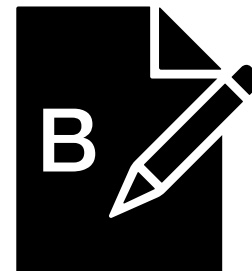
# Commit

## Phases

Working directory



Staging area



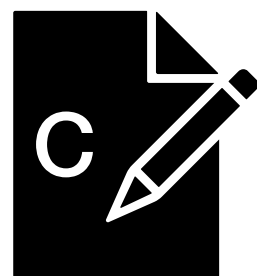
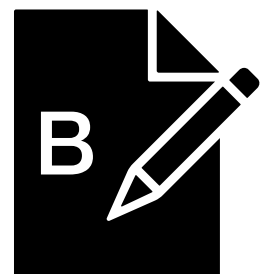
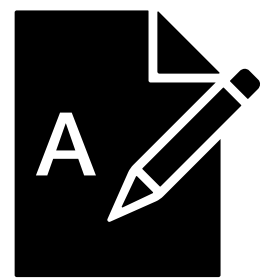
(Local) repository

git commit

# Commit

## Phases

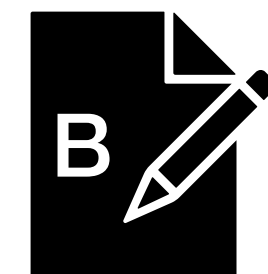
Working directory



Staging area

(Local) repository

git commit



# Git commands

# Git init

- Enable git for a directory
- A .git folder will be created where git stores all necessary information about versioning the directory.

# Git status

- Show current status of the corresponding repository

- Branch
- Changes
- (Un)staged files
- Untracked files

```
tinnguyen@TUD1000963 MyProject % git status
On branch main
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    new file:   File_A.txt

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
    modified:   Readme.md

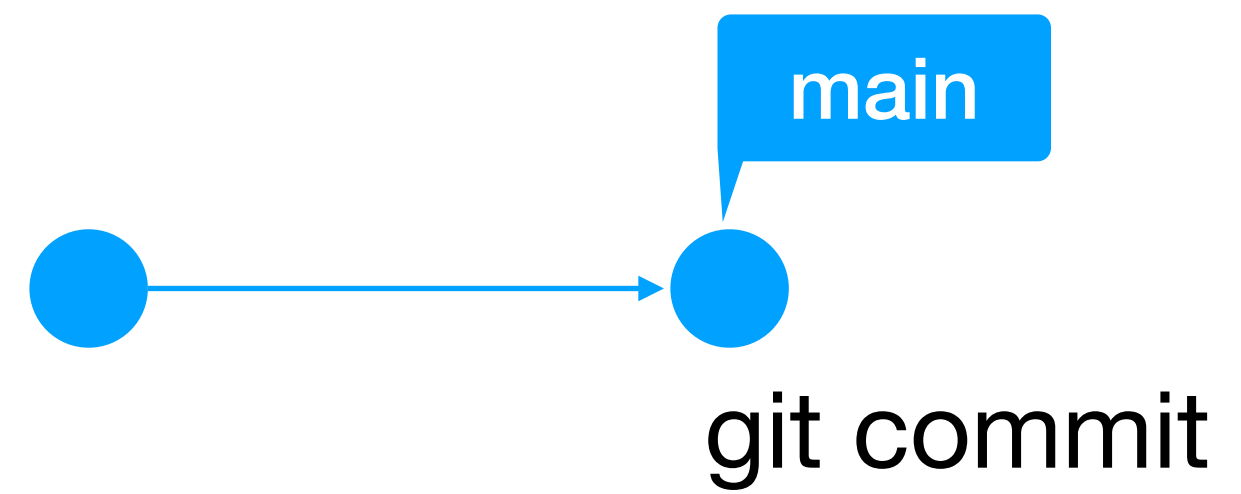
Untracked files:
  (use "git add <file>..." to include in what will be committed)
    File_B.txt
```

# Git add

- Stage files
  - Select changes (modified files)
- Staged files are ready to be committed

# Git commit

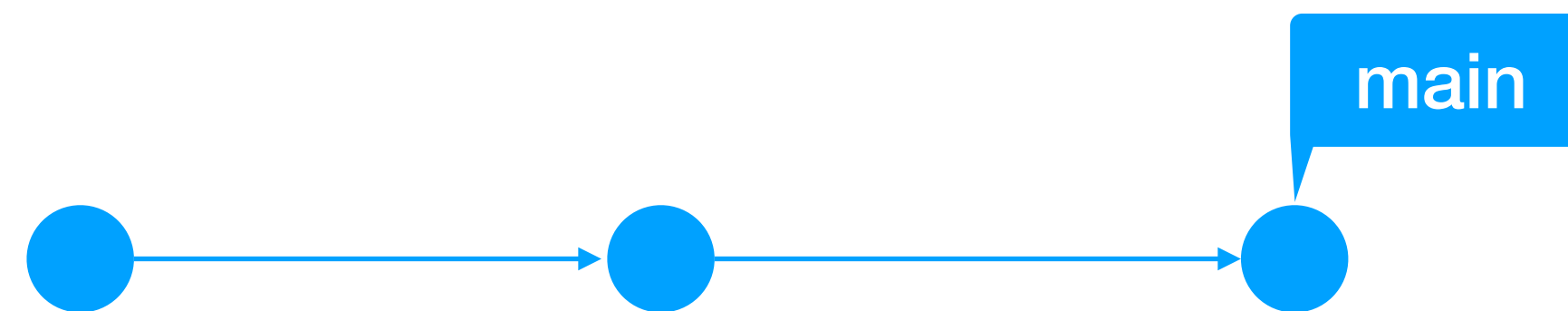
- Commit staged files





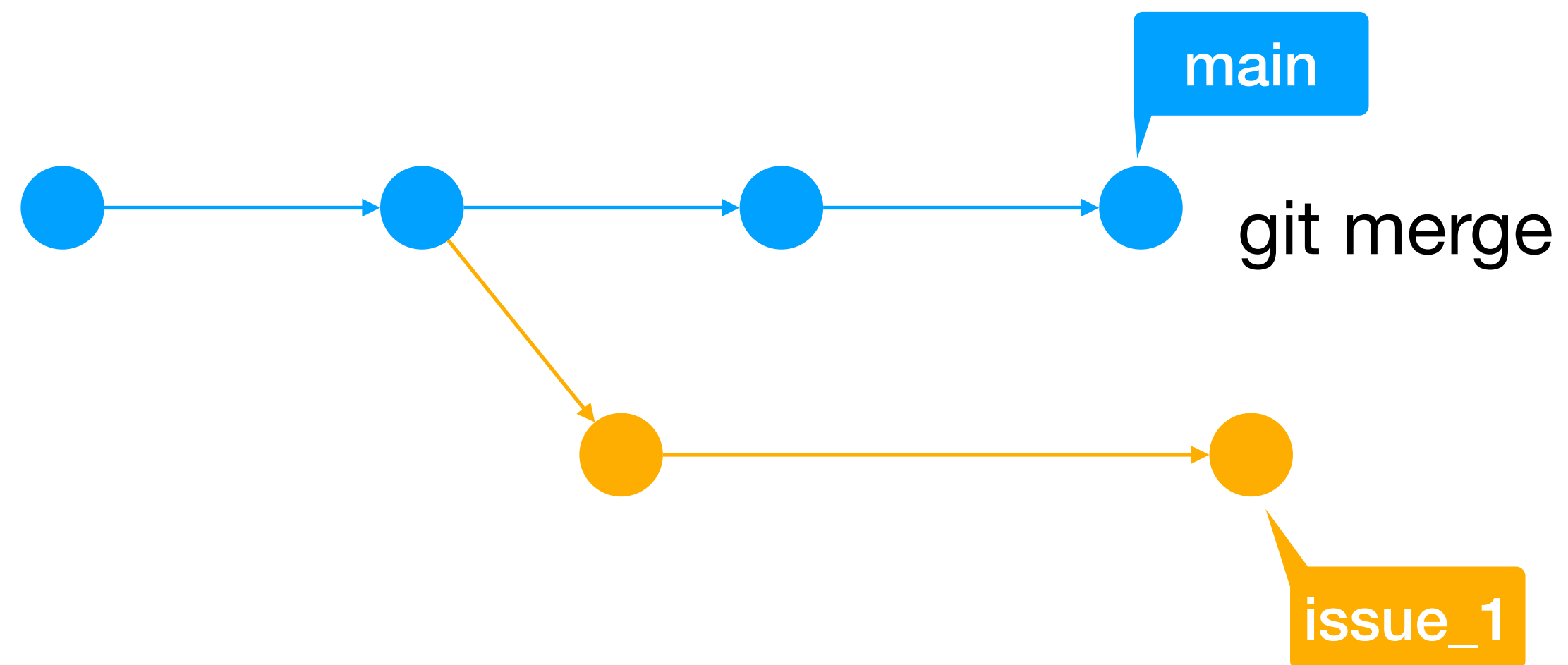
# Git commit

- Commit staged files



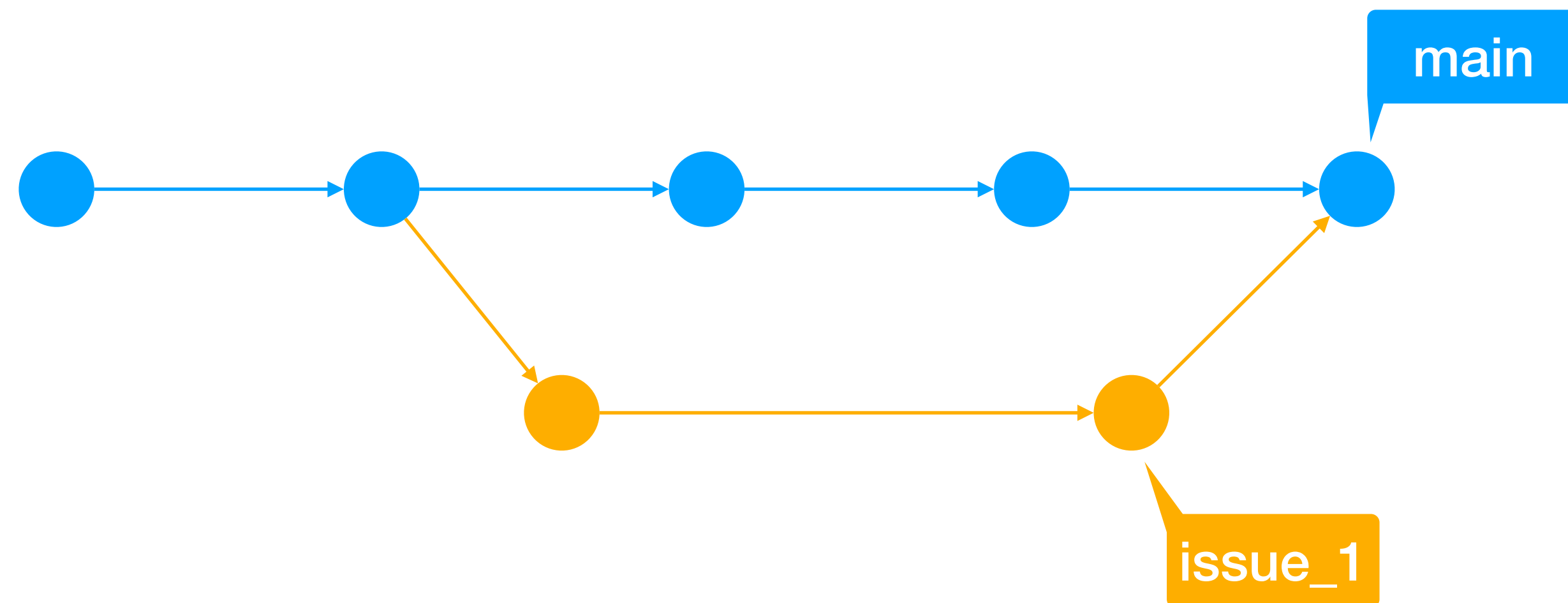
# Git merge

- Merge two branches



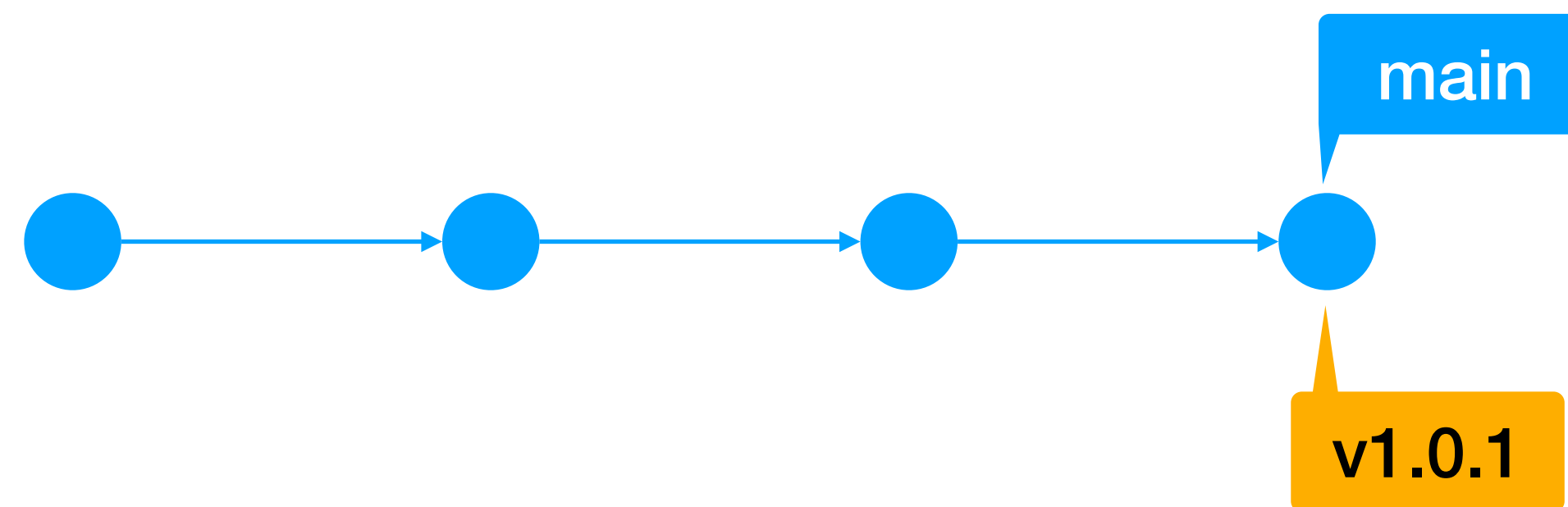
# Git merge

- Merge two branches



# Git tag

- Assign a tag to a commit



# Git log

- Shows git history

Time ↑

```
tinnguyen@TUD1000963 MyProject % git log
commit daaa0d40acbcac024bbe41358f40043ba97cd5cf (HEAD -> main)
Author: Tin Nguyen <nguyenthientin@gmail.com>
Date:   Mon Sep 26 20:39:46 2022 +0200

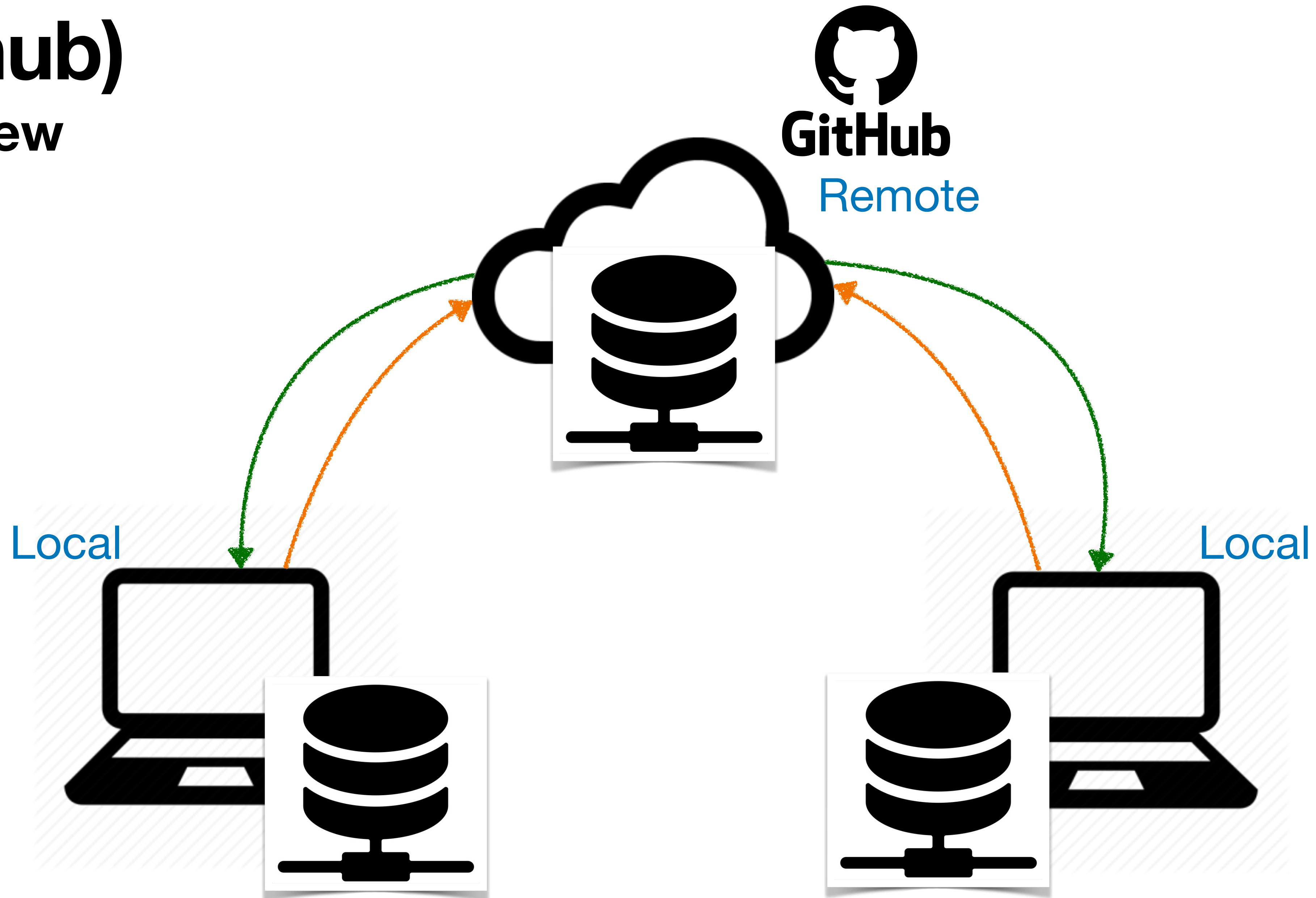
    second commit

commit 20fdefd847d8a9e1265f1db7cd43a19b451ab94d
Author: Tin Nguyen <nguyenthientin@gmail.com>
Date:   Mon Sep 26 16:04:21 2022 +0200

    first commit
```

# Git(hub)

## Overview



# Synchronisation

# Remote repository

- git remote add
  - Link the local repository to a remote repository - Cloud place holder
- remote branches are preceded by the term 'origin'

```
tinnguyen@TUD1000963 mslearn-dp100 % git log
commit 48bc4227570b0817702d195aa06fa4dabe1bbdd7 (HEAD -> main, origin/main, origin/HEAD)
[Author: madiepev <madiepev@microsoft.com>
Date: Tue Jun 28 15:24:01 2022 +0200

    update designer deploy ui
```



# Git pull & Git push

- Synchronise the local and remote repositories
- ‘git pull’ pulls the changes in the remote repository to the local repository
- ‘git push’ pushes the local changes in the local repository to the remote repository

# Resolve conflicts

- When merging, a conflict happens when there are 2 versions of a file

