Making your Project Successful and Less Stressfull

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Collaborative Coding

In your research you are probably building some piece of software

- other people (undergraduates, collegues etc.) might work on it, too
- often a cause of problems
- ideas differ, sometimes people derail it, etc.
- driven by ideas, requirements, papers
- many ideas are experimental, unclear if they will work
- have to find a balance between code quality and freedom
- ego can be a problem, too

Disclaimer: The approach I propose worked for us, not necessarily for everybody. But perhaps it can give ideas.

The Actors

Everybody is different, but here are some common perspectives

- **undergraduate students**
  - enthusiastic, but often inexperienced
  - code often needs some polishing to improve quality
  - might leave after some time
- **PhD students**
  - stay for much longer
  - know the system better, more experienced programmers
  - sometimes tempted to hack something together for a paper, though
- **you**
  - should have the long term success of the project as goal
  - have to keep the code quality up
  - make sure that boring but missing features are implemented

Not always easy. Also some people are more altruistic than others.

The Solution

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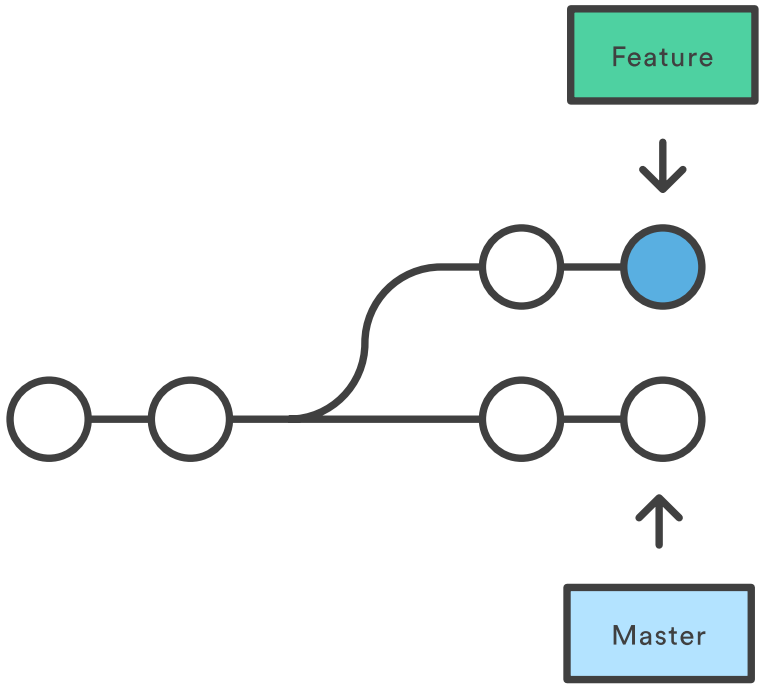
- sounds a bit extreme, but is a good idea
- a key requirement for code quality is code review
- after the fact reviewing never works
- it must be physically impossible to write without reviewing
- but reviewing must not hinder productivity
- a DVCS with pull requests is a good system for that

Distributed Version Control



- in a DVCS like git everybody has its own repository
- the “mainline” only exists by convention, everybody is one a branch
- on the branch everybody can experiment with new features
- but mainline merge happens only after pull request + code review
- the most important task of the project coordinator
- can also happen hierarchical (undergraduates $\rightarrow$ PhD students)

Code Review

An essential step for long-term code quality, must be taken very serious

- a student pushes its own branch to some public place, sends a pull request
- you carefully go over the code together with the student
- give hints, check for logic errors, point out style issues, etc.
- usually (!) the initial pull request will be refined, perhaps multiple times
- quite time consuming, also for the reviewer, but very important

Everybody knowns: If I want my feature to get into mainline, I have to write high-quality code.

Benefits

- everybody can experiment on his branch just fine, not limit in productivity
- but mainline code is carefully reviewed
- mainline is always in good shape
- inexperienced programmers do not disrupt the code, learn from reviews
- prevents half-baked code (as in: "a hack for this paper")
- creates pressure to implement boring stuff

A lot of work for the reviewer, but essential for long term project success.

You should build systems, too!

I would like to encourage you to build some kind of system:

- much more work than just a micro-benchmark for a paper, of course
- but you should aim for the long term benefit
- incredible useful to have a running system
- you can try out new features easily
- experiments are much more meaningful in complete systems
- great for teaching PhD students

And use code reviews!