GitHub Classroom in the Classroom



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GitHub Classroom

- The presentation provides information for using GitHub Classroom, which allows the creation of individual classrooms and assignments in the context of GitHub
- Why GitHub?
 - GitHub (and Git) are critical components in maintaining versioned repositories of work in data science, software development, and other areas
 - Using these tools is an important job skill that students should be familiar with
- Why GitHub Classroom?
 - GitHub Classroom enables instructors to assign and assess individual work while simultaneously providing students with hands-on experience with GitHub
 - Assignment repositories created by the instructor can be cloned by students and maintained within the classroom
 - Cloned student repositories actually belong to the instructor and are <u>private</u> by default



Start with an Instructor Account on GitHub Education

- Apply for an instructor account on GitHub Education
 - (https://education.github.com/teachers)
 - account verification may take a day or two





Create an Organization in GitHub

- Organizations can be used to organize your courses (e.g. Programming, Analytics, Networking, etc.
- Select "Your organizations" from your profile menu in GitHub

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Latest c	Signed in as ProfSingletary
18	Set status
De suç	Your profile
Yes	Your repositories
Ma	Your organizations
Tub	Your projects



Creating an Organization

• Select "New organization" from the page

Settings		Q + •	o n 🛛 🐨
David Singlet Your personal accou	ary (ProfSingletary) nt ⇄ Switch to another account -	Go	to your personal profile
名 Public profile	Organizations	\langle	New organization
AccountAppearance	community Outside collaborator on	1 repository	Leave
Accessibility♀ Notifications	FSCJ-COP2800C Owner	Compare plans	Settings Leave



Creating an Organization

 Choose "Create a <u>free</u> organization"

Search or jur	np to	Pulls Issues Codespaces Marketplace Explore	e Q + - 🤹 -
	Pic	^{Choose a plan} k a plan for vour organizatic	on
		How often do you want to pay?	
		Monthly Yearly S Get 1 month free	
		Free The basics for individuals	
		\$ 0 per year forever	
		Create a free organization	



Creating an Organization

Tell us about your organization

1

Set up your organization

Organization account name *

FSCJ-COP1234C

This will be the name of your account on GitHub. Your URL will be: https://github.com/FSCJ-COP1234C.

Contact email *

david.singletary@fscj.edu

This organization belongs to: *

My personal account
 I.e., ProfSingletary (David Singletary)

O A business or institution

For example: GitHub, Inc., Example Institute, American Red Cross

Verify your account





Creating an Organization





 In GitHub Classroom (https://classroom.github.com), select the desired organization for your classroom





• Name your classroom





• TAs or Admins?





- Add Students
- Note: this step is not required; an alternative approach is to let your students add themselves by accepting your assignment invitations





Back in GitHub: Create an Assignment Template

• Working in your organization, create a new repository





Back in GitHub: Create an Assignment Template

• Working in your organization, create a new repository





• Name the repo and set it to Public

E FSCJ-COP123	34C	Q Type 🕖 to search	>_ + *
🙃 Overview 🛛 🛱 Repos	itories 🖽 Projects 🛇 Packages २३ Teams	유 People 1 🛱 Settings	
	Create a new repository A repository contains all project files, including to Import a repository. Required fields are marked with an asterisk (*). Repository template No template • Start your repository with a template repository's conter Owner * Repository num ESCJ-COP1234C • / Module1Assign Module1Assign	he revision history. Already have a proj nts. ne * nment in available.	iect repository elsewhere?
(Great repository names are short and memorable Description (optional) Public Anyone on the internet can see this reposite Trimes You choose who can see and commit to this	le. Need inspiration? How about scaling by. You choose who can commit.	g-funicular ?



- The repo needs to be a template:
- Select the Settings tab

R Teams R People 1 & Settings	
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	epository elsewhere?
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- The repo needs to be a template
- After creating the repo, select the Settings tab

Code 💿 Issues 🖏 Pull requests 💿 Actions 🖽 Projects 🖽 Wiki	① Security 🗠 Insights 🕸 Settings
Module1Assignment Public	☆ Edit Pins → ③ Watch 0 → ♀ Fork 0 → ☆ Star 0
Set up GitHub Copilot Use GitHub's AI pair programmer to autocomplete suggestions as you code.	A ⁺ Give access to the people you work with Ensure the right people and teams have access to this repository.
Quick setup — if you've done this kind of thing before	



• On the Settings page, check the Template repository box

E SCJ-COP1234C / Module1Assignm	ent	Q Type [] t	o search		>_	+ •	\odot	11 e	-
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段 General	General								
Access	Repository name								
R Collaborators and teams	Module1Assignment		Rename						
🖓 Moderation options 🗸 🗸	🛛 Tamulata nanasitamu 🧹								
Code and automation	 Template repositories let user repositories. 	s generate new	repositories with t	he same dìrectory	structure and files.	Learn more	about te	mplate	
🛱 Rules 🗸 🗸	Require contributors to s	sian off on we	b-based comm	nits					
Actions	Enabling this setting will requ	ire contributors	to sign off on con	nmits made throug	h GitHub's web int	erface. Sign	ing off is	a way for	
🔏 Webhooks	more about signing off on co	mmits.	mes with the repo	sitory's terms, com	monly the Develop	Der Certificat	e or Orig	in (DCO). I	Learn



- Note: there is no "OK", "Submit", or "Commit" button just checking the Template repository box commits the setting
- Return to the repo home page and refresh the browser to verify the repo is a "Public template"

			C	
<> Code	 Issues 	វរ Pull requests	 Actions 	Projects



• Back in GitHub Classroom, select your course and create an assignment





- Back in GitHub Classroom, select your course and create an assignment
- Can use same name as template, or not
- Private visibility for repo is a good thing

srooms / COP1234C Sumr	er 23 / New assignment
 Assignment basics 	Let's set up the basics for your assignment.
Starter code and er	vironment
 Grading and feedb. 	Assignment title
	Student assignment repositories will have the prefix module1assignment
	Deadline (optional)
	mm/dd/yyyy: 🗖
	Individual or group assignment Individual assignment 🗢
	Repository visibility Private repositories will only be visible to the student and the classroom owners. Public repositories will be visible to everyone, including other students.
	 Private Public Grant students admin access to their repository Editing this after assignments are created will not retroactively change permissions.



• Select your GitHub template repo for the assignment starter code:

Add your starter code and choose an optional online IDE.

Add a template repository to give students starter code

Your assignment will be created with empty student repositories if you don't add starter code. Changes to starter code after students have accepted the assignment will not retroactively change existing student repositories.

(i) Note: All starter code must use a template repository. Your starter code repository must be either in the same organization as this classroom or a public repository if elsewhere. Learn about transferring your

FSCJ-COP1234C/Module1Assignment •

GitHub Codespaces

Your organization is eligible for GitHub Codespaces. Enable Codespaces in students' repositories to give them a one-click experience for getting started coding, running, and collaborating on their code. Enable it in Classroom settings.

Add a supported editor

Automatically include a link to an editor in students' repositories to give them a one-click experience for getting started coding, running, and collaborating on their code.

Select an editor 👻



• Set up a test for autograding if desired, then "Create assignment"

Add autogr	ading tests
Autograding tes Add a test to en	ts help provide feedback for students immediately upon submission using GitHub Actions able autograding.
	No tests added yet
	Add a test to enable autograding
Add test	÷
🗆 Enable fee	dback pull requests
A pull reque you to answ	st will automatically be created on all student repository submissions. Pull requests allow er questions and provide feedback.



• Provide the assignment invitation link to your students





• Sample assignment in Canvas:





- Log in to GitHub Classroom and Select the Course Assignment
 - https://classroom.github.com/classrooms

0	Classroom	
	Find a classroom	
	COP2805C Summer 22 FSCJ-ProfSingletary	
<	8 cop2805CModule2	
	cop2805CModule1GitAndGitHub	



• Select the "Go to repo" Icon

cop2805CModule2

Rostered students 6		Q Search by GitHub username or stu	udent identifier	
Added students	0	Classroom roster	Unlinked accounts - Accepted - Submitted - Passing -	Sort -
ccepted students	4	1	-O- 0 commits	Ģ
Assignment submissions	0			
		⁽ⁱ⁾	-O- 0 commits	Ģ
		٠	-O- 0 commits	Ę
				Go to repo



• Select "Code" For Download/Access Options

Search or jump to Pull requests Issues M	arketplace Explore	↓ + - 🏟 -
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<> Code 🕑 Issues 11 Pull requests 🕑 Actions 🖽 Projects	Security 🗠 Insights 🕸 Settings	
양 main → 양 1 branch ⓒ 0 tags	Go to file Add file - Code -	About 章
github-classroom[bot] Initial commit	9151f21 3 days ago 🕲1 commit	cop2805cmodule2-ProfBrauda-Student created by GitHub Classroom
README.md Initial commit	3 days ago	□ Readme
README.md	Ø	 ⊙ 0 watching ♀ 0 forks
COP2805C Module 2 Graded Pro Assignment	ogramming	Releases
Implement a public Customer class which contains the following m	iembers:	Create a new release



• Choose Your Preferred Option

- Clone the student repo
- Open with GH Desktop
- Download Zip

	Go to file	Add file -	Code +
▶ Clone			1
HTTPS SSH	GitHub CLI		
https://gi	thub.com/FSCJ-F	ProfSingletary/co	C
Use Git or che	ckout with SVN usi	ng the web URL.	
덮 Open wi	th GitHub Desk	top	
Downloa	ad ZIP		



• Or Use "Go to file" to Go Directly to Desired File

Search or jump to 7 Pull requests Issues Marketpla	ace Explore	Ģ + • 🧔 •
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README.md Initial commit	3 days ago	
README.md	Ø 0 watching ♥ 0 forks	9
COP2805C Module 2 Graded Progra Assignment	Releases No releases publi	ished
Implement a public Customer class which contains the following member	Create a new rele	ease



GitHub Workflows

- A GitHub workflow is a configurable automated process that will run one or more jobs.
- Workflows are defined by a YAML file checked in to your repository and will run when triggered by an event in your repository, or they can be triggered manually, or at a defined schedule.
- Workflows are defined in the .github/workflows directory in a repository, and a repository can have multiple workflows, each of which can perform a different set of tasks.
 - You can have one workflow to build and test pull requests, another workflow to deploy your application every time a release is created, and still another workflow that adds a label every time someone opens a new issue

https://docs.github.com/en/actions/using-workflows/about-workflows



Automated Grading using Actions and Workflows

- You can use autograding to automatically check a student's work for an assignment on GitHub Classroom.
- You configure tests for an assignment, and the tests run immediately every time a student pushes to an assignment repository on GitHub.com.
 - The student can view the test results, make changes, and push to see new results.
- After a student accepts an assignment, on every push to the assignment repository, GitHub Actions runs the commands for your autograding test in a Linux environment containing the student's newest code.
- GitHub Classroom creates the necessary workflows for GitHub Actions.
- You can add, edit, or delete autograding tests for an existing assignment.
 - (All changes made via the Classroom UI will be pushed to existing student repositories, so use caution when editing tests)
- https://docs.github.com/en/education/manage-coursework-with-githubclassroom/teach-with-github-classroom/use-autograding



• Set up the assignment as shown earlier





 Add a test in the "Set up autograding and feedback" section, choose "Input/Output test"

Set up autograding and feedback.		
	Add test 👻	
Add autograding tests	Choose grading method	
Autograding tests help provide feedback for students immediately upon submission using GitHub Actions. Add a test to enable autograding.	Input/Output test	
	Run command	
No tests added yet	Run Java	
Add a test to enable autograding	Run Node	
	Run Python	
Add test 👻	Run C	
	Run C++	



- I used the following parameters:
 - Test name: Simple Test
 - Setup command: javac KitchenConverter.java
 - (builds the students application)
 - Run command:
 - java KitchenConverter 5.5 (application requires command line input)
 - Expected output: 5.50 cups is 88.00 tablespoons
 - Timeout: 10 minutes (default)
 - Points (optional): not specified

Test name	
Simple Test	
Setup command (optional)	
javaversion;javacversion;jav	vac KitchenConverte
Run command	
java KitchenConverter 5.5	
Inputs	
Furnested Quita at	<i>u</i>
Expected Output	
5.50 cups is 88.00 tablespoons	
5.50 cups is 88.00 tablespoons	1
5.50 cups is 88.00 tablespoons Comparison: Included -	u
5.50 cups is 88.00 tablespoons Comparison: Included - Timeout (minutes)	11
5.50 cups is 88.00 tablespoons Comparison: Included - Timeout (minutes)	1
5.50 cups is 88.00 tablespoons Comparison: Included - Timeout (minutes) 10 Points (optional)	li



• The assignment repo is created with two folders: .github/classroom and .github/workflows



Automated Grading using Workflows

• The classroom folder contains a JSON input file

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<> Code 💿 Issues 🏦 Pull requests 🕑 Act	ions 🖽 Projects 🛈 Security 🗠 Insights	
안 main ▾ ghc-demo-assignment-Pro 다	ofS-Student / .github / classroom / Q Go to	file
👮 github-classroom[bot] GitHub Classroom Autog	Irading	
Name	Last commit message	
I		

• JSON input file

github-classroom[bot] GitHub Classroom Autograding Code Blame 14 lines (14 loc) · 323 Bytes 1 { "tests": [2 3 { "name": "Simple test", 4 "setup": "java --version; javac --version; javac KitchenConverter.java", 5 "run": "java KitchenConverter", 6 "input": "5.5", 7 "output": "5.50 cups is 88.00 tablespoons", 8 "comparison": "included", 9 "timeout": 10, 10 "points": null 11 12 3 13 14 }

• The workflows folder contains a YAML workflow file

<> Code Issues Pull re	equests 🕑 Actions 🖽 Projects 😲 Security 🗠 Insights
ניין אין אין אין אין אין אין אין אין אין	-assignment-ProfS-Student / .github / workflows / Q Go to file
💂 github-classroom[bot] GitHub	Classroom Autograding Workflow 🗙
Name	Last commit message
Classroom.yml	GitHub Classroom Autograding Workflow

Code	Blame 20 lines (20 loc) · 979 Bytes
1	name: GitHub Actions Demo
2	run-name: \${{ github.actor }} is testing out GitHub Actions 🌮
3	on: [push]
4	jobs:
5	Explore-GitHub-Actions:
6	runs-on: ubuntu-latest
7	steps:
8	- run: echo "🎉 The job was automatically triggered by a \${{ github.event_name }} event."
9	- run: echo "🙆 This job is now running on a \${{ runner.os }} server hosted by GitHub!"
10	- run: echo "🔎 The name of your branch is \${{ github.ref }} and your repository is \${{ github.repository }}.
11	- name: Check out repository code
12	uses: actions/checkout@v3
13	- run: echo " 💡 The \${{ github.repository }} repository has been cloned to the runner."
14	- run: echo "😾 The workflow is now ready to test your code on the runner."
15	- name: List files in the repository
16	run:
17	ls \${{ github.workspace }}
18	- run: echo "🎃 This job's status is \${{ job.status }}."
19	- run: javac KitchenConverter.java
20	- run: java KitchenConverter 5

GHC Demo Assignment

८ Individual assignment • Active			https://classroom.git	Edit ▼
Accepted assignments 2 2 Students	Assignment submiss 0 Submitted	sions 2 2 Not submitted	Passed students 2 2/2 Passed	
Filters - Q Search for an assignment			8	Filter by passing • Sort •
Total students				
moneymatt7 Submitted @moneymatt7 Latest commit 16 hours ago v	 -O- 4 commits 			📮 Repository
ProfS-Student Submitted @ProfS-Student Latest commit 7 minutes ago	- ∽ - 4 commits			📮 Repository

• To see test details, click on the --- icon.

• Failed tests are marked with an X, which you can click on

• Successful tests are marked with a green checkmark, which you can also click on

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