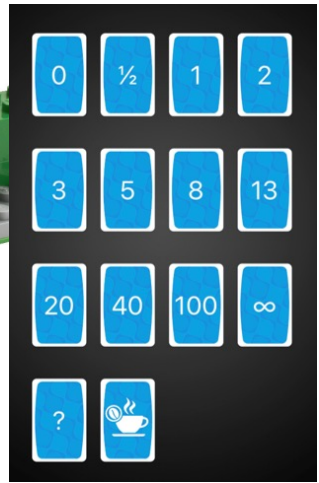
Task Estimation

Estimation 2

Create a small house

X Point(s)

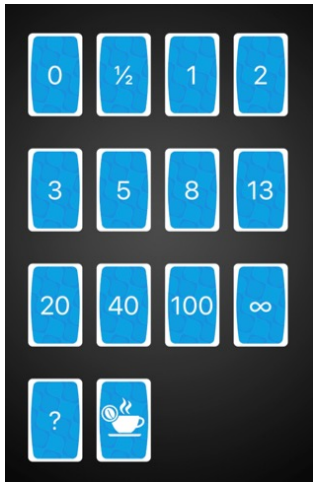


Task Estimation

Estimation 3

Create a programmable Lego robot

X Point(s)



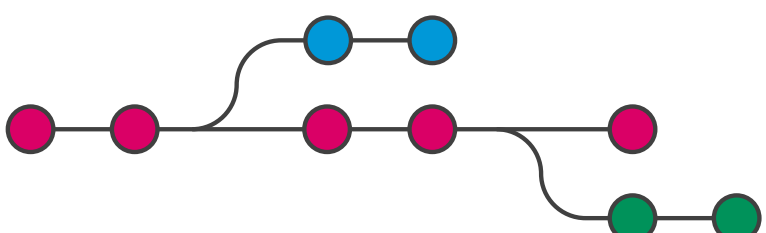
Hes·so VALAIS WALLIS

School of Engineering

System Design

Version Control

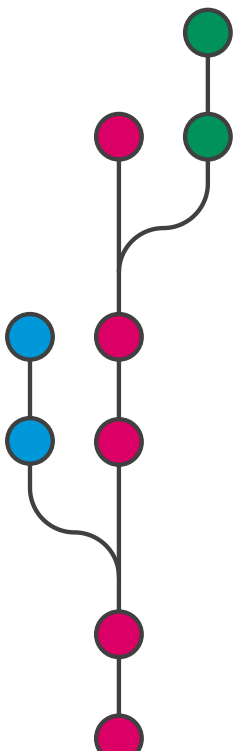
Systems Engineering program



Silvan Zahno silvan.zahno@hevs.ch

Your current system

Version control



master v1.0.1 c4a9fee Merge branch 'release' into 'master' - Silvan Zahno <silvan.zahno@hevs.ch>

release 66ccde9 Merge branch 'develop' into 'release' - Silvan Zahno <silvan.zahno@hevs.ch>

2377d1e forgot to heat it up - Silvan Zahno <silvan.zahno@hevs.ch>

develop c43eda8 a whole cheese pizza, just for me - Silvan Zahno <silvan.zahno@hevs.ch>

fe3a9ee watter balloons (for the kids) - Silvan Zahno <silvan.zahno@hevs.ch>

v1.0.0 3b2d15b Merge branch 'release' into 'master' - Silvan Zahno <silvan.zahno@hevs.ch>

9dc3571 Merge branch 'develop' into 'release' - Silvan Zahno <silvan.zahno@hevs.ch>

fcd53f8 prepare for release - Silvan Zahno <silvan.zahno@hevs.ch>

9ddb202 added fabric softener - Silvan Zahno <silvan.zahno@hevs.ch>

a969898 added eggs - Silvan Zahno <silvan.zahno@hevs.ch>

ca10016 added milk - Silvan Zahno <silvan.zahno@hevs.ch>

e60c1b0 initial commit - Silvan Zahno <silvan.zahno@hevs.ch>

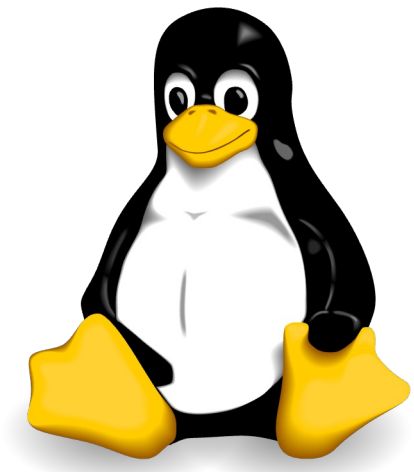
Possible Tools

Git (git)

Subversion (svn)

Mercurial (hg)

Linus Torvalds

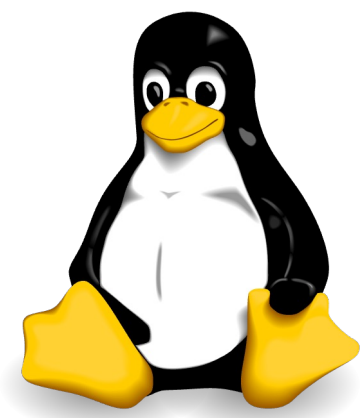


Linux (1991)

Git (2005)

Why Linux needs git

Linux has become the largest collaborative development project in the history of computing over the last 30 years.



- 600 active Linux distribution
- 85% of all Smartphones
- 500 top supercomputers
- >27.8 millon lines of code
- > 12’000 contributors
- > 1 million commits

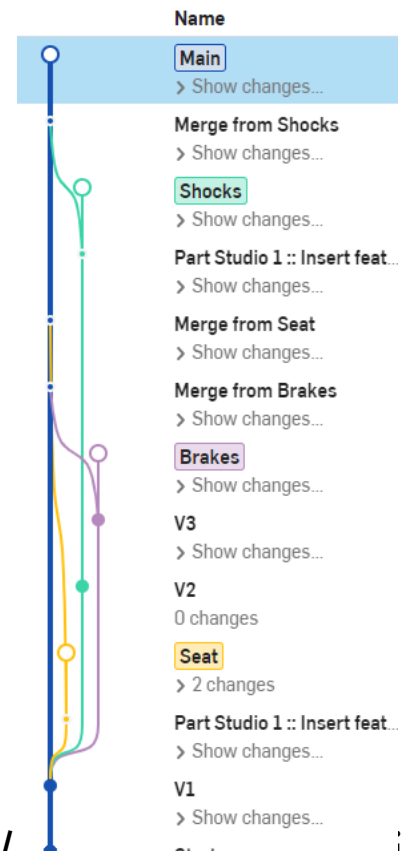
https://truelist.co/blog/linux-statistics/

Why you need git in Power&Control or Design&Material

Versioning

- Tracking Changes
- Collaboration
- Rollback Capabilities
- Documentation
- Deployment

AUTODESK Vault



https://truelist.co/ics/

Git Platforms

Gitlab

https://gitlab.com
https://gitlab.hevs.ch

Github

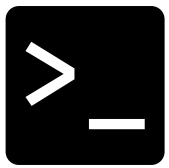
https://github.com

Bitbucket

https://bitbucket.com

Git Tools

Commandline



Fork

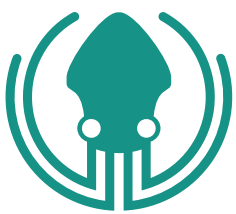
Sublime Merge

Tower

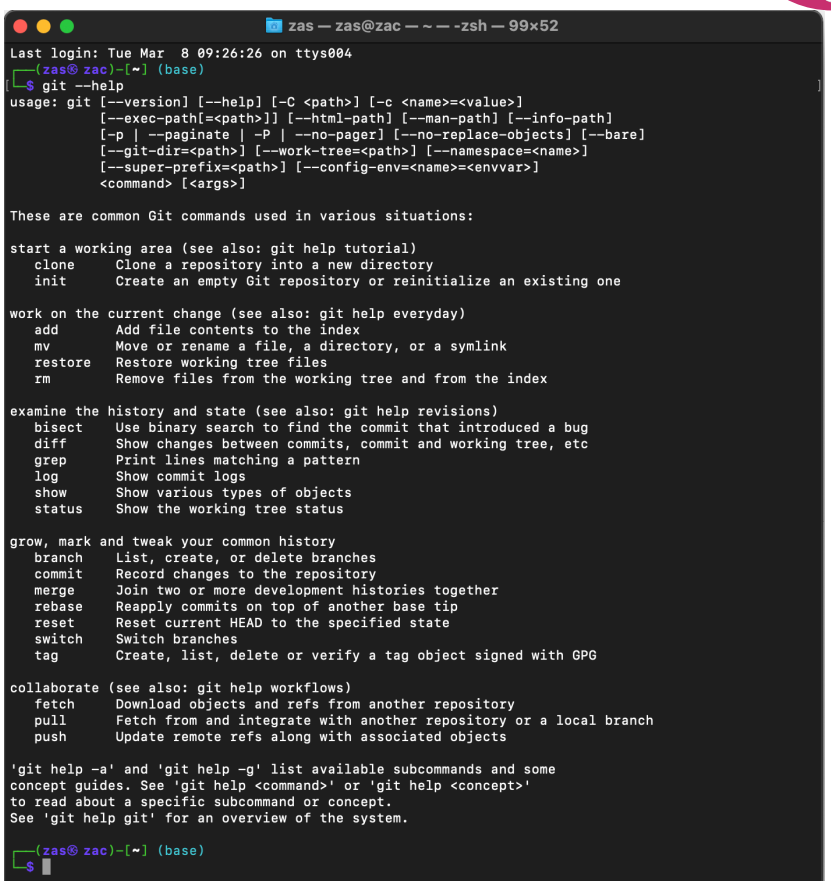
Git Cola

SmartGit

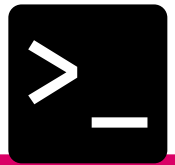
Git Kraken



Git Commandline



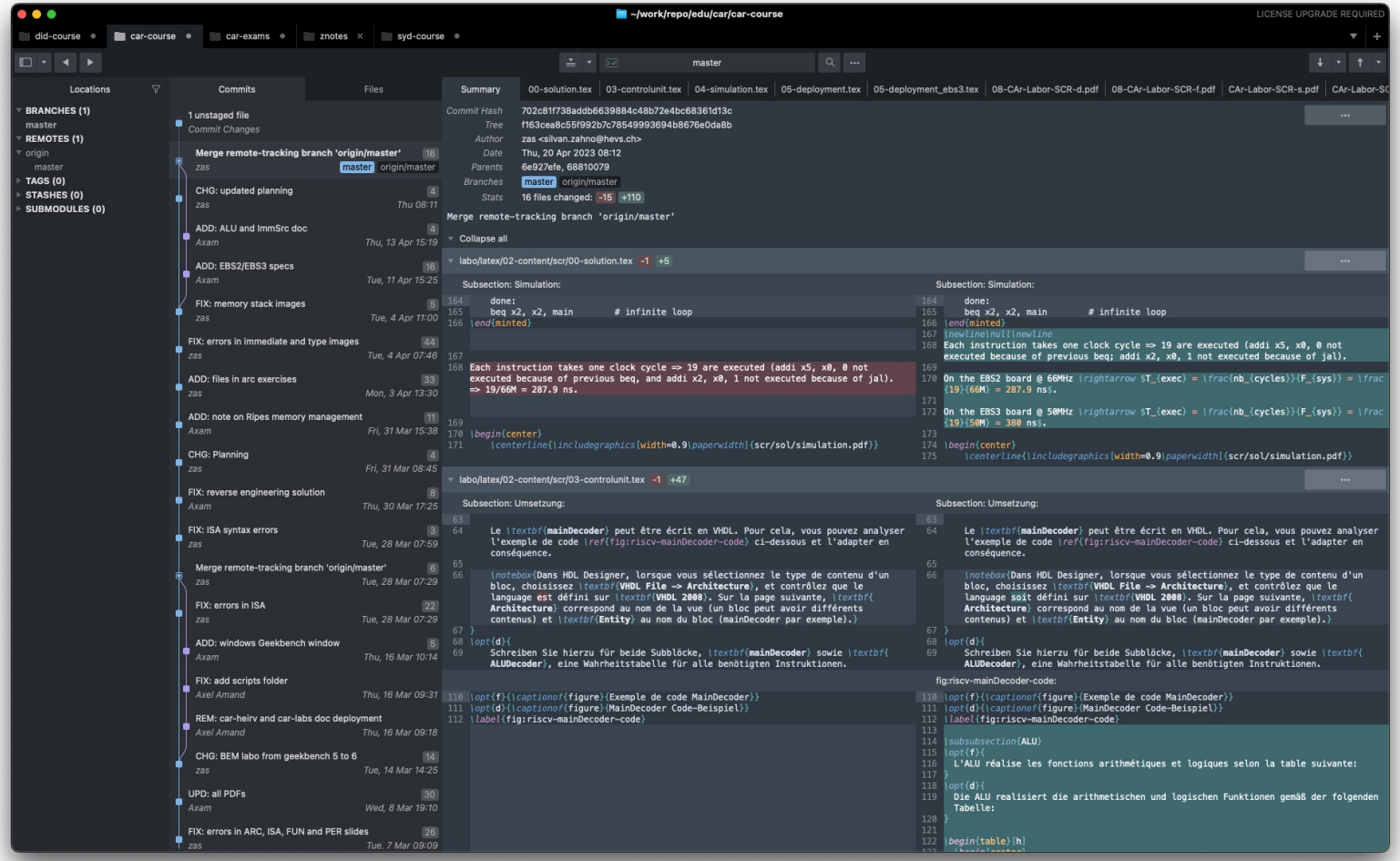
`git` Commands



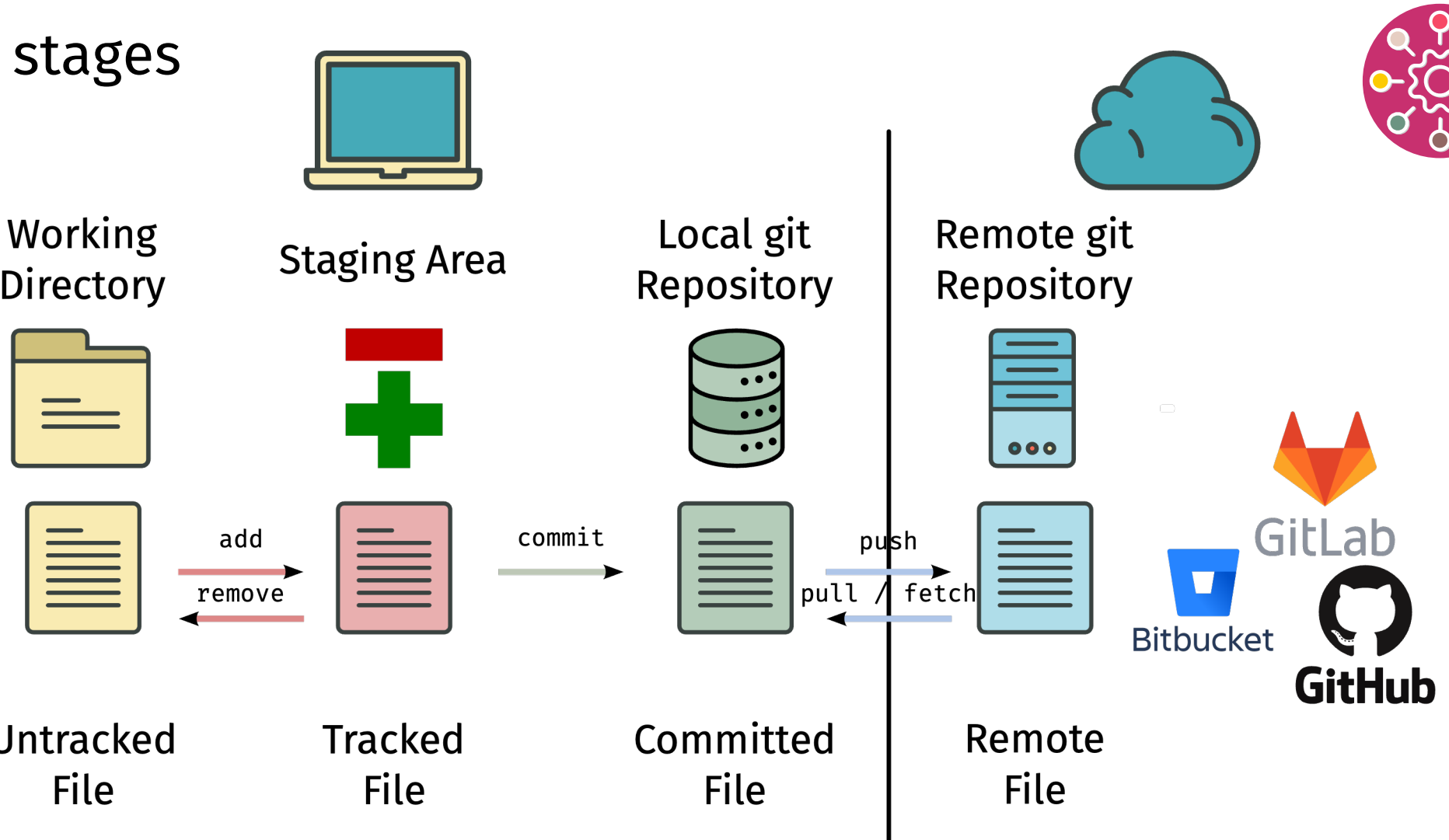
Command	Description
Start a working area	
`clone`	Clone a repository into a new directory
`init`	Create an empty Git repository or reinitialize an existing one
Work on the current change	
`add`	Add file contents to the index
`mv`	Move or rename a file, a directory, or a symlink
`reset`	Reset current HEAD to the specified state
`rm`	Remove files from the working tree and from the index
Examine the history and state	
`log`	Show commit logs
`show`	Show various types of objects
`status`	Show the working tree status

Command	Description
Grow, mark and tweak your common history	
`branch`	List, create, or delete branches
`checkout`	Switch branches or restore working tree files
`commit`	Record changes to the repo
`diff`	Show changes between commits, commit and working tree, etc
`merge`	Join two or more development histories together
`rebase`	Reapply commits on top of another base tip
`tag`	Create, list, delete or verify a tag object
`Collaborate`	
`fetch`	Download objects and refs from another repo
`pull`	Fetch from and integrate with another repo or a local branch
`push`	Update remote refs along with associated objects

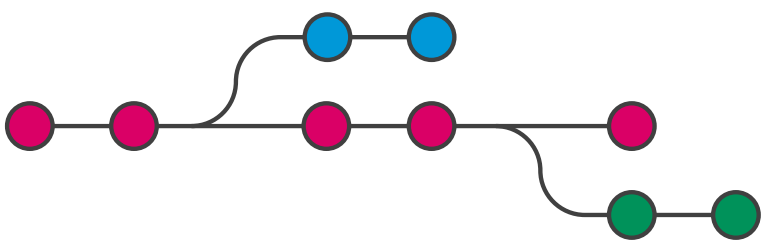
Sublime Merge



Git stages


Working Directory
Staging Area
Local git Repository
Remote git Repository
add
remove
commit
push
pull / fetch
Untracked File
Tracked File
Committed File
Remote File
GitLab
Bitbucket
GitHub

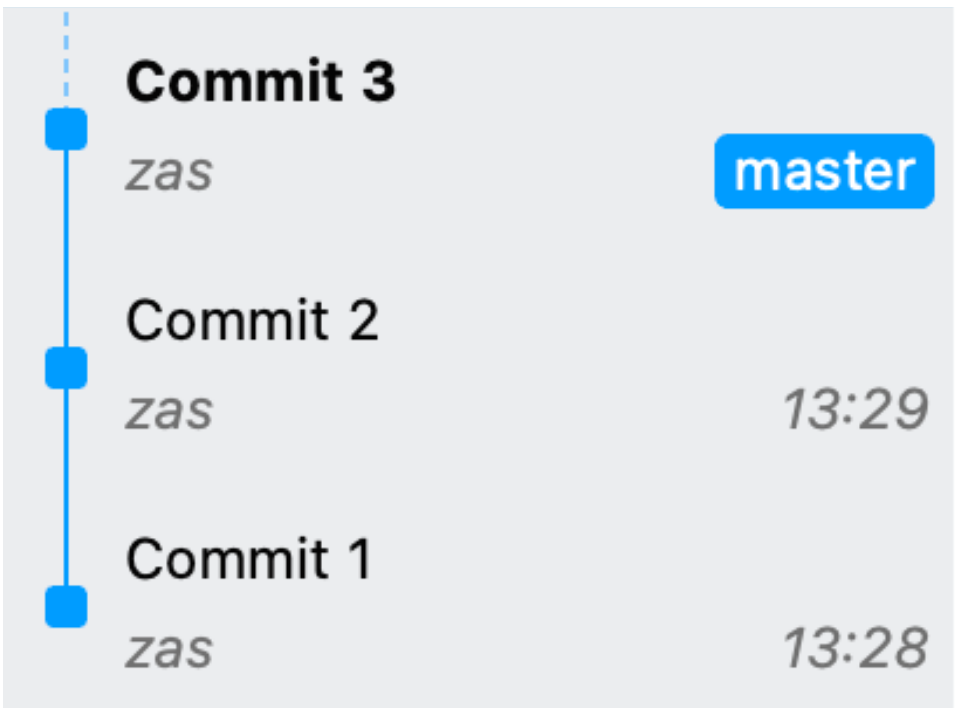
Git Branch and Merge Example



Branch and Merge

Initial repo state

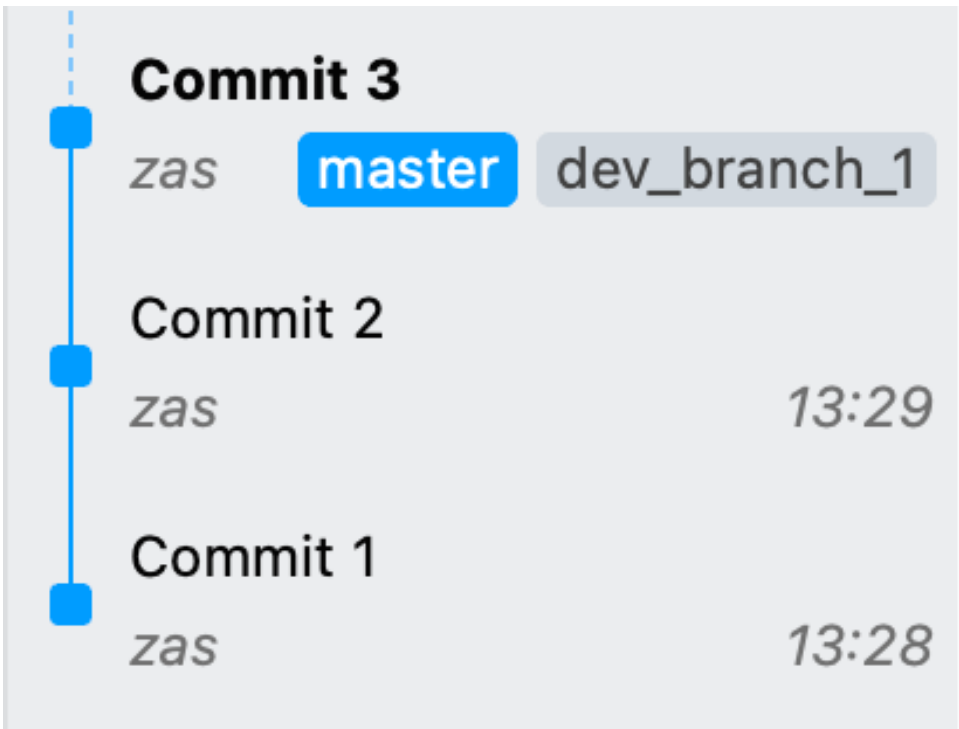
Every repo has either a `main` or `master` branch as default branch



Branch and Merge

Create branch `dev_branch_1`

Create branch

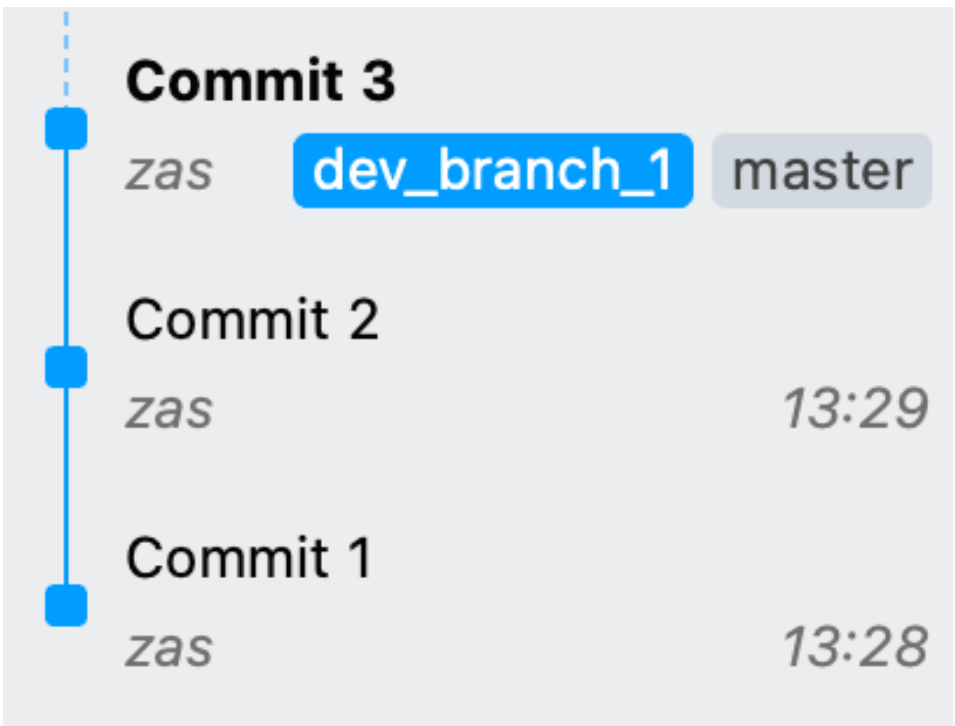


Branch and Merge

Checkout `branch dev_branch_1`

Check on which branch we are on

Checkout branch

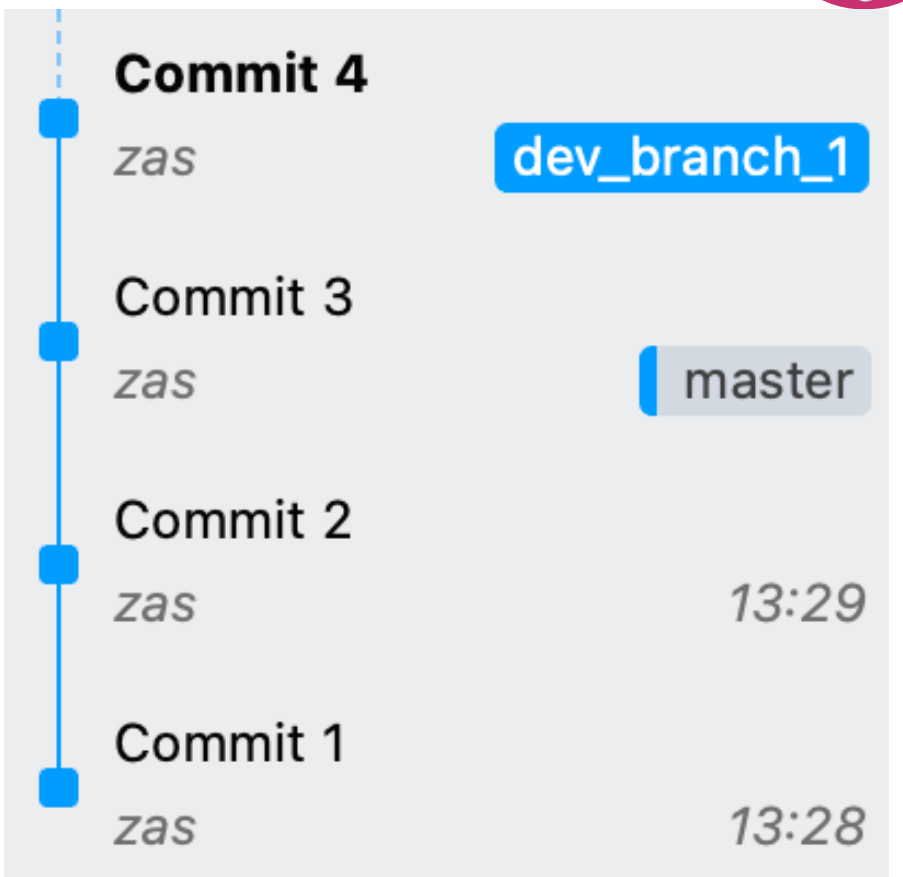


Branch and Merge

Commit on dev_branch_1

Stage new file

Commit stages files

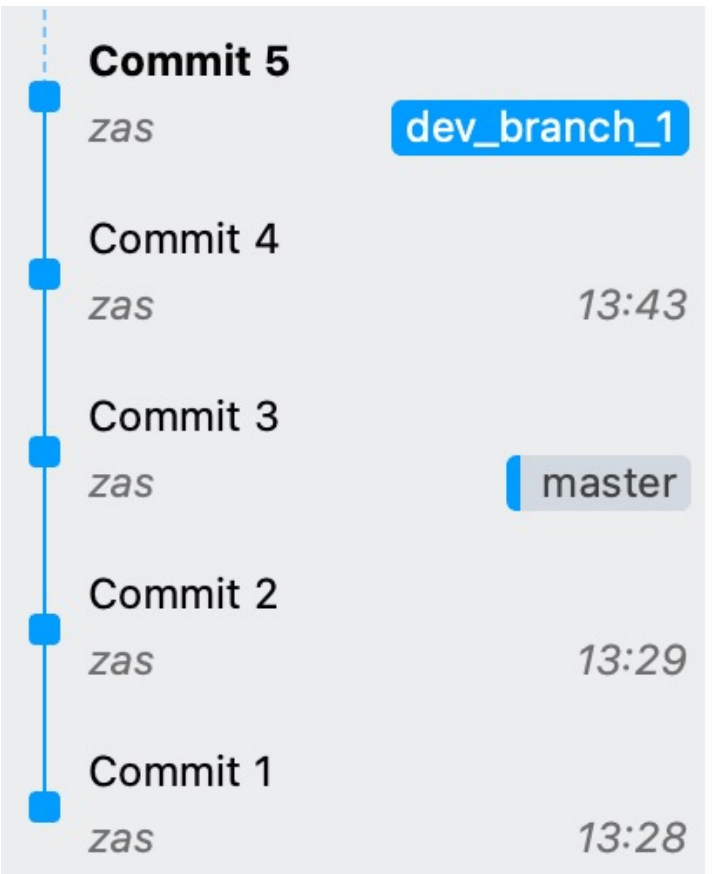


Branch and Merge

Commit on dev_branch_1

Stage new file

Commit stages files

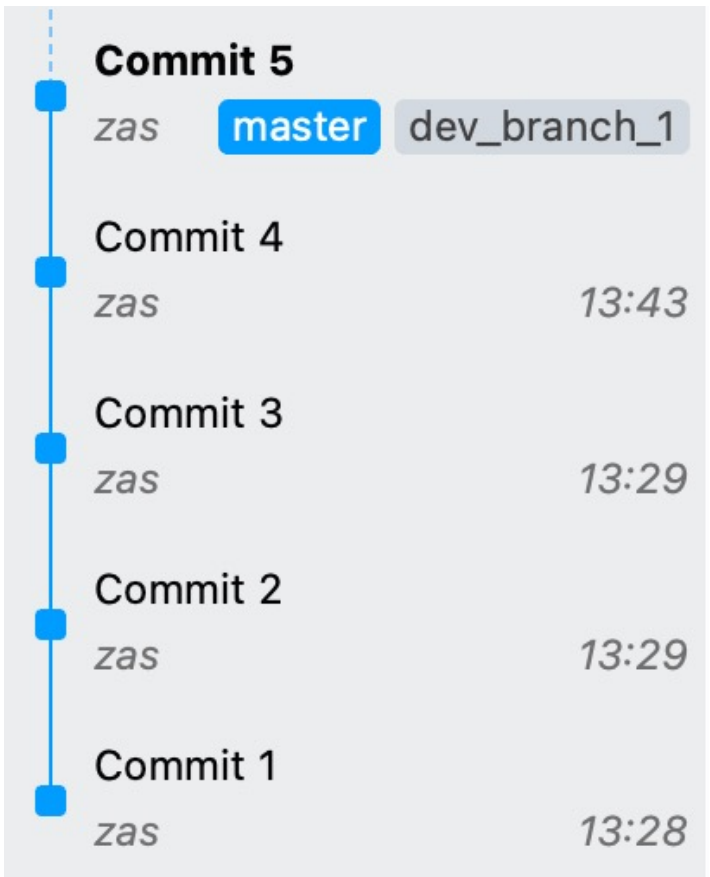


Branch and Merge

Merge `master` and `dev_branch_1`

Checkout `master` branch

Merge `dev_branch_1` into `master`

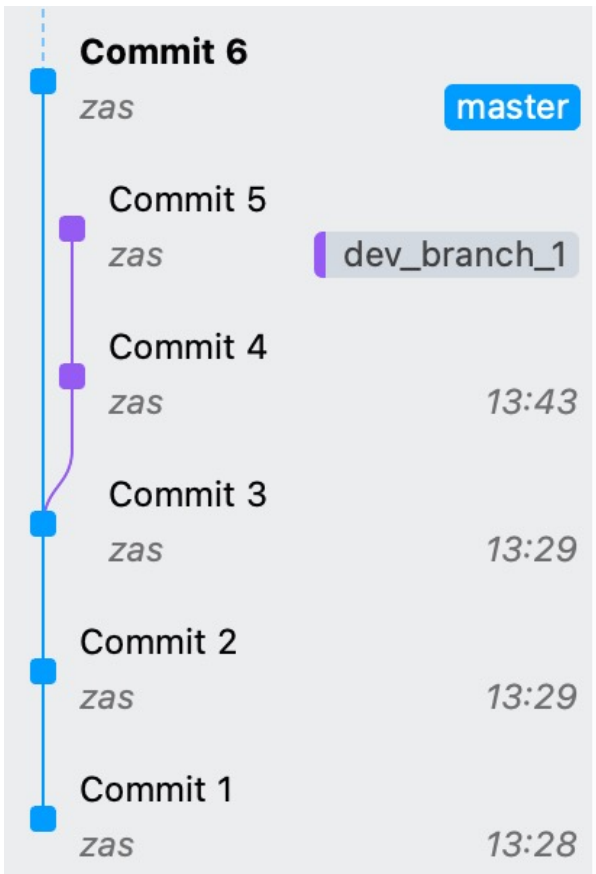


Branch and Merge

Commit on `master` branch

Stage new file

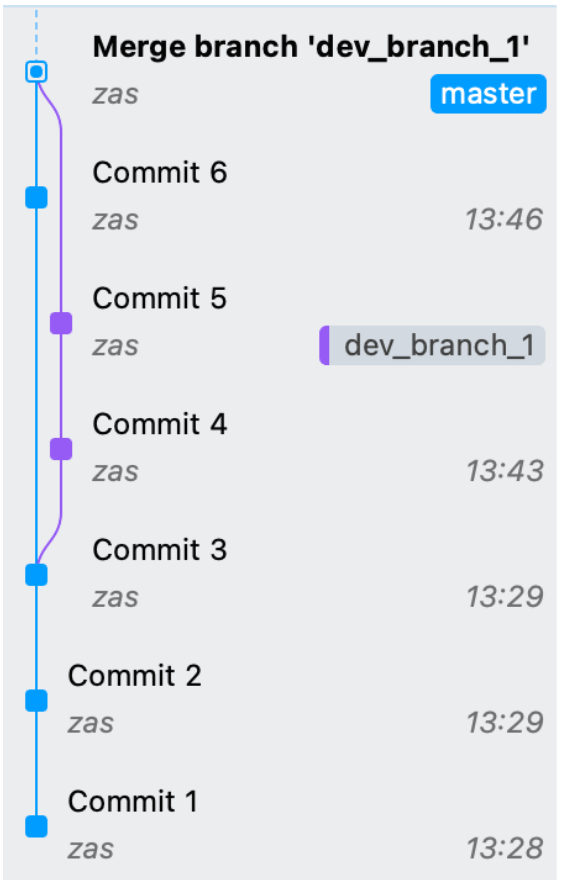
Commit stages files



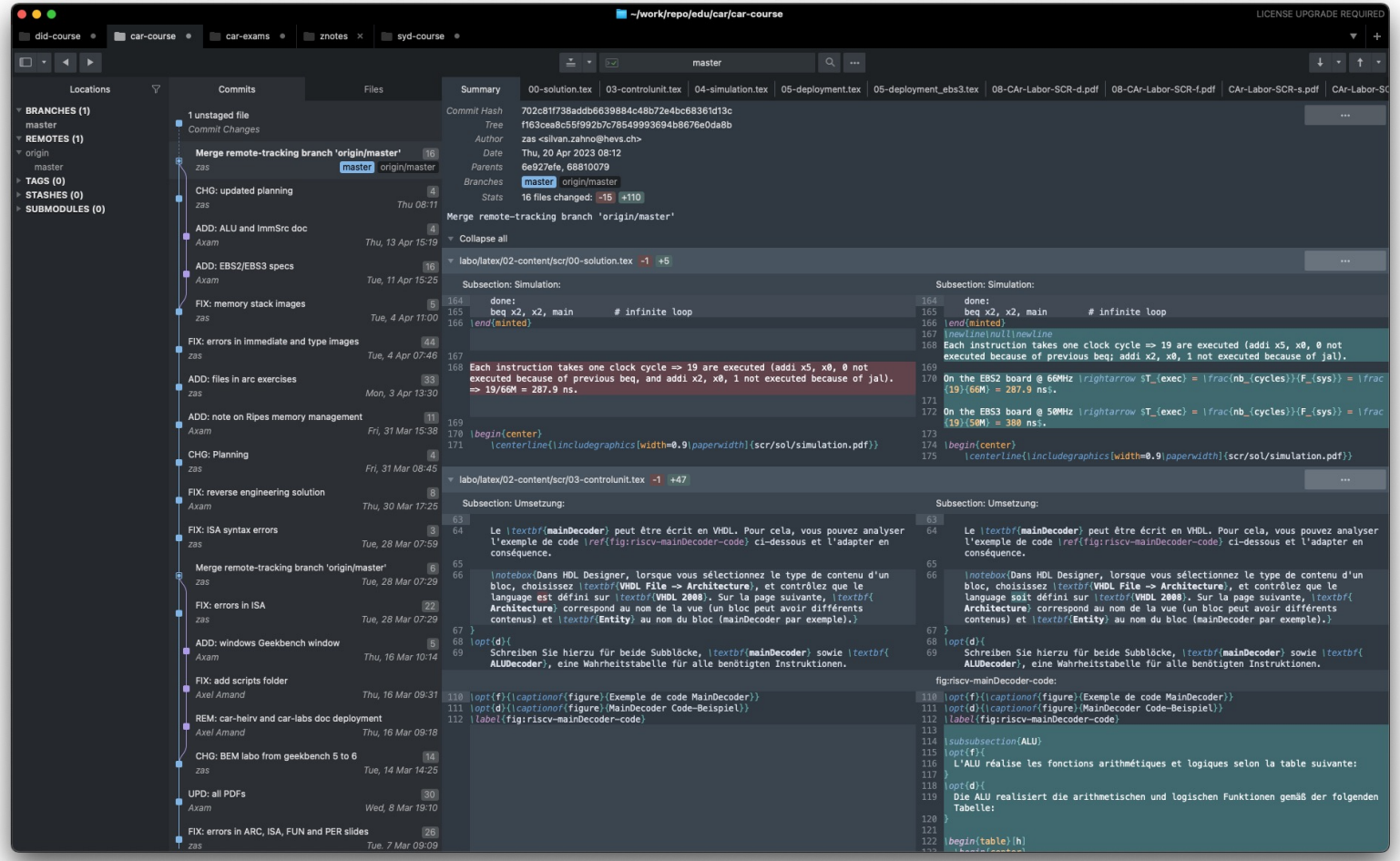
Branch and Merge

Three way merge `master` and `dev_branch_1`

Merge into

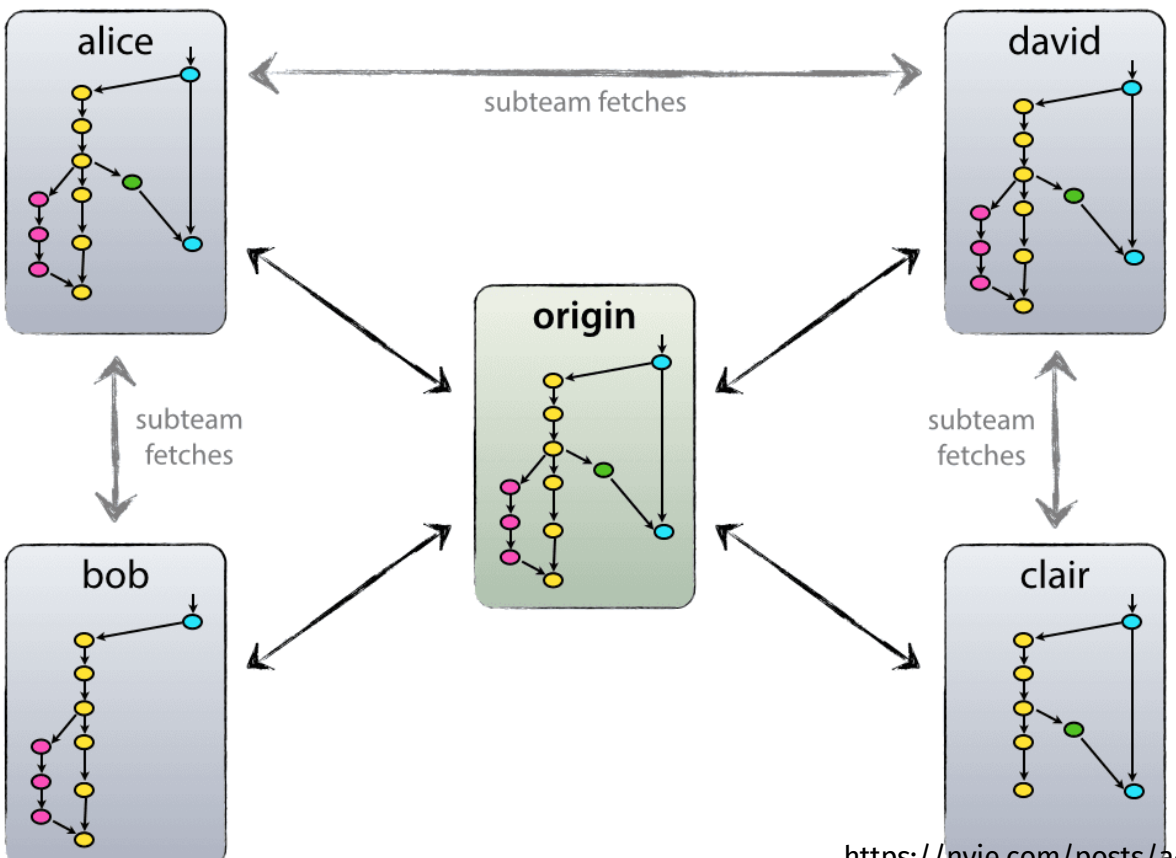


Demo


~/work/repo/edu/car/car-course
LICENSE UPGRADE REQUIRED
did-course
car-course
car-exams
znotes
syd-course
master
Locations
Commits
Files
BRANCHES (1)
master
REMOTES (1)
origin
master
TAGS (0)
STASHES (0)
SUBMODULES (0)
1 unstaged file
Commit Changes
Merge remote-tracking branch 'origin/master'
zas
master
origin/master
CHG: updated planning
ADD: ALU and ImmSrc doc
Axam
Thu, 13 Apr 15:19
ADD: EBS2/EBS3 specs
Tue, 11 Apr 15:25
FIX: memory stack images
Tue, 4 Apr 11:00
FIX: errors in immediate and type images
Tue, 4 Apr 07:46
ADD: files in arc exercises
Mon, 3 Apr 13:30
ADD: note on Ripes memory management
Fri, 31 Mar 15:38
CHG: Planning
Fri, 31 Mar 08:45
FIX: reverse engineering solution
Thu, 30 Mar 17:25
FIX: ISA syntax errors
Tue, 28 Mar 07:59
Merge remote-tracking branch 'origin/master'
Tue, 28 Mar 07:29
FIX: errors in ISA
Tue, 28 Mar 07:29
ADD: windows Geekbench window
Thu, 16 Mar 10:14
FIX: add scripts folder
Axel Amand
Thu, 16 Mar 09:31
REM: car-heirv and car-labs doc deployment
Axel Amand
Thu, 16 Mar 09:18
CHG: BEM labo from geekbench 5 to 6
Tue, 14 Mar 14:25
UPD: all PDFs
Wed, 8 Mar 19:10
FIX: errors in ARC, ISA, FUN and PER slides
Tue, 7 Mar 09:09
Summary
00-solution.tex
03-controlunit.tex
04-simulation.tex
05-deployment.tex
05-deployment_ebs3.tex
08-CAr-Labor-SCR-d.pdf
08-CAr-Labor-SCR-f.pdf
CAr-Labor-SCR-s.pdf
Commit Hash 702c81f738addb6639884c48b72e4bc68361d13c
Tree f163cea8c55f992b7c78549993694b8676e0da8b
Author zas <silvan.zahno@hevs.ch>
Date Thu, 20 Apr 2023 08:12
Parents 6e927efe, 68810079
Branches master origin/master
Stats 16 files changed: -15 +110
Merge remote-tracking branch 'origin/master'
Collapse all
labo/latex/02-content/scr/00-solution.tex -1 +5
Subsection: Simulation:
done:
beq x2, x2, main # infinite loop
\end{minted}
Each instruction takes one clock cycle => 19 are executed (addi x5, x0, 0 not executed because of previous beq, and addi x2, x0, 1 not executed because of jal).
=> 19/66M = 287.9 ns.
\begin{center}
\centerline{\includegraphics[width=0.9\paperwidth]{scr/sol/simulation.pdf}}
Subsection: Simulation:
done:
beq x2, x2, main # infinite loop
\end{minted}
\newline\null\newline
Each instruction takes one clock cycle => 19 are executed (addi x5, x0, 0 not executed because of previous beq; addi x2, x0, 1 not executed because of jal).
On the EBS2 board @ 66MHz \rightarrow $T_{exec} = \frac{nb_{cycles}}{F_{sys}} = \frac{19}{66M} = 287.9 ns$.
On the EBS3 board @ 50MHz \rightarrow $T_{exec} = \frac{nb_{cycles}}{F_{sys}} = \frac{19}{50M} = 380 ns$.
\begin{center}
\centerline{\includegraphics[width=0.9\paperwidth]{scr/sol/simulation.pdf}}
labo/latex/02-content/scr/03-controlunit.tex -1 +47
Subsection: Umsetzung:
Le \textbf{mainDecoder} peut être écrit en VHDL. Pour cela, vous pouvez analyser l'exemple de code \ref{fig:riscv-mainDecoder-code} ci-dessous et l'adapter en conséquence.
\notebox{Dans HDL Designer, lorsque vous sélectionnez le type de contenu d'un bloc, choisissez \textbf{VHDL File -> Architecture}, et contrôlez que le language est défini sur \textbf{VHDL 2008}. Sur la page suivante, \textbf{Architecture} correspond au nom de la vue (un bloc peut avoir différents contenus) et \textbf{Entity} au nom du bloc (mainDecoder par exemple).}
\opt{d}{
Schreiben Sie hierzu für beide Subblöcke, \textbf{mainDecoder} sowie \textbf{ALUDecoder}, eine Wahrheitstabelle für alle benötigten Instruktionen.
\opt{f}{\captionof{figure}{Exemple de code MainDecoder}}
\opt{d}{\captionof{figure}{MainDecoder Code-Beispiel}}
\label{fig:riscv-mainDecoder-code}
Subsection: Umsetzung:
Le \textbf{mainDecoder} peut être écrit en VHDL. Pour cela, vous pouvez analyser l'exemple de code \ref{fig:riscv-mainDecoder-code} ci-dessous et l'adapter en conséquence.
\notebox{Dans HDL Designer, lorsque vous sélectionnez le type de contenu d'un bloc, choisissez \textbf{VHDL File -> Architecture}, et contrôlez que le language soit défini sur \textbf{VHDL 2008}. Sur la page suivante, \textbf{Architecture} correspond au nom de la vue (un bloc peut avoir différents contenus) et \textbf{Entity} au nom du bloc (mainDecoder par exemple).}
\opt{d}{
Schreiben Sie hierzu für beide Subblöcke, \textbf{mainDecoder} sowie \textbf{ALUDecoder}, eine Wahrheitstabelle für alle benötigten Instruktionen.
fig:riscv-mainDecoder-code:
\opt{f}{\captionof{figure}{Exemple de code MainDecoder}}
\opt{d}{\captionof{figure}{MainDecoder Code-Beispiel}}
\label{fig:riscv-mainDecoder-code}
\subsubsection{ALU}
\opt{f}{
L'ALU réalise les fonctions arithmétiques et logiques selon la table suivante:
}
\opt{d}{
Die ALU realisiert die arithmetischen und logischen Funktionen gemäß der folgenden Tabelle:
}
\begin{table}[h]

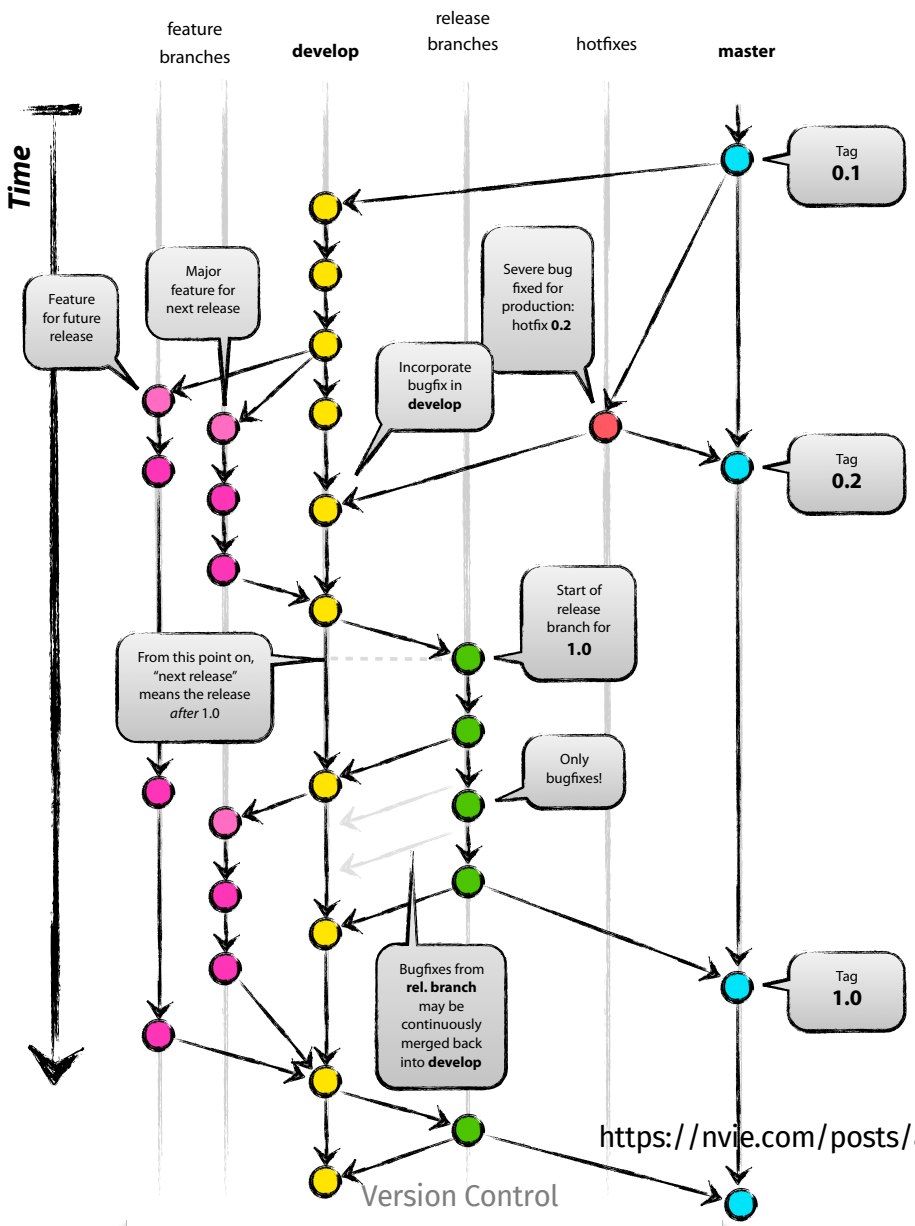
Gitflow

Gitflow Collaboration



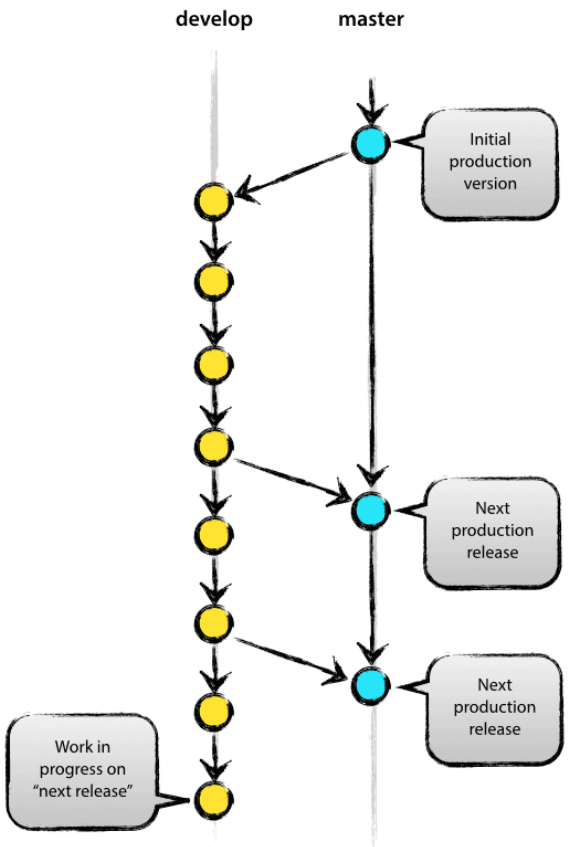
https://nvie.com/posts/a-successful-git-branching-model/

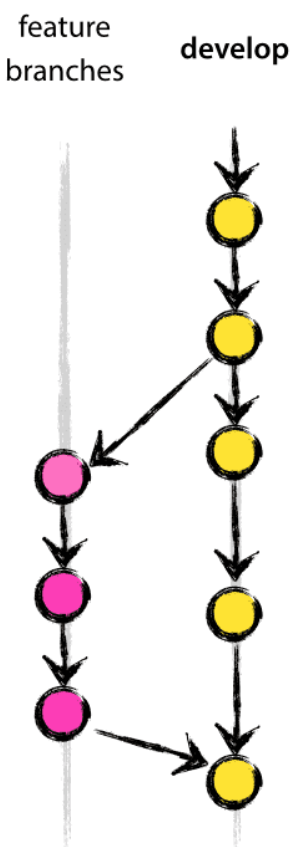
Gitflow

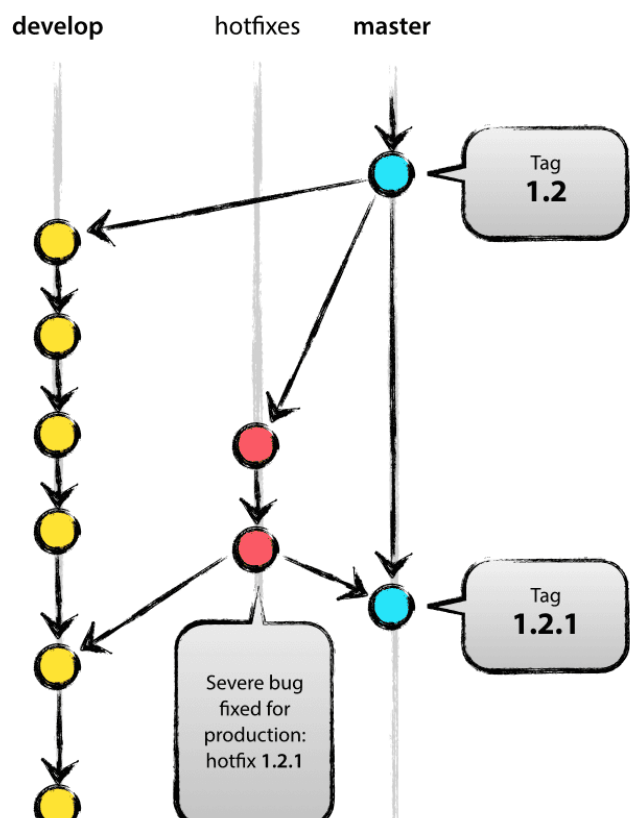


https://nvie.com/posts/a-successful-git-branching-model/

Gitflow Branching







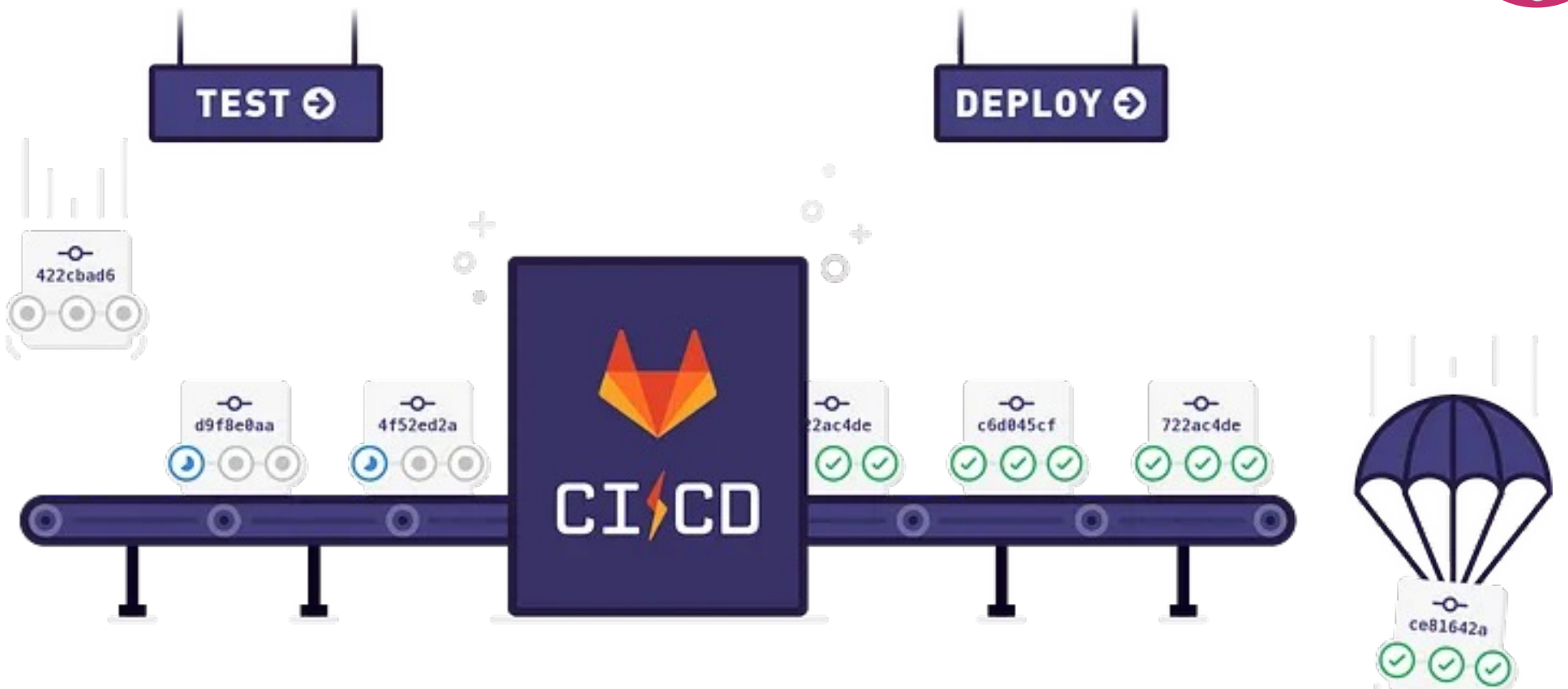
https://nvie.com/posts/a-successful-git-branching-model/

Git CI/CD

What is CI/CD?

- Continuous Integration (CI) is the practice of frequently integrating code changes into a shared repository, which is then automatically built and tested.
- Continuous Delivery (CD) takes CI a step further by automatically deploying code changes to production-like environments for further testing and validation.
- Automated testing is a critical component of CI/CD, as it helps catch bugs and other issues early in the development process.
- Popular tools are GitLab CI/CD, Github Actions, Jenkins, CircleCI, and Travis CI.

What is CI/CD?



https://about.gitlab.com/features/continuous-integration/

Gitlab Workflow

https://docs.gitlab.com/ee/ci/introduction/