Git Internals

Yijun Pan Stautland

tietoevry

Why Should We Care

- We are technologists
- Enhance our understanding of git
- Very cool!

tietoevry

Workshop today

- Introduction to Git Internals & objects (15 min)
- Individual tasks (1,5 hour)
- Sum up & questions (10 min)

tietoevry

Yijun Pan Stautland
Senior full-stack Developer

tietoevry

.git

```
yps@Yijuns-MacBook-Pro magnusGPT % ls -a
.                       chessboard.jpg
..                      chessboard2.jpg
.DS_Store               chessboard3.jpg
.git                    chessboard4.jpg
LICENSE                 detect_chessboard.py
Pipfile                 frontend.html
Pipfile.lock            grayscale.jpg
README.md
```

- Repository (locals)
- Changes are stored as files in .git

tietoevry

Anatomy of a commit

- The Blob, The Tree, The Commit, The Tag
- Actual data of Git
- “Object database” is .git
- Objects are saved under .git/objects/
- Compressed and referenced by the SHA-1

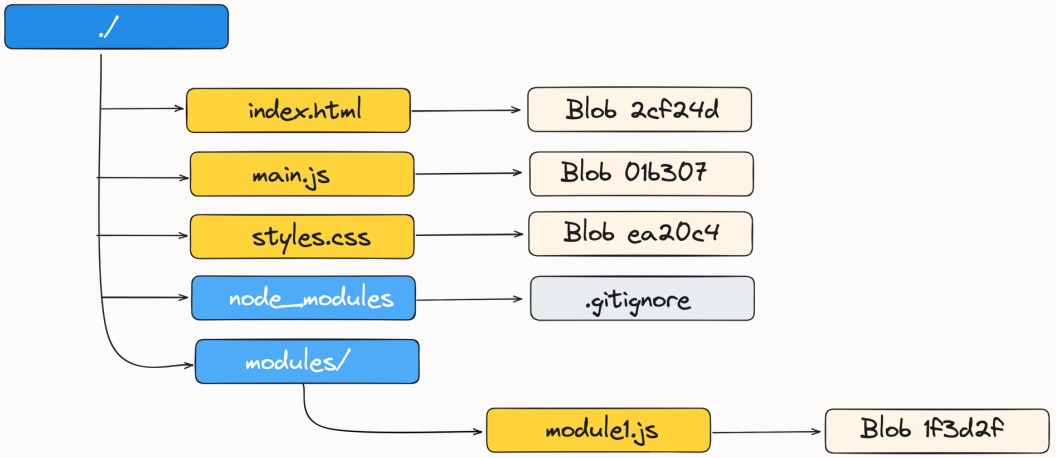
Internal Objects

Blob

Tree

Commit

- Binary Large Objects
- Raw data of content
- Use SHA-1 Hashing



tietoevry

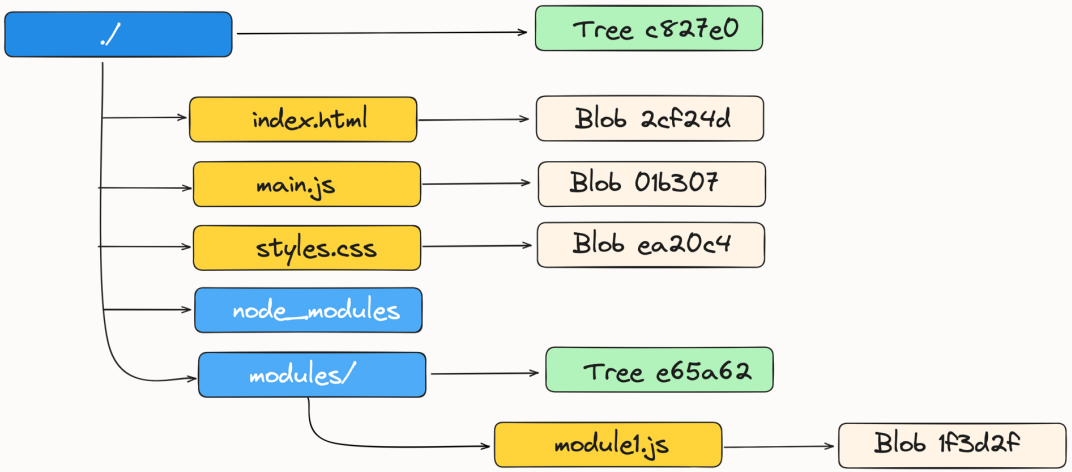
Internal Objects

Blob

Tree

Commit

- Represent directories
- Contains list of trees and blobs
- Use SHA-1 Hashing



tietoevry

Internal Objects

Blob

Tree

Commit

- Contains
  - Hash of tree
  - Hash of parent commit(s)
  - Author name, email, timestamp
  - Committer name, email, timestamp
  - Commit message
- Hash from information above

Branches

- Only a reference
- Updates working directory with data from trees and blobs
- Currently checked out branch is referred to by the HEAD pointer (.git/HEAD)
- .git/refs/heads/

Porcelain And Plumbing

tietoevry

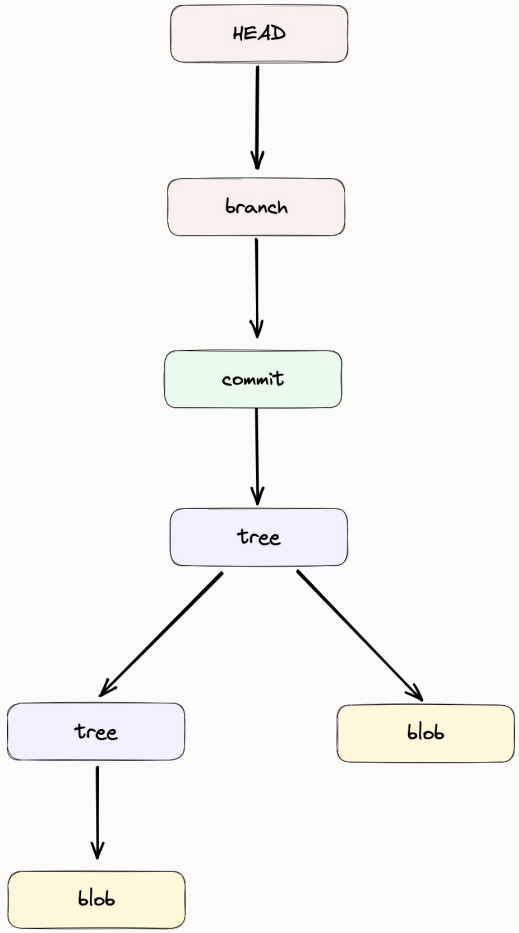
Workshop

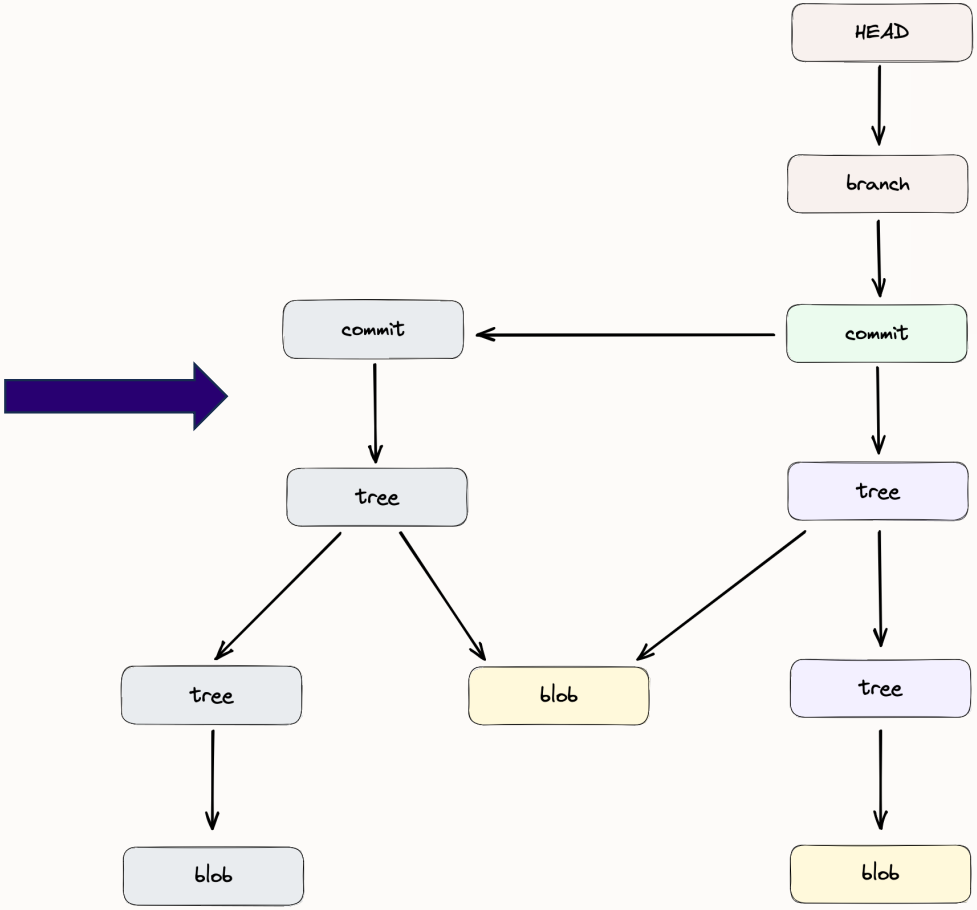
- 1,5 hour
- 6 pages of tasks and explanations
- Do it in your own tempo

tietoevry

https://bruswei.github.io/git-workshop-24/

tietoevry


HEAD
branch
commit
tree
tree
blob
blob


HEAD
branch
commit
commit
tree
tree
tree
blob
tree
blob
blob

tietoevry

What have we learned today

- Git internal structure and objects
- Porcelain & plumbing commands
- Branches as reference
- Git Index
- Commit history
- SHA-1 hashes for integrity & Identification

tietoevry

Food For Thought

- Git fetch
- Git pull
- Git push
- Git stash

tietoevry

Thank you!

Yijun Pan Stautland

tietoevry