A Hands-On Guide to Teaching Programming with GitHub, Travis CI, and Python

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Hi! My name is GREGORY M. KAPFHAMMER

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Roadmap for this Talk

Ask and answer questions about effective instruction in the programming field
Exploring Technologies

GitHub

Travis

Python
Why would I decide to use GitHub and Travis CI?
Important Goals

- Clear Status
- Key Ideas
- Fast Grading
HELP STUDENTS AND FACULTY EFFECTIVELY COLLABORATE
Deliverables to Check

- Source Code
- Technical Writing
- Commit Counts
- Commit Messages
- Program Output
- Data Files
USE INDUSTRY STANDARD TOOLS IN ALL COURSE WORK
DEVELOP NEW SOLUTIONS IN PYTHON WHEN NECESSARY
Benefits of Python

Tools
Options
Testing
How should I setup and use GitHub Classroom?
Create a GitHub organization for your course

Sign up your team

- Completed: Create personal account
- Step 2: Create organization
- Step 3: Invite members

Create an organization account

Organization name
- Allegheny-Computer-Science-111-F2018

This will be your organization name on https://github.com/Allegheny-Computer-Science-111-F2018.

Billing email
- gkapfham@allegheny.edu

Choose your plan

Organization accounts allow your team to plan, build, review, and ship software — all while tracking bugs and discussing ideas.
Now you have an empty organization
Let GitHub Classroom access the organization

ProTip! Don’t see your organization? You need to grant us access first.

with ❤️ by GitHub

GitHub Classroom is open source.
Create a student roster for the Classroom

Next, let's set up a "roster", so you can easily track student progress on your dashboard.

To create your roster, you'll need to share a way to identify your students. These "identifiers" can be:

- Student last names
- Student email addresses
- Any other unique piece of information

You can always come back and complete this step later.

What information would you like to use to identify your students? (emails, student ID #, etc.)

Paste your list of identifiers below (one per line, please):
Create an assignment for your course
CREATE TWO REPOSITORIES FOR EACH ASSIGNMENT
Using Travis CI

Solution  Starter  Check
THE STARTER REPOSITORY SHOULD NOT PASS THE TESTS
Create an assignment using the starter
A classroom will contain many assignments

GitHub Classroom

Computer Science 111 Fall 2017 at Allegheny College
Allegheny-Computer-Science-111-F2017

Assignments

- **Computer Science 111 Fall 2017 Lab 1**
  Individual assignment
  https://classroom.github.com/a/Uzf3tjLV

- **Computer Science 111 Fall 2017 Lab 10**
  Group assignment for Computer Science 111 Lab 10 Teams Formed on November 9, 2018
  https://classroom.github.com/g/G1VJvjkG

- **Computer Science 111 Fall 2017 Lab 11**
  Group assignment for Computer Science 111 Lab 11 Teams Formed on November 16, 2017
  https://classroom.github.com/g/BNsbvcdC
How do you automatically check student submissions?
Flexible Checking

Local

Travis
Let's Configure Travis CI

1. # use both Python and Java
2. sudo: required
3. dist: trusty
4. language: python
5. python:
6.  - '3.6'
7. before_install:
8.  - jdk_switcher use oraclejdk8
9.
10. # download gradle
11. before script:
1. #!/bin/bash
2. 
3. # assume that gatorgrader.py exits correctly
4. GATORGRADER_EXIT=0
5. 
6. # assume that the human-readable answer is "No"
7. GATORGRADER_EXIT_HUMAN_PASS="No"
8. 
9. # determine if the exit code is always failing
10. determine_exit_code() {
11.   if [ "$1" -eq 1 ]; then

Running GatorGrader on a Correct Submission
Running GatorGrader on an Incorrect Project
Previous Courses and Topics

- Computational Expression
- Data Abstraction
- Web Development
- Software Engineering

Different topics, goals, languages, and levels
Exciting New Features

Script → Gradle
What do the students think about this idea?
This approach ensures that the source code and GitHub repositories are organized. It is easier for me to help the students who are struggling in an introductory course.

- SAEGIN MAHLAU-HEINERT
This tool suite made it easier for me to talk with students about technical requirements. It helped me to make complex assignments more accessible to students.

- MARIA KIM
GatorGrader encouraged me to add better code comments and try out language constructs that I would not have otherwise investigated. The tool was a big help this semester!

- SAMATHA DARRIS
GatorGrader is like having a constant coach! I liked receiving feedback on the quality of my source code and writing before turning in the final version of my lab.

- ANNA YEAGER
How can we improve and study this approach?
Ideas for Experiments

Deliverables

Insights
WHAT CODE AND CONCEPTS CAUSE STUDENT FRUSTRATION?
WHAT FEATURES BEST SUPPORT EMERGING PROGRAMMERS?
HOW DO TEAM MEMBERS INFLUENCE LEARNING?
Let's Collaborate

Pull Requests

Defect Reports
GitHub Classroom developers are great!

Internal Server Error 500 When Accessing an Assignment in GitHub Classroom #1117

gkapfhm opened this issue on Aug 31, 2017 · 10 comments

Hello! Thank you so much for developing GitHub Classroom. So far, my students and I have really enjoyed using the system. In advance of running the laboratory session today, I have tested it repeatedly with small class sizes for our first laboratory assignment and everything always worked correctly.

That is, it was possible to:

- Instructor: Create an organization for the class
Review these slides on SpeakerDeck
See slide source code on GitHub
Check out GatorGrader on GitHub!
Main Contributions

- Clear Status
- Key Ideas
- Fast Grading

GatorEducator/GatorGrader