Git Notes

I will teach you some knowledge of life.

Muffle a lot of money →

by Shuxiao

Do you use Git

Of course!

Topics

1. Download and organize git repo

   > in Go src style, use glone

2. Rebase

   > 2 cases in daily development

3. Merge or rebase?

   > Differences and scenarioes

4. How to

   > some cases we meet in daily development

5. Some diff tool in terminal and configuration I use

1. Download and organize git repo

in Go src style, use glone

1. Current status
2. Tool

1.1 How code organized in Go src

This is tree-like structure in $GOROOT/src

```
├── github.com
│   ├── alessio
│   │   └── shellescape
│   ├── BurntSushi
│   │   └── toml
│   ├── evanphx
│   │   └── json-patch
│   ├── jessevdk
│   │   └── go-flags
│   ├── mattn
│   │   └── go-isatty
│   ├── mitchellh
│   │   └── go-homedir
│   ├── pelletier
│   │   └── go-toml
│   ├── pkg
│   │   └── errors
│   └── spf13
│       ├── cobra
│       └── pflag
```

1.3 Tool can help

Glone

https://github.com/keaising/glone

SUPPORT

```
git://github.com/zsh-users/zsh-completions.git
https://github.com/zsh-users/zsh-completions
```

USAGE

```
taiga@clinkz ~/code/go/src
Δ glone git://github.com/zsh-users/zsh-completions.git
git clone git@github.com:zsh-users/zsh-completions.git /home/taiga/code/github.com/zsh-users/zsh-completions
Cloning into '/home/taiga/code/github.com/zsh-users/zsh-completions'...
remote: Enumerating objects: 4761, done.
remote: Counting objects: 100% (126/126), done.
remote: Compressing objects: 100% (71/71), done.
remote: Total 4761 (delta 63), reused 112 (delta 55), pack-reused 4635
Receiving objects: 100% (4761/4761), 1.78 MiB | 1.89 MiB/s, done.
Resolving deltas: 100% (3006/3006), done.
```

2. Rebase

1. Edit latest commits history
2. Integrate changes from one branch into another

2.1 Edit latest commits history

Current status

github.com/keaising/auto-mouse-keyboard

```
* 7907930 - (HEAD -> test, tag: v1.3.2, origin/main, main) change windows release (6 months ago) <keaising>
* 2e05e48 - (tag: v1.3.1) bugfix and run specific file (6 months ago) <keaising>
* 9aadc52 - update README (6 months ago) <keaising>
* 5aa8708 - (tag: v1.3.0) read all .conf in current working directory (6 months ago) <keaising>
* 92fb077 - (tag: v1.2.1) bugfix (6 months ago) <keaising>
*   b2616ce - (tag: v1.2.0) Merge pull request #1 from keaising/workflow (6 months ago) <keaising>
|\
| * 9058389 - add macos package (6 months ago) <keaising>
| * a525111 - add macos (6 months ago) <keaising>
| * ce80f5f - add test CI (6 months ago) <keaising>
| * 82e9a96 - add test CI (6 months ago) <keaising>
| * 93a449c - add release (6 months ago) <keaising>
| * 6fe1371 - upload artifacts after building (6 months ago) <keaising>
| * 7d282f6 - add windows (6 months ago) <keaising>
| * 99d9958 - follow ubuntu setup (6 months ago) <keaising>
| * 20822c2 - fix ci (6 months ago) <keaising>
| * fccbe92 - Create go.yml (6 months ago) <Shuxiao WANG>
|/
* 8c3dad1 - (tag: v1.1.0) change S to ms and add support for loop (6 months ago) <keaising>
```

2.1 Edit latest commits history

Target status: the latest 5 commits will be squashed into 1 commit

github.com/keaising/auto-mouse-keyboard

```
* 13584ba  -  squash commit (75 seconds ago) <keaising>
*   b2616ce - (tag: v1.2.0) Merge pull request #1 from keaising/workflow (6 months ago) <keaising>
|\
| * 9058389 - add macos package (6 months ago) <keaising>
| * a525111 - add macos (6 months ago) <keaising>
| * ce80f5f - add test CI (6 months ago) <keaising>
| * 82e9a96 - add test CI (6 months ago) <keaising>
| * 93a449c - add release (6 months ago) <keaising>
| * 6fe1371 - upload artifacts after building (6 months ago) <keaising>
| * 7d282f6 - add windows (6 months ago) <keaising>
| * 99d9958 - follow ubuntu setup (6 months ago) <keaising>
| * 20822c2 - fix ci (6 months ago) <keaising>
| * fccbe92 - Create go.yml (6 months ago) <Shuxiao WANG>
|/
* 8c3dad1 - (tag: v1.1.0) change S to ms and add support for loop (6 months ago) <keaising>
* b56721f - update config convert (6 months ago) <keaising>
* 6756c93 - update readme (6 months ago) <keaising>
```

2.1 Edit latest commits history

Full process of squash

1. Tell git: we want to start editing the latest 5 commits
2. Determine the commands of each commit's modifications
3. Edit each commit based on commands in step 2

   a. edit as command declared(commit message or diff)

   b. resolve all possible conflicts in the editing

   c. use `` `git add . && git commit && git rebase --continue` `` to finish editing for one commit
4. Squash finish

2.1 Edit latest commits history

Step 1. Tell git: we want to start editing the latest 5 commits

Use command to re-edit the latest 5 commits

```
git rebase -i HEAD~5
```

2.1 Edit latest commits history

Step 2. Determine the commands of each commit's modifications

After running commands in step 1, git will open your default editor to allow you edit message below

```
pick 92fb077 bugfix
squash 5aa8708 read all .conf in current working directory
squash 9aadc52 update README
squash 2e05e48 bugfix and run specific file
squash 7907930 change windows release name amk-windows.exe=> amk.exe

# Rebase b2616ce..7907930 onto 2e05e48 (5 commands)
# p, pick <commit> = use commit
# r, reword <commit> = use commit, but edit the commit message
# e, edit <commit> = use commit, but stop for amending
# s, squash <commit> = use commit, but meld into previous commit
# f, fixup <commit> = like "squash", but discard this commit's log message
# x, exec <command> = run command (the rest of the line) using shell
# b, break = stop here (continue rebase later with 'git rebase --continue')
# d, drop <commit> = remove commit
# l, label <label> = label current HEAD with a name
# t, reset <label> = reset HEAD to a label
```

And we can see, there are more commands like `pick/reword/edit/fixup/drop...` can be used in

2.1 Edit latest commits history

Step 2. Determine the commands of each commit's modifications

You need to be careful about the sort of commits, it is reversed from git log

1. Rebase message

```
oldest ->     pick 92fb077 bugfix
       ->     squash 5aa8708 read all .conf in current working directory
       ->     squash 9aadc52 update README
       ->     squash 2e05e48 bugfix and run specific file
latest ->     squash 7907930 change windows release name amk-windows.exe=> amk.exe
```

2. Git log

```
latest ->     * 7907930 - (HEAD -> test, tag: v1.3.2, main) change windows release (6 months ago) <keaising>
       ->     * 2e05e48 - (tag: v1.3.1) bugfix and run specific file (6 months ago) <keaising>
       ->     * 9aadc52 - update README (6 months ago) <keaising>
       ->     * 5aa8708 - (tag: v1.3.0) read all .conf in current working directory (6 months ago) <keaising>
oldest ->     * 92fb077 - (tag: v1.2.1) bugfix (6 months ago) <keaising>
```

2.1 Edit latest commits history

Step 3. Edit each commit based on commands in step 2

After editing declaration message and closing the editor, git will open an new editor window for editing each commit message

In this case, we only keep one commit, so we only need to edit once

If there are more commits kept, you need to edit mulitple times

This is what I want to save in the squashed commit’s message

```
This is the combination of 5 commits.
```

2.1 Edit latest commits history

Step 4. Final result

```
* b7b2bc3 - (HEAD -> test)  This is the combination of 5 commits. (75 seconds ago) <keaising>
*   b2616ce - (tag: v1.2.0) Merge pull request #1 from keaising/workflow (6 months ago) <keaising>
|\
| * 9058389 - add macos package (6 months ago) <keaising>
| * a525111 - add macos (6 months ago) <keaising>
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* 8c3dad1 - (tag: v1.1.0) change S to ms and add support for loop (6 months ago) <keaising>
* b56721f - update config convert (6 months ago) <keaising>
* 6756c93 - update readme (6 months ago) <keaising>
```

2.2 Integrate changes, similar to Merge

Rebase branchA based on branchB

1. Rebase will repeat all commit from branchA to branchB
2. Rebase will update commit history of the branchA
3. Rebase will not create a `merge` commmit like `b2616ce `

```
* b7b2bc3 - (HEAD -> test)  This is the combination of 5 commits. (75 seconds ago) <keaising>
*   b2616ce - (tag: v1.2.0) Merge pull request #1 from keaising/workflow (6 months ago) <keaising>
|\
| * 9058389 - add macos package (6 months ago) <keaising>
| * 93a449c - add release (6 months ago) <keaising>
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| * fccbe92 - Create go.yml (6 months ago) <Shuxiao WANG>
|/
* 8c3dad1 - (tag: v1.1.0) change S to ms and add support for loop (6 months ago) <keaising>
```
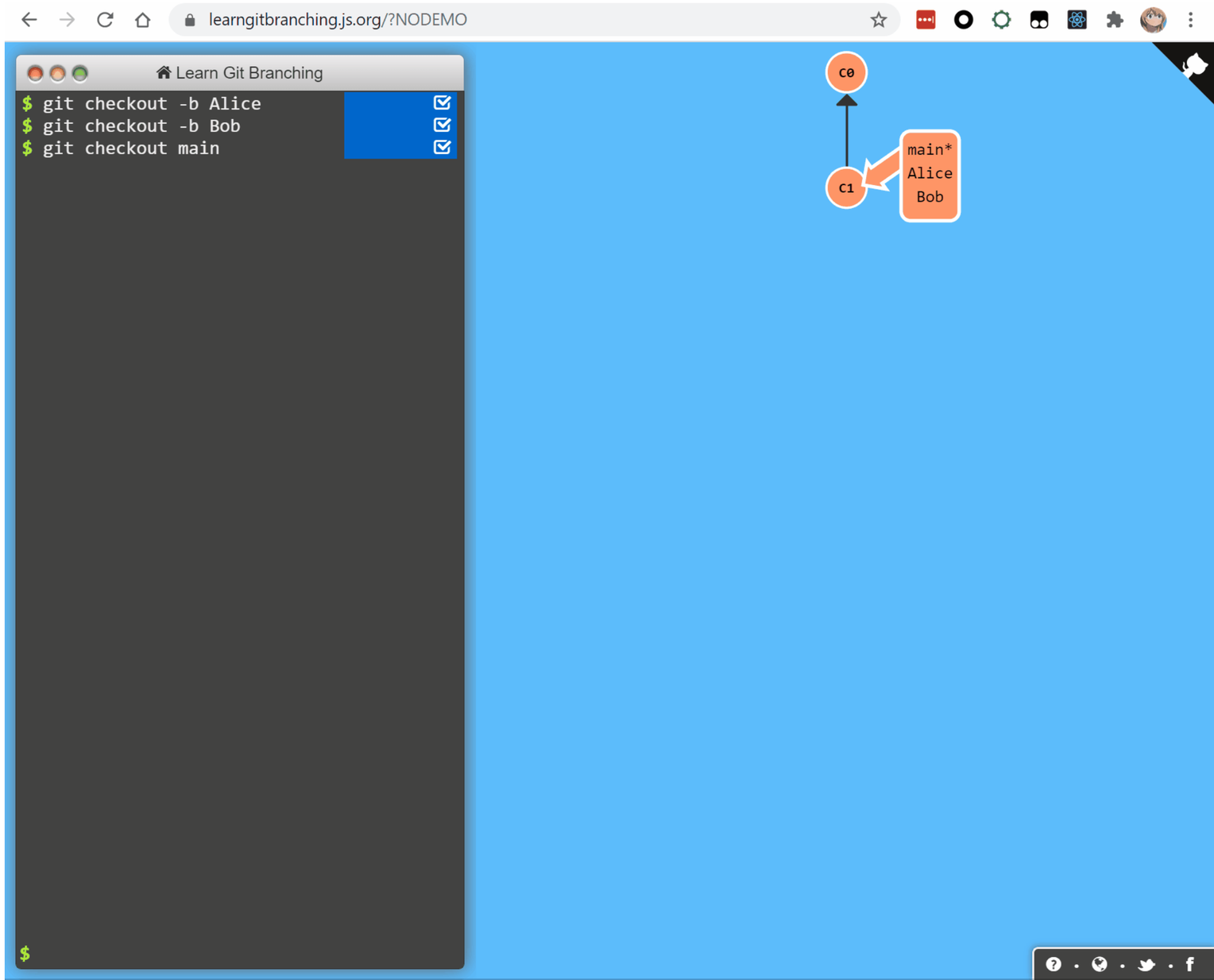

4. After rebase, branchA can merge into branchB in `fast forward` mode

5. If conflict exists in rebase process, something different

2.2 Integrate changes, similar to Merge

Demo in learngitbranching.js.org



Merge

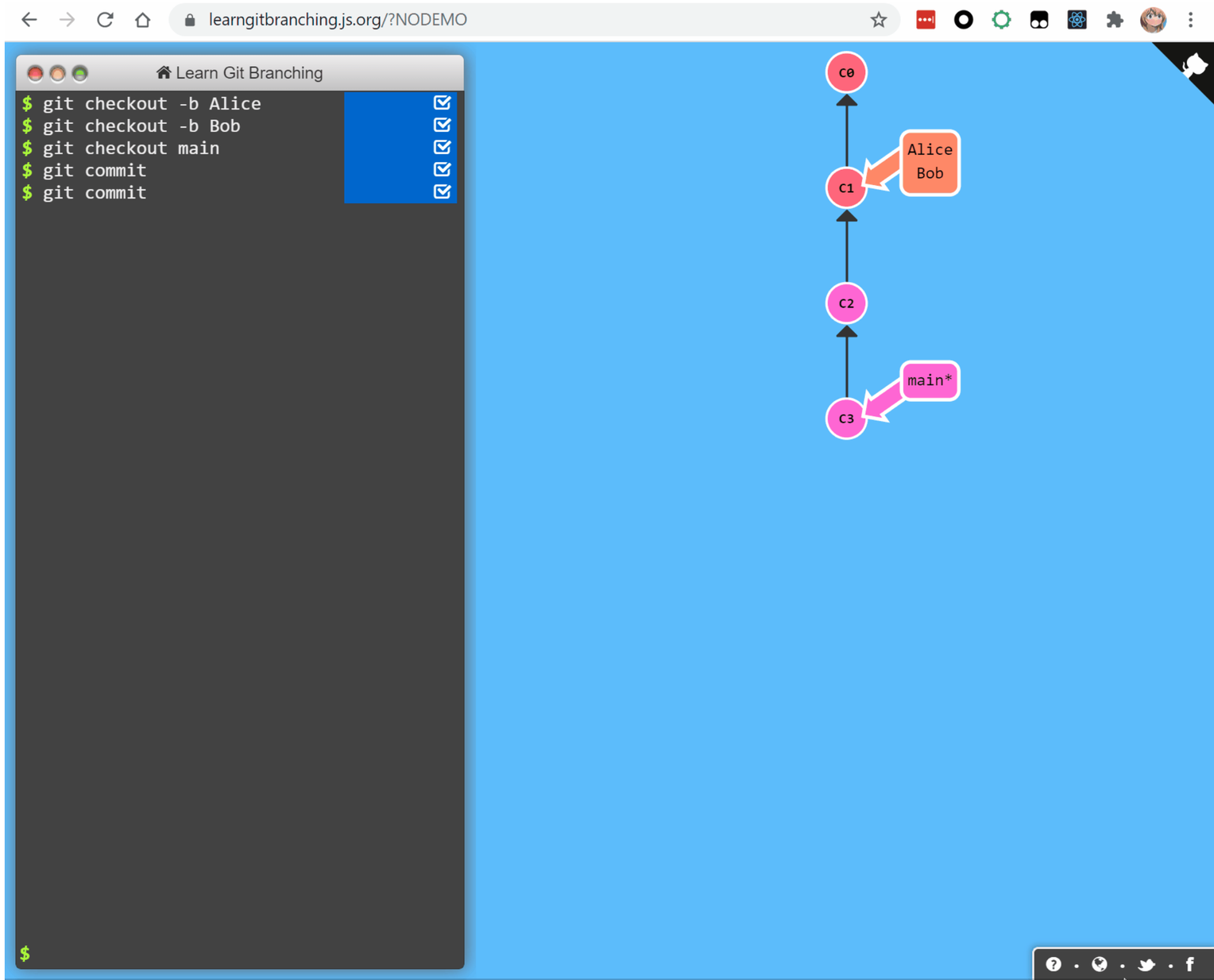
Alice and Bob are two independent developers

They both contribute to branch in their own name

When work finished, they `merge` their commit into common branch named `main`

2.2 Integrate changes, similar to Merge

Demo in learngitbranching.js.org



Rebase

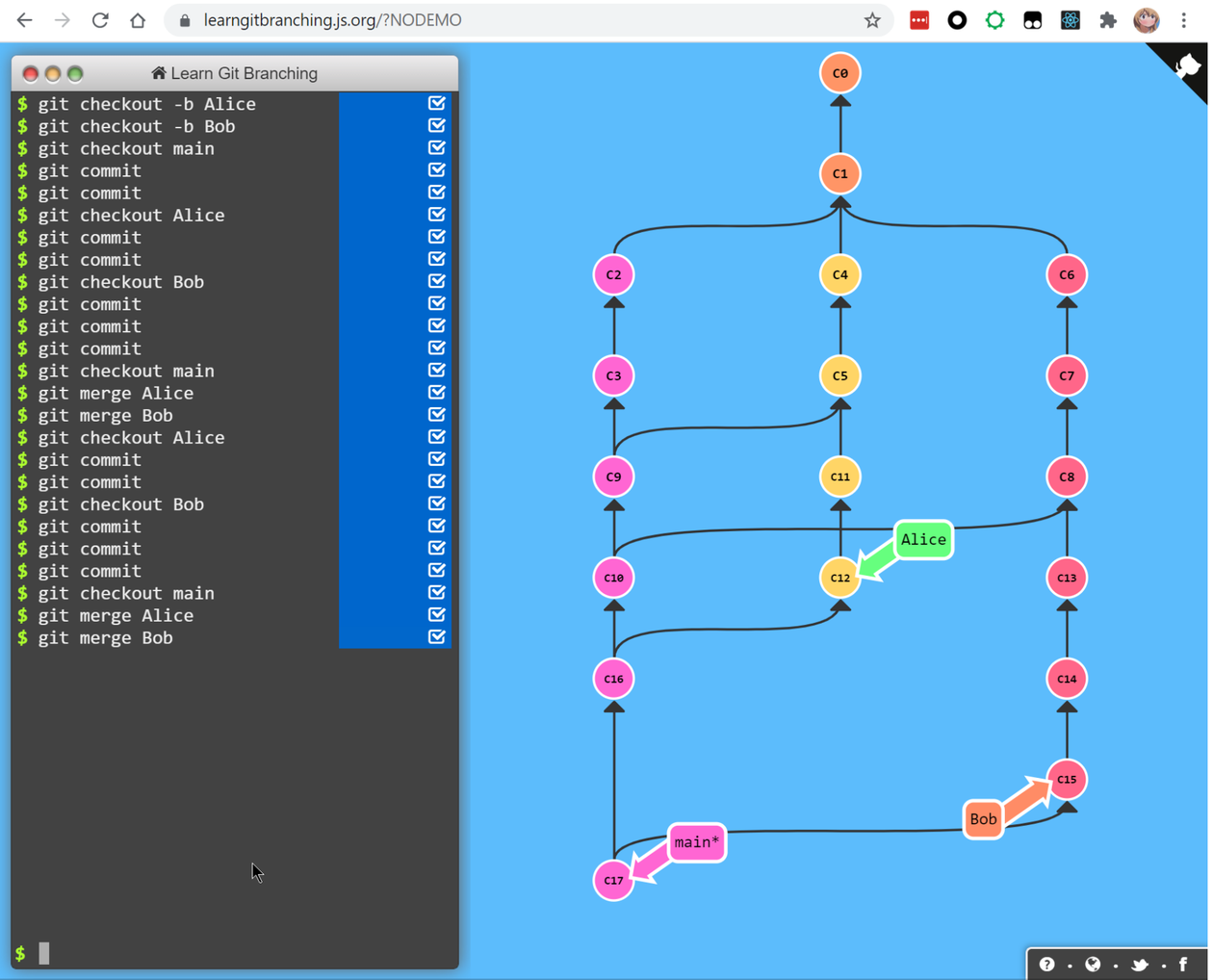
Alice and Bob are two independent developers

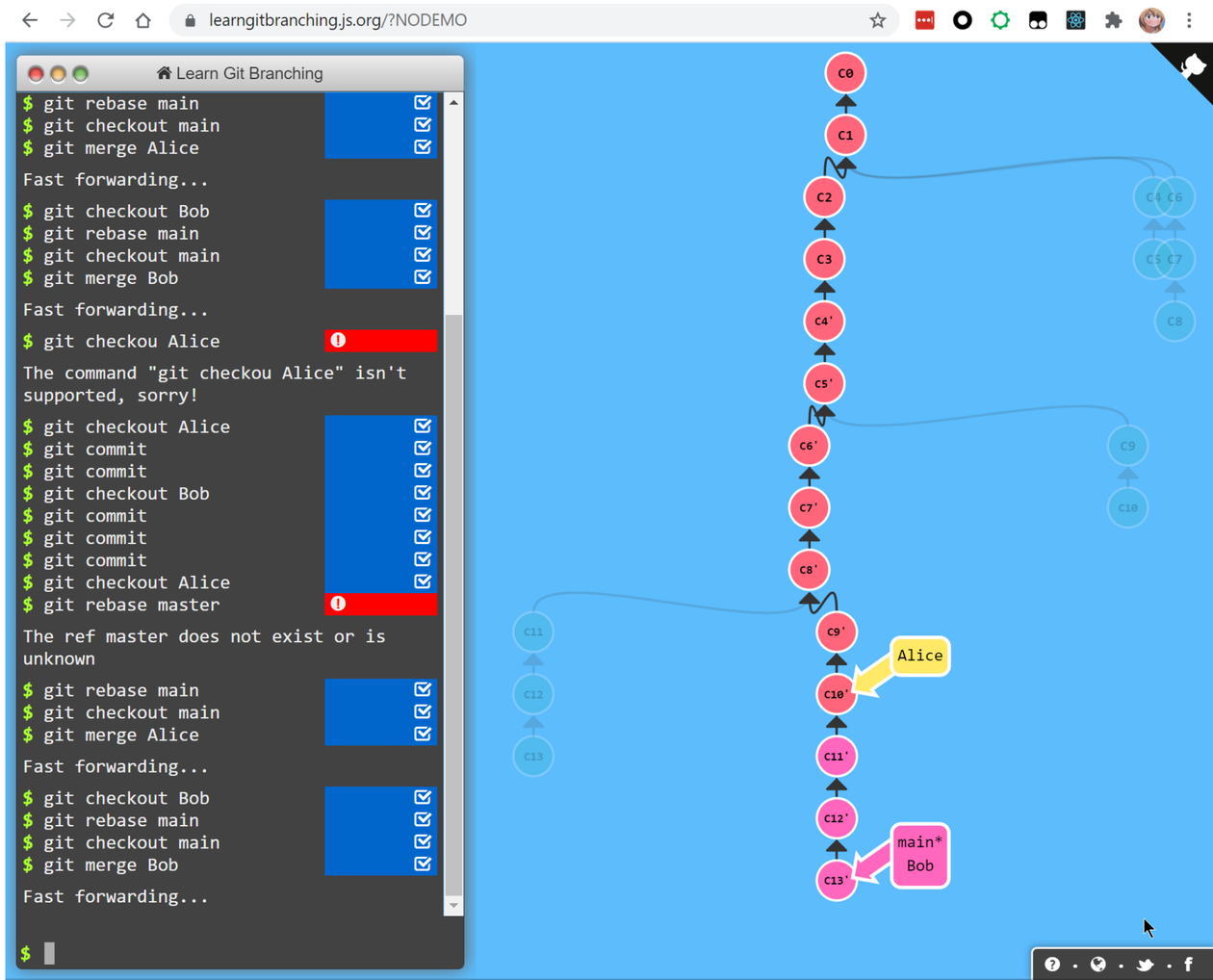
They both contribute to branch in their own name

When work finished, they `rebase` their own branch base on `main`, and then merge it into `main`

2.2 Integrate changes, similar to Merge

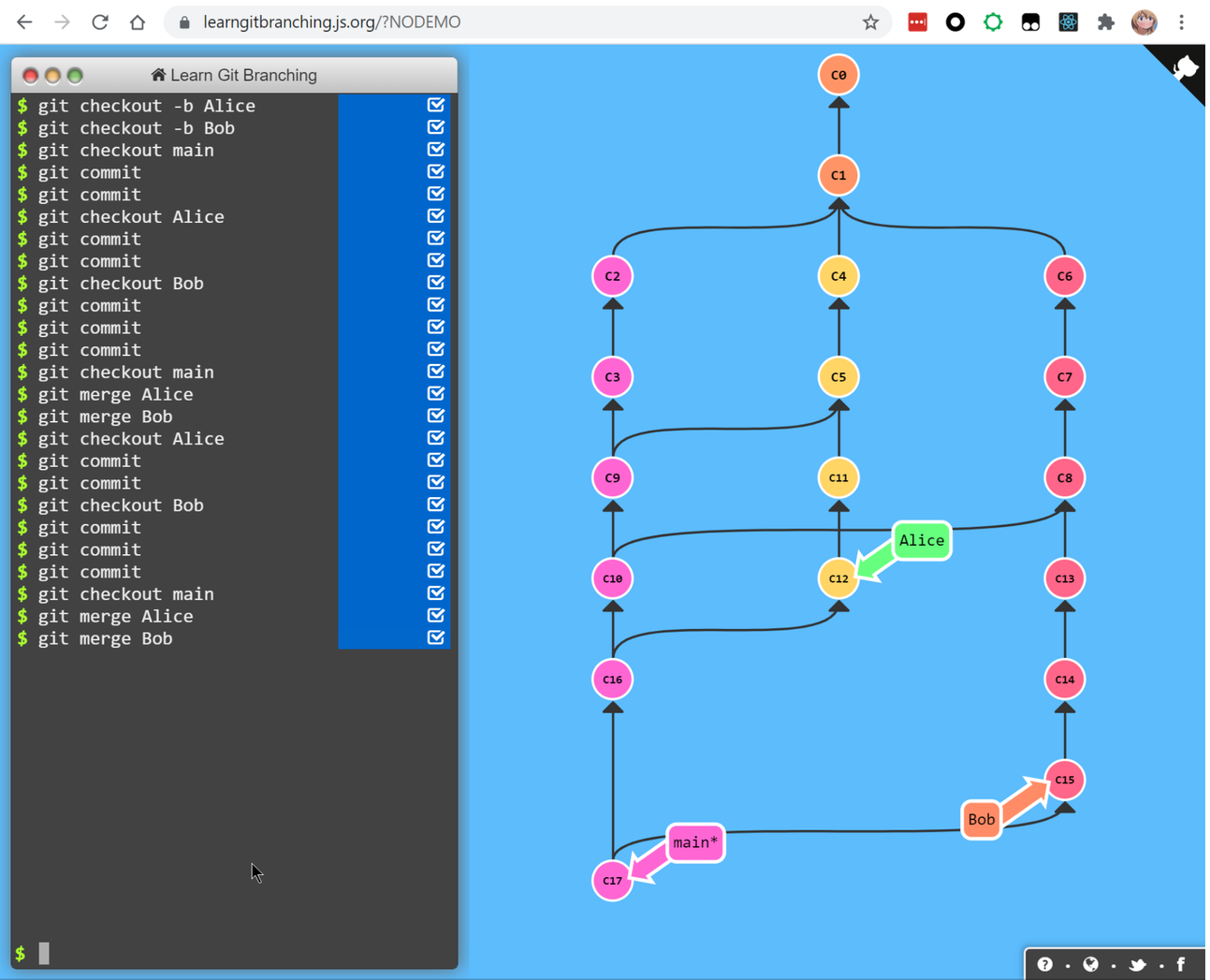
Result: Merge v.s. Rebase





2.2 Integrate changes, similar to Merge

Details in merge result

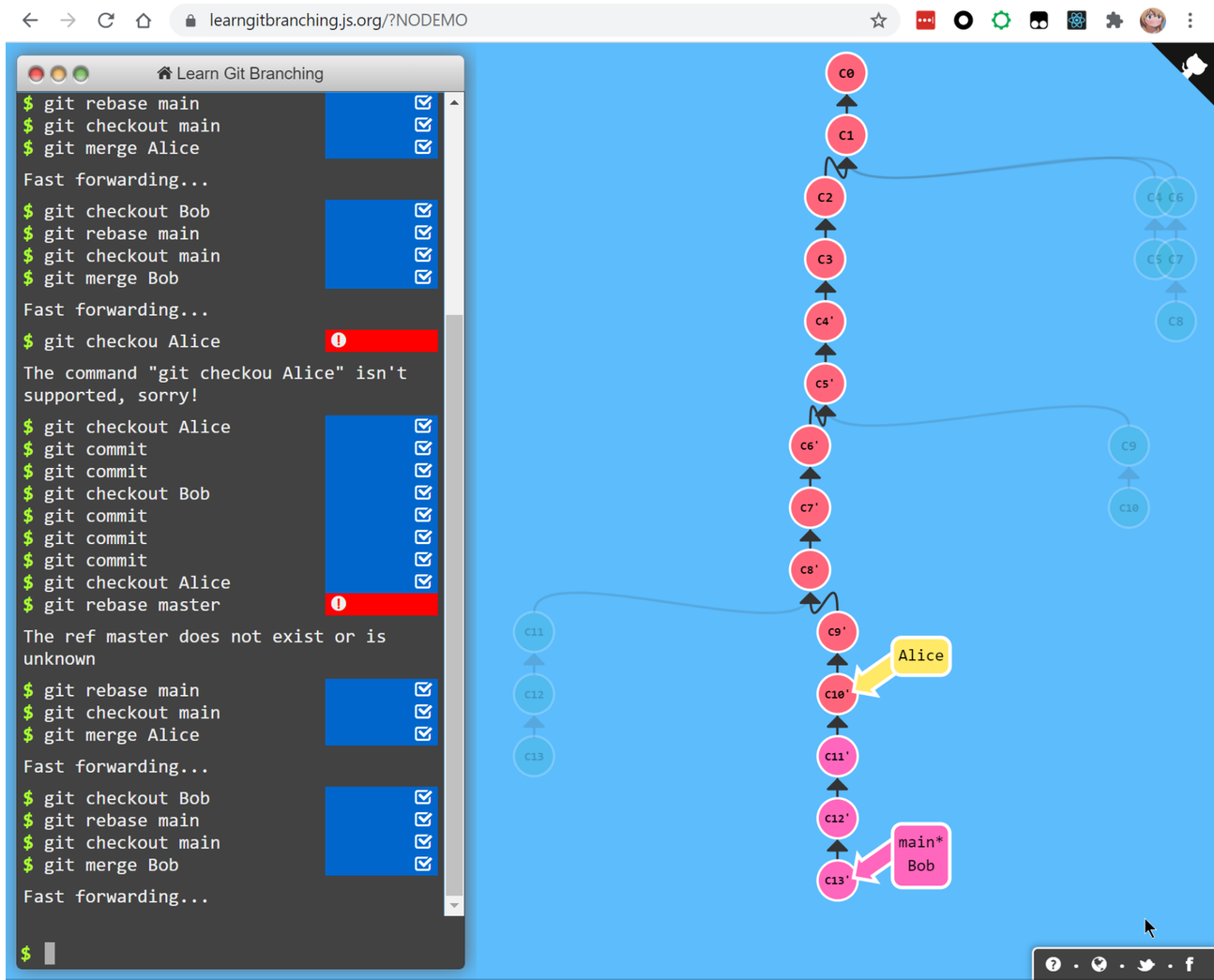


1. Merge will create `merge` commits like `c9, c10, c16, c17`
2. Thest merge commits contain nothing about file changing, they are just records of the merge of 2 branch
3. All commits history will be kept, without any modification

2.2 Integrate changes, similar to Merge

Details in rebase result

1. Rebase will not create `merge` commits like merge command
2. All commit from dev branch will be modified, like `c4', c5', c6', c7', etc.`, and the origin commits will disappear
3. If everyone rebase `main` before merging into `main`, git log will be a straight line rather than a reversed tree



2.2 Integrate changes, similar to Merge

If conflicts exist

Rule

1. You need resolve them, both in merge and rebase
2. Conflict cases will be same, both in merge and rebase
3. Merge calls for one resolving step, because merge just **merge** 2 branch's `HEAD`
4. Rebase maybe call for multiple resolving process, it depends on how many commits conflict

2.2 Integrate changes, similar to Merge

If conflicts exist

Example

- Integrate branch `Alice` into branch `main`
- `Alice` has 5 new commits before `main`, 3 of them have conflicts with `main`
  - If `merge`, you need resolve all conflicts of 3 commits in only **ONE** step
  - If `rebase`, you need resolve conflicts in 3 step, **ONE** step for **ONE** conflicted commit
- `rebase` like `cherry-pick` every commit into `main` in turn

3. Merge or rebase?

It depends

1. Differences
2. Scenarios

3.1 Differences between Merge & Rebase

1. Merge will save all origin history, Rebase will update them
2. In Rebase, each conflict must be resolved in separately in each commit
3. You need to resolve all conflicts in both

Compare with `Merge`

Type	Origin history	Resolve conflict resolved separately	All conflicts need resolved
Merge	✔	✖	✔
Rebase	✖	✔	✔

3.2 Scenarios

Merge

1. History need to be saved.

   a. merge a dev branch with many commits into release branch

   b. merge your branch into a long term development common branch

2. Maybe you will cherry-pick or roll back in the future

3. You are not sure which method you should use

3.2 Scenarios

Rebase

1. Squash some commits

2. Eidt commit history (`git rebase -i HEAD~5`)

3. Pull from origin same name branch

   It depends, most of time rebase is prefered, rebase makes history more clean.

   ```
   git pull origin master
   =>
   git pull origin master --rebase/-r
   ```

   Or change your `~/.gitconfig` with commands

   ```
   git config --global pull.rebase true
   ```

4. How to xxx

Some cases we meet in daily development

1. Return to some commits
2. Move commit to another branch
3. Work with teammates on the same/different branch

4.1 Return to some commits

1. Reset HEAD

```
git reset [commit-id]
```

2. Check out a new branch from specified commit

```
git checkout -b [new-branch-name] [commit-id(default:HEAD)]
```

Both of them will move `HEAD` to the specified commit, in general, checkout a new branch is prefered

4.2 Move commits to another branch

``

`cherry-pick` can move one or more commits to other branch.

If conflicts exist, you need to resolve them all, like a lite rebase.

Move A...B commits to current branch, include A

```
git cherry-pick A^..B
```

5. Tools and configuration tricks

1. Tools

    a. Fork: beautiful git tool cross platform

    b. GitUI: operate every chunk in VIM/terminal

    c. diff-so-fancy & delta: better diff tool

2. Configuration tricks

    a. alias

    b. global gitignore

    c. global git hook

    d. delete orgin branch in local automaticly

    e. use different configuration for different account depends on path

5.1 Tools demonstration

Fork: beautiful git tool cross platform

5.1 Tools demonstration

GitUI: operate every chunk in VIM mode

5.1 Tools demonstration

diff-so-fancy: Good-lookin' diffs

5.1 Tools demonstration

delta: A viewer for git and diff output

5.2 Configuration tricks

1. alias

Edit your `~/.gitconfig`

```
[alias]
    new = checkout -b
    cm = commit -m
    st = !echo 'untracked' && git ls-files . --exclude-standard --others && \
        echo '\nunstaged' && git diff --stat && \
        echo '\nstaged' && git diff --cached --stat
    com = checkout master
    unstage = reset HEAD--
    last = log-1 HEAD
    lg = log \
         --color \
         --graph \
         --pretty=format:'%Cred%h%Creset -%C(yellow)%d%Creset %s %Cgreen(%cr) %C(bold blue)<%an>%Creset' \
         --abbrev-commit
    amend = commit --amend --no-edit
    dif = diff HEAD
```

You can use `git lg` to view all logs

5.2 Configuration tricks

2. global `.gitignore`

Edit your `~/.gitconfig`

```
[core]
    excludesfile = ~/.git-config/.gitignore_global
```

3. global hook

```
[core]
    hooksPath = ~/.git-config/hooks/
```

5.2 Configuration tricks

4. delete deleted remote branch in local automaticly

```
[remote "origin"]
    prune = true
```

5. use different configuration for different account depends on path

```
[includeIf "gitdir:~/code/github.com/"]
    path = ~/.git-config/.gitconfig_github
[includeIf "gitdir:~/code/gitlab.com/"]
    path = ~/.git-config/.gitconfig_gitlab
```

One more thing

shell enhancements

zsh only

1. zsh highlight
2. zsh suggestion

All shells matter

3. fzf: fuzzy finder in everything
4. z.lua: navigate faster by learning your habits
5. modern unix: Alternatives to common unix commands, a.k.a RIIR

One more thing

shell enhancements

zsh highlight: Fish shell-like syntax highlighting for Zsh

Some examples:

Before: `% echo $'Hello, world\x21'`

After: `% echo $'Hello, world\x21'`

Before:
```
% echo 'Pay $5 to Joe'
% echo "Pay $5 to Joe"
```

After:
```
% echo 'Pay $5 to Joe'
% echo "Pay $5 to Joe"
```

Before: `% ( foo=42 }`

After: `% ( foo=42 }`

Before: `% echo 3> /proc/…/vm/drop_caches`

After: `% echo 3> /proc/…/vm/drop_caches`

One more thing

shell enhancements

zsh autosuggestions: Fish-like fast/unobtrusive autosuggestions for zsh

One more thing

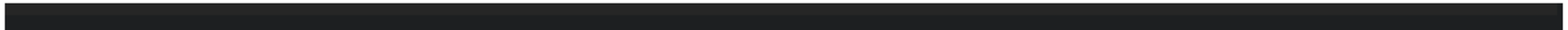
shell enhancements

fzf: A general-purpose command-line fuzzy finder

One more thing

shell enhancements

z.lua: A new cd command that helps you navigate faster by learning your habits



Appendix: Tools in this slide

Glory to the Creators!

Name	URL
Powered by	Slidev
Theme	Self updated @slidev/theme-seriph
GIF recording	ScreenToGif
Host on	GitHub Pages

Learn More

- Share this git notes
- Configure zsh from 0 to 1