Using Git and GitHub

Videogames Technology
Asignatura transversal

Departamento de Automática

Universidad de Alcalá

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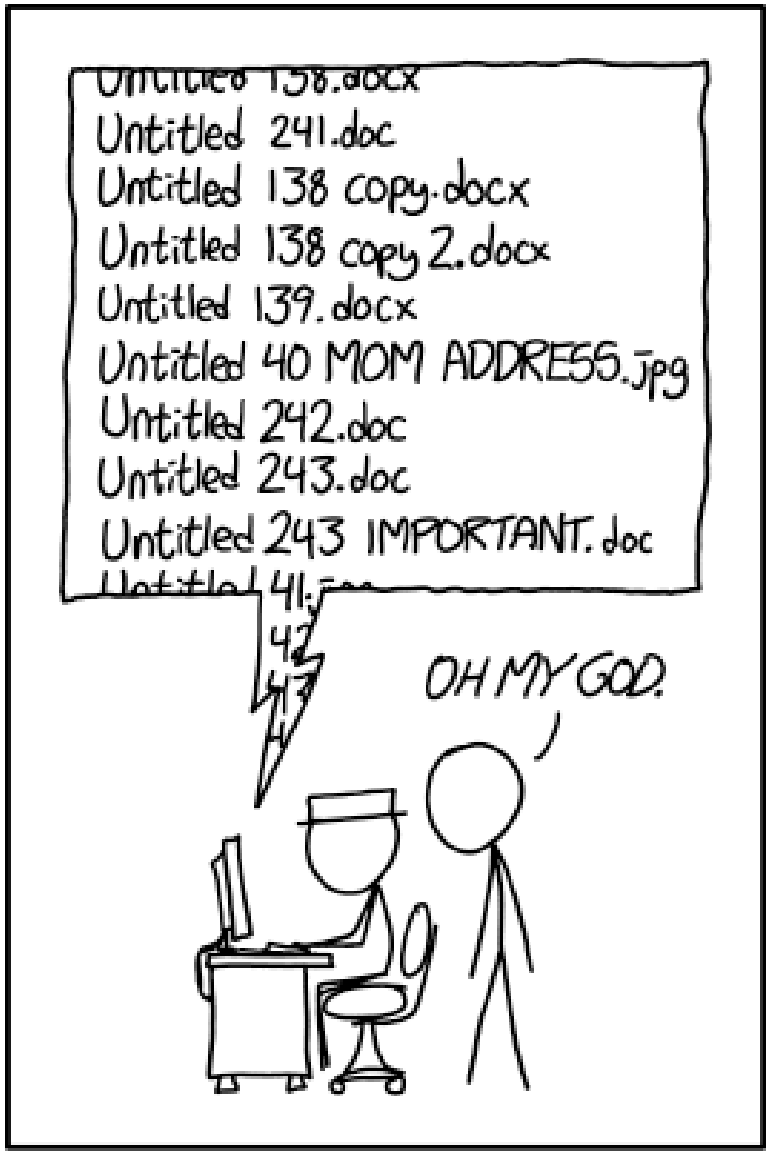

PROTIP: NEVER LOOK IN SOMEONE ELSE'S DOCUMENTS FOLDER.

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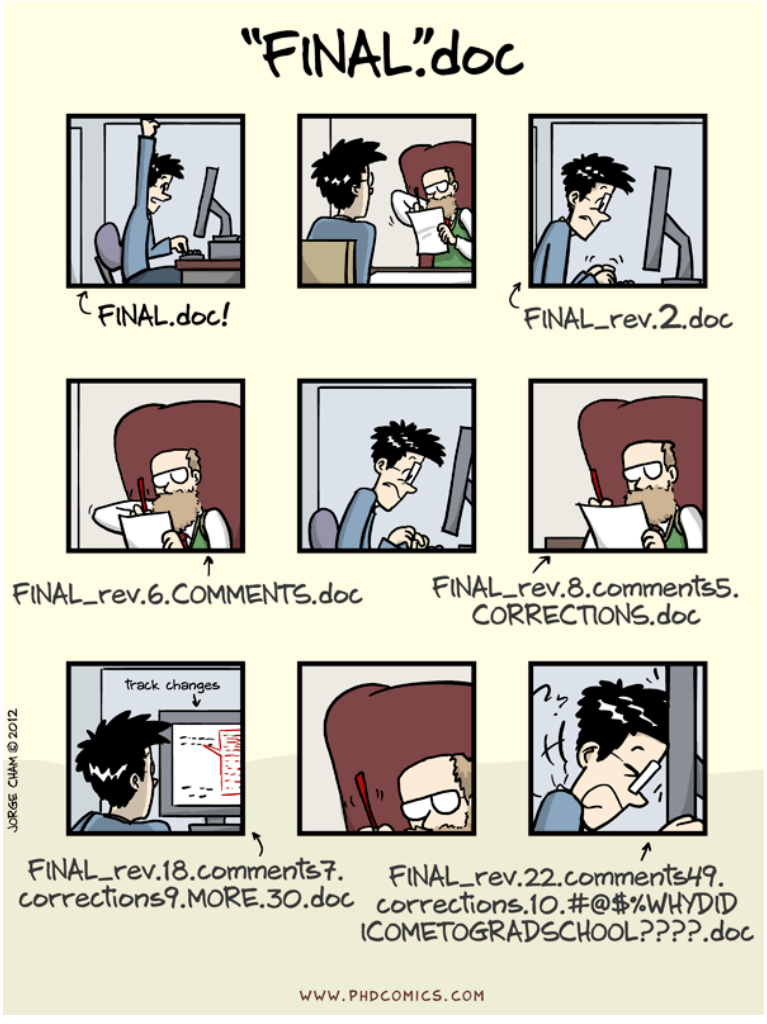

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Version control

Introduction

Version control systems

Version control systems (VCS) keep track of changes to source code. Allows multiple people to edit a project in a predictable manner.

Main open source VCS

- 1982 RCS
- 1990 CVS
- 2000 Subversion
- 2005 Git/Mercurial

There are many proprietary ones but `Git` is now the most popular one by far.
All software should be under a version control system, if not, it ain't software!

Git

What is Git?

Git is an open source distributed version control system, created by Linus Torvald.

`https://git-scm.com/`

(Interactive tutorial)

Git

Git sites

It is easier to start with free hosting sites instead of maintaining your own server.

- GitHub: public repositories (as many as you want), but private ones are not free (except for academia). It is now part of Microsoft
- Bitbucket: allow us to keep private repositories limiting the number of collaborators.
- GitLab: both public and private without limitations. It is becoming more popular.
- Others ...

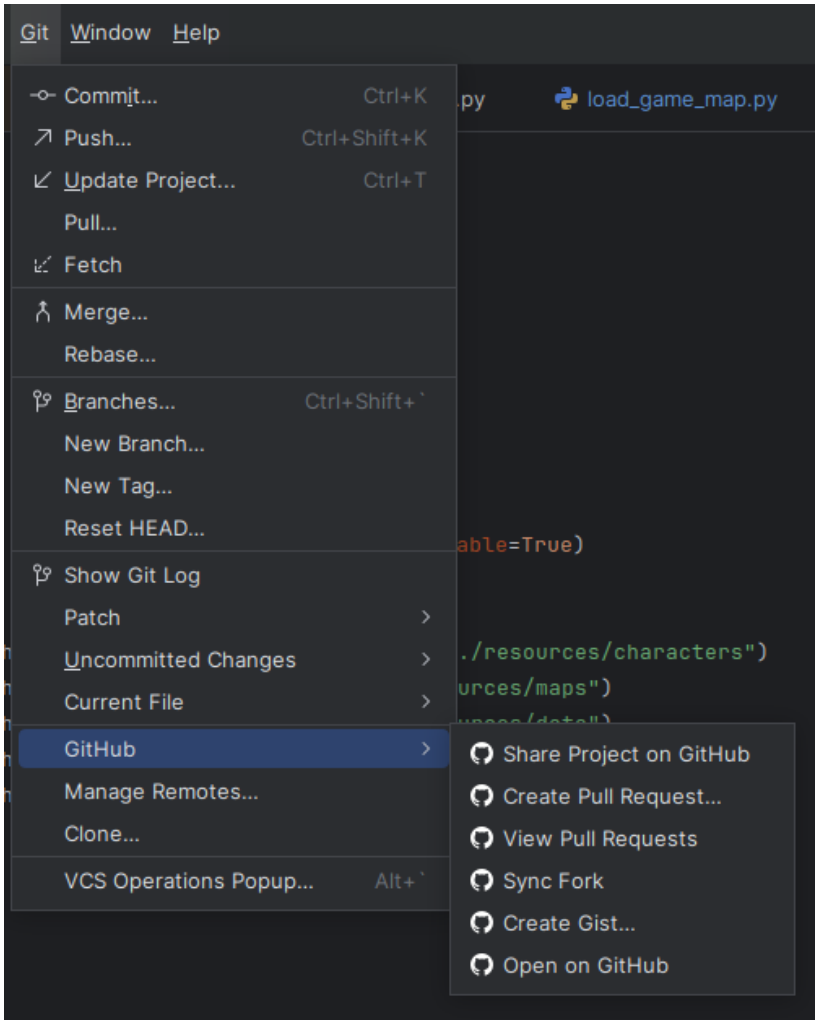
It is typically used as central repository:

- from which everyone pulls other people's changes
- to which everyone pushes changes they have made

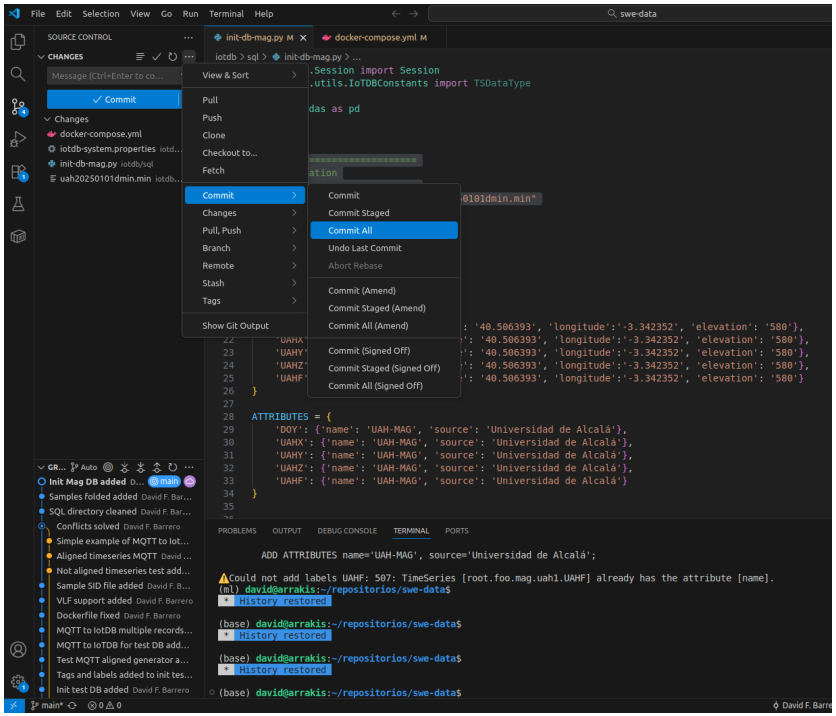
Git

Git in IDEs

PyCharm



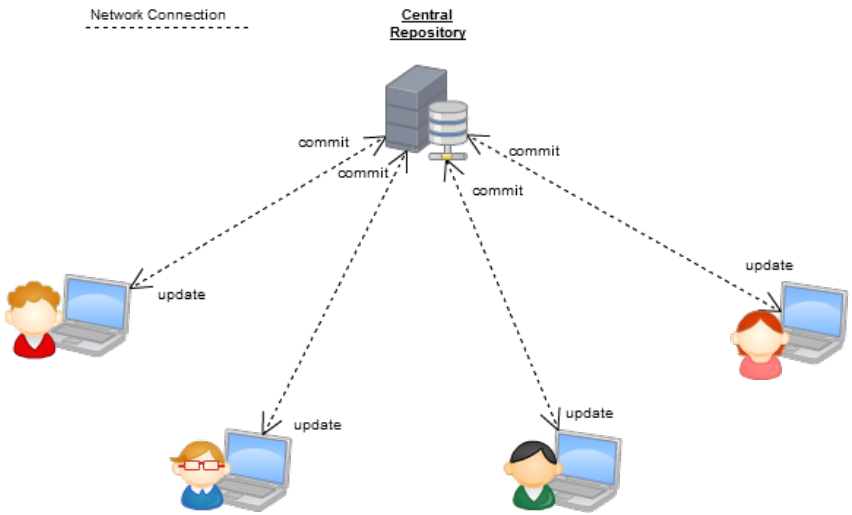
VSCode



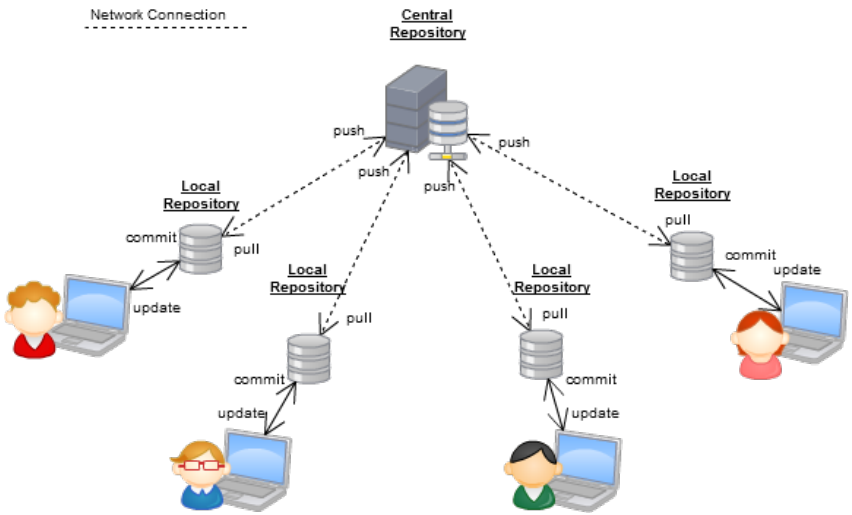
Git

Git vs. SVN (I)

Centralized (SVN)



Distributed (Git)



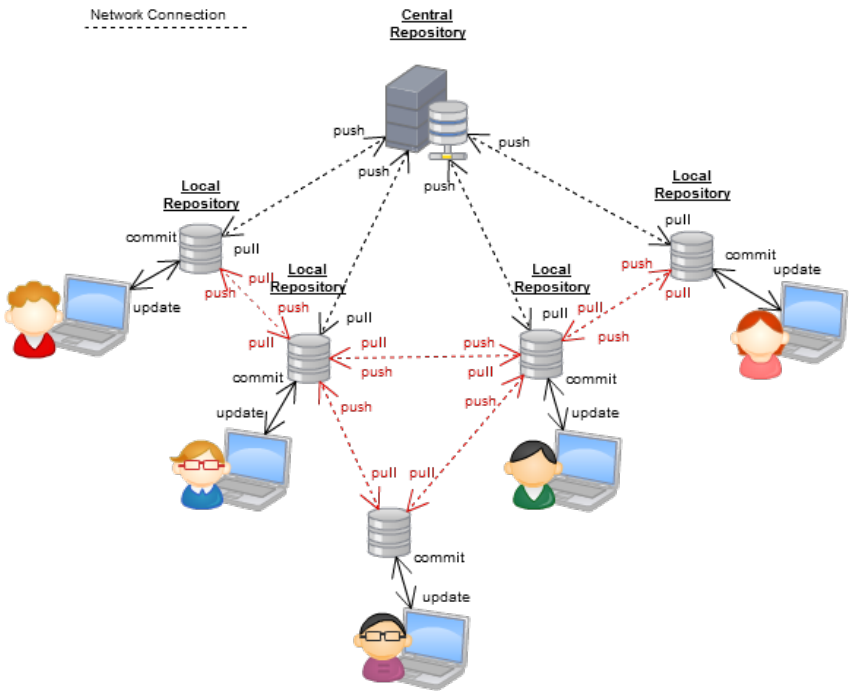
(Source)

Disclaimer: Do not pay attention to the labels of these diagrams

Git

Git vs. SVN (II)

Fully distributed (Git)



(Source)

Key Git concepts to know

- `repository` (local or not)
- `clone`
- `commit`, `push`
- `pull`, `fetch`
- `remote`, `origin`
- `merge`

Using Git

Conflicts

If two people both modify the same file, the first to push *wins*. The second person will have to pull and merge before pushing.

- Changes in different parts of a file are automatically merged
- Changes in the same part of a file cause conflicts
  - Select either your changes or remote, or a mix of the two

Using Git

Commits

Each commit has ...

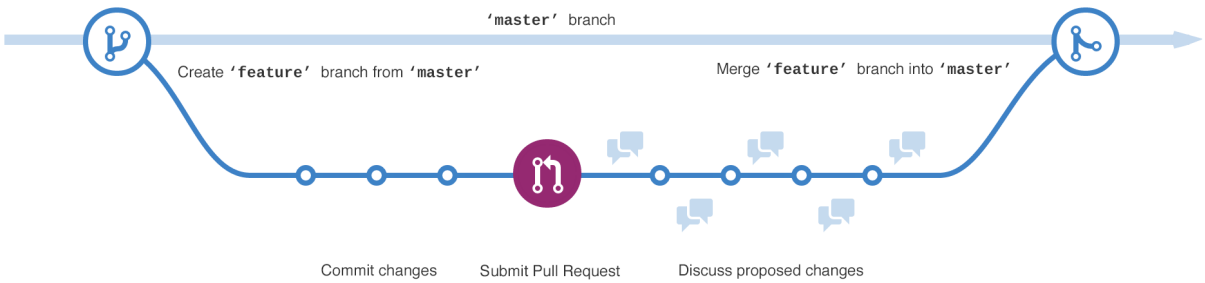
- ... an author
- ... a comment: "Fix deprecated py36 black option"
- ... a date
- ... an ID (or *hash*)

```
commit 44161dde6ea234f8cb997644f8e187123c3cc4af
Author: David <foo@foo.com>
Date:   Fri Mar 9 14:57:32 2018 +0100

    Issue with syntax highlighting solved
```

Using Git

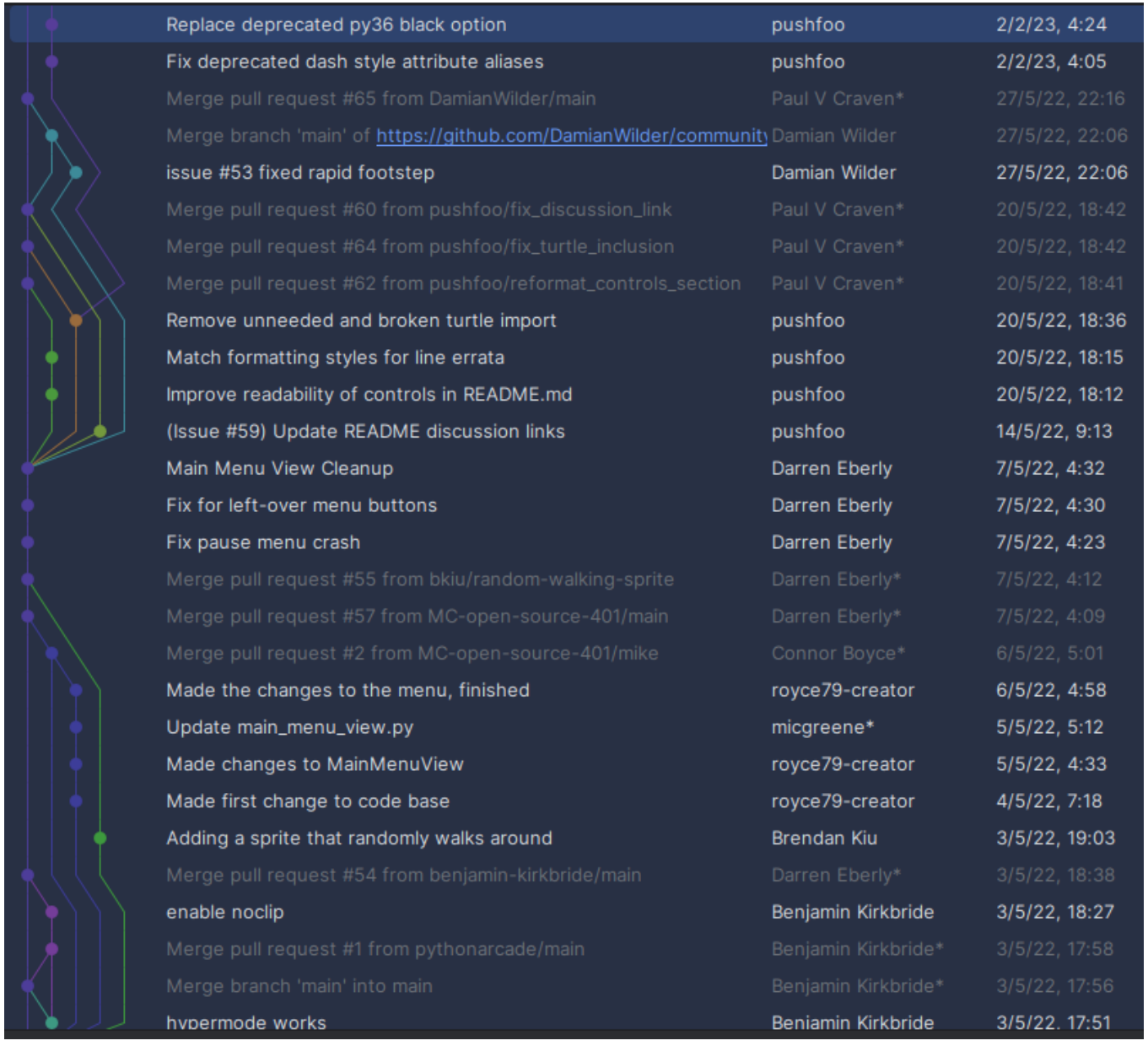
Branches (I)



Branches are used extensively (e.g. some like feature branches).

- A repository (local and remote) can have explicit branches
- The default branch is called master
- A merge is a fusion between two branches

Do no use branches in the project!

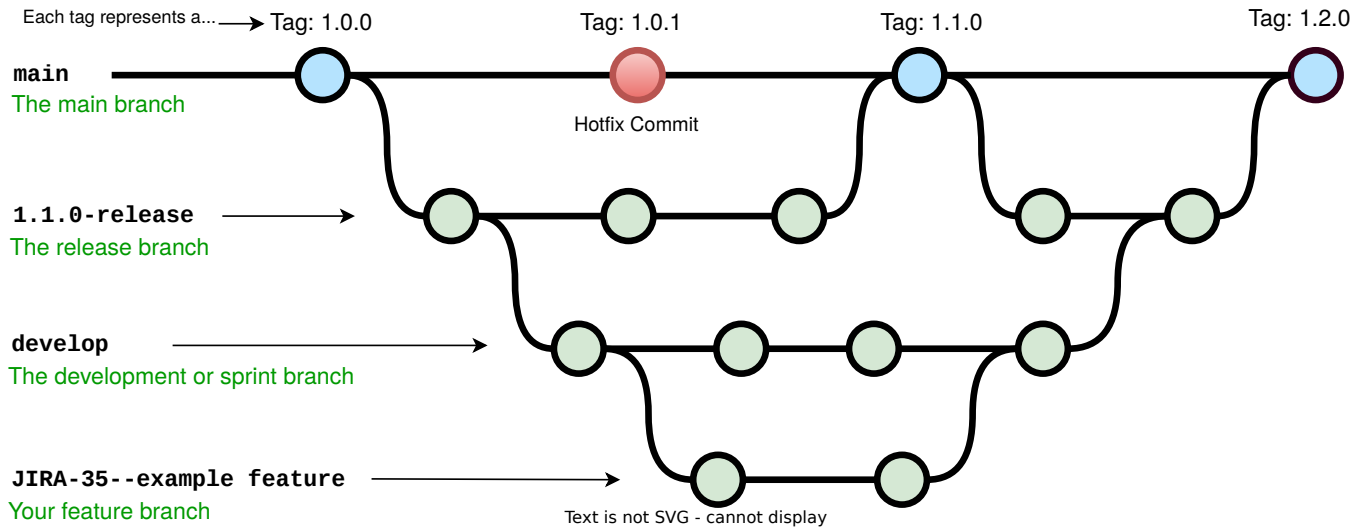

Replace deprecated py36 black option pushfoo 2/2/23, 4:24
Fix deprecated dash style attribute aliases pushfoo 2/2/23, 4:05
Merge pull request #65 from DamianWilder/main Paul V Craven* 27/5/22, 22:16
Merge branch 'main' of https://github.com/DamianWilder/communit Damian Wilder 27/5/22, 22:06
issue #53 fixed rapid footstep Damian Wilder 27/5/22, 22:06
Merge pull request #60 from pushfoo/fix_discussion_link Paul V Craven* 20/5/22, 18:42
Merge pull request #64 from pushfoo/fix_turtle_inclusion Paul V Craven* 20/5/22, 18:42
Merge pull request #62 from pushfoo/reformat_controls_section Paul V Craven* 20/5/22, 18:41
Remove unneeded and broken turtle import pushfoo 20/5/22, 18:36
Match formatting styles for line errata pushfoo 20/5/22, 18:15
Improve readability of controls in README.md pushfoo 20/5/22, 18:12
(Issue #59) Update README discussion links pushfoo 14/5/22, 9:13
Main Menu View Cleanup Darren Eberly 7/5/22, 4:32
Fix for left-over menu buttons Darren Eberly 7/5/22, 4:30
Fix pause menu crash Darren Eberly 7/5/22, 4:23
Merge pull request #55 from bkiu/random-walking-sprite Darren Eberly* 7/5/22, 4:12
Merge pull request #57 from MC-open-source-401/main Darren Eberly* 7/5/22, 4:09
Merge pull request #2 from MC-open-source-401/mike Connor Boyce* 6/5/22, 5:01
Made the changes to the menu, finished royce79-creator 6/5/22, 4:58
Update main_menu_view.py micgreene* 5/5/22, 5:12
Made changes to MainMenuView royce79-creator 5/5/22, 4:33
Made first change to code base royce79-creator 4/5/22, 7:18
Adding a sprite that randomly walks around Brendan Kiu 3/5/22, 19:03
Merge pull request #54 from benjamin-kirkbride/main Darren Eberly* 3/5/22, 18:38
enable noclip Benjamin Kirkbride 3/5/22, 18:27
Merge pull request #1 from pythonarcade/main Benjamin Kirkbride* 3/5/22, 17:58
Merge branch 'main' into main Benjamin Kirkbride* 3/5/22, 17:56
hypermode works Benjamin Kirkbride 3/5/22, 17:51

Using Git

Tags

Example diagram for a GIT workflow:

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



A tag is a pointer to a specific point in the repository history

- Tags usually have names (e.g. “v1.1”)
- Widely used to keep and publish software releases

Using Git

Good practices

Learn on the job: the best way to learn it is by using it.

Best practices

- Regularly push and pull (at least daily, in general)
- ⇒ Test before pushing! ⇐
- Don't push half-baked changes
- Don't pull if you're in the middle of a task
- Never commit temporal/intermediate files
- Keep commit descriptions short and informative
- *The master must be a clean and functional version of the project*

Remember: Git never overwrites local changes without an explicit order

- .. even with a `git pull`

GitHub

Features

Free Git hosting provider

- Free public repositories

Added value features

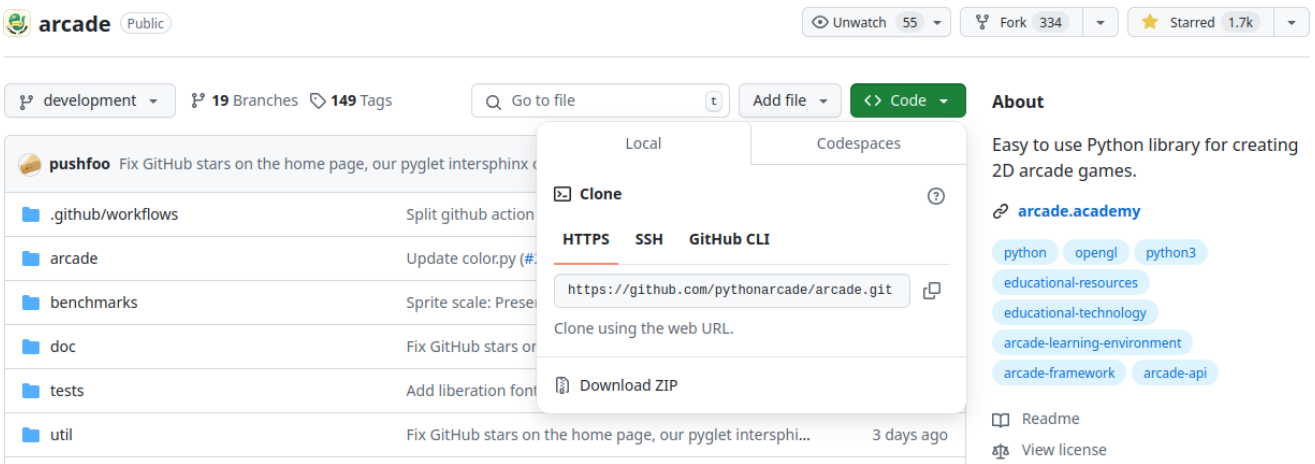
- Social network
- Collaborative tools
- Repository browser
- Pull requests
- Issue tracking
- Web hosting
- Markdown integration
- Organizations

GitHub

Key concepts

Key GitHub concepts to know

- `Pull request`
- `Fork`



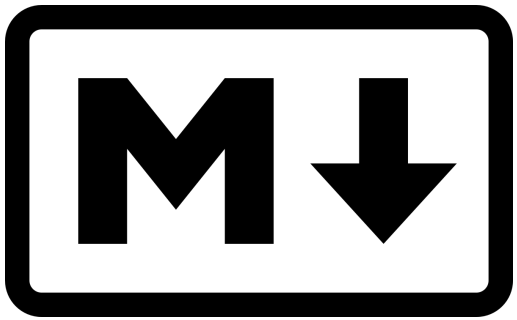
GitHub

README

Special file: README.md

- Contains information about the project
- Automatically visualized
- md means Markdown

Markdown (I)



Markdown: Trivial markup

- Simple
- Very simple
- Extremely simple
- Did I say it's simple?

VERY powerful

- Several outputs
- Professional quality
- ... and simple!

Markdown (II)

Markdown example

```
# I am a header
## I am a subheader

Regular, *italic* and **bold**

- List item 1
- List item 2

[I am a link](http://foo.com)

![I am a pic](markdown.png)

~~~C
printf("Hello, world");
~~~
```

I am a header

I am a subheader

Regular, *italic* and **bold**

- List item 1
- List item 2

I am a link

I am a pic

```
printf("Hello, world");
```