
Prof. Dr. Sören Petrat (Office 112, Res. I)

Organization:

- website

- class: Wed, 15:45-17:00
  Thu, 8:15-9:30 and 9:45-11:00
  (first slot is more "lecture", second slot more "lab/interactive")

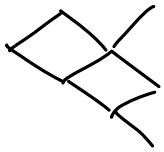
- weekly homework/programming assignments (start next week)
  ↳ download and upload solutions via git (see later), also grading via git
  ↳ usual schedule: hand out on Tuesday, due midnight the Tuesday after
  ↳ two worst homework submissions are excluded from the grade
  (except illness over several days); therefore no extensions!
  ↳ solution discussed in class
  ↳ note: I check for copying; respect Academic Integrity

- grade: project portfolio
  - 70% weekly homework submissions
  - 30% final take-home exam / project

- TA: Anish Ghosh
  - ↳ "pre-grading" of weekly submission
  - ↳ ask questions!
  - ↳ ask him detailed questions about grading first

Please bring your laptop to class!

Course topics:

- introduction to git and scientific python
- basics of finance (interest, cash flows, bond, immunization, options)
- binomial tree models 
- Brownian motion 
- stochastic integrals and stochastic ODEs
- Black-Scholes eq.
- time series analysis

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

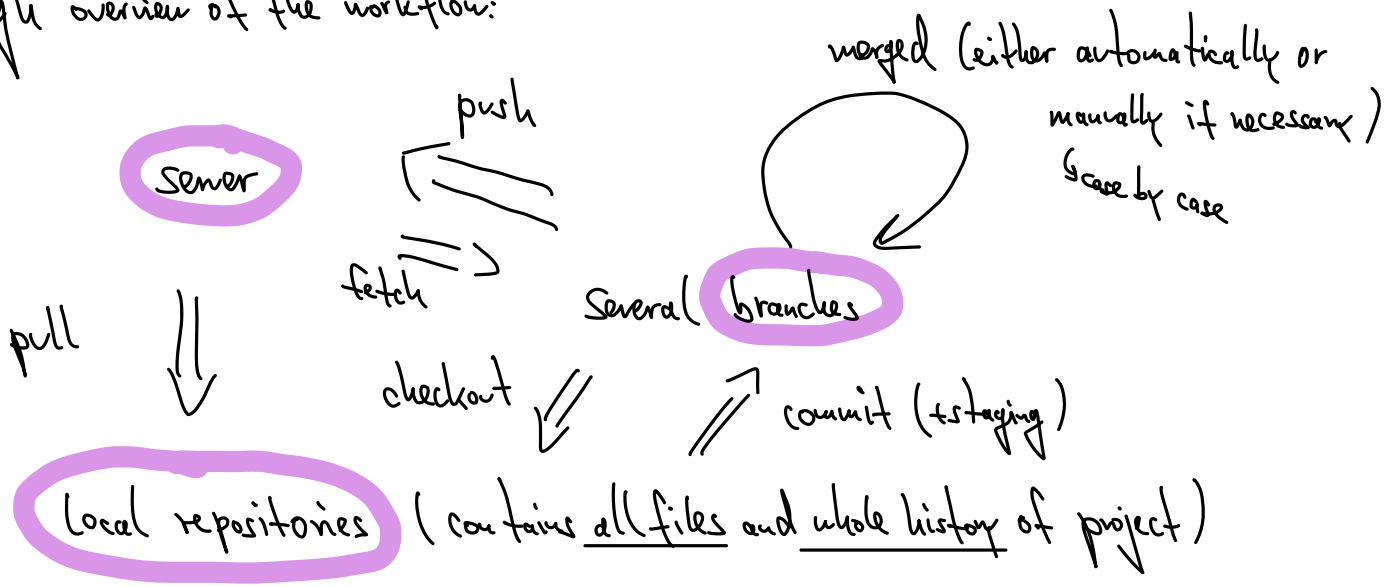
0. Introduction to git and Scientific Python

0.1 git

- software (free + open source) ((locally on your computer)
- project development software
  - ↳ version control, change tracking
  - ↳ speed, non-linear workflow (file merging; different timestamps)
  - ↳ used predominantly for software development (linux, recently windows, some google, ...)
  - ↳ useful for (large) scientific collaborations

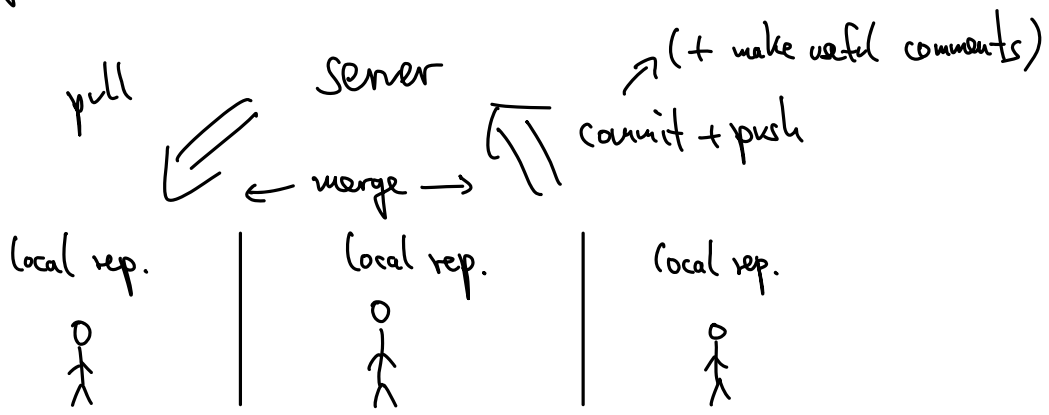
hosting server (filestorage + sometimes other things): we will use **bitbucket**

rough overview of the workflow:



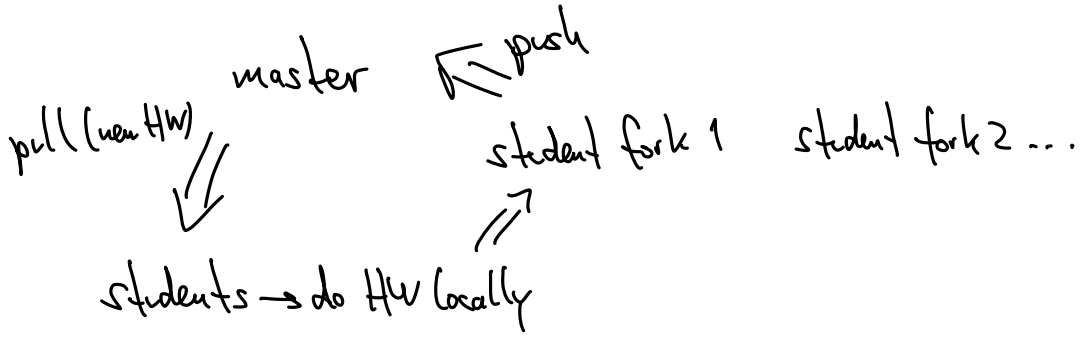
Ex.: Scientific collaboration

smaller project: usually one branch sufficient



- this class:

  - master branch: all official course material + assignments (public)
  - each student: - maintains separate private branch (fork)
    - thus gets all files from master, but add own private work
  - instructor / TA: write access to all branches
  - students: read access to master branch



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

Steps for setting up git (see also "Intro to git for academics" on website):

- download and install git (git-scm.com)
- open command line (git CMD) to configure git (see "Intro")
- get bitbucket account (bitbucket.org), register with Jacobs email address
- on bitbucket: • fork repository spetrat/sm(_2022, mark as private!
  • under "User and group access", add s.petrat@jacobs... and ani.ghosh@jacobs... with "write" access.
- on your computer: clone your repository (via command line)
  your own branch that you just created