香港浸會大學
HONG KONG BAPTIST UNIVERSITY

COMP7940 Cloud Computing

Course Introduction and Git Tutorial

Instructor

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Assessment Scheme

😄 **Good news, no midterm.**

- Continuous Assessment (40%)
  - Two individual programming assignments (6% + 12%)
  - One group project with presentation (size <= 3)
- Examination (60%)
  - Covers all topics of the course.
  - Exam date: TBA

Academic Honesty

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- Do you copy any work from other website without properly citation.
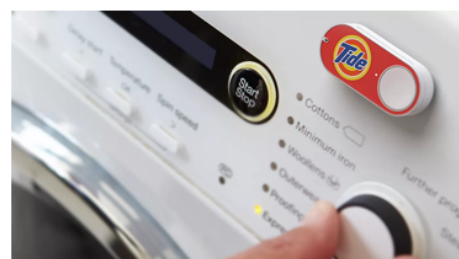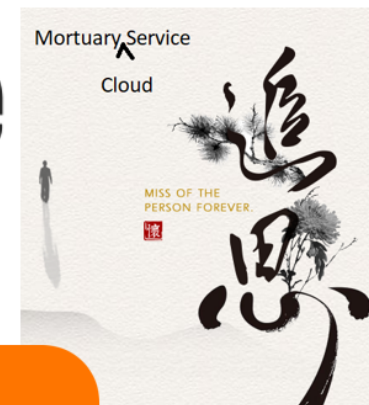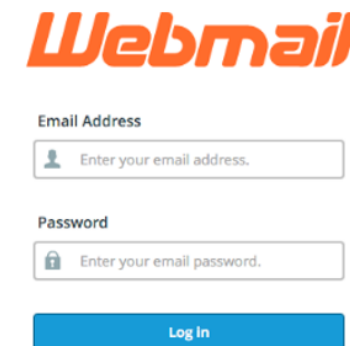- If you have doubt, consult your instructor for explicit clarification.

Penalty for Plagiarism

http://ar.hkbu.edu.hk/curr/avoid_plagiarism/

http://ar.hkbu.edu.hk/file/22

What is Cloud computing?

Decide which should be considered as Cloud.

A very rough definition about Cloud

# SERVICE

NIST definitions on Cloud

- On-demand self-service

- Broad network access

- Resource pooling

- Rapid elasticity

- Measured service

Learning outcomes

This course introduces the techniques underlying the design and engineering of **distributed systems** and **cloud computing systems**. Topics include distributed system models, computer clusters, virtualization, data centers, cloud computing models, cloud-enabling technologies, cloud mechanisms, and cloud architectures. Students will also acquire **hands-on experience** in cloud computing software.
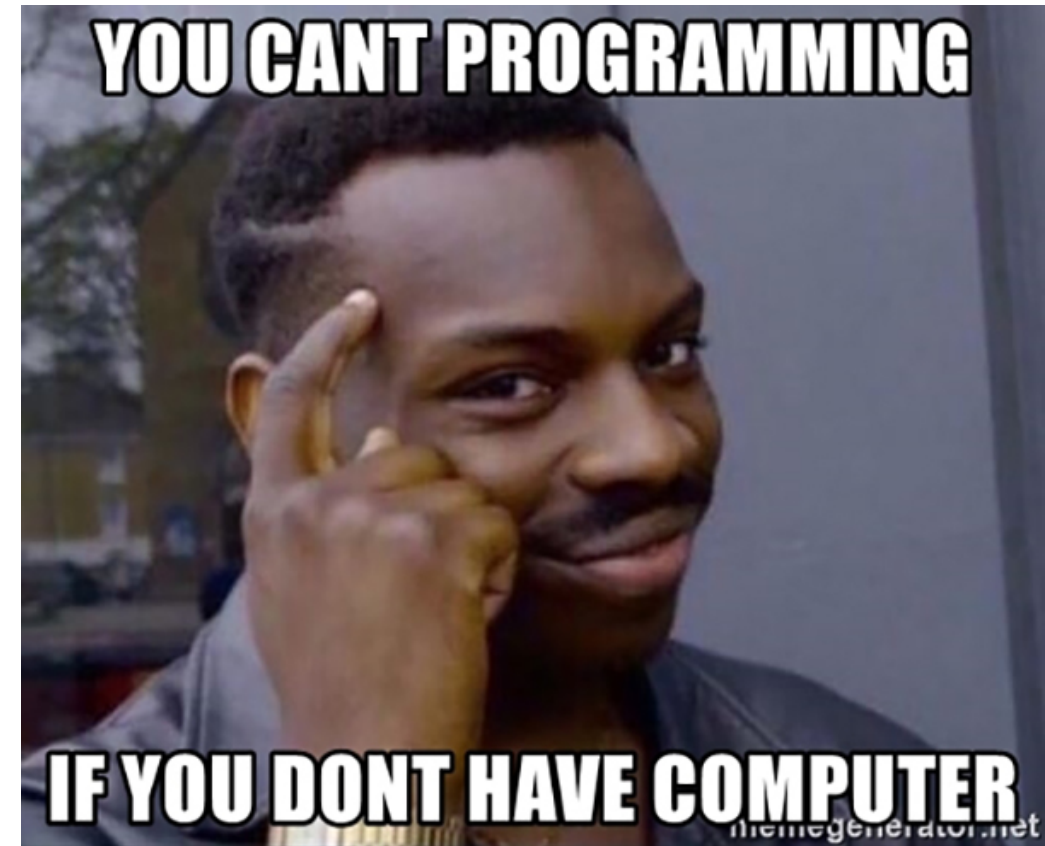
Project - A line Chatbot
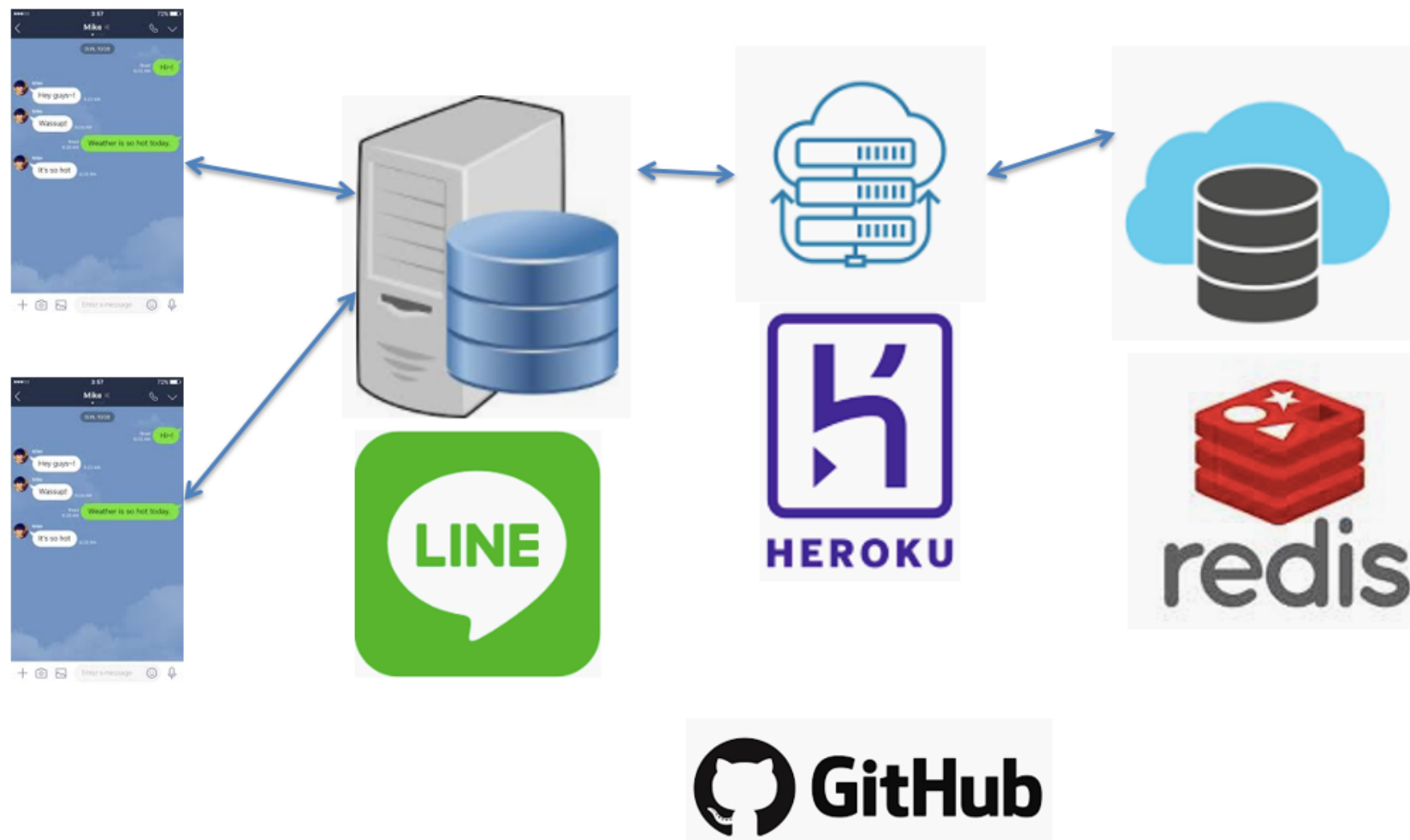
Am I right to this course?

- Assumption of programming background: none

- Assumption of time required: a lot, if you have almost zero experience.

- You can tell in the interview:
    - Experience in deploying apps on cloud
    - Experience of using NoSQL database
    - Experience of using GitHub

Software to Install

- Python 3 (3.6 or above)

- A Git client (git command line + a GUI)

- An IDE (e.g. VS Code)

- Plus some other software that will be told in the assignments

Textbooks

George Coulouris, Jean Dollimore, and Tim Kindberg, "Distributed Systems: Concepts and Design," 5th Edition, 2012

References

Learnpython.org

Tutorialspoint Python

Git

ADD GIT PROVIDER ▼

What is Git?

Git is a software that does version control (like apple Time Machine). It can be executed offline. It can also be synchronized with a Git service provider.

Git ≠ GitHub

Github

GitLab

BitBucket

Stash

BitBucket server
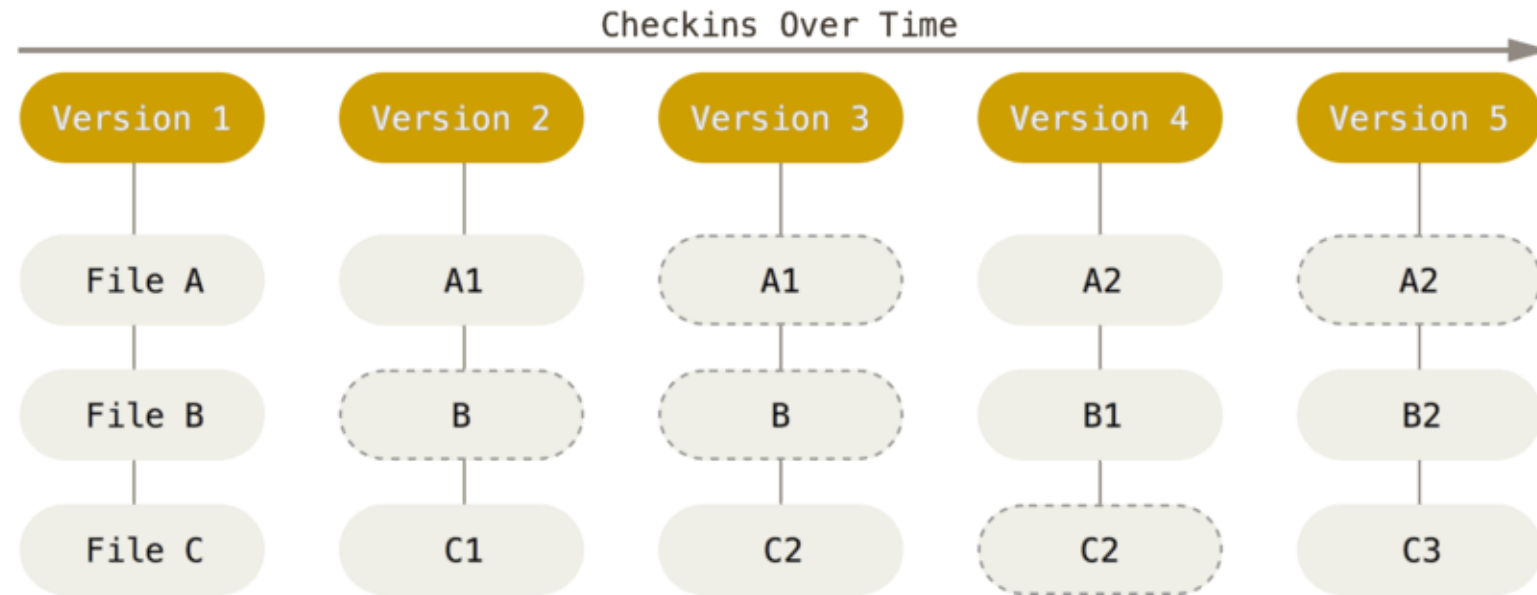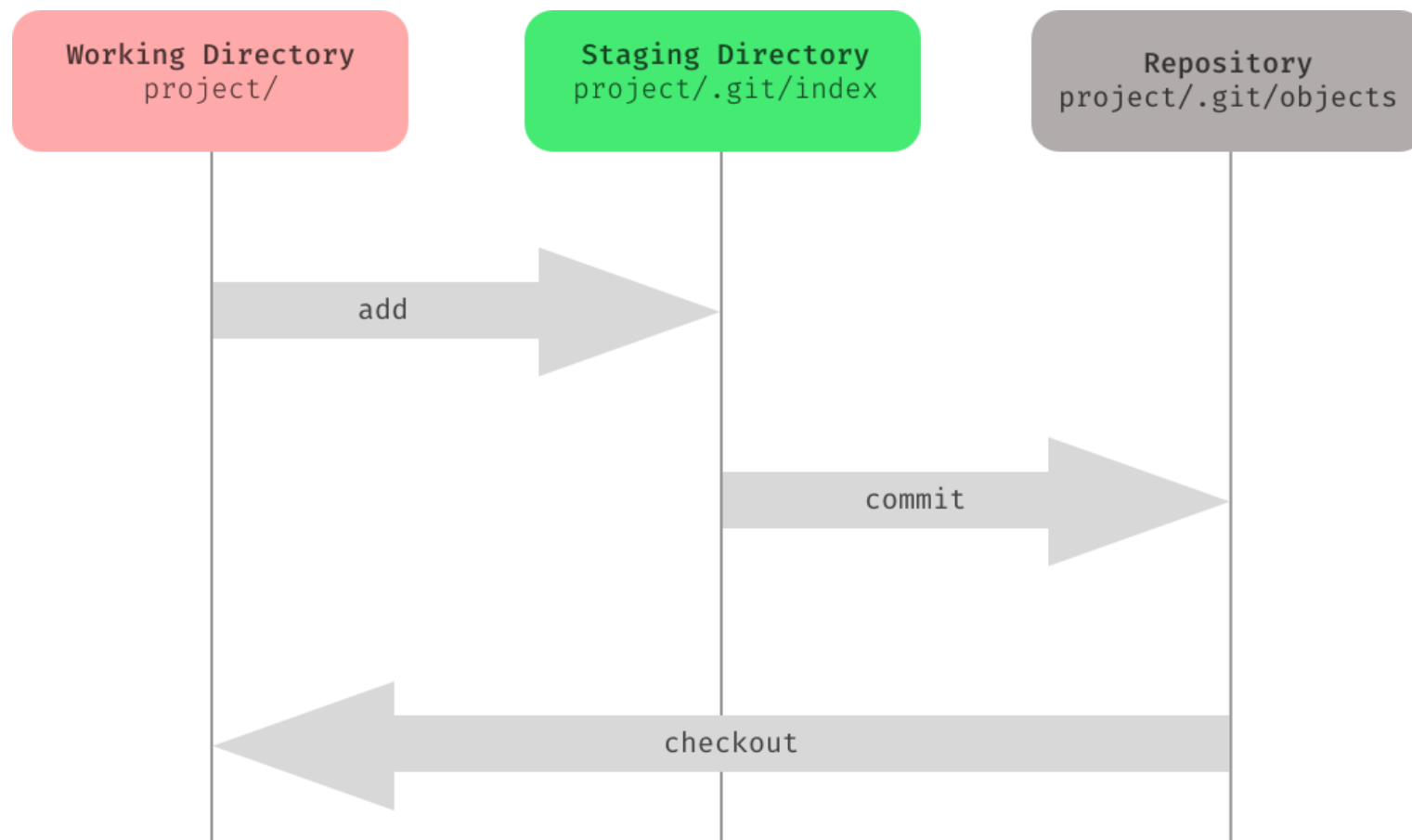
A Git System

- Each **commit** is a snapshot of file systems.
- Unchanged files will not be duplicated.

https://git-scm.com/

Checkins Over Time

Version 1	Version 2	Version 3	Version 4	Version 5
File A	A1	A1	A2	A2
File B	B	B	B1	B2
File C	C1	C2	C2	C3

The three trees on Git

https://hackernoon.com/understanding-git-index-4821a0765cf

Life Cycle of Git Version Control

0. Init a repo or Clone a repo
  - `init` : create a repo from nothing
  - `checkout` : download a new from existing source.

1. Stage File
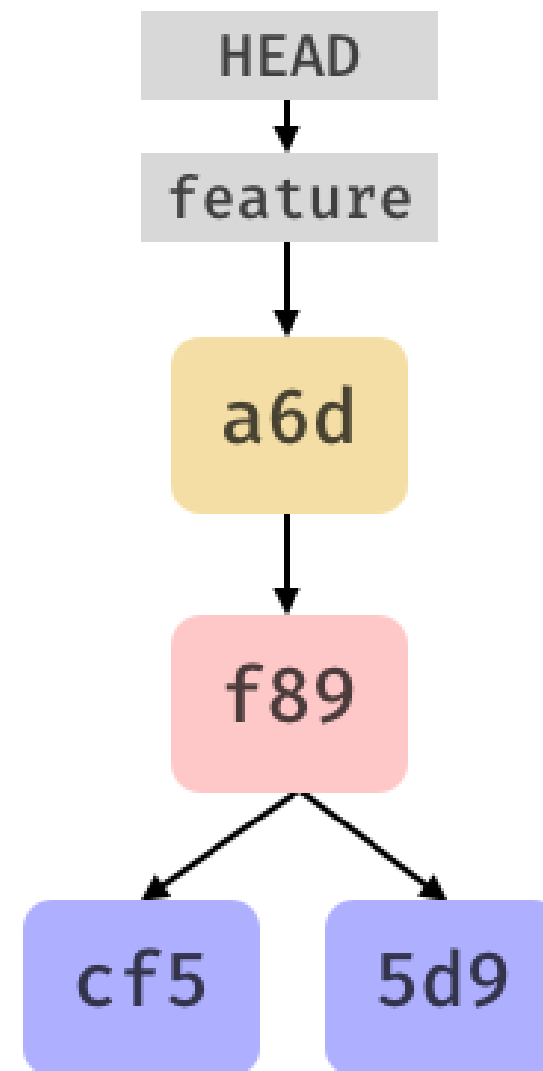 - `add` a file to let git track it.

2. Commit Changes
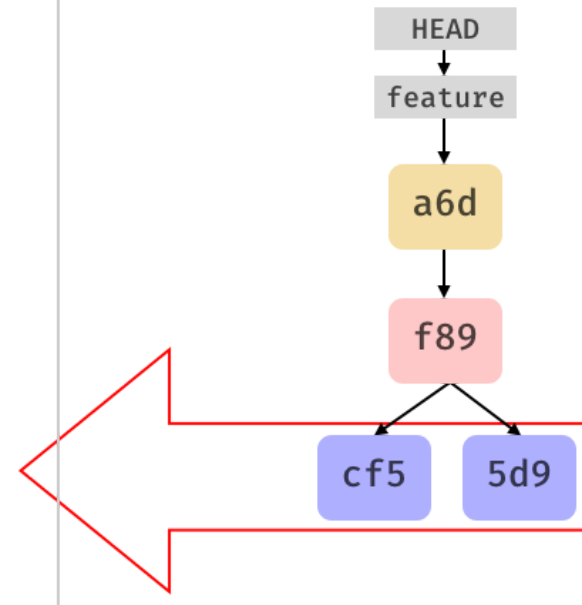 - `commit` all changes to build a snapshot in the repo.

Your original repo stores.

HEAD

feature

a6d

f89

cf5   5d9

checkout - step 1.1

checkout - step 1.2

edit index.php

`git status` (update the index)

	Working Directory project/		Index project/.git/index						Repository project/.git/objects


```
        Working Directory                  Index                          Repository
            project/                  project/.git/index              project/.git/objects

                                 mtime   file      wdir    stage   repo

    1:21  index.php              1:21  index.php   9f5     5d9     5d9

    1:20  README.md             1:20  README.md    cf5     cf5     cf5
```
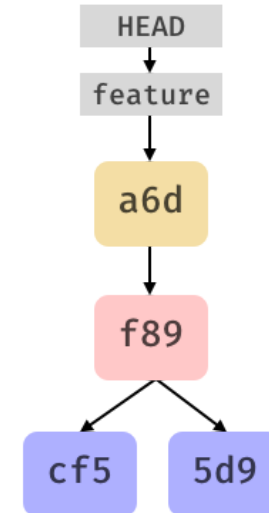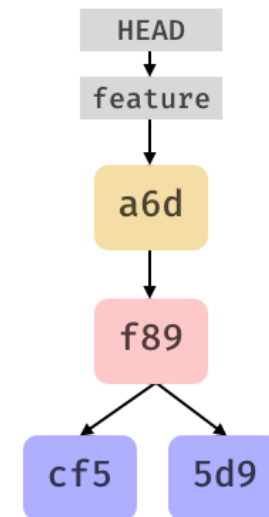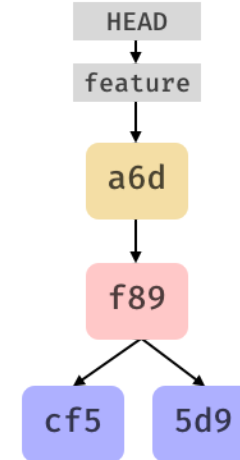
```
On branch feature
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)
modified:    index.php
no changes added to commit (use "git add" and/or "git commit -a")
```

git add index.php

	Working Directory project/		Index project/.git/index					Repository project/.git/objects

Working Directory
project/

1:21 index.php

1:20 README.md

Index
project/.git/index

mtime	file	wdir	stage	repo
1:21	index.php	9f5	9f5	5d9
1:20	README.md	cf5	cf5	cf5

Repository
project/.git/objects

HEAD
feature
a6d
f89
9f5 cf5 5d9

Working Directory
project/

Index
project/.git/index

Repository
project/.git/objects

mtime	file	wdir	stage	repo
1:21	index.php	9f5	9f5	5d9
1:20	README.md	cf5	cf5	cf5

1:21 index.php

1:20 README.md

HEAD
feature
a6d
f89
9f5 cf5 5d9
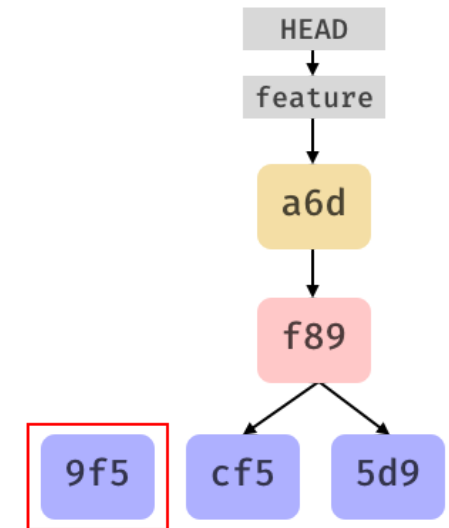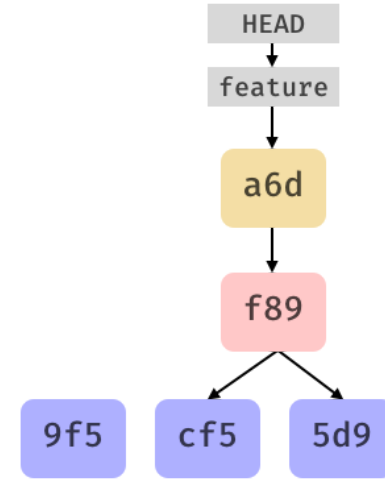
```
On branch feature
Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)
modified:   index.php
```

`index.php` is now staged. Ready to be committed.

git commit -am "Message"

Working Directory project/	Index project/.git/index				Repository project/.git/objects

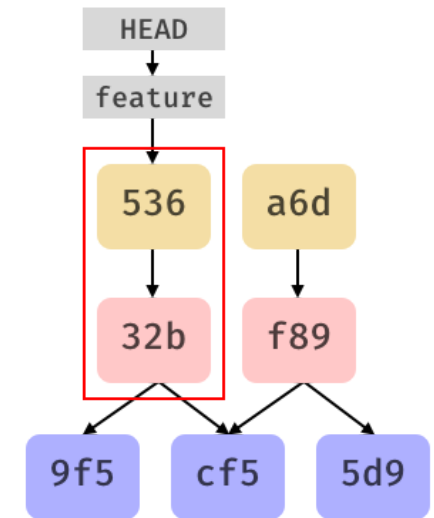
Working Directory project/

1:21 index.php

1:20 README.md

Index project/.git/index

mtime	file	wdir	stage	repo
1:21	index.php	9f5	9f5	9f5
1:20	README.md	cf5	cf5	cf5

Repository project/.git/objects

HEAD → feature → 536 → 32b

a6d → f89

536/32b → 9f5, cf5
f89 → cf5, 5d9
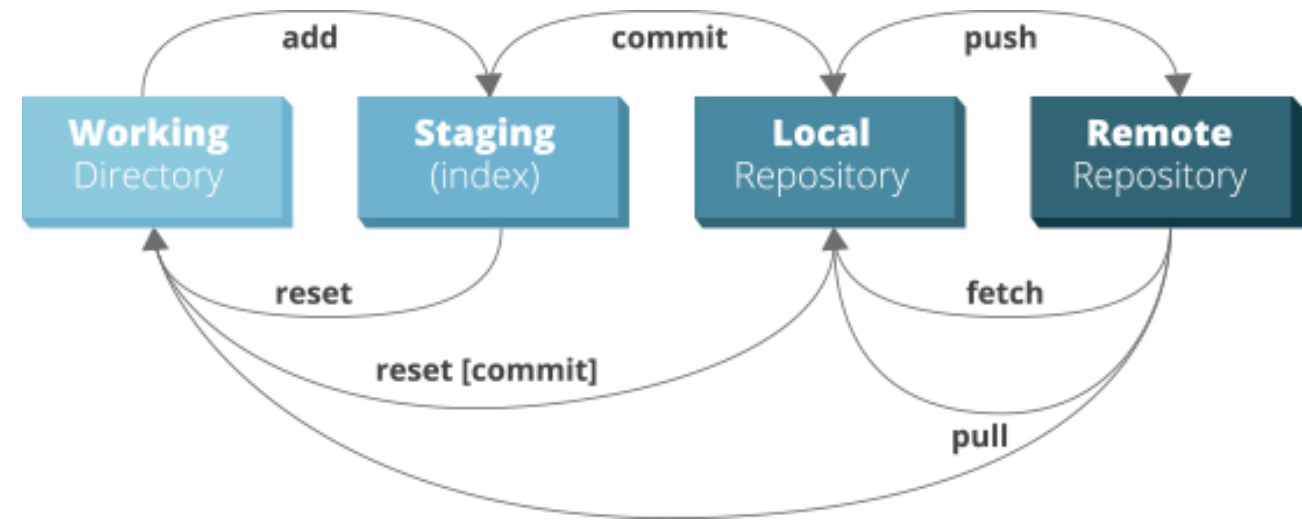
The fourth - remote repo

A remote repository is a service that allow you and your teammate to synchronize your code online.

- Push: to upload code to remote repo
- Fetch/Pull: to download code from remote repo

View your remote repo

```
git remote -v

heroku  https://git.heroku.com/aqueou.git (fetch)
heroku  https://git.heroku.com/aqueou.git (push)
origin  https://github.com/khwang0/COMP3111 (fetch)
origin  https://github.com/khwang0/COMP3111 (push)
```

`origin` is the default remote repo.

Add a remote repo

```
git remote add my_repo https://whatever.com/eg.git
```

```
git remote -v

heroku   https://git.heroku.com/aqueou.git (fetch)
heroku   https://git.heroku.com/aqueou.git (push)
my_repo https://whatever.com/eg.git (fetch)
my_repo https://whatever.com/eg.git (push)
origin   https://github.com/khwang0/COMP3111 (fetch)
origin   https://github.com/khwang0/COMP3111 (push)
```

To remove a repo: `git remote remove my_repo`

A typical workflow

sit down > pull > code and test > pull-commit-push > lunch

- The first pull to update your code with your teammates.
- The second pull is to make sure no one has updated the code before your commit.

`git pull` - To download

```
git pull origin master
```

- `origin` is the remote repo name
- `master` is the branch name

`git push` - To upload

```
git push origin master
```

or

```
git push origin master:branchX
```

push your local branch `master` to remote repo `origin`'s branch `branchX`

History

https://stackoverflow.com/questions/3639342/whats-the-difference-between-git-reset-and-git-checkout

View your history

```
git log

commit 58b1ca14651ad88889d6adf1601528b5f5d893cb
Merge: d8b0018 0f8b162
Author: Kevin Wang <kevinw@comp.hkbu.edu.hk>
Date:   Wed Nov 15 15:34:57 2017 +0800

    Merge pull request #24 from victorkwan/master

    Adds solutions for Lab 6

commit 0f8b1629362bbfc211029ec12cf473c4f22ff291
Merge: 2bc16e3 d8b0018
Author: Kevin Wang <kevinw@comp.hkbu.edu.hk>
Date:   Wed Nov 15 15:34:45 2017 +0800

    Merge branch 'master' into master
```

Navigate

Both `git checkout` and `git reset` do similar thing.
`git checkout` can be less harmful.

```
git checkout 0f8b1629362bbfc211029ec12cf473c4f22ff291
```

or just

```
git checkout 0f8b1
```

or go back one version

```
git checkout HEAD~1
```

If you do a `git checkout`

> Note: checking out 'd8b0'.
> You are in 'detached HEAD' state. You can look around, make experimental changes and commit them, and you can discard any commits you make in this state without impacting any branches by performing another checkout.

A `git branch` gives

```
* (HEAD detached at d8b0018)
  lab3
  master
```

Going back to the latest commit

```
git checkout master
```
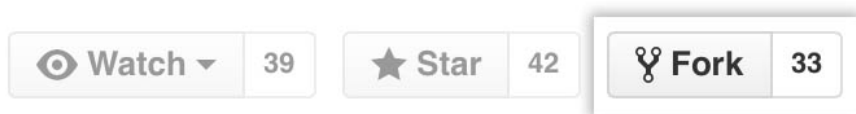
or the commit hash directly

A particular file

```
git show d8b0018:README.md
```
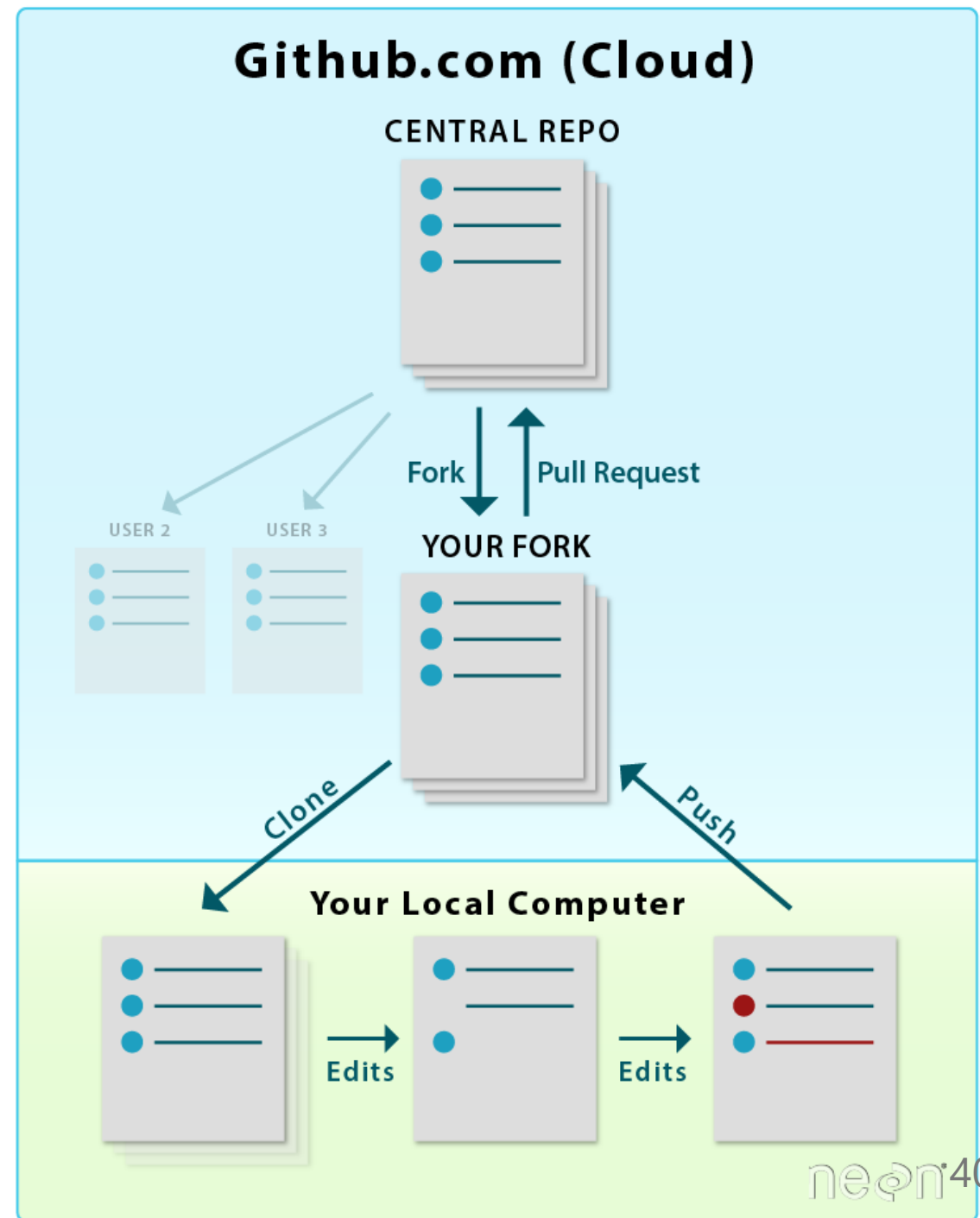
or revert to previous version

```
git checkout HEAD~1 README.md
```

Fork a project

| ⊙ Watch ▾ | 39 | ★ Star | 42 | ⅄ Fork | 33 |

Sometimes you want to work on a open source project more that just downloading it.

Fork our project today!

40

Very important Topic but less useful for us

- Branching

- Merging

- Pull Request

What are you expected to do (related git)..

- Fork the project

- Clone it to your local machine

- Commit your code regularly

- Push to GitHub for version control

- Push to Heroku for deployment

Hope you just don't do this, everyday.

Ungraded Exercise

- Apply a GitHub student account.

- Create a remote repo call `cloud-computing` on GitHub.

- Clone the repo to your local hard-disk

- Add the lecture note, commit it, and push it to the remote repo.