

# GitHub Actions in 3 Hours

Revision 1.0 – 9/10/23

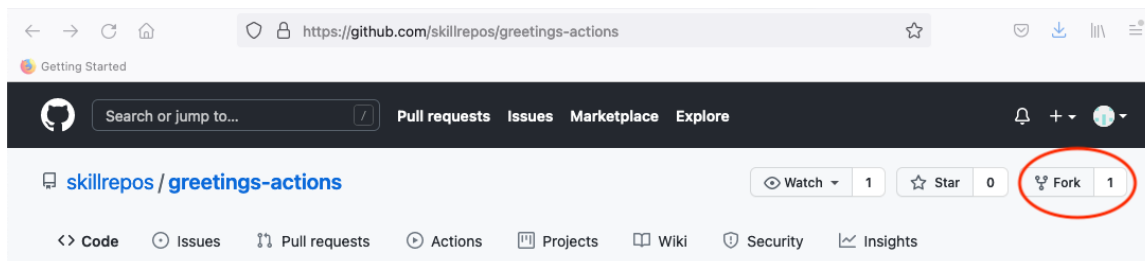
Tech Skills Transformations LLC / Brent Laster

*Important Prerequisite: You will need a GitHub account for this. (Free tier is fine.)*

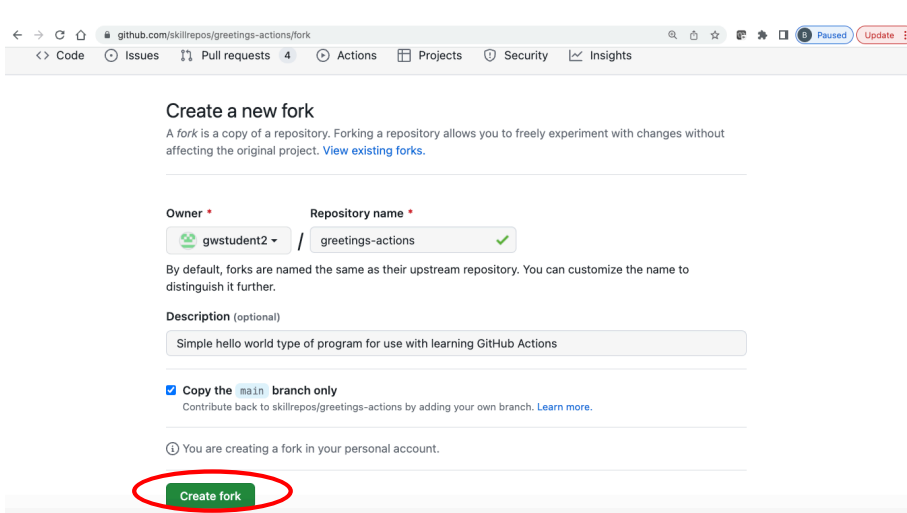
## Lab 1 – Creating a simple example

**Purpose:** In this lab, we'll get a quick start learning about CI with GitHub Actions by creating a simple project that uses them. We'll also see what a first run of a workflow with actions looks like.

1. Log in to GitHub with your GitHub id
2. Go to <https://github.com/skillrepos/greetings-actions> and fork that project into your own GitHub space. Click on the *Fork* button in the upper right. On the next screen, you can just accept the options and click on the green *Create fork* button.

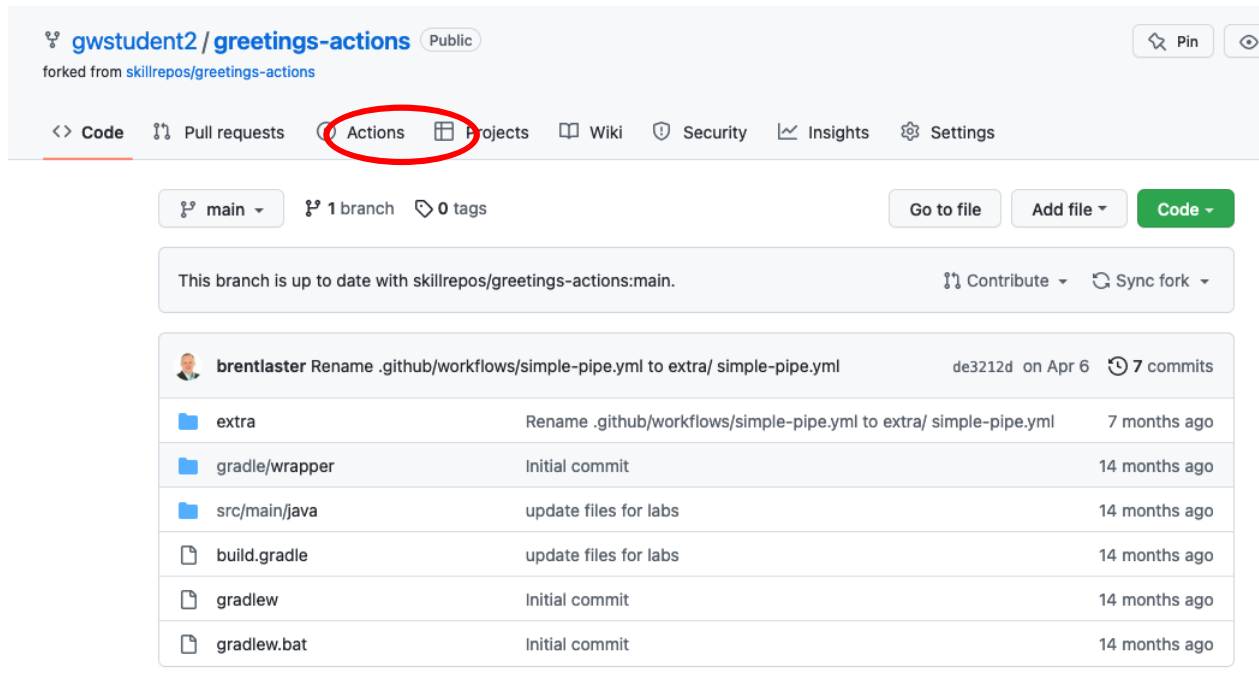


The screenshot shows the GitHub repository page for `skillrepos/greetings-actions`. The `Fork` button is circled in red. Below the repository name, there are tabs for `Code`, `Issues`, `Pull requests`, `Actions`, `Projects`, `Wiki`, `Security`, and `Insights`. The `Code` tab is selected. The repository has 1 watch, 0 stars, and 1 fork. The `About` section describes it as a "Simple hello world type of program for use with learning GitHub Actions". The `Releases` section shows "No releases published".

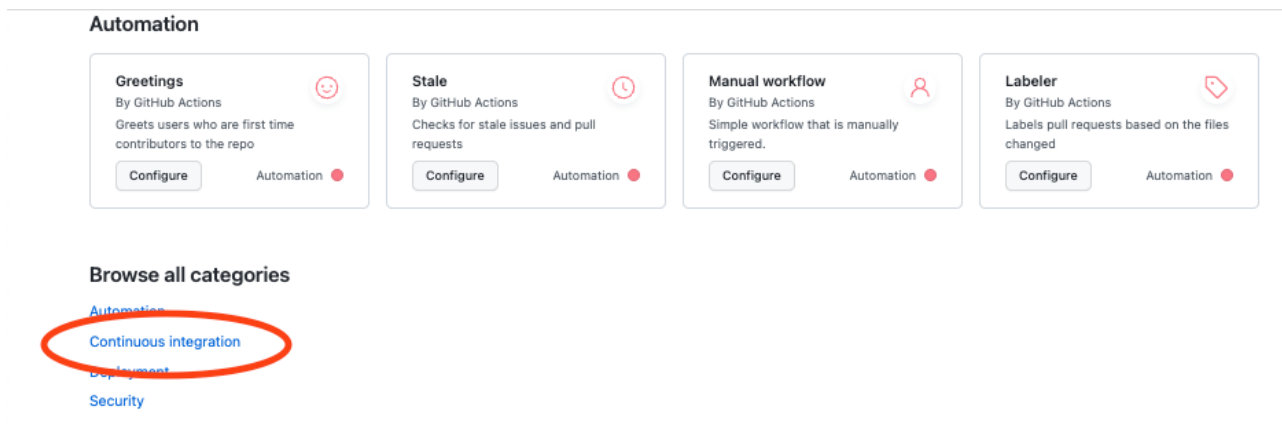


The screenshot shows the "Create a new fork" dialog. The `Owner` is `gwstudent2` and the `Repository name` is `greetings-actions`. The `Description` is "Simple hello world type of program for use with learning GitHub Actions". The `Copy the main branch only` checkbox is checked. The `Create fork` button is circled in red.

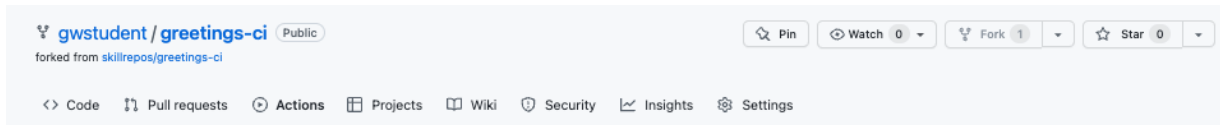
3. We have a simple java source file named *echoMsg.java* in the subdirectory *src/main/java*, a Gradle build file in the root directory named *build.gradle*, and some other supporting files. We could clone this repository and build it manually via running Gradle locally. But let's set this to build with an automatic CI process specified via a text file. Click on the **Actions** button in the top menu under the repository name.



4. This will bring up a page with categories of starter actions that GitHub thinks might work based on the contents of the repository. We'll select a specific CI one. Scroll down to near the bottom of the page under "Browse all categories" and select "Continuous integration".



5. In the CI category page, let's search for one that will work with Gradle. Type "Gradle" in the search box and press Enter.



## Get started with GitHub Actions

Build, test, and deploy your code. Make code reviews, branch management, and issue triaging work the way you want. Select a workflow to get started.

Skip this and [set up a workflow yourself](#) →

### Categories

Automation

Continuous integration

Deployment

Security

Q Gradle

Found 52 workflows

**Android CI**  
By GitHub Actions  
Build an Android project with Gradle.  
[Configure](#) Java

**Java with Ant**  
By GitHub Actions  
Build and test a Java project with Apache Ant.  
[Configure](#) Java

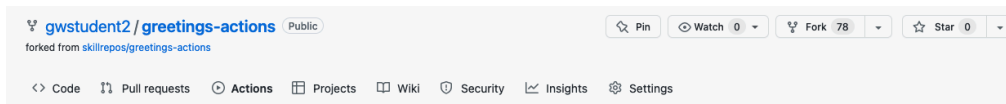
**Clojure**  
By GitHub Actions  
Build and test a Clojure project with Leiningen.  
[Configure](#) Clojure

**Publish Java Package**  
[Configure](#)

**Java with Gradle**  
[Configure](#)

**Publish Java Package**  
[Configure](#)

- From the results, select the “Java with Gradle” one and click the “Configure” button to open a predefined workflow for this.



## Get started with GitHub Actions

Build, test, and deploy your code. Make code reviews, branch management, and issue triaging work the way you want. Select a workflow to get started.

Skip this and [set up a workflow yourself](#) →

### Categories

Automation

Continuous integration

Deployment

Security

Pages

Q Gradle

Found 4 workflows

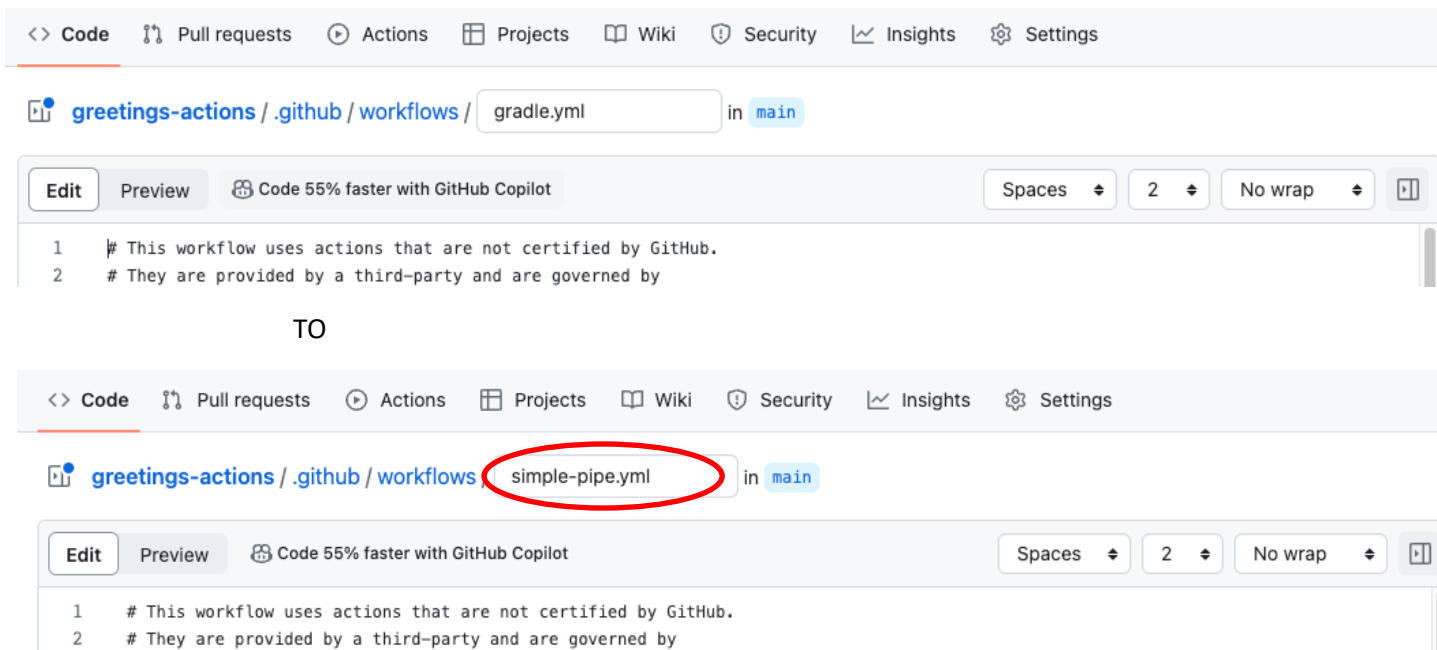
**Android CI**  
By GitHub Actions  
Build an Android project with Gradle.  
[Configure](#) Java

**SLSA Generic generator**  
By Open Source Security Foundation (OpenSSF)  
Generate SLSA3 provenance for your existing release workflows  
[Configure](#) Go

**Publish Java Package with Gradle**  
By GitHub Actions  
Build a Java Package using Gradle and publish to GitHub Packages.  
[Configure](#) Java

**Java with Gradle**  
By GitHub Actions  
Build and test a Java project using a Gradle wrapper script.  
[Configure](#) Java

- This will bring up a page with a starter workflow for CI that we can edit as needed. There are two edits we'll make - changing the name of the file and the name of the workflow. In the top section where the path is, notice that there is a text entry box around “gradle.yml”. This is the current name of the workflow. Click in that box and edit the name to be simple-pipe.yml. (You can just backspace over or delete the name and type the new name.)

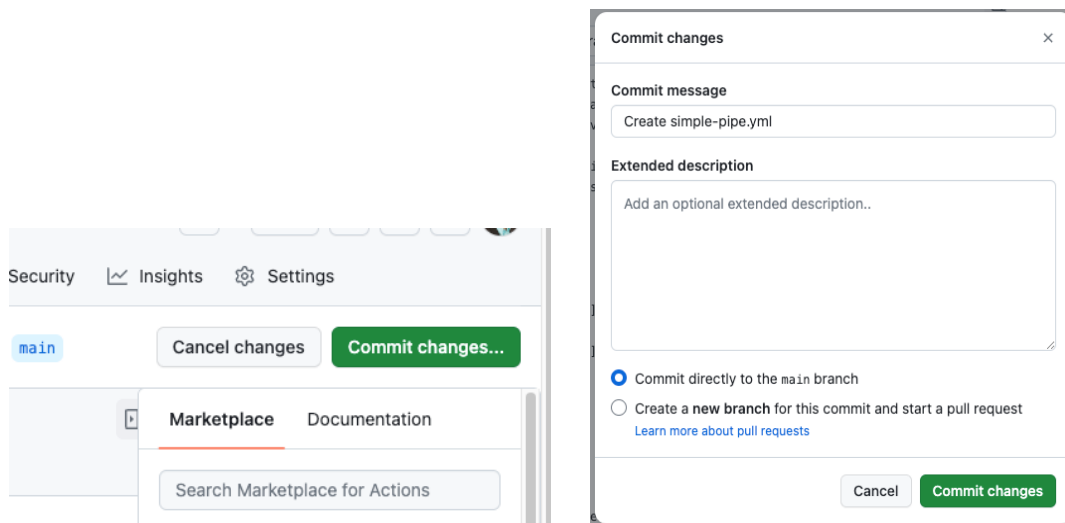


TO

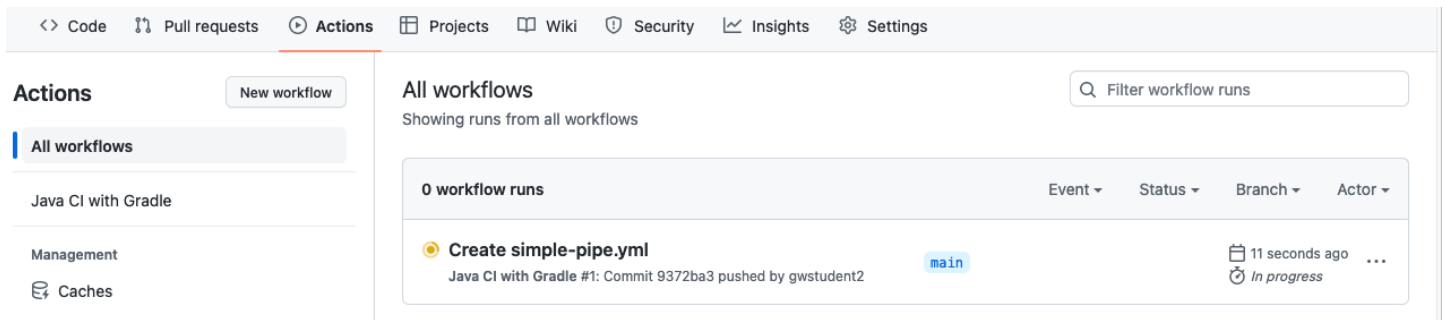
- Now, edit the name of the workflow - change line 8 from "name: Java CI with Gradle" to "name: Simple Pipe".

5	# This workflow will build a Java project	5	# This workflow will build a Java project
6	# For more information see: https://docs.	6	# For more information see: https://docs.
7		7	
8	name: Java CI with Gradle	8	name: Simple Pipe
9		9	
10	on:	10	on:
11	push:	11	push:

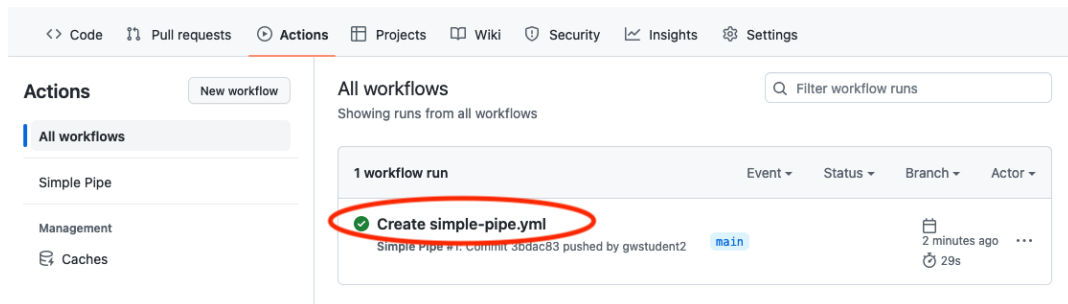
- Commit the new workflow via the "Commit changes..." button in the upper right. In the dialog that comes up, you can enter an optional comment if you want. Leave the "Commit directly..." selection checked and then click on the "Commit changes" button. (If you happen to get a 404 error, you can ignore it.)



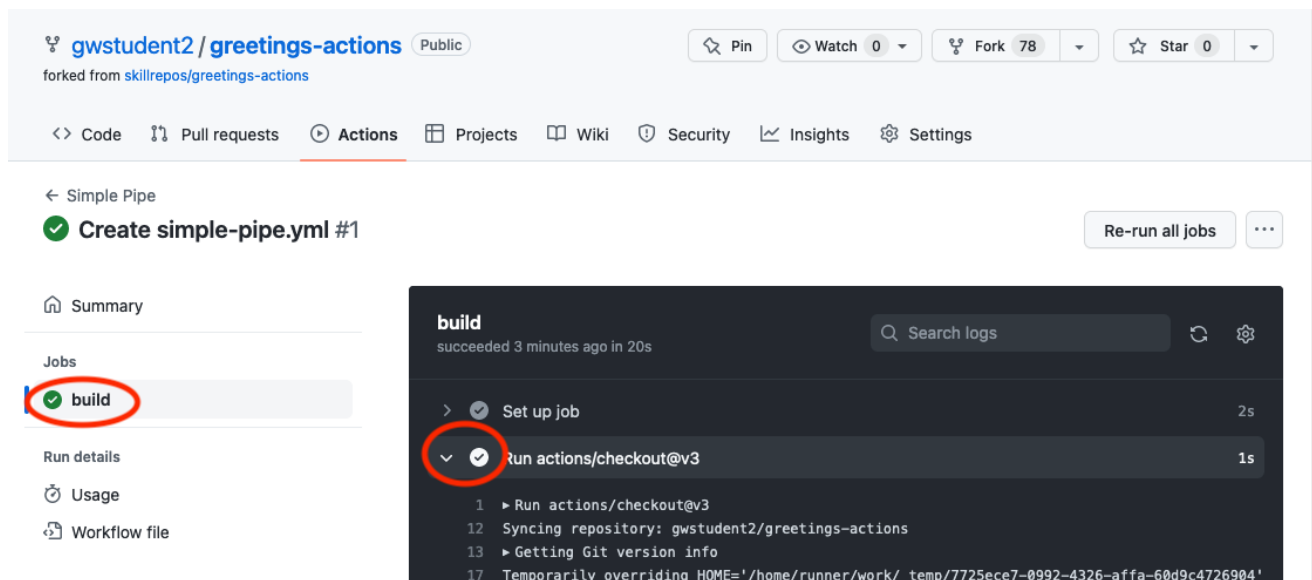
10. Since we've committed a new file and this workflow is now in place, the "on: push:" event is triggered and the CI automation kicks in. Click on the Actions menu again to see the automated processing happening.



11. After a few moments, the workflow should succeed. (You may need to refresh your browser.) After it is done, you can click on the commit message for the run to get to the details for that run.



12. From here, you can click on the build job in the graph or the "build" item in the list of jobs to get more details on what occurred on the runner system. You can expand any of the steps in the list to see more details.



## Lab 2 – Learning more about Actions

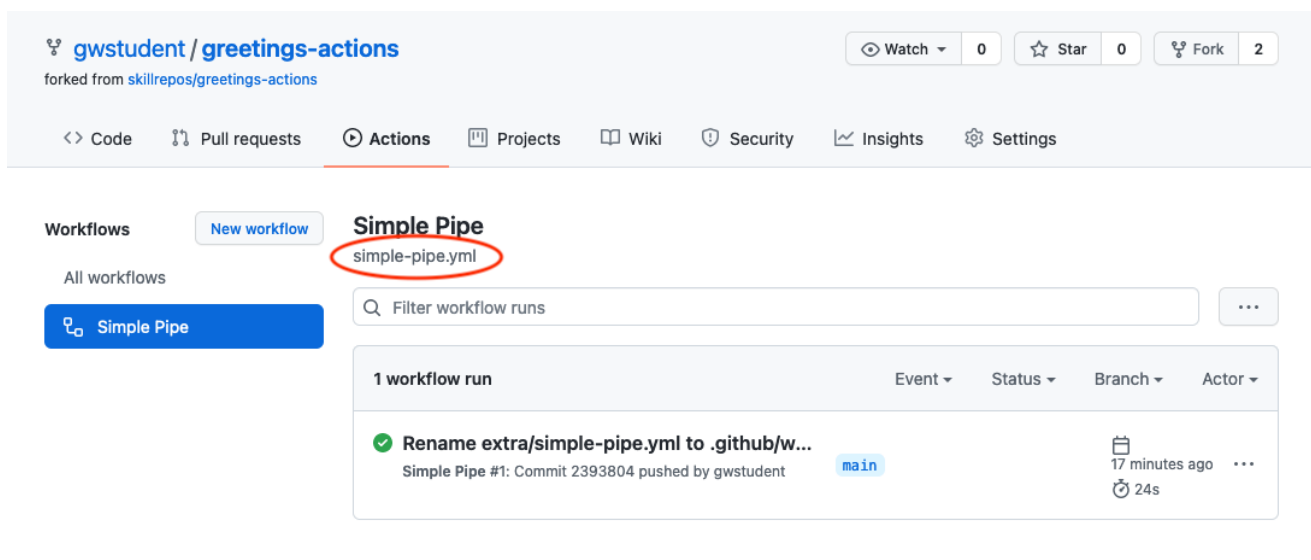
**Purpose:** In this lab, we'll see how to get more information about actions and how to update our workflow to use others.

1. We're going to explore one way in GitHub to update a workflow and add additional actions into it. Start out by opening up the workflow file `simple-pipe.yml`. There are multiple ways to get to it but let's open it via the Actions screen.

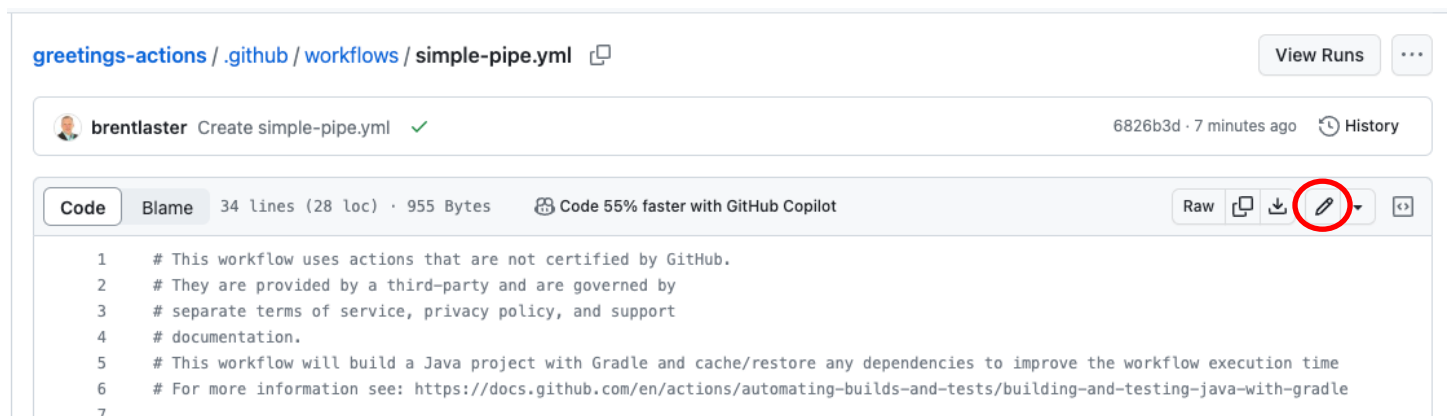
In your GitHub repository, click the Actions button at the top if not already on the Actions screen.

Under "All workflows", select the "Simple Pipe" workflow.

After that, select the "`simple-pipe.yml`" link near the middle top.



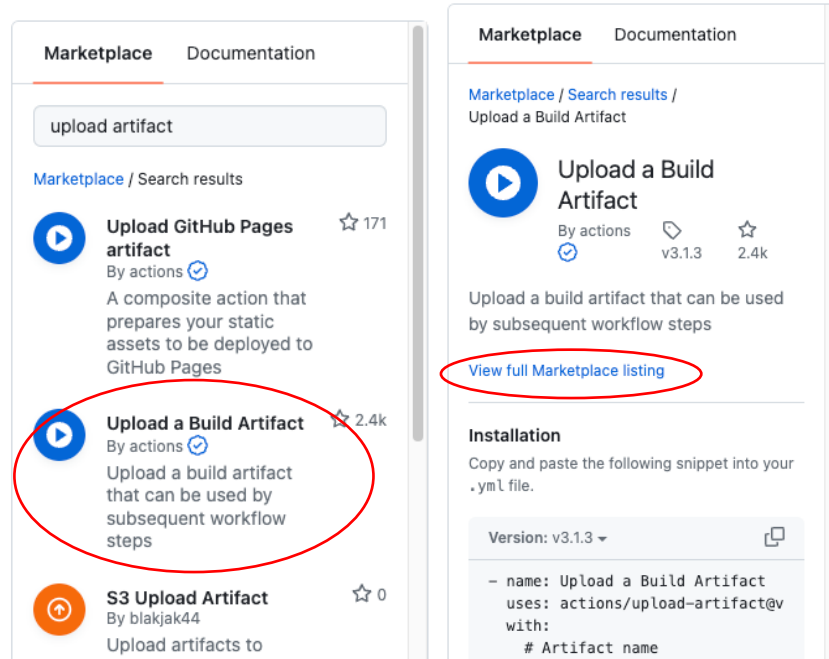
2. Once the file opens up, click on the pencil icon in the top right to edit it.



3. You'll now see the file open up in the editor, but also to the right, you should see a new pane with references to GitHub Actions. We're going to add a job to our workflow to upload an artifact. Let's find actions related to uploading.

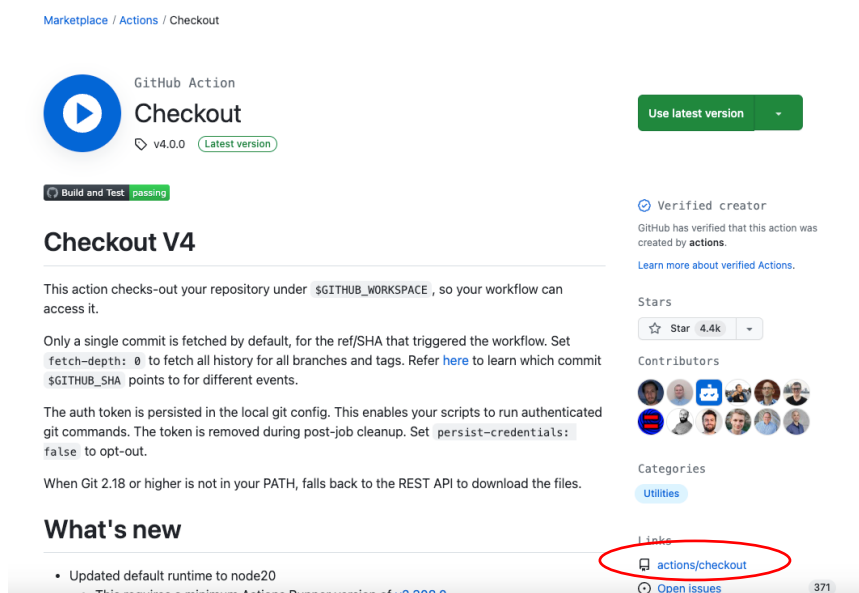
In the "Search Marketplace for Actions" box on the upper right, enter "upload artifact" and see what's returned.

Next, click on the "Upload a Build Artifact" item. Take a look at the page that comes up from that. Let's look at the full listing on the Actions Marketplace. Click on the "View full Marketplace listing".

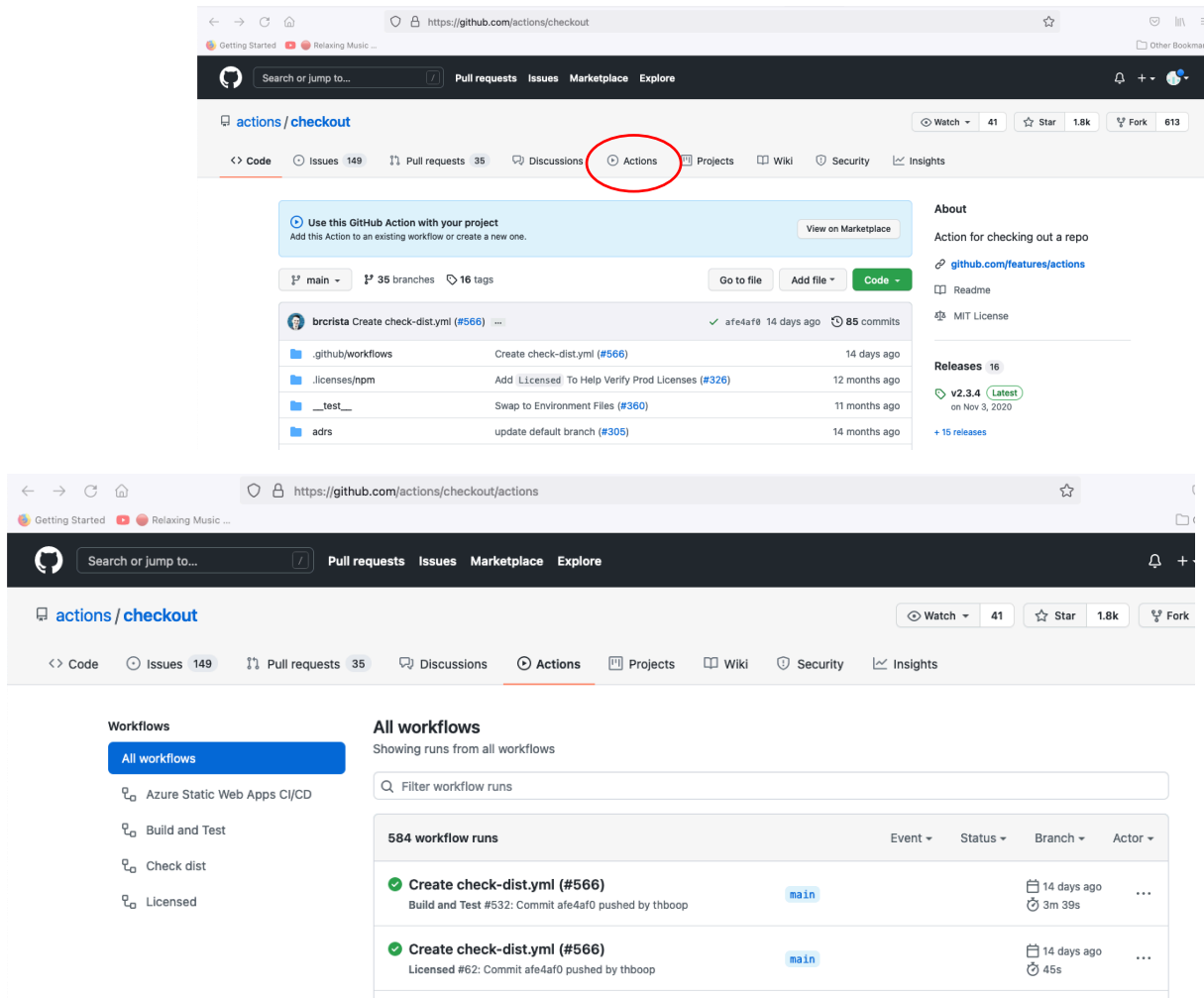


- This should open up the full GitHub Actions Marketplace listing for this action. Notice the URL at the top - <https://github.com/marketplace/actions/upload-a-build-artifact>. You can use this same relative URL to see other actions that are in the marketplace. For example, let's look at the checkout one we're already using. Go to <https://github.com/marketplace/actions/checkout>

Then click on the "actions/checkout" link under "Links" in the lower right.



5. This will put you on the screen for the source code for this GitHub Action. Notice there is also an Actions button here. GitHub Actions use workflows that can use other GitHub Actions. Click on the Actions button to see the workflows that are in use/available.



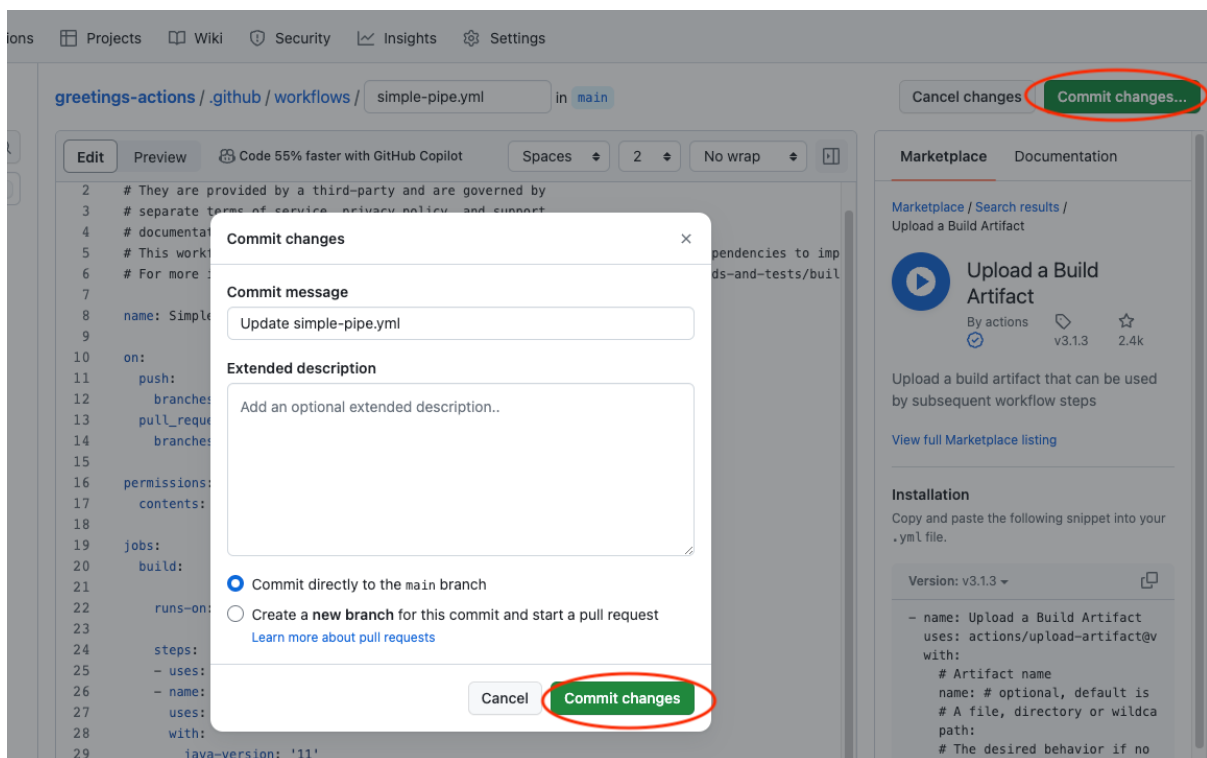
6. Switch back to the browser tab where you are editing the workflow for greetings-actions. Update the build job to include a new step to use the "upload-artifact" action to upload the jar the build job creates. To do this, add the following lines in line with the build job steps. **Pay attention to the indenting.** See the screenshot (lines 36-40) for how this should look afterwards. (Your line numbers may be different.)

```
- name: Upload Artifact
  uses: actions/upload-artifact@v3
  with:
    name: greetings-jar
    path: build/libs
```

```
<> Edit file    Preview changes

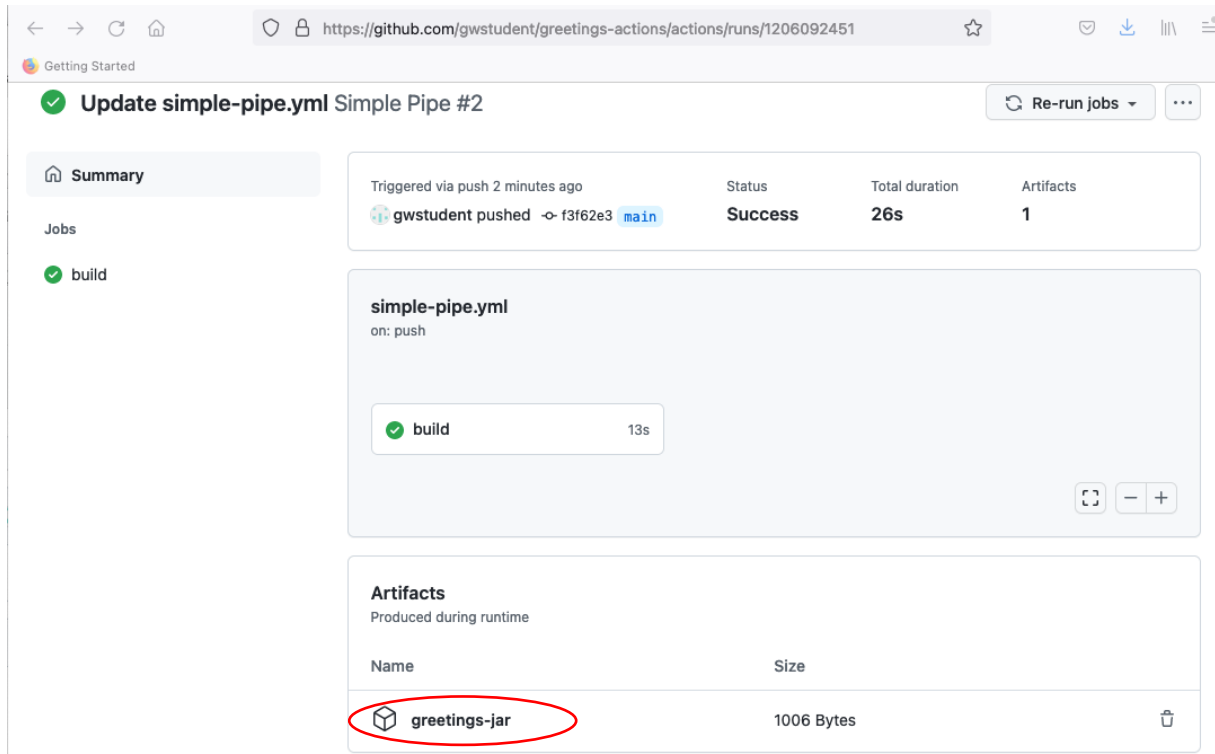
10 permissions:
17   contents: read
18
19 jobs:
20   build:
21
22     runs-on: ubuntu-latest
23
24     steps:
25     - uses: actions/checkout@v3
26     - name: Set up JDK 11
27       uses: actions/setup-java@v3
28       with:
29         java-version: '11'
30         distribution: 'temurin'
31     - name: Build with Gradle
32       uses: gradle/gradle-build-action@67421db6b
33       with:
34         arguments: build
35
36     - name: Upload Artifact
37       uses: actions/upload-artifact@v3
38       with:
39         name: greetings-jar
40         path: build/libs
41
```

- Click on the green "Commit changes..." button in the upper right. In the dialog that comes up, add a different commit message if you want, then click the green "Commit changes" button to make the commit.



- Switch to the "Actions" tab in your repository to see the workflow run. After a few moments, you should see that the run was successful. Click on the title of that run "Update simple-pipe.yml" (or whatever your commit message was). On the next screen, in addition to the graph, there will be a

new section called "Artifacts" near the bottom. You can download the artifact from there. Click on the name of the artifact to try this.



- Now let's add a new job to our workflow (in simple-pipe.yml) to download this artifact and execute the jar file. The code is straightforward because there's already a "download\_artifact" action for us to use. And we can just use a shell run command to execute "java -jar" on this. Add the code below into your workflow, indenting test-run to line up with the "build" job entry above it. See also the screenshot further down. (For convenience, this code is also in "extra/test-run.txt".) Again, pay attention to indentation.

**test-run:**

```
runs-on: ubuntu-latest
needs: build
```

**steps:**

- name: Download candidate artifacts  
uses: actions/download-artifact@v2  
with:  
  name: greetings-jar
- shell: bash  
  run: |  
    java -jar greetings-actions.jar \${github.event.inputs.myValues }

greetings-actions / .github / workflows / simple-pipe.yml in main

```
<> Edit file  Preview changes  Spaces 2 No wrap
26     run: ./gradlew build
27     - name: Upload Artifact
28       uses: actions/upload-artifact@v2
29       with:
30         name: greetings-jar
31         path: build/libs
32
33     test-run:
34
35     runs-on: ubuntu-latest
36     needs: build
37
38     steps:
39     - name: Download candidate artifacts
40       uses: actions/download-artifact@v2
41       with:
42         name: greetings-jar
43     - shell: bash
44       run: |
45         java -jar greetings-actions.jar ${ github.event.inputs.myValues }
```

10. Click on the green "Commit changes..." button as before, commit the change, and then switch over the "Actions" tab. Click on the latest entry. You should see in the workflow graph two jobs now. (Note there is also a button to cancel the workflows.). Eventually, both should succeed.

<> Code Pull requests Actions Projects Wiki Security Insights Settings

Update simple-pipe.yml Simple Pipe #3 Cancel workflow ...

Summary

Jobs

- build

Triggered via push 17 seconds ago	Status	Total duration	Artifacts
gwestudent pushed 4c12b4e main	In progress	-	-

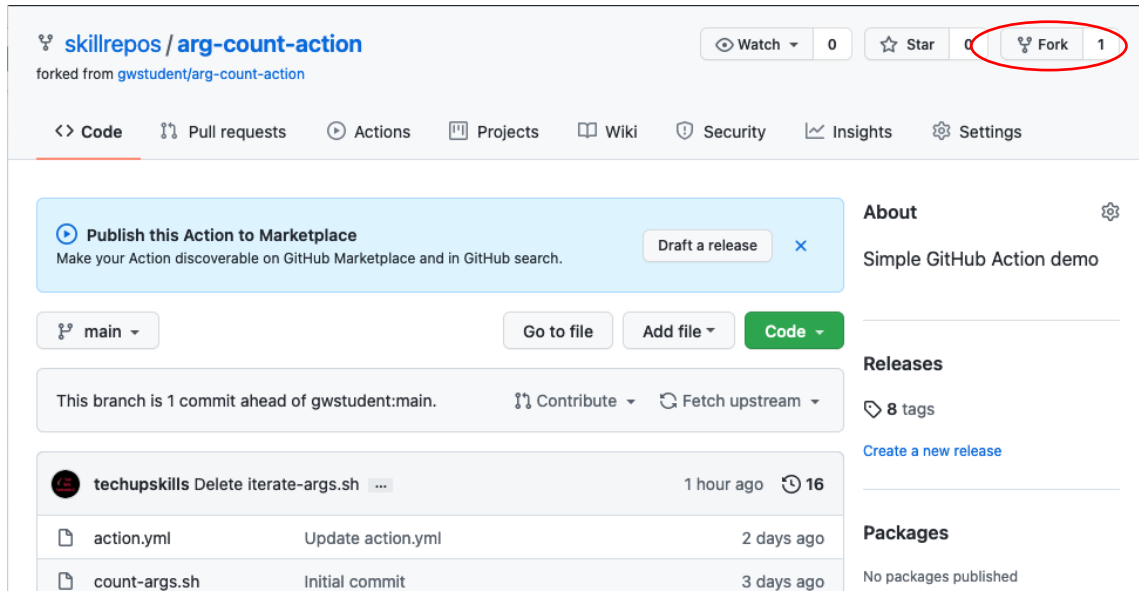
simple-pipe.yml  
on: push

build 7s test-run

## Lab 3: Adding your own action

**Purpose:** in this lab, we'll see how to create and use a custom GitHub Action.

1. First, we'll fork the repo for a simple action that displays a count of the arguments passed into a function. Go to <https://github.com/skillrepos/arg-count-action> and then Fork that repository into your own GitHub space. Again, you can just accept the defaults and click on the "Create fork" button.



2. In your fork of the repository, look at the files here. We have a one-line shell script (for illustration) to return the count of the arguments - "count-args.sh." And we have the primary logic for the action in the "action.yml" file.

Take a look at the action.yml file and see if you can understand what its doing. The syntax is mostly what we've seen in our workflow up to this point.

3. Switch back to the file for your original workflow (go back to the *greetings-actions* project and edit the *simple-pipe.yml* file). Let's add the code to use this custom action to report the number of arguments passed in. Edit the file and add the code shown below (again indenting the first line 2 spaces to align with the other job names). (For convenience, this code is also in "greetings-actions/extra/count-args.txt".) **For now, just leave the text exactly as is so we can see what errors look like.**

**count-args:**

**runs-on: ubuntu-latest**

**steps:**

**- id: report-count**

```

uses: <your github userid>/arg-count-action@main
with:
  arguments-to-count: ${{ github.event.inputs.myValues }}
- run: echo
- shell: bash
run: |
  echo argument count is ${{ steps.report-count.outputs.arg-count }}

```

greetings-actions / .github / workflows / simple-pipe.yml in main

```

42     name: greetings-jar
43     - shell: bash
44     run: |
45       java -jar greetings-actions.jar ${{ github.event.inputs.myValues }}
46
47
48     count-args:
49
50     runs-on: ubuntu-latest
51
52     steps:
53     - id: report-count
54       uses: <your github userid>/arg-count-action@main
55       with:
56         arguments-to-count: ${{ github.event.inputs.myValues }}
57       - run: echo
58       - shell: bash
59       run: |
60         echo argument count is ${{ steps.report-count.outputs.arg-count }}
61

```

In this case, we call our custom action (<your github repo/arg-count-action>), using the latest from the main branch.

- Let's use a pull request to merge this change. Click on the green "Commit changes..." button, but in the "Commit changes" dialog, click on the bottom option to "Create a new branch for this commit and start a pull request." Change the proposed branch name if you want and then click on "Propose changes".

Commit changes

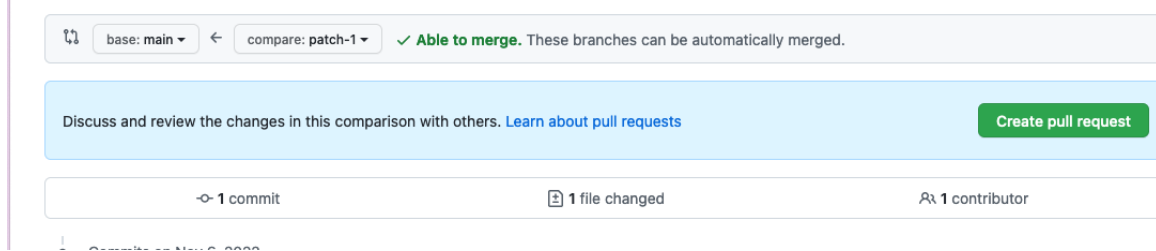
Update simple-pipe.yml

Add an optional extended description...

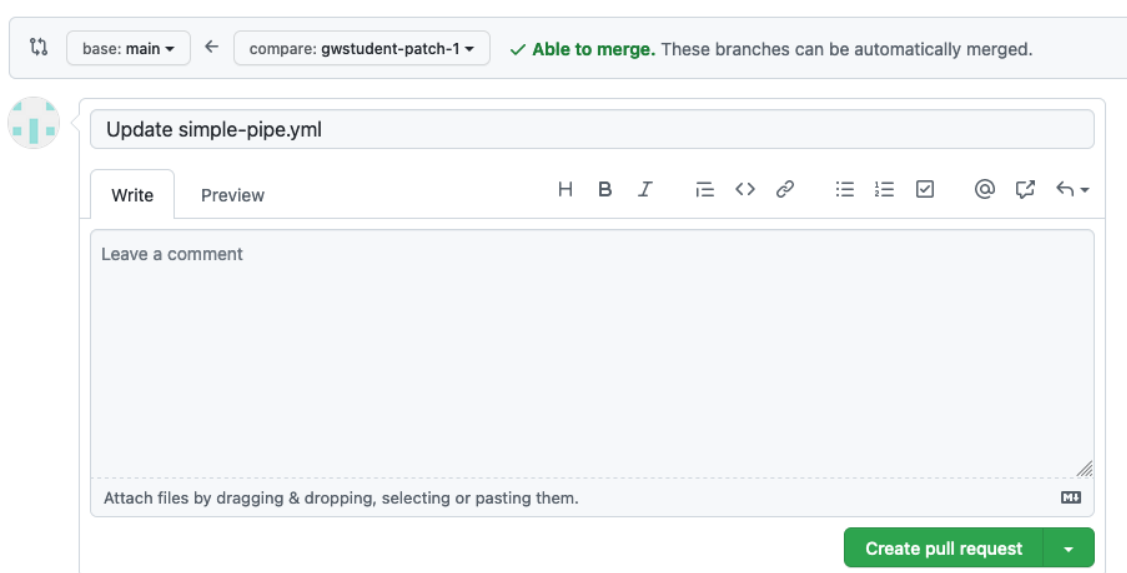
☐ Commit directly to the main branch.
 ☒ Create a new branch for this commit and start a pull request. [Learn more about pull requests.](#)

Propose changes

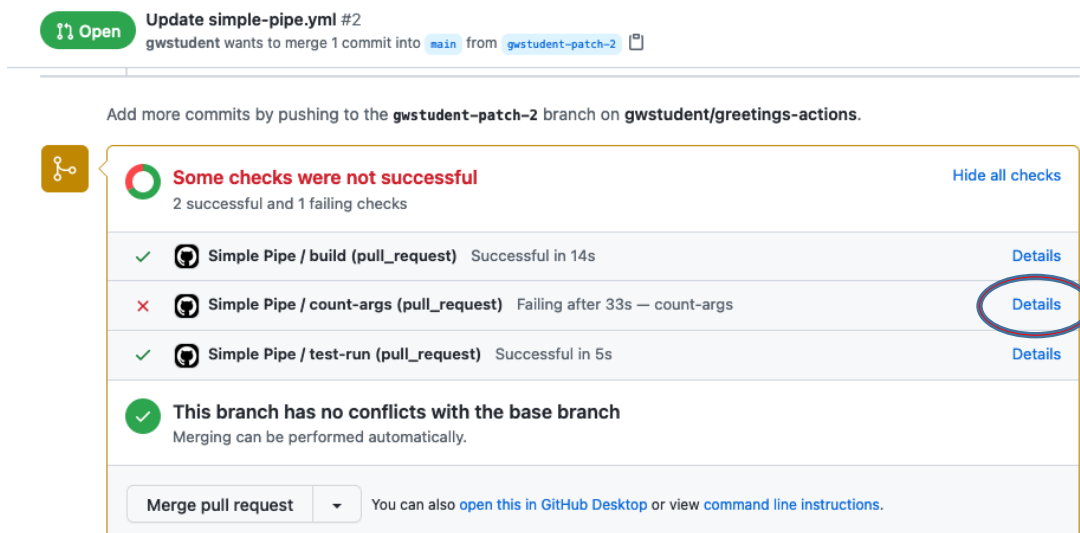
5. In the next screen, click on the "Create pull request" button. In the following screen, update the comment if you want and then click on the "Create pull request" button. You'll then see it run through the jobs in our workflow as prechecks for merging.



The change you just made was written to a new branch named `gwstudent-patch-1`. Create a pull request below to propose these changes.



6. Click on the link for "Details" on the right of the line with the failure to see the logs that are available. You can then see the error at the bottom of the log.



Code Pull requests 1 Actions Projects Wiki Security Insights Settings

## Update simple-pipe.yml Simple Pipe #4

Summary

Jobs

- build
- count-args
- test-run

**count-args**

failed 6 minutes ago in 0s

Set up job

```

1 Current runner version: '2.285.0'
2 ▶ Operating System
6 ▶ Virtual Environment
11 ▶ Virtual Environment Provisioner
13 ▶ GITHUB_TOKEN Permissions
27 Secret source: Actions
28 Prepare workflow directory
29 Prepare all required actions
30 Getting action download info
31 Error: Unable to resolve action `<your github userid>/arg-count-action@main`, repository not found

```

7. In the left column, click on the "Summary" link. This will take you back to the main graph page where you can also see the error.

Update simple-pipe.yml Simple Pipe #5

Re-run jobs

Summary

Jobs

- build
- count-args
- test-run

Triggered via pull request 14 minutes ago

Status: **Failure**

Total duration: **45s**

Artifacts: **1**

gwstudent opened #2 gwstudent-patch-2

**simple-pipe.yml**

on: pull\_request

```

graph LR
    build[build 14s] --> test-run[test-run 5s]
    count-args[count-args 33s]

```

**Annotations**

1 error

**count-args**

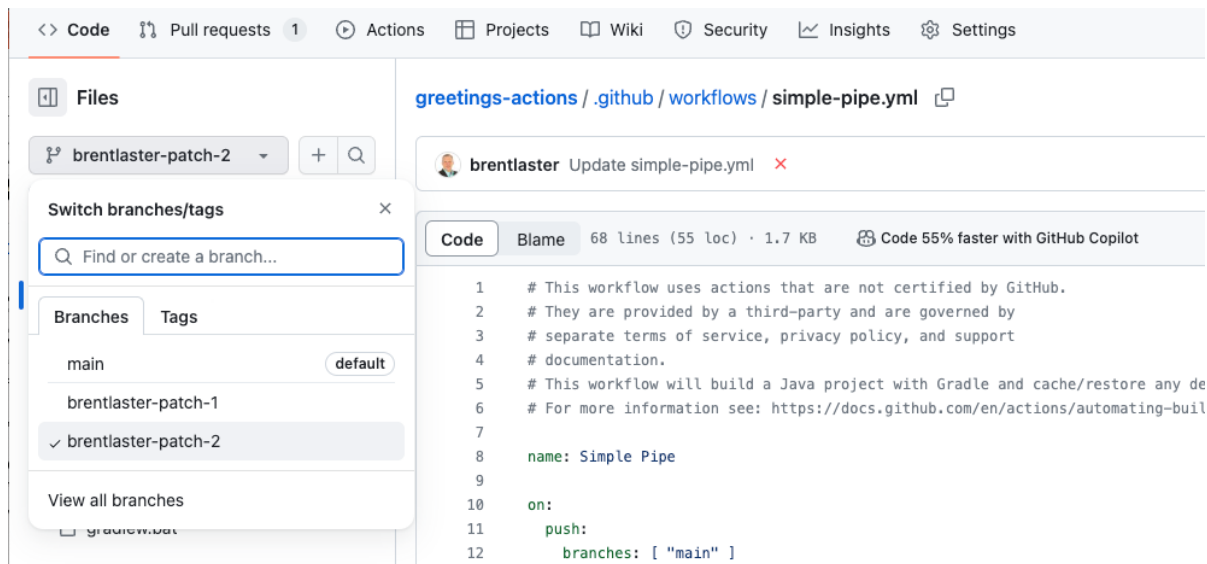
Unable to resolve action `<your github userid>/arg-count-action@main`, repository not found

**Artifacts**

Produced during runtime

Name	Size
greetings-jar	1006 Bytes

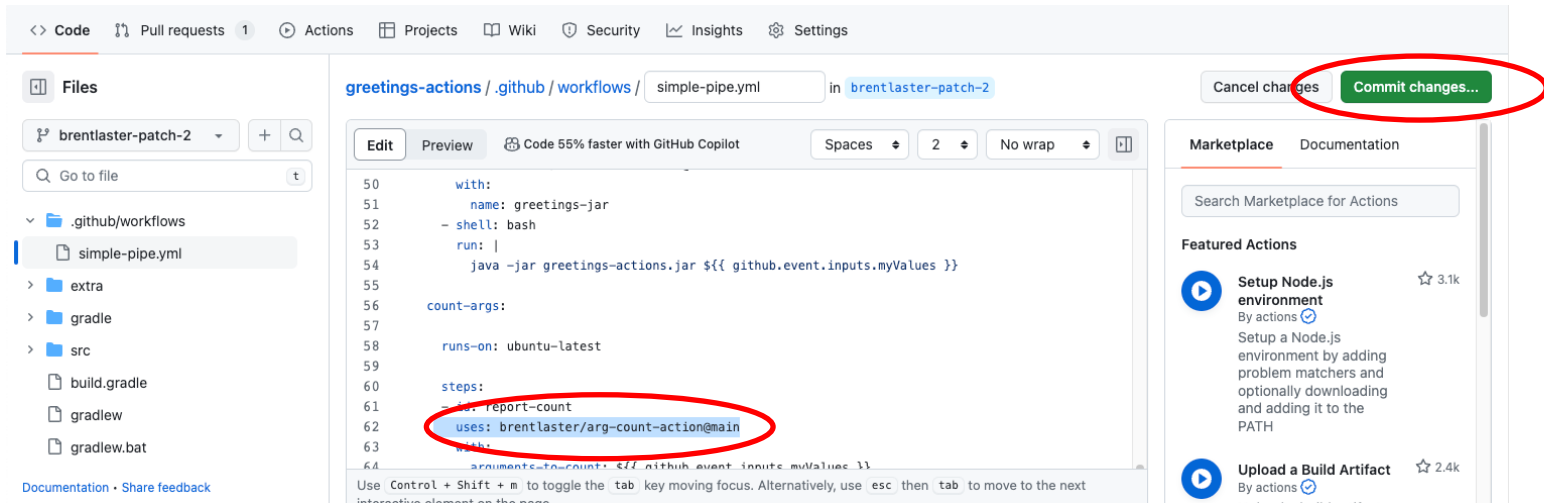
8. So, before we can merge the PR, we need to fix the code. Go back to the "Actions" tab at the top, select the "Simple Pipe" workflow on the left, and then select the **simple-pipe.yml** file (if not already there) and **switch to the patch branch that you created for the pull request**. (Alternatively, you can select the file via the Code tab.)



9. Edit the simple-pipe.yml file (use the pencil icon). Then update the line that has "uses : <your github userid>/arg-count-action@main" to actually have your GitHub userid in it.


```
47 count-args:
48
49   runs-on: ubuntu-latest
50
51   steps:
52   - id: report-count
53     uses: gwstudent/arg-count-action@main
54     with:
55       arguments-to-count: ${ github.event.inputs.myValues }
56   - run: echo
57   - shell: bash
58     run: |
59       echo argument count is ${ steps.report-count.outputs.arg-count }
60
```


10. When you're done, click on the green "Commit changes..." button, add in a comment if you want, leave the selection set to "Commit directory to the ... branch" so it will go in to the same patch branch as before. Then select "Commit changes".




- Now click on the "Pull requests" link at the top of the page and select the Pull Request again. Eventually all the checks should complete. You can now choose to "Merge pull request", confirm the merge and delete the branch.

Add more commits by pushing to the **gwstudent-patch-2** branch on **gwstudent/greetings-actions**.



**All checks have passed**

3 successful checks

**This branch has no conflicts with the base branch**

Merging can be performed automatically.

Merge pull request


You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

Merge pull request #2 from gwstudent/gwstudent-patch-2

Update simple-pipe.yml

Confirm merge

Cancel

**Pull request successfully merged and closed**

You're all set—the **gwstudent-patch-2** branch can be safely deleted.

Delete branch

Afterwards, you should see that a new run of the workflows in main has been kicked off and will eventually complete.

Workflows

New workflow

All workflows

Simple Pipe

All workflows

Showing runs from all workflows

7 workflow runs

Event ▾ Status ▾ Branch ▾ Actor ▾

✓

Merge pull request #2 from gwstudent/gwstudent-...

main

43 seconds ago

40s

...

Simple Pipe #7: Commit 274fa3a pushed by gwstudent

## Lab 4: Exploring logs

**Purpose:** In this lab, we'll take a closer look at the different options for getting information from logs.

- If not already there, switch back to the Actions tab. To the right of the list of workflows is a search box. Let's execute a simple search - note that only certain keywords are provided and not a complete log search. Let's search for the workflow runs that were done for the branch that you used for the Pull Request in the last lab. Enter "**branch:<patch-branch-name>**" (no spaces) in the search box and hit enter.

<> Code

Pull requests

Actions

Projects

Wiki

Security

Insights

Settings

Actions

New workflow

All workflows

Simple Pipe

Management

Caches

All workflows

Showing runs from all workflows

2 workflow run results

Event ▾ Status ▾ Branch ▾ Actor ▾

✓

Update simple-pipe.yml

patch-1

3 minutes ago

35s

...

Simple Pipe #6: Pull request #1 synchronize by gwstudent2

✗

Update simple-pipe.yml

patch-1

16 minutes ago

43s

...

Simple Pipe #5: Pull request #1 opened by gwstudent2

- Click on the "X" at the right end of the box to clear the entry. You can also accomplish the same thing by clicking on the items in the "workflow run results" bar. Clicking on one of the arrows next to them will bring up a list of values to select from that will also filter the list. Try clicking on some of them. Click on the "X" again when done.

All workflows

Showing runs from all workflows

7 workflow runs

Event ▾ Status ▾ Branch ▾ Actor ▾

✓

Merge pull request #2 from gwstudent/gwstudent-...

main

s ago

...

Simple Pipe #7: Commit 274fa3a pushed by gwstudent

✓

Update simple-pipe.yml

gwstud

s ago

...

Simple Pipe #6: Pull request #2 synchronize by gwstudent

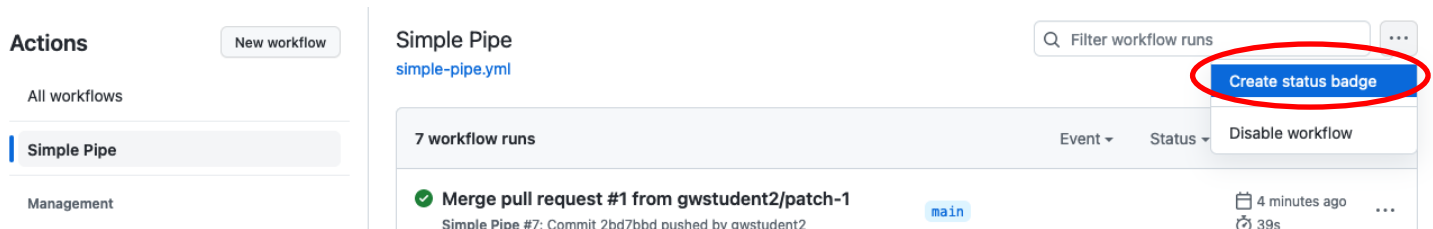
Filter by branch

Find a branch

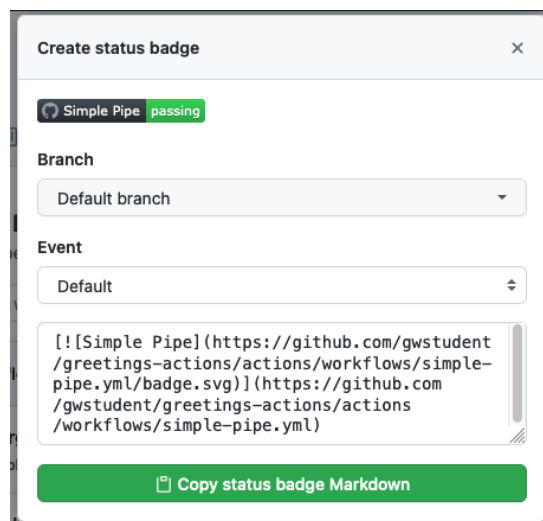
gwstudent-patch-1

gwstudent-patch-2

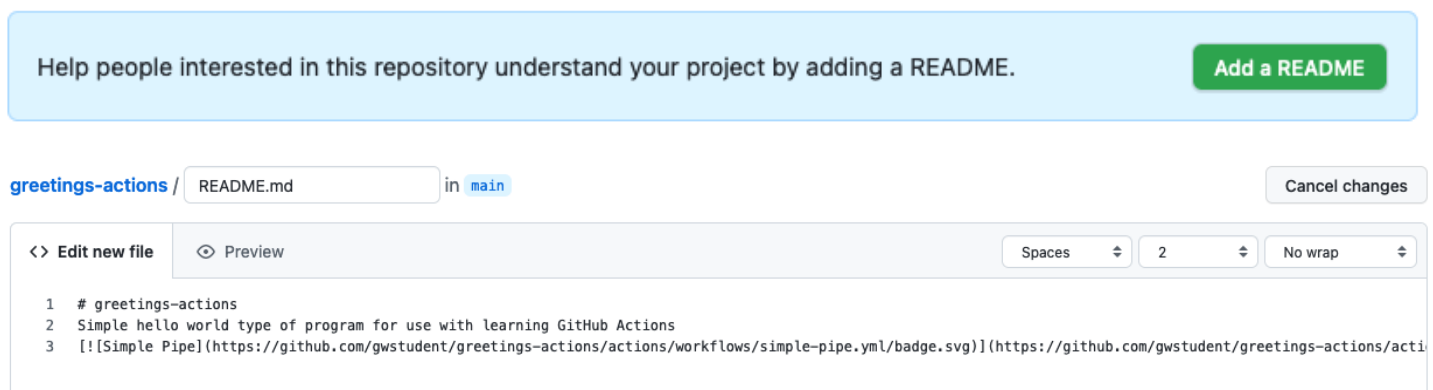
3. Select the "Simple Pipe" workflow. You'll now have a box with "..." beside the search box that has some additional options. Click on the "..." beside the search box to see some of them. They include disabling the workflow and setting up a "badge" for the workflow. Let's go ahead and set up a badge now to show success/failure for running the workflow. Click on the entry for "Create status badge".



4. In the dialog that pops up, click on the entry for "Copy status badge Markdown". Then close the dialog.



5. Click on the "<> Code" tab at the top left of the project. At the bottom of the file list, click on the green button to "Add a README" (or edit the README if you already have one). Paste the code you copied in the previous step into the README.md text edit window.



6. Commit your changes. Then you should see the badge showing up as part of the README.md content.

main greetings-actions / README.md

gwstudent2 Create README.md ✓ Latest commit 8c7f16b 1 minute ago History

1 contributor

3 lines (3 sloc) | 285 Bytes

< > Raw Blame

## greetings-actions

Simple hello world type of program for use with learning GitHub Actions **Simple Pipe** passing

7. Click back on the Actions tab. Click on the name of the top run in the Workflow runs list. Notice that we have information in the large bar at the top about who initiated the change, the SHA1, the status, duration, and number of artifacts.

Code Pull requests Actions Projects Wiki Security Insights Settings

Simple Pipe

✓ Create README.md #8 Re-run all jobs

Summary

Jobs

- build

Triggered via push 3 minutes ago	Status	Total duration	Artifacts
gwstudent2 pushed 8c7f16b main	Success	48s	1

8. In the main part of the window, we have the job graph, showing the status and relationships between jobs. **Click on the "test-run" job.** In the screen that pops up, we can get more information about what happened.

simple-pipe.yml

on: push

build 29s test-run 3s

count-args 2s

First, let's turn on timestamps. **Click on the "gear" icon and select the "Show timestamps" entry.**

In the list of steps click on the third item "Run java..." to expand it. Then, in line 1 of that part, click on the arrowhead after the timestamp to expand the list and see all the steps executed in between.

The screenshot shows the GitHub Actions interface for a workflow named "Create README.md Simple Pipe #8". The "test-run" step is selected in the left sidebar. The main panel shows the expanded "Run java -jar greetings-actions.jar" step. The logs show the following commands and output:

```
1 Mon, 06 Sep 2021 17:06:05 GMT Run java -jar greetings-actions.jar
2 Mon, 06 Sep 2021 17:06:05 GMT java -jar greetings-actions.jar
3 Mon, 06 Sep 2021 17:06:05 GMT shell: /usr/bin/bash --noprofile --norc -e -o pipefail {0}
4 Mon, 06 Sep 2021 17:06:06 GMT Greetings!
5 Mon, 06 Sep 2021 17:06:06 GMT No arguments were passed in.
```

9. We can get links to share to any line. Hover over any of the line numbers and then right-click to Copy Link, Open in a New Tab, or whatever you would like to do.

10. Click on the gear icon again. Notice there is an option to "Download log archive" if we want to get a copy of the logs locally. Or we can get a full view of the raw logs by clicking on the last entry.

Click on "View raw logs". When you are done looking at them, switch back to the workflow screen.

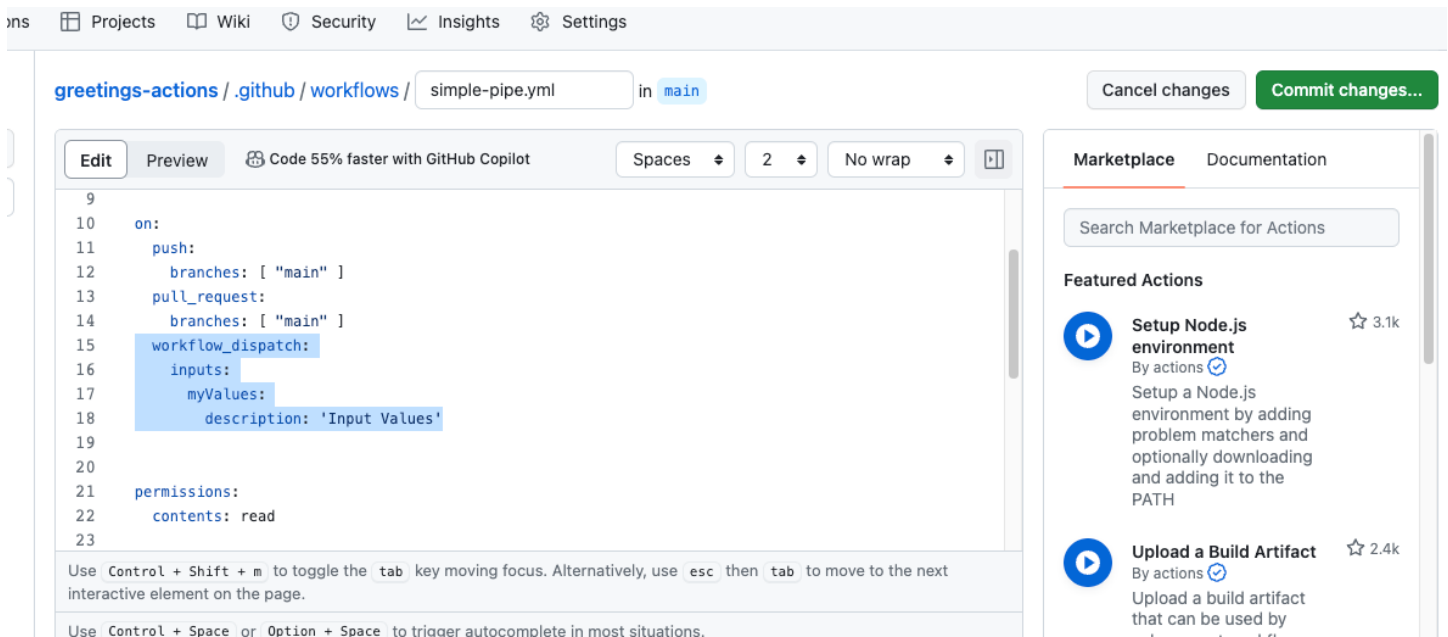
The screenshot shows the raw logs for the "Run java -jar greetings-actions.jar" step. The logs are displayed in a monospace font and include the following information:

```
2021-09-04T18:24:07.7246019Z Found online and idle hosted runner in the current repository's organization account that matches the required labels: 'ubuntu-latest'
2021-09-04T18:24:07.7843970Z Waiting for a Hosted runner in the 'organization' to pick this job...
2021-09-04T18:24:08.0283205Z Job is waiting for a hosted runner to come online.
2021-09-04T18:24:10.7866800Z Job is about to start running on the hosted runner: Hosted Agent (hosted)
2021-09-04T18:24:12.5682931Z Current runner version: '2.280.3'
2021-09-04T18:24:12.5709160Z ##[group]Operating System
2021-09-04T18:24:12.5710048Z Ubuntu
2021-09-04T18:24:12.5710438Z 20.04.3
2021-09-04T18:24:12.5710860Z LTS
2021-09-04T18:24:12.5711302Z ##[endgroup]
2021-09-04T18:24:12.5712059Z ##[group]Virtual Environment
2021-09-04T18:24:12.5712713Z Environment: ubuntu-20.04
2021-09-04T18:24:12.5713332Z Version: 20210831.9
2021-09-04T18:24:12.5714366Z Included Software: https://github.com/actions/virtual-environments/blob/ubuntu20/20210831.9/images/linux/Ubuntu2004-README.md
2021-09-04T18:24:12.5715874Z Image Release: https://github.com/actions/virtual-environments/releases/tag/ubuntu20%2F20210831.9
2021-09-04T18:24:12.5716827Z ##[endgroup]
2021-09-04T18:24:12.5717449Z ##[group]Virtual Environment Provisioner
2021-09-04T18:24:12.5718158Z 1.0.0-master-20210816-1
2021-09-04T18:24:12.5718690Z ##[endgroup]
2021-09-04T18:24:12.5720787Z ##[group]GITHUB_TOKEN Permissions
2021-09-04T18:24:12.5722135Z Actions: write
2021-09-04T18:24:12.5722726Z Checks: write
2021-09-04T18:24:12.5723289Z Contents: write
2021-09-04T18:24:12.5723909Z Deployments: write
```

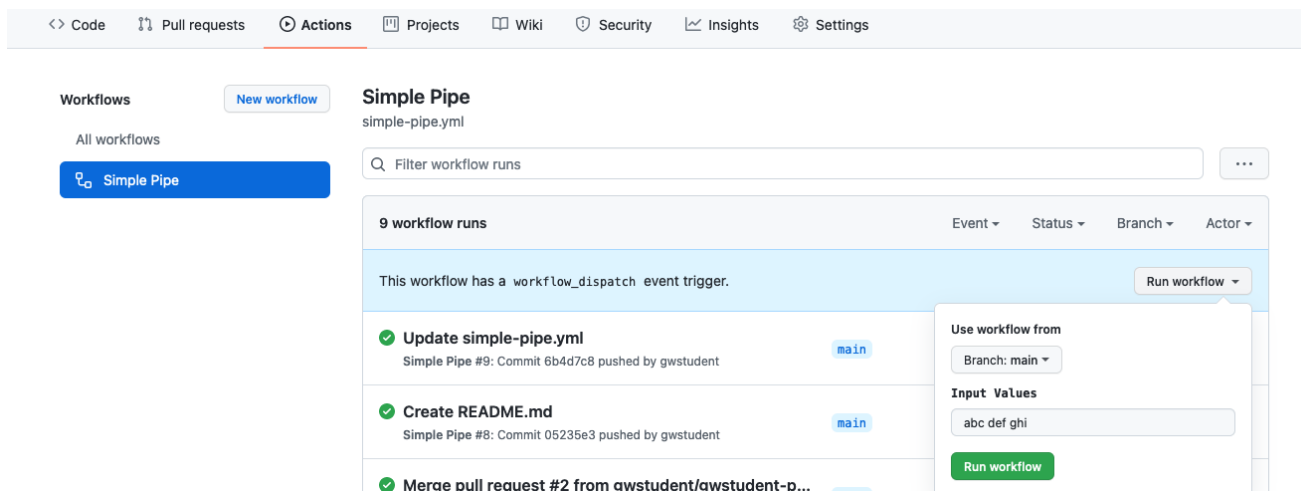
12. Let's make one more change to make it easier to run our workflow manually to try things out, start runs, etc. Edit the simple-pipe.yaml file as before. With the yaml file for the workflow open, add the

code below at the bottom of the "on" section. ("workflow\_dispatch" should line up with "pull\_request" and "push")

```
workflow_dispatch:
  inputs:
    myValues:
      description: 'Input Values'
```



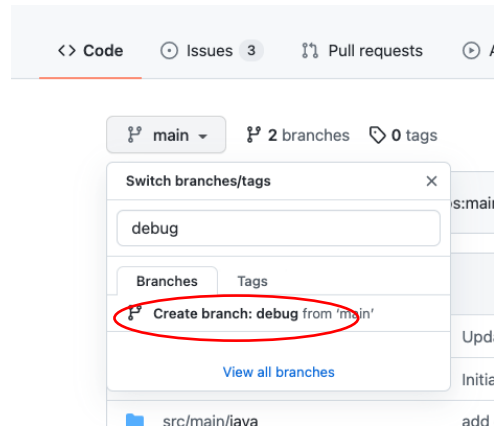
13. Commit your changes to the main branch. Since we added the additional "on" section, if you look at the Actions page and select the workflow and select the "Simple Pipe" workflow, you'll see that after the merge we now have a note that "This workflow has a workflow\_dispatch event trigger." And there is a "Run workflow" button that we can use to run the workflow manually. Click on that button, enter some data and then click "Run workflow" to see this in action. After a few moments, you should see another run of the workflow startup and complete.



## Lab 5: Looking at debug info

**Purpose:** In this lab, we'll look at some ways to get more debugging info from our workflows.

1. First, let's create a new branch in GitHub for the debug instances of our workflows. On the repository's Code page, click on the drop-down under "main", and enter "debug" in the "Find or create a branch..." field. Then click on the "Create branch: debug from 'main'" link in the dialog.



2. At this point you should be in the new branch - the "debug" branch. Go to the workflow file in .github/workflows and edit the simple-pipe.yaml file. **Change the references to "main" in the "on" section at the top to "debug"**. Also, add a new job to surface some debug context. Add in the lines below after the "jobs:" line. Pay attention to indenting again. A screenshot of how everything should look and lines up is further down. (For convenience, the text for the info job is also in a file in extra/info.txt.)

**info:**

**runs-on: ubuntu-latest**

**steps:**

- name: Print warning message

run: |

echo "::warning::This version is for debugging only."

- name: Dump context for runner

env:

RUNNER\_CONTEXT: \${ toJSON(runner) }

run:

echo "::debug::Runner context is above."

<> Edit file

Preview changes

```

5
6 on:
7   push:
8     branches: [ debug ]
9   pull_request:
10    branches: [ debug ]
11 workflow_dispatch:
12   inputs:
13     myValues:
14       description: 'Input Values'
15
16 jobs:
17
18   info:
19     runs-on: ubuntu-latest
20
21     steps:
22     - name: Print warning message
23       run: |
24         echo "::warning::This version is for debugging only."
25     - name: Dump context for runner
26       env:
27         RUNNER_CONTEXT: ${ toJSON(runner) }
28       run:
29         echo "::debug::Runner context is above."
30

```

- When you are done making the changes, commit as usual. Switch back to the Actions tab and click on the currently running workflow. Then click on the "info" job in the graph and look at the logs.

#### ✓ Update simple-pipe.yml Simple Pipe #11

Summary

Jobs

✓ info

✓ build

✓ count-args

✓ test-run

Triggered via push 1 minute ago

gwestudent pushed

→ 133e67c

debug

Status

Success

Total duration

42s

Artifacts

1

simple-pipe.yml

on: push

✓ build

18s

✓ test-run

3s

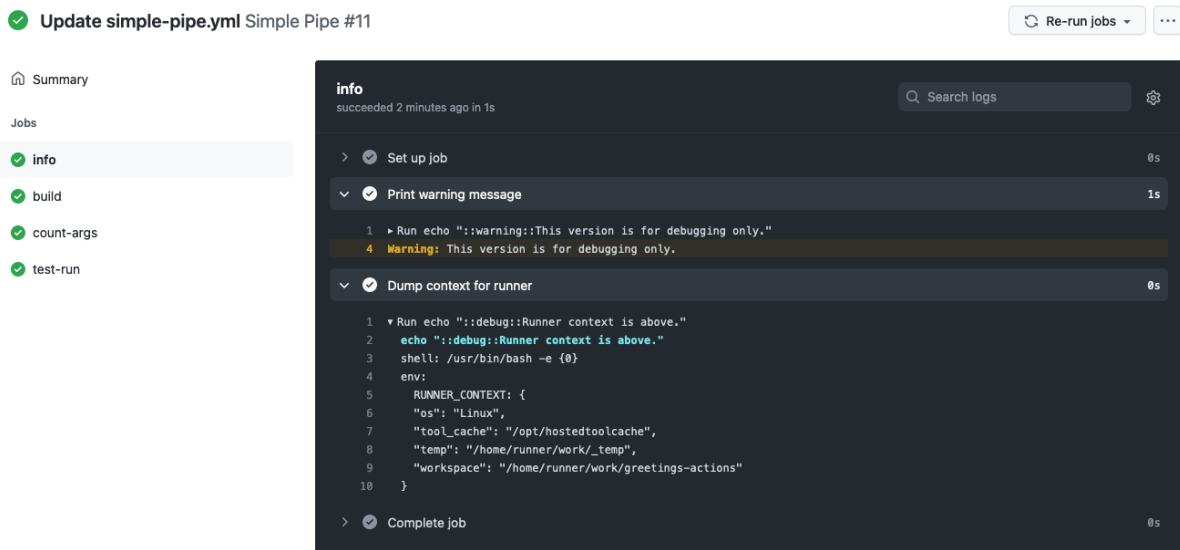
✓ info

1s

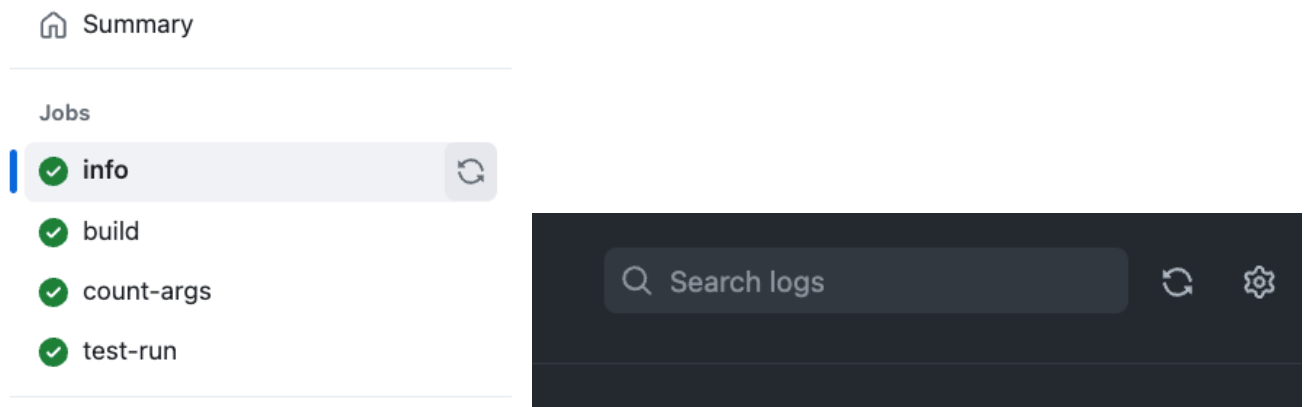
✓ count-args

3s

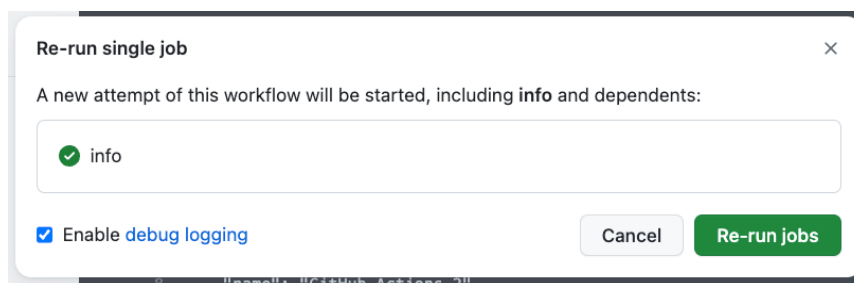
- Expand the entries for "Print warning message" and "Dump context for runner" to see the outputs for those.



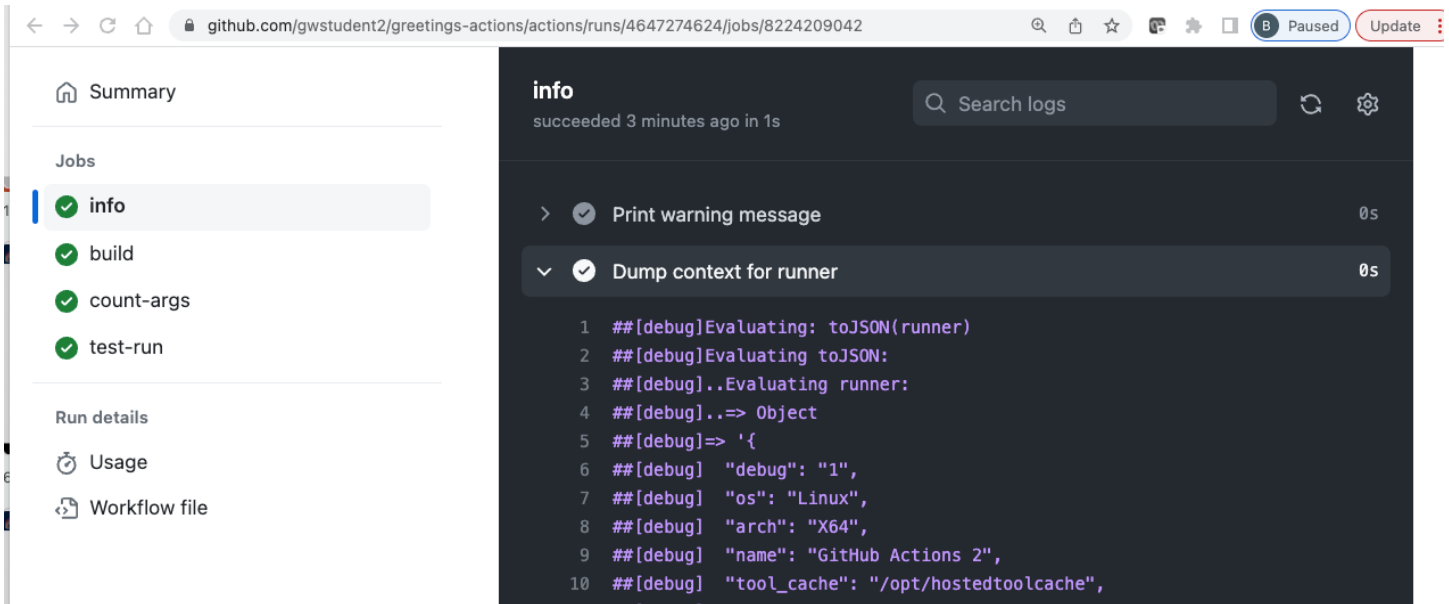
- Notice that while we can see both commands that echo our custom "warning" and "debug" messages - only the output of the warning message actually is displayed, not the output of the debug message. There are a couple of ways to get the debugging info.
- The first way is to simply rerun the job. If you hover over the job name under the Summary section, you can see two curved arrows appear. Click on those. (At the same time, the arrows are also available in the upper right of the logs window - next to the gear icon.)



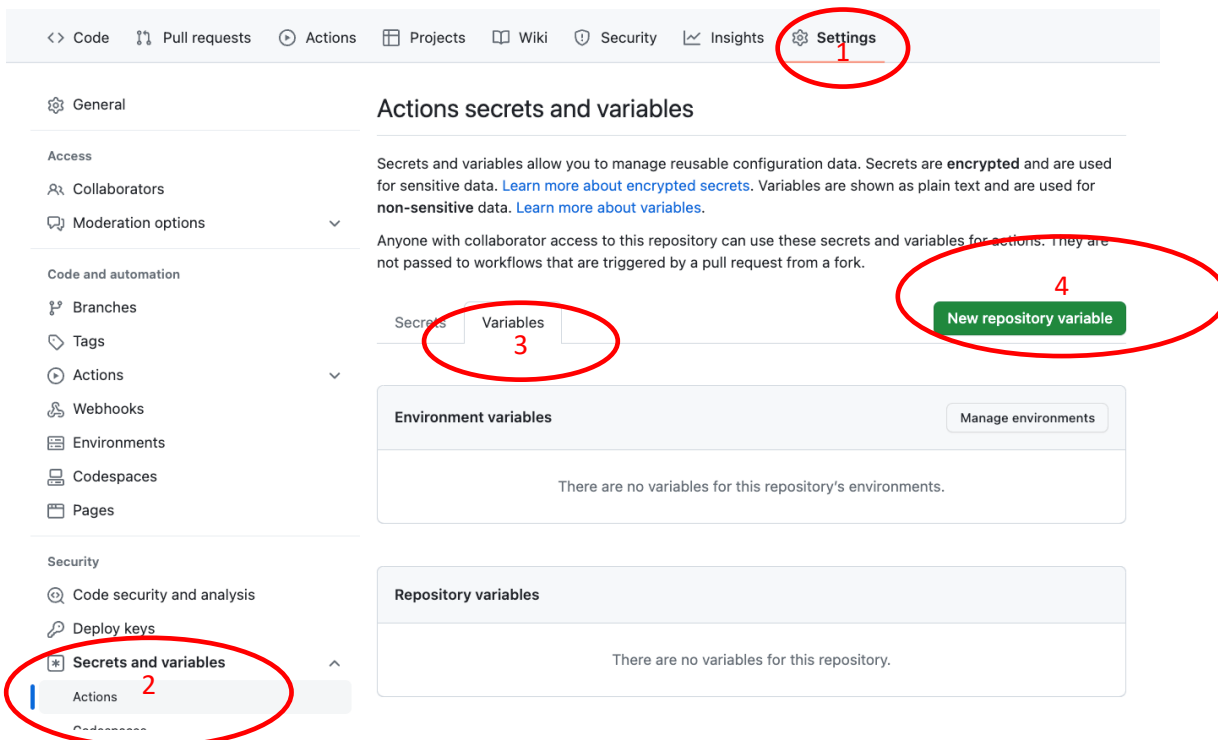
- This will bring up a dialog to re-run that job (and any dependent jobs) - with a checkbox to click to *Enable debug logging*. Click that box and then click the "Re-run jobs" button.



8. After the job is re-run, if you look at the latest output, and expand the "Dump context for runner" step, you'll see the actual debug output.



9. However, that doesn't cause debug info to show up for commits. We do that by enabling a secret or a variable for ACTIONS\_STEP\_DEBUG. Since this setting is not sensitive information, we'll use a variable.
10. To do this, go to the repository's top menu and select "Settings". Then on the left-hand side, select "Secrets and variables", and then "Actions" under that. Select the "Variables" tab and "New repository variable".



11. On the next screen, enter **ACTIONS\_STEP\_DEBUG** for the name, set the value to *true* and click on the *Add variable* button.

General

Access

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Branches

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Actions

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Codespaces

Pages

Security

Code security and analysis

Deploy keys

Secrets and variables

Actions

Codespaces

### Actions variables / New variable

Note: Variable values are exposed as plain text. If you need to encrypt and mask sensitive information, [create a secret](#) instead.

Name \*

ACTIONS\_STEP\_DEBUG

- Alphanumeric characters ([a-z], [A-Z], [0-9]) or underscores (\_) only.
- Spaces are not allowed.
- Cannot start with a number.
- Cannot start with GITHUB\_ prefix.

Value \*

true

Add variable

12. Now, switch back to the "Actions" tab, select the "Simple Pipe" workflow, and click on the "Run workflow" button. **Select "debug" from the list for the branch.** Enter in any desired arguments. Then click the green "Run workflow" button to execute the workflow.

Run workflow

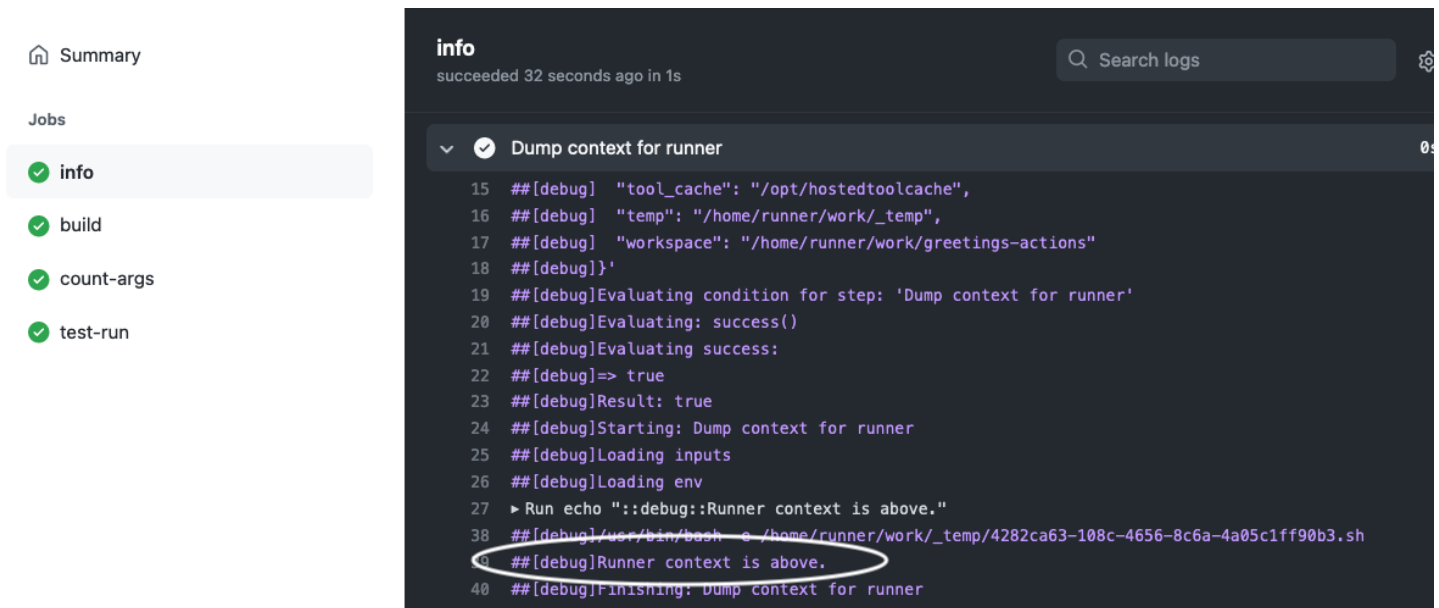
Use workflow from

Branch: debug

Input Values

Run workflow

13. A new run will be started. Go into it and select the "info" job. In the output now, if you expand the sections, you should be able to see a lot of "##[debug]" messages including the one you added in the "Dump context for runner" section.

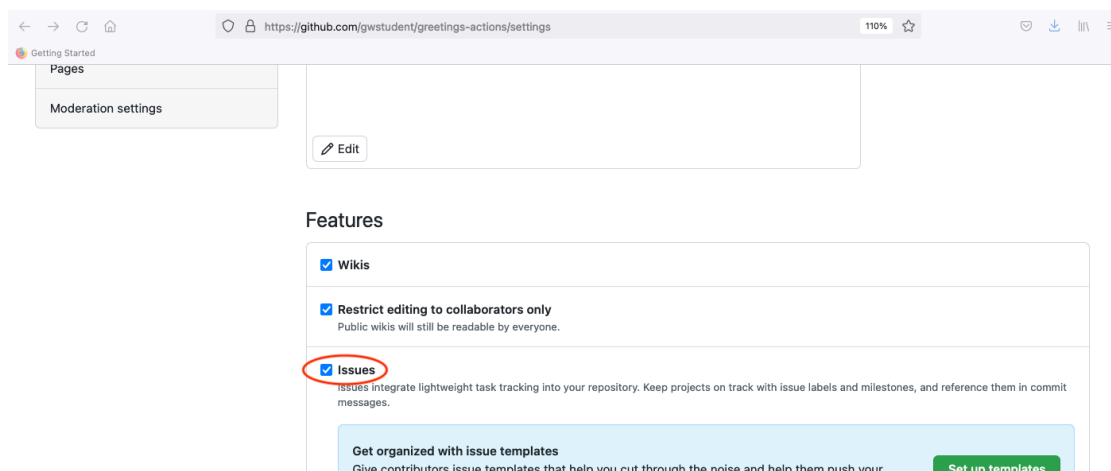


14. Note that the debug log info will be turned on for all runs from here on - as long as the repository variable exists and is set to "true".

## Lab 6: Chaining workflows, using conditionals, and working with REST APIs in workflows.

**Purpose:** Learning one way to drive one workflow from another.

1. We're going to leverage a reusable workflow that will be able to automatically create a GitHub issue in our repository. And then we will invoke that workflow from our current workflow. But first, we need to ensure that the "Issues" functionality is turned on for this repository. Go to the project's Settings main page, scroll down and under "Features", make sure the "Issues" selection is checked.



2. The workflow to create the issue using a REST API call is already written to save time. It is in the main project under "extra/create-failure-issue.yml". You need to get this file in the .github/workflows directory. You can just move it via GitHub with the following steps.

- a. In the repository, browse to the "extra" folder and to the "create-failure-issue.yml" file.
- b. Take a few moments to look over the file and see what it does. Notice that:
  - i. It has a workflow\_call section in the "on" area, which means it can be run from another workflow.
  - ii. It has a workflow\_dispatch section in the "on" area, which means it can be run manually.
  - iii. It has two inputs - a title and body for the issue.
  - iv. The primary part of the body is simply a REST call (using the GITHUB\_TOKEN) to create a new issue.
- c. Click the pencil icon to edit it.

The screenshot shows the GitHub interface for the file 'create-failure-issue.yml' in the 'extra' directory of the 'greetings-actions' repository. The file path is shown as 'greetings-actions / extra / create-failure-issue.yml'. The file is 49 lines long (39 sloc) and 1.12 KB. The file content is visible, showing a reusable workflow for creating an issue. The 'Edit' button (pencil icon) is circled in red.

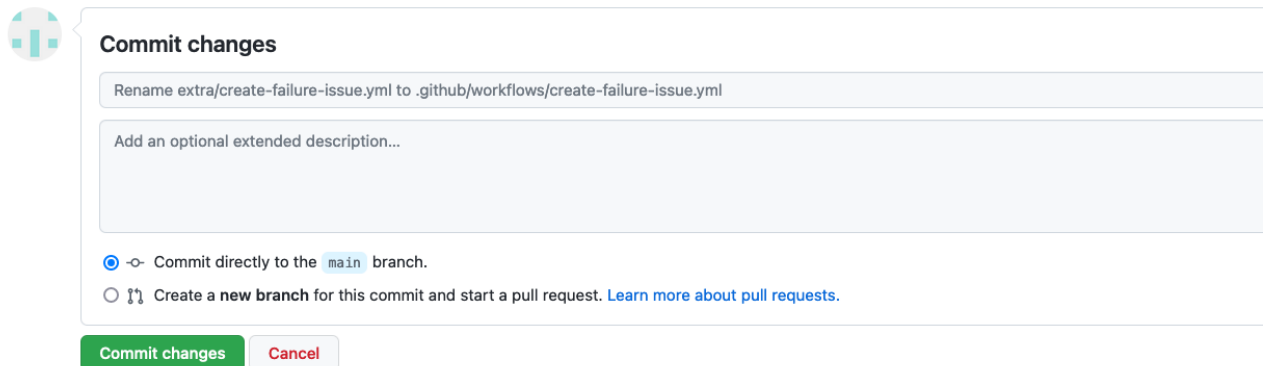
```
1 # This is a reusable workflow for creating an issue
2
3 name: create-failure-issue
4
5 # Controls when the workflow will run
```

- d. In the filename field at the top, change the name of file. Use the backspace key to backspace over "extra/" making sure to backspace over the word. Then type in the path to put it in the workflows ".github/workflows/create-failure-issue.yml".

The screenshot shows the GitHub repository file view for 'greetings-actions'. The filename field at the top is highlighted, showing the path 'greetings-actions / .github / workflows / create-failure-issue.yml' in the 'main' branch. The 'Edit file' button is visible, and the file content is shown below.

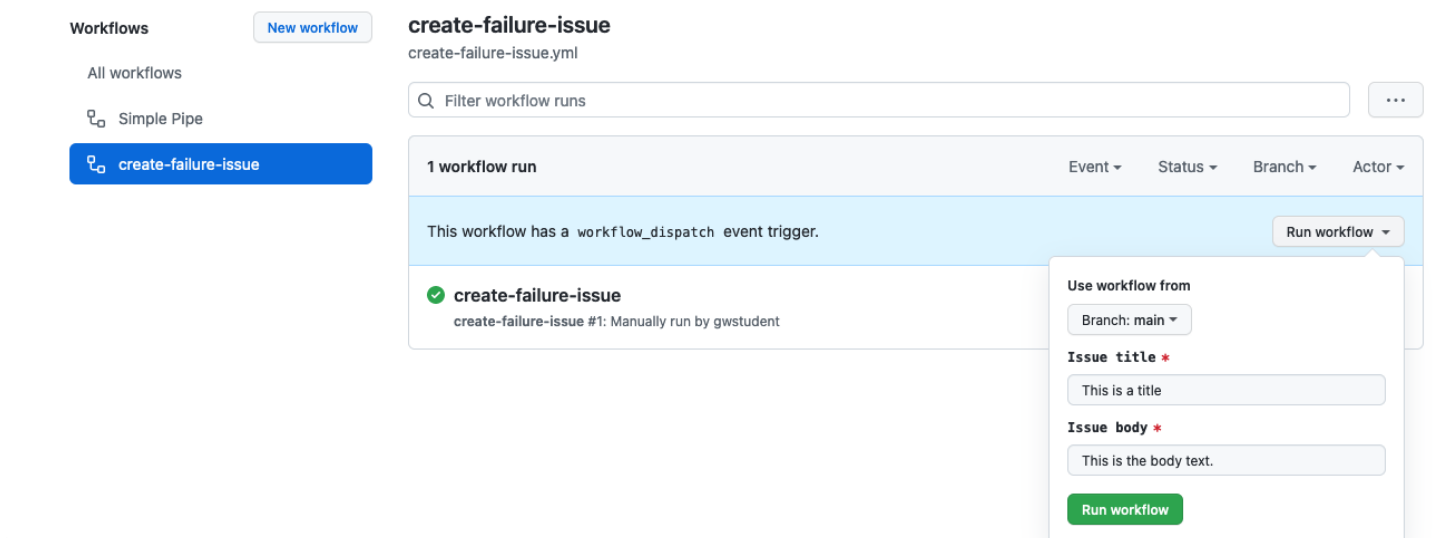
```
1 # This is a reusable workflow for creating an issue
2
3 name: create-failure-issue
```

- e. To complete the change, click on the green "Commit changes" button. (Ignore the 404 error if you get one.)



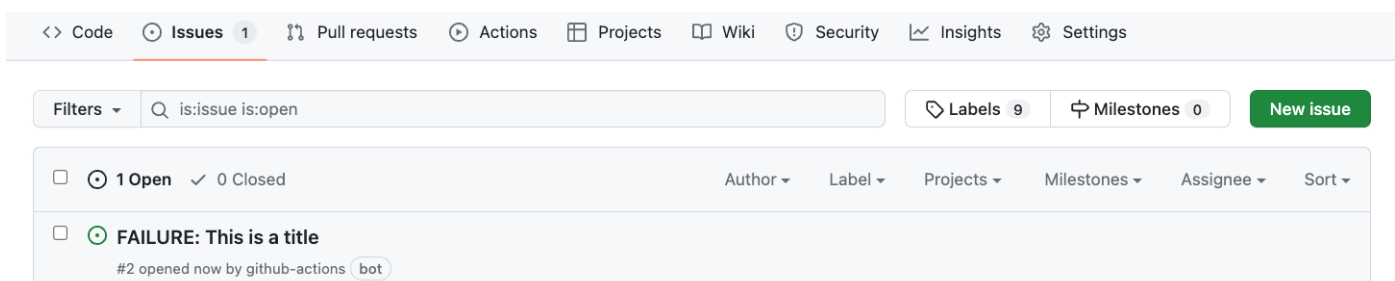
The "Commit changes" dialog box shows the commit message "Rename extra/create-failure-issue.yml to .github/workflows/create-failure-issue.yml". It includes a text area for an optional extended description. Below the text area, there are two radio button options: "Commit directly to the main branch." (selected) and "Create a new branch for this commit and start a pull request." (with a link to "Learn more about pull requests."). At the bottom, there are two buttons: "Commit changes" (green) and "Cancel" (red).

3. Go back to the Actions tab. You'll see a new workflow execution due to the rename. Also, in the Workflows section on the left, you should now see a new workflow titled "create-failure-issue". Click on that. Since it has a workflow\_dispatch event trigger available, we can try it out. Click on the "Run workflow" button and enter in some text for the "title" and "body" fields. Then click "Run workflow".



The screenshot shows the GitHub Actions page for the "create-failure-issue" workflow. On the left, the "Workflows" section is active, showing "create-failure-issue" as the selected workflow. The main area displays "1 workflow run" with a status of "Success". A "Run workflow" button is visible. A modal dialog is open, prompting the user to "Use workflow from" (Branch: main), "Issue title" (This is a title), and "Issue body" (This is the body text.). A "Run workflow" button is at the bottom of the modal.

4. After a moment, you should see the workflow run start and then complete. If you now click on the Issues tab at the top, you should see your new issue there.



The screenshot shows the GitHub Issues page. The "Issues" tab is selected in the top navigation bar. The page shows "1 Open" issue. The issue is titled "FAILURE: This is a title" and was opened by "github-actions" (bot). The issue body is "#2 opened now by github-actions (bot)".

- Now that we know that our new workflow works as expected, we can make the changes to the previous workflow to "call" this if we fail. Edit the simple-pipe.yml file and add the following lines as a new job and set of steps at the end of the workflow. (For convenience, these lines are also in the file "extra/create-issue-on-failure.txt" if you want to copy and paste from there.)

create-issue-on-failure:

```
permissions:
  issues: write
needs: [test-run, count-args]
if: always() && failure()
uses: ../github/workflows/create-failure-issue.yml
with:
  title: "Automated workflow failure issue for commit ${github.sha}"
  body: "This issue was automatically created by the GitHub Action workflow ** ${github.workflow} **"
```

- In order to have this executed via the "if" statement, we need to force a failure. We can do that by simply adding an "exit 1" line at the end of the "count-args" job (right above the job you just added).

Make that change too. (A screenshot is below showing what the changes should look like. The "exit 1" is line 65 in the figure.)

[greetings-actions](#) / [.github](#) / [workflows](#) / `simple-pipe.yml` in `gwstudent2:main`



The screenshot shows a GitHub Actions workflow file editor for the file `simple-pipe.yml` in the `gwstudent2:main` branch. The editor has tabs for "Edit file" and "Preview changes". The workflow file content is as follows:

```
71 - shell: bash
72   run: |
73     echo argument count is ${ steps.report-count.outputs.arg-count }
74     exit 1
75
76   create-issue-on-failure:
77
78     permissions:
79       issues: write
80     needs: [test-run, count-args]
81     if: always() && failure()
82     uses: ../github/workflows/create-failure-issue.yml
83     with:
84       title: "Automated workflow failure issue for commit ${github.sha}"
85       body: "This issue was automatically created by the GitHub Action workflow ** ${github.workflow} **"
```

- After you've made the changes, commit them. At that point, you should get a run of the workflow. Click back to the Actions tab to watch it. After a few minutes, it will complete, and the "count-args" job will fail. This is expected because of the "exit 1" we added. But in a few moments, the create-issue-on-failure job should kick in and invoke the other workflow and produce a new ticket.

## Workflows

New workflow

All workflows

Simple Pipe

create-failure-issue

## All workflows

Showing runs from all workflows

15 workflow runs		Event ▾	Status ▾	Branch ▾	Actor ▾
✓	create-failure-issue create-failure-issue #2: Manually run by gwstudent				15 seconds ago 13s
✗	Update simple-pipe.yml Simple Pipe #14: Commit 1539282 pushed by gwstudent	main			1 minute ago 49s

8. You can look at the graphs from the runs of the two workflows if you want.

### ✗ Update simple-pipe.yml Simple Pipe #14

Re-run jobs ▾

...

#### Summary

Jobs

✓ build

✗ count-args

✓ test-run

✓ create-issue-on-failure

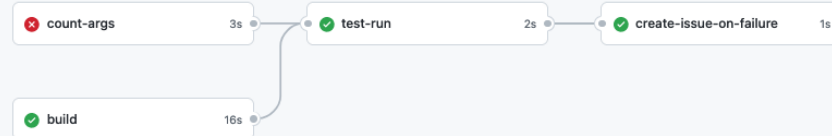
Triggered via push 3 minutes ago  
gwstudent pushed -o- 1539282 main

Status  
Failure

Total duration  
49s

Artifacts  
1

simple-pipe.yml  
on: push



#### Annotations

1 error

✗ count-args  
Process completed with exit code 1.

#### Artifacts

Produced during runtime

Name	Size
greetings-jar	1006 Bytes

### ✓ create-failure-issue create-failure-issue #2

Re-run jobs ▾

...

#### Summary

Jobs

✓ create\_issue\_on\_failure

Manually triggered 3 minutes ago  
gwstudent -o- 1539282

Status  
Success

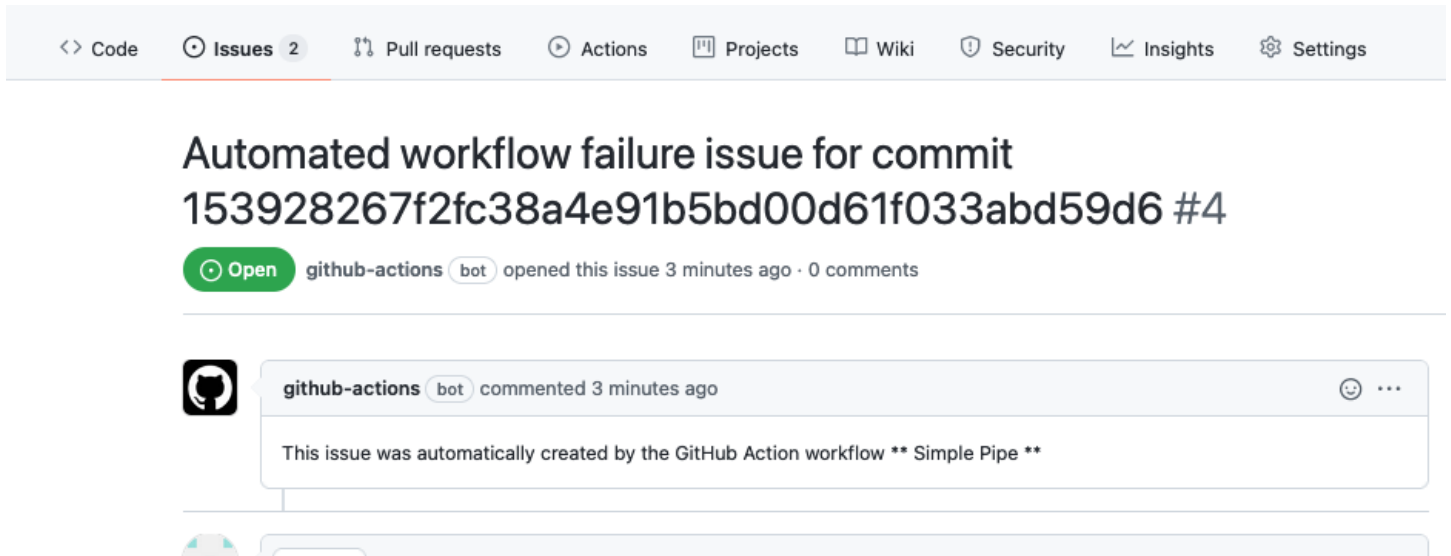
Total duration  
13s

Artifacts  
-

create-failure-issue.yml  
on: workflow\_dispatch

✓ create\_issue\_on\_failure 1s

9. Under "Issues", you can also see the new ticket that was opened with the text sent to it.



THE END - THANKS!