INF 502 – SOFTWARE DEVELOPMENT METHODOLOGIES

Week 1

NORTHERN ARIZONA UNIVERSITY

Course instructor

- Dr. Ana Paula Chaves
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  - Ms. in Computer Science
- Assistant Teaching Professor, NAU
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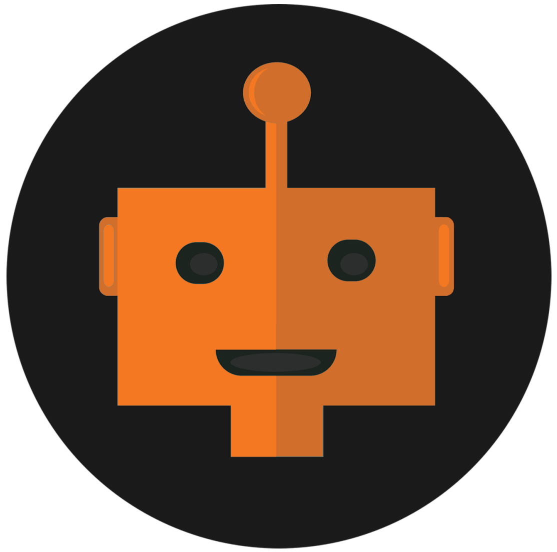
  - MS Teams: link on BBLearn
- Office hours:
  - Available on GitHub

About me…



Communication

MS Teams channels

Quick questions

Discussions

MS Teams private message

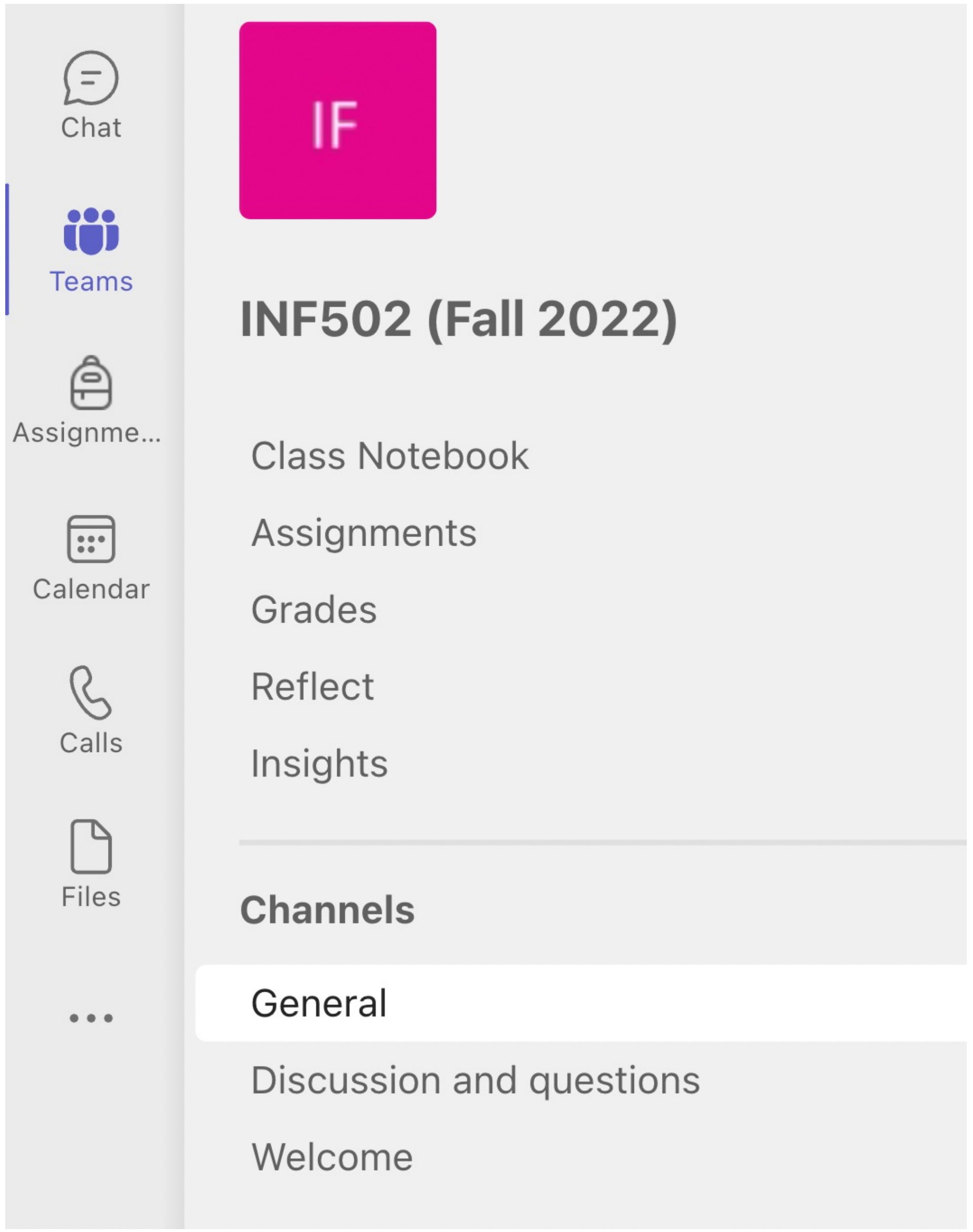
Individual interests

Email

Ana.Chaves@nau.edu

Office hours

In-person, SICCS building, rm 216



The course...

Course page

- https://github.com/chavesana/INF502-Fall22

What?

- Git/GitHub
- Python
  - With some extras
- Software engineering (Agile)

About you…

What is your background (BS, MS, etc.)

Knowledge in Programming (if any)

- where did you learn and how much do you know

What is your research topic (which program)

Your expectations about this course

Syllabus Time

Be ready for what’s next…

Create a GitHub account: www.github.com

INF 502 – SOFTWARE DEVELOPMENT METHODOLOGIES

Introduction to Programming Languages and source control

Programming languages

Enable constructing representations of a computational process; well-defined algorithms processing information

Mapping to machine instructions

Syntax and associated semantics

Fundamentally just like human languages and form of expression

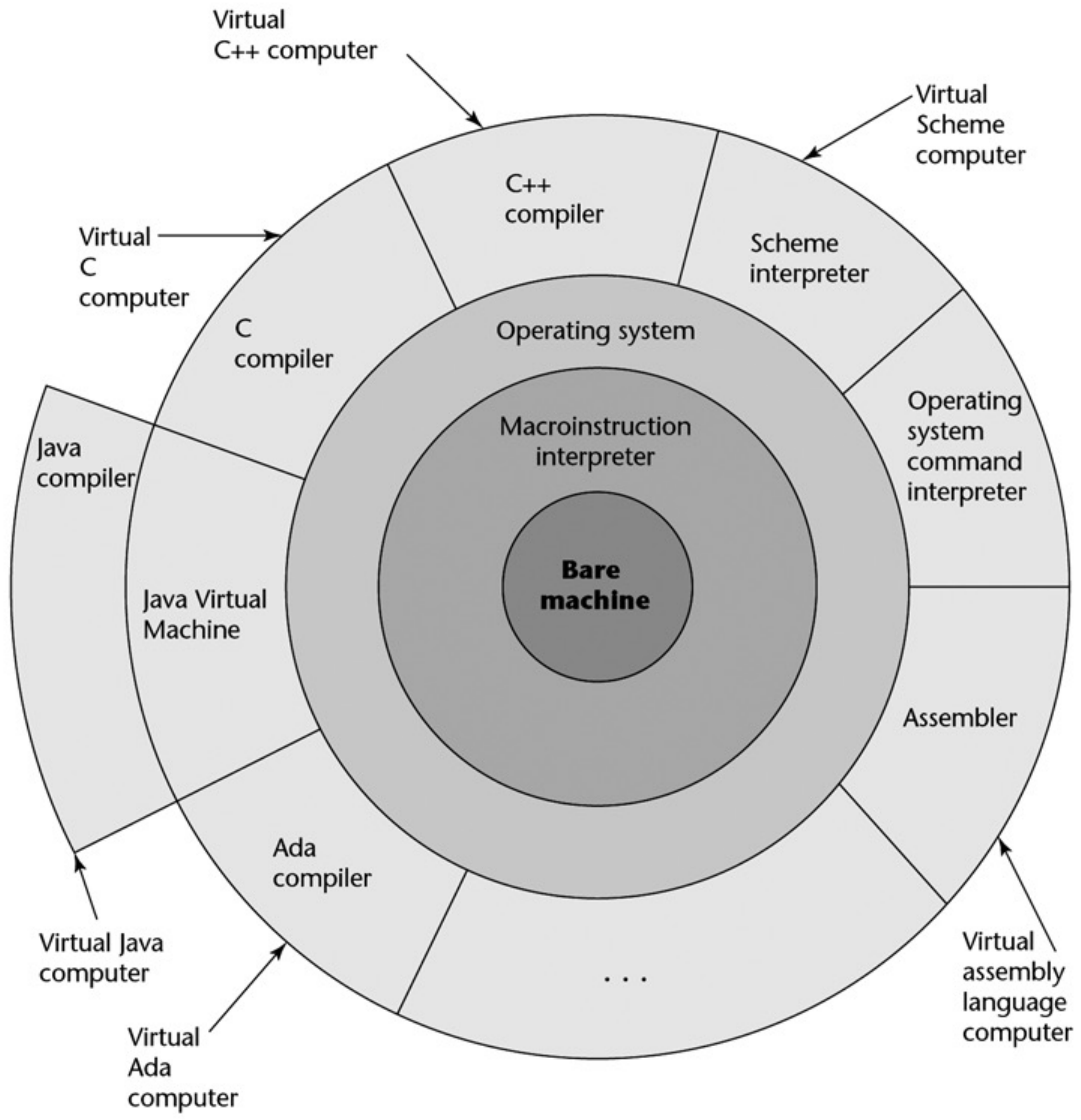
Non-functional properties become critical

Language Implementations

- Layered architectures
    - Mappings from high-level to low-level instructions

Figure 1.2

Layered interface of virtual computers, provided by a typical computer system

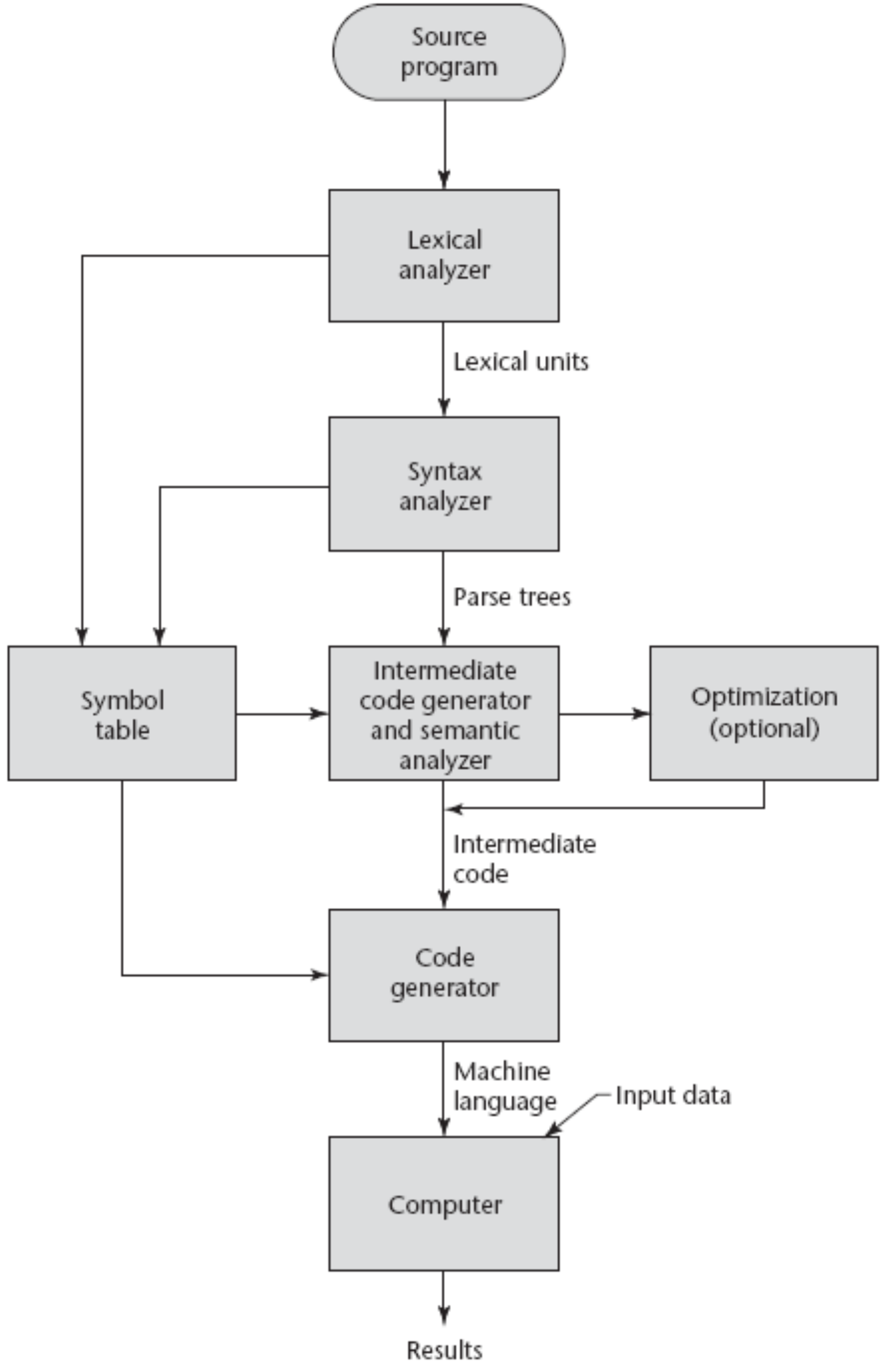


Compiler-based implementations

- Mapping
  - High-level syntax to machine code
    - Plus linking of external resources
- (Some) Advantages:
  - (Usually) faster execution due to optimizations
    - Both algorithmic and machine-specific
- (Some) Disadvantages:
  - Compiled code coupled to specific hardware architecture
  - Long iterative cycle
  - Requires complete program

Figure 1.3

The compilation process

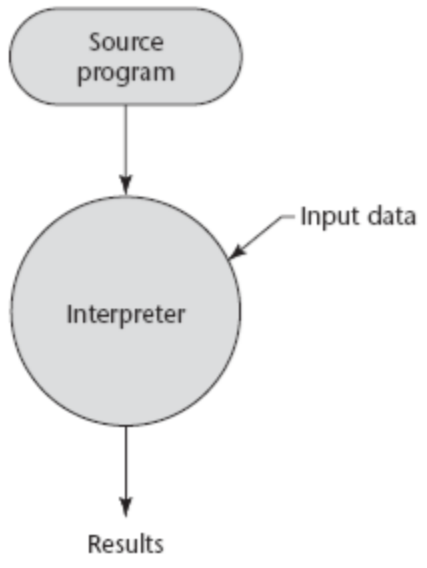


Interpreter-based implementations

- Mapping
  - High-level syntax executed by interpreter
  - Interpreter "wraps" around machine and maps to machine code
- (Some) Advantages:
  - Higher accessibility
    - Ease of experimentation
  - Portable from machine to machine
    - As long as an interpreter exists for each
  - Dynamic code generation
- (Some) Disadvantages:
  - (Usually) slower due to interpreter layer

Figure 1.4

Pure interpretation

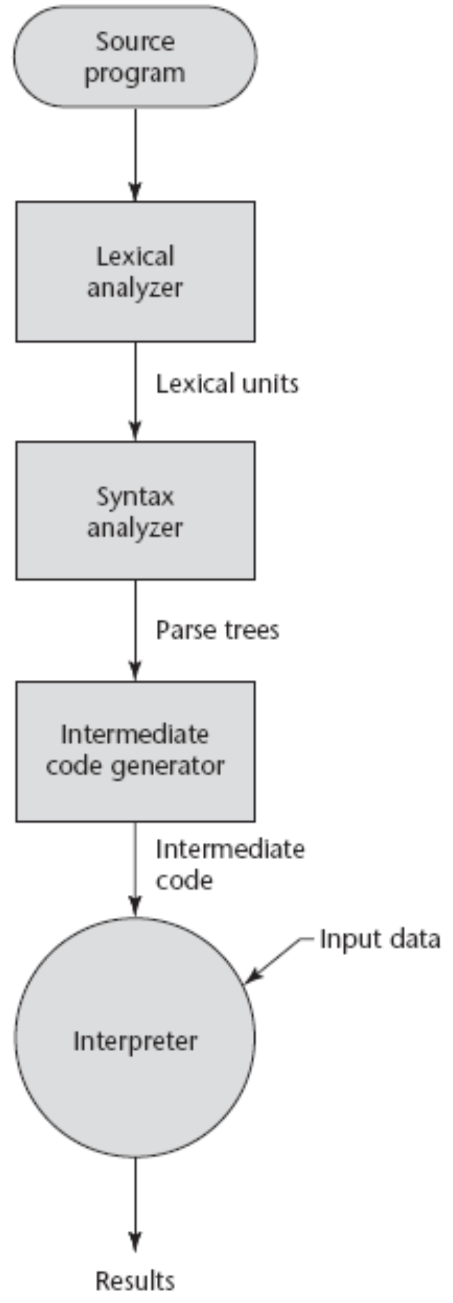


Hybrid implementations

- Mapping
  - High-level syntax to interpreter instructions (intermedi representation)
    - Or purely interpreted
  - Interpreter still “wraps” around machine and maps inte representation to machine code
- (Some) Advantages:
  - Improved performance (over fully interpreted options)
    - Enabling compiler-type optimizations
  - Higher accessibility
    - Intermediate representation portable from machir machine
- (Some) Disadvantages:
  - Longer iterative cycle than fully interpreted options
  - (Usually) still slower due to interpreter layer

Figure 1.5

Hybrid implementation system



The source control

Code Management/Versioning

- Team development
  - Code sharing and versioning…

Code Management/Versioning

git

SUBVERSION

mercurial

CVS

Bazaar

...

We will focus on:

git

Installation guide: https://github.com/git-guides/install-git

Who offers this service

GitHub

Atlassian Bitbucket

GitLab

Your machine! (?)

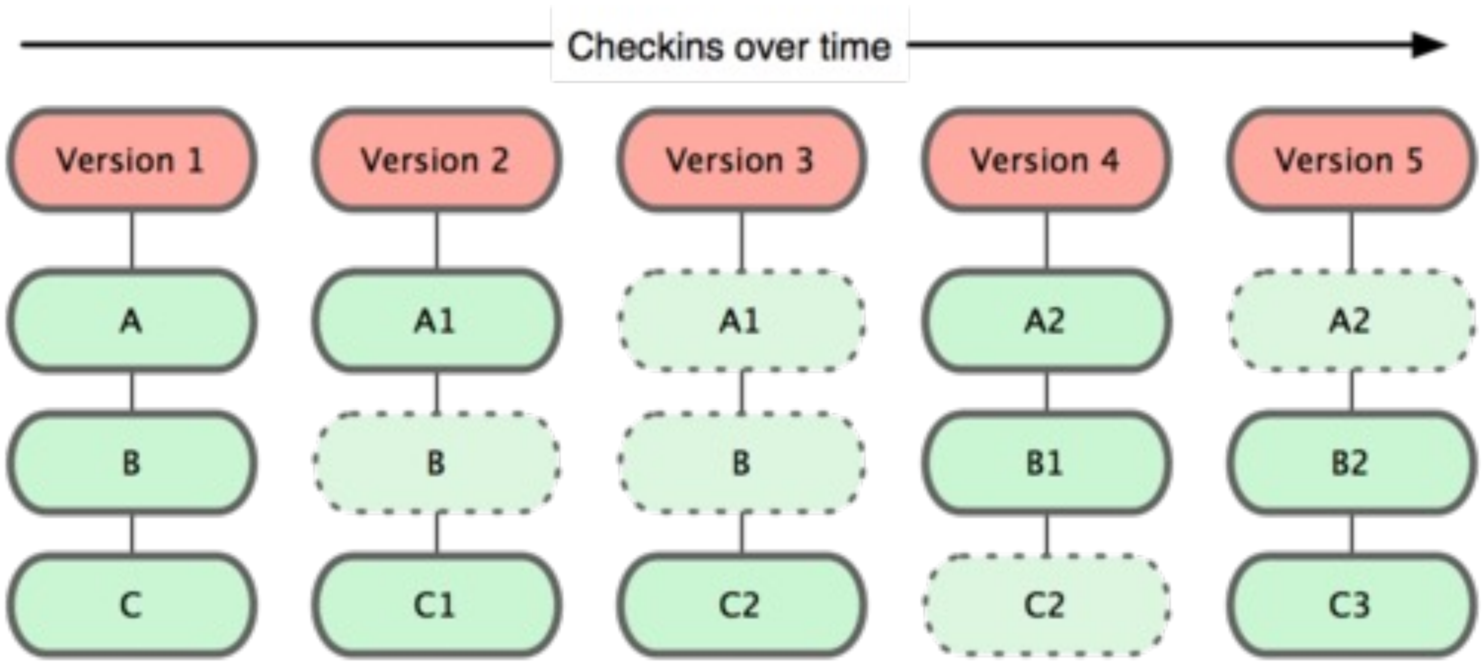
beanstalk

SOURCEFORGE®

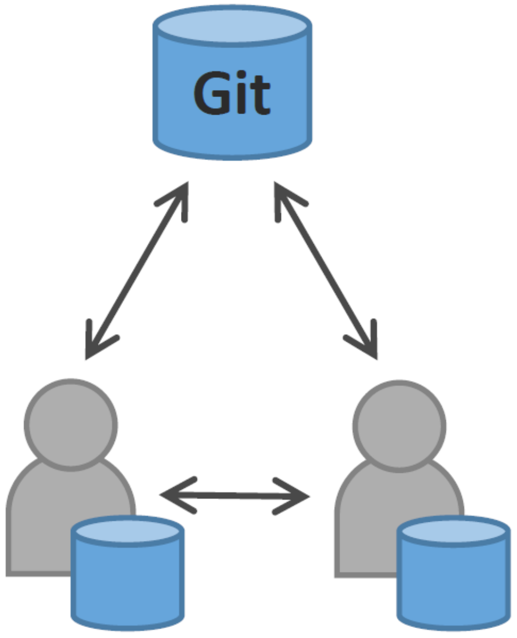
HelixTeamHub

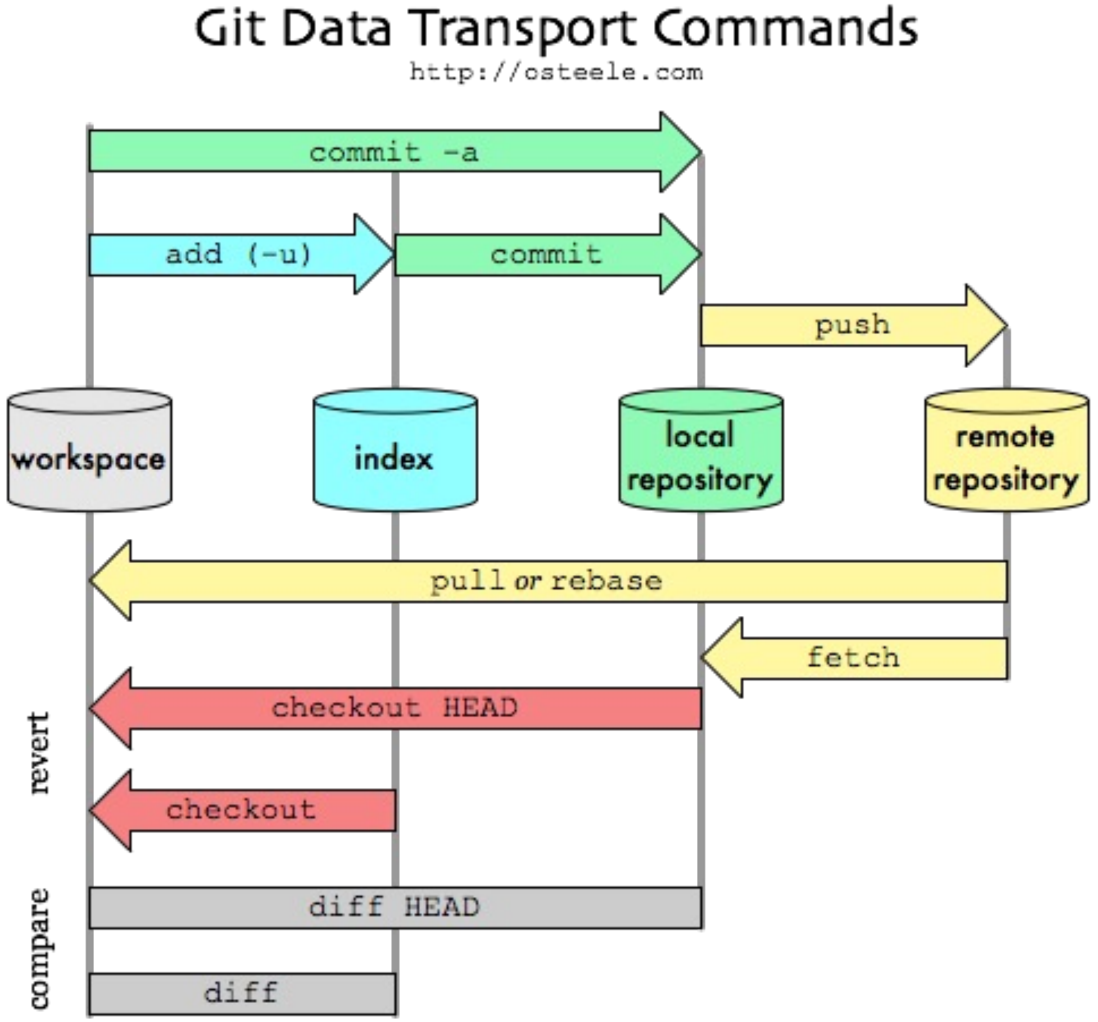
codebase

How Git Manages Files Over Time

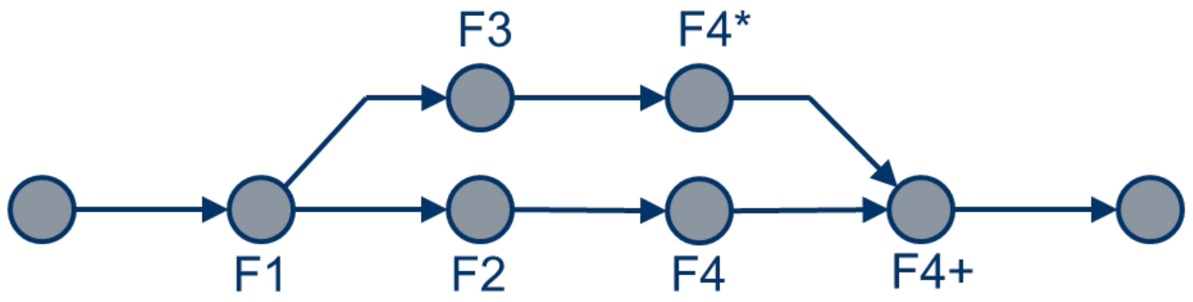


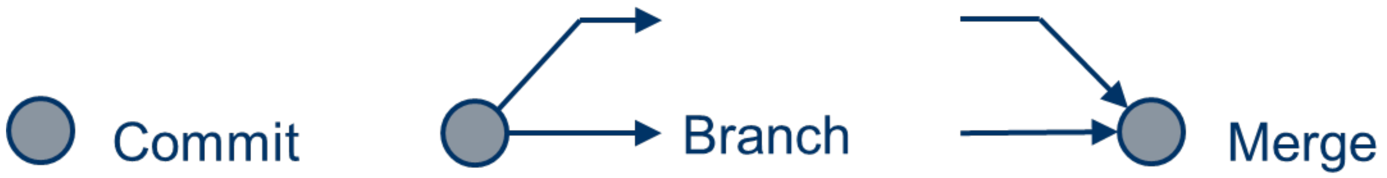
Git - overview





Git Local Flow - Example





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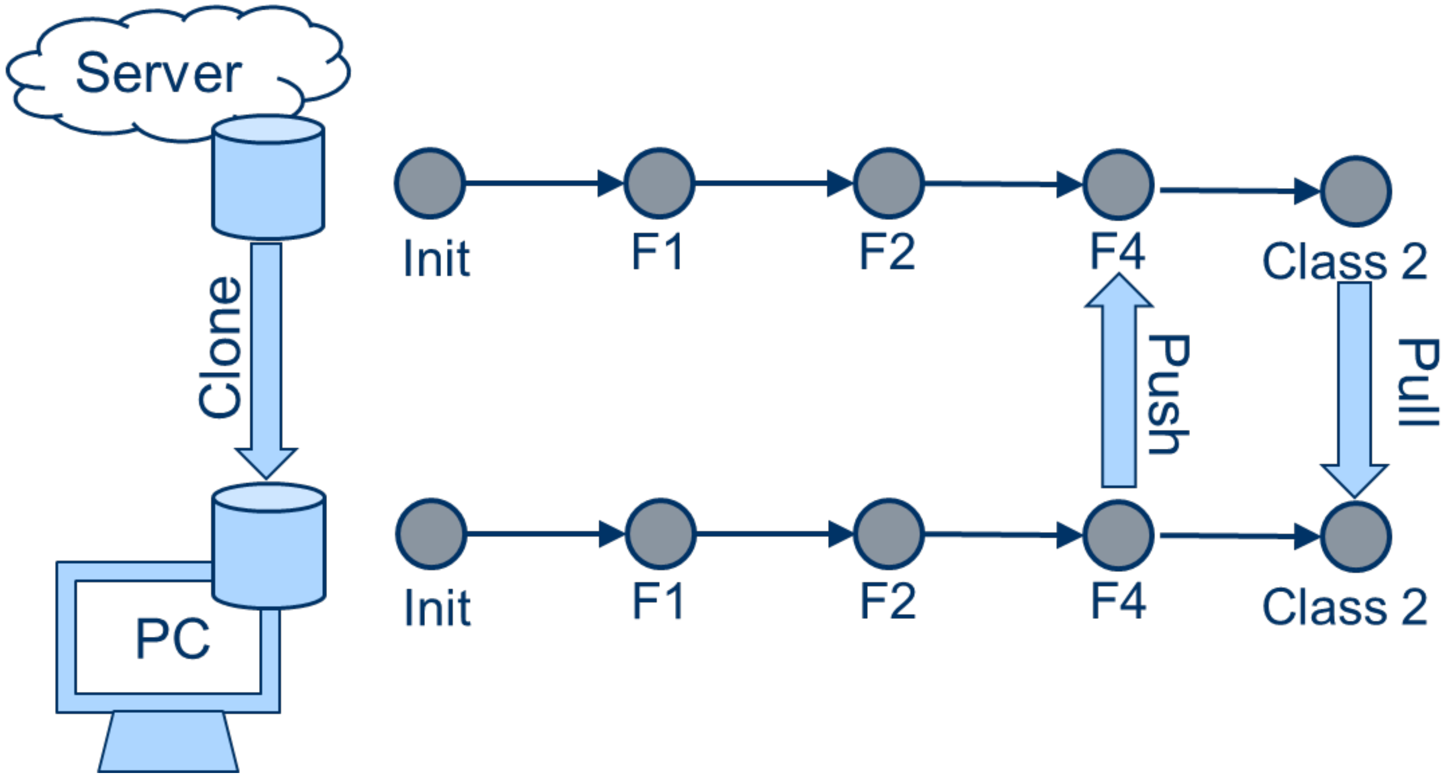

It’s Hands On Time

Moment 1:

Local commands: add, commit, branch, merge, conflicts..

Moment 2

Interaction with the remote repo: Push, pull

Kicking off

- git config --global user.name “your name”

For all repos

- git config --global user.email “your email”

- Create a folder / access this folder
- git init
  - This folder is now a repo

Hands On

1. Create a file

2. Check the status of the repo
   - git status

3. Add the file to the index
   - git add <filename>

4. Check the status

Hands On

- Our first commit
  - git commit -a -m “Our first commit!!!”
    - -a: all files
    - -m: will include a commit message
- Check the last commits
  - git log
- Check what has been done in the last commit
  - git show

Let’s do it again…

Change the file

git status

git commit …

git status

git log

And this is the basic flow to put your contributions back to the repo

add

commit

status

log

show

Be ready for what's next…

Branching and merging

Dealing with remote repositories