

# Stochastic Methods + Lab

Prof. Sören Petrat

Office: 112, Research I

## Organization:

- syllabus

- website

- class: Thu, 15:45-17:00

Fri, 8:15-9:30, 9:45-11:00

no difference between lab and lecture slots

- weekly homework assignments / programming (starting Fri, Sep 7)

↳ download and upload and grading via git (see later)

↳ due a week after before class

↳ late hand-in: 75% of original points

↳ solutions discussed in class

↳ note: I check for copying

- TAs: Sandeep Gyawali

Ilseok Lee

↳ weekly office hour

↳ ask general questions + questions about grading

- grade: 80% HW  
20% final take-home exam  
(same grade for class and lab)

## - topics:

- introduction to git and scientific python
- basics of finance (interest, cash flows, bond, immunization, options)
- binomial tree models
- Brownian motion
- stochastic integrals and ODEs
- Black-Scholes eq.
- time series analysis
- some extra topics not related to financial math (depending on time)

- books: • Cyrv (main reference)  
• Etheridge (but later may more mathematically involved than this class)

Bring laptop to class

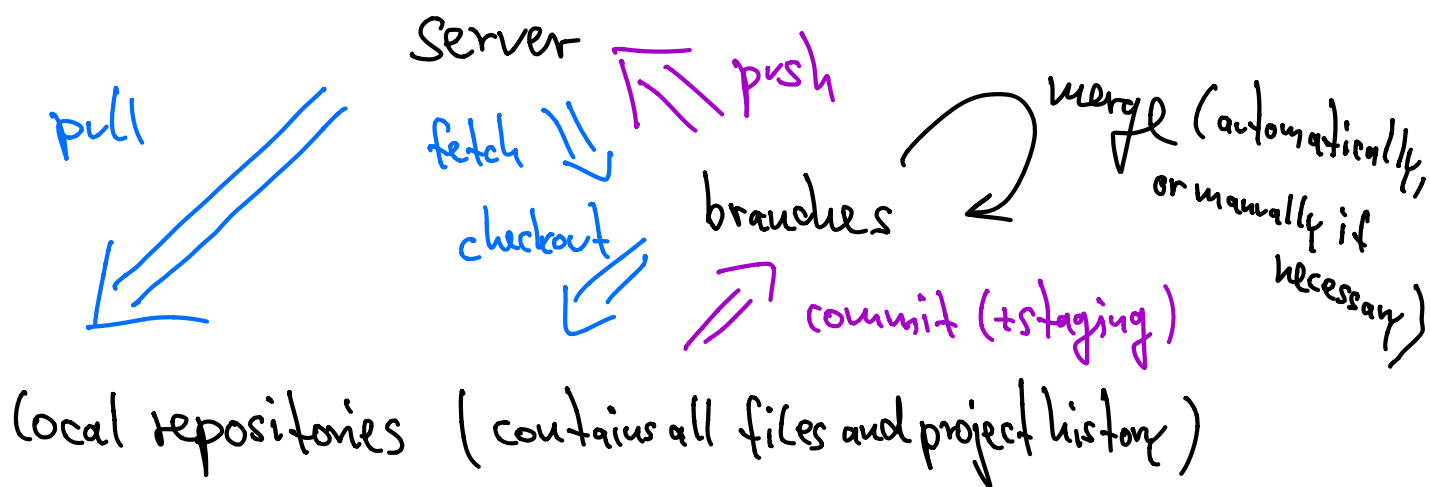
# 0. Introduction to git and scientific python

## 0.1 git

- software (free + open source)
- project development software
  - ↳ version control, change tracking
  - ↳ speed, non-linear workflow (file merging etc.)
  - ↳ used for software development (Linux, recently Windows, ...)
  - ↳ useful for (large) scientific collaborations

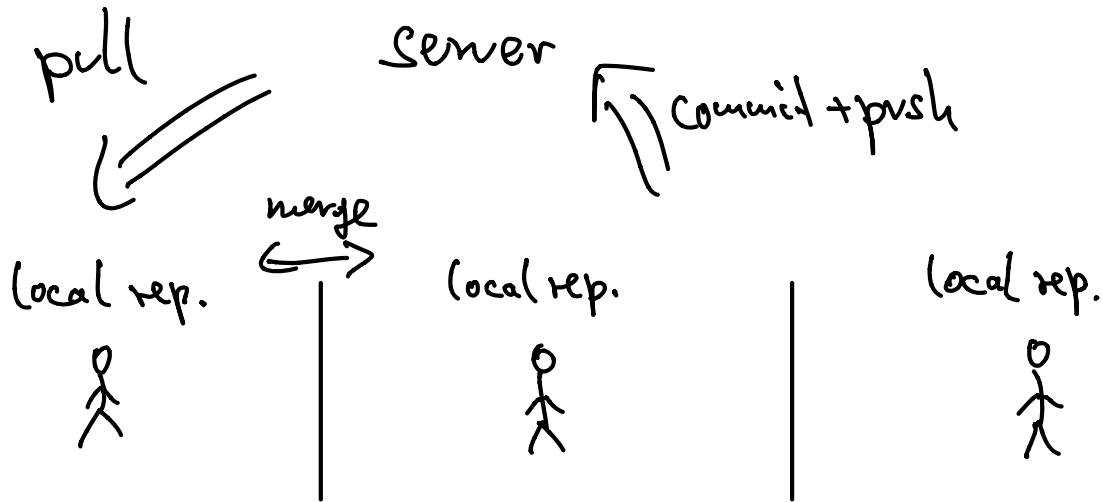
hosting server (filestorage etc.): bitbucket

### Workflow



Ex.: • scientific collaboration

smaller projects: one branch (master) is enough



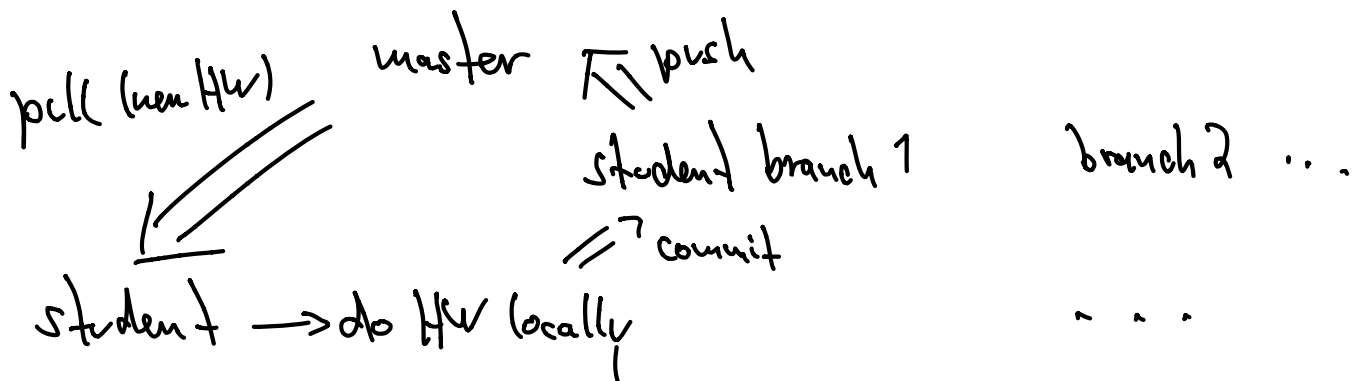
• this class

master branch: all official course material (HW)

each student: separate branch (private)

teacher/TA: write access to all branches

student: read access to master



student: pull master → do work → stage and commit → push

To Do:

- set up git using "Intro to git for academics" (link on website)

↳ download git

↳ configure git

↳ bitbucket account

sign up with Jacobs email address → academic account  
→ so I can find you

(↳ gitg (graphical browser, Linux, Windows))

↳ fork and clone repository

give spetrat, Lee/lseok, sgyawali22 write access

## 0.2 Scientific Python

Recommended: Anaconda (version 3.x) (Windows, Linux, Apple)

↳ SciPy package included  
↳ spyder editor (development environment)