Using GitHub in First Year Computer Science Courses

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Motivation

- I was already teaching revision control as a tool.
- More and more job applications included a place for your "GitHub URL".
- I also wanted to encourage students to play with open source code.

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GitHub Academic Services

- `https://classroom.github.com`
- GitHub has a classroom interface.
- This creates an Organization, which houses all your repositories.
- Premium features, such as creating private repositories, are available for free to educators.
- The classroom interface creates a repository for each assignment.

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Initial Rollout in Introduction to CS II

- Initially, I used the classroom interface.
- I gave 5 programming assignments, the first 4 in private repositories.
- The fifth assignment was a public repository, in this project the students were to write an original game.
- After CS II, their GitHub account would contain one open source program.

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Management Scripts

- I ultimately abandoned the classroom interface.
- I wrote a series of scripts to automate my workflow:
  - deploy-assignment
  - distribute
  - distribute-grades
  - fetch-assignment
  - grade-assignment
  - grade-report
- These scripts are available at:
  `https://github.com/pngwen/cs-classroom`

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Using GitHub in Introduction to CS I

- Students have one private repository for the whole semester.
- Includes a `.gitignore` which will not publish binaries.
- Classroom examples are deployed in the example directory.
- Grade reports are published to their repositories.
- We do one group assignment at the end of the semester, where groups share a private

Student Repository

```
GRADE.TXT
boilerplate.cpp
examples
    01-Intro-C++
    03-Prog-Structure
    04-Arithmetic
    05-Decisions
    06-Loops
    ...
programs
    program1
    program2
    ...
labs
    week2
```

Goals in Both Semesters

CSC111 - Intro CS I

- Gain familiarity with the basic git workflow: pull, add, commit, push.
- Collaborate via GitHub.
- Easily access grades and examples.

CSC111 - Intro CS II

- Learn to manage GitHub repositories.
- Treat each assignment as a new GitHub project.
- Publish an open source project via GitHub.
- Learn to play with code found on GitHub.

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Results

- Students seem to take to GitHub.
- I have seen better directory organization from my CS I students!
- In the first semester, they get an intuitive feel for collaboration.
- By the end of the second semester, they are able to participate in community projects.

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Future Improvements

- I need to document my scripts.
- I need to make the scripts more user friendly.
- In the future, I may create a project that calls on students to pull together several open source projects and modify them.
- Slowly, but surely, I am migrating all my classroom sources to `https://github.com/relowe`

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