Git Merges

1 hour 30 minutes   Free

Introduction

In this lab, you'll use your knowledge of Git and Git commit history to check out an existing repo and make some changes to it. You'll also test what you learned about rolling back commits after bad changes in order to fix a script in the repo and run it to produce the correct output.

What you'll do

- Check the status and history of an existing Git repo
- Create a branch
- Modify content on the branch
- Make rollback changes
- Merge the branch

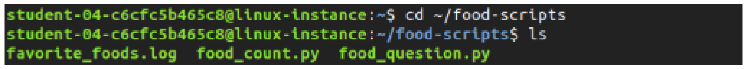
Explore repository

There is a Git repository named `food-scripts` consisting of a couple of food-related Python scripts.

Navigate to the repository using the following command:

```
cd ~/food-scripts
```

Now, list the files using the `ls` command. There are three files named **favorite_foods.log**, **food_count.py**, and **food_question.py**.



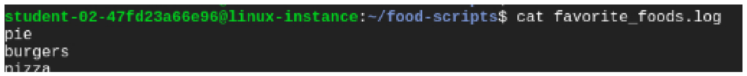
```
student-04-c6cfc5b465c8@linux-instance:~$ cd ~/food-scripts
student-04-c6cfc5b465c8@linux-instance:~/food-scripts$ ls
favorite_foods.log  food_count.py  food_question.py
```

Let's explore each file. Use the `cat` command to view each file.

1. **favorite_foods.log**: This file consists of a list of food items. You can view it using the following command:

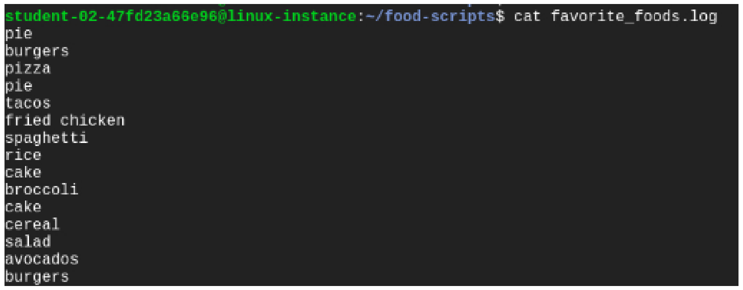
```
cat favorite_foods.log
```

Output:



```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ cat favorite_foods.log
pie
burgers
pizza
```

Output:



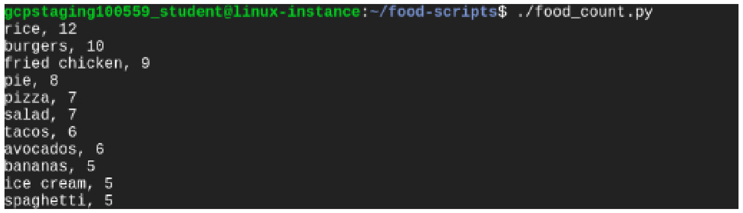
```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ cat favorite_foods.log
pie
burgers
pizza
pie
tacos
fried chicken
spaghetti
rice
cake
broccoli
cake
cereal
salad
avocados
burgers
```

2. **food_count.py**: This script returns a list of each food and the number of times the food appeared in the `favorite_foods.log` file.

Let's execute the script `food_count.py`:

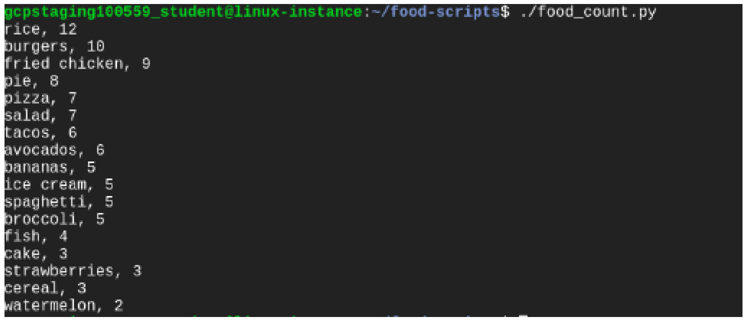
```
./food_count.py
```

Output:



```
gcpstaging100559_student@linux-instance:~/food-scripts$ ./food_count.py
rice, 12
burgers, 10
fried chicken, 9
pie, 8
pizza, 7
salad, 7
tacos, 6
avocados, 6
bananas, 5
ice cream, 5
spaghetti, 5
```

Output:



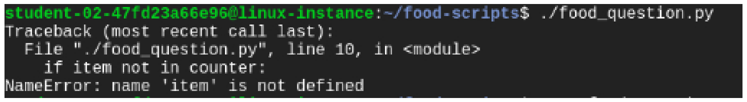
```
gcpstaging100559_student@linux-instance:~/food-scripts$ ./food_count.py
rice, 12
burgers, 10
fried chicken, 9
pie, 8
pizza, 7
salad, 7
tacos, 6
avocados, 6
bananas, 5
ice cream, 5
spaghetti, 5
broccoli, 5
fish, 4
cake, 3
strawberries, 3
cereal, 3
watermelon, 2
```

3. **food_question.py**: This prints a list of foods and prompts the user to enter one of those foods as their favorite. It then returns an answer of how many others in the list like that same food.

Run the following command to see the output of `food_question.py` script:

```
./food_question.py
```

Output:



```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ ./food_question.py
Traceback (most recent call last):
  File "./food_question.py", line 10, in <module>
    if item not in counter:
NameError: name 'item' is not defined
```

Uh oh , this gives us an error. One of your colleagues reports that this script was working fine until the most recent commit. We'll be fixing this error later during the lab.

Understanding the repository

Let's use the following Git operations to understand the workflow of the repository:

- git status
- git log
- git branch

Git status: This displays paths that have differences between the index file and the current HEAD commit; paths that have differences between the working tree and the index file; and paths in the working tree that are not tracked by Git. You can view the status of the working tree using the command: **[git status]**

```
git status
```

You can now view the status of the working tree.

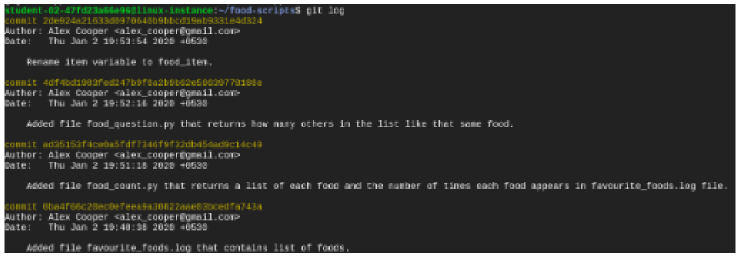
Git log: This lists the commits done in the repository in reverse chronological order; that is, the most recent commits show up first. This command lists each commit with its SHA-1

Git log: This lists the commits done in the repository in reverse chronological order; that is, the most recent commits show up first. This command lists each commit with its SHA-1 checksum, the author's name and email, date, and the commit message.

You can see logs by using the following command:

```
git log
```

Output:



```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ git log
commit 2de924a21633d8970648b9bbcd19eb9331e4d324
Author: Alex Cooper <alex_cooper@gmail.com>
Date:   Thu Jan 2 19:53:54 2020 +0530

    Rename item variable to food_item.

commit 4df4bd1983fed247b9f8a2b0b62e59039778188e
Author: Alex Cooper <alex_cooper@gmail.com>
Date:   Thu Jan 2 19:52:16 2020 +0530

    Added file food_question.py that returns how many others in the list like that same food.

commit ad35153f4ce0a5fdf7346f9f32db456ad9c14c49
Author: Alex Cooper <alex_cooper@gmail.com>
Date:   Thu Jan 2 19:51:18 2020 +0530

    Added file food_count.py that returns a list of each food and the number of times each food appears in favourite_foods.log file.

commit 0ba4f66c28ec0efeea9a30822aae830cedfa743a
Author: Alex Cooper <alex_cooper@gmail.com>
Date:   Thu Jan 2 19:40:38 2020 +0530

    Added file favourite_foods.log that contains list of foods.
```

Git branch: Branches are a part of the everyday development process on the master branch. Git branches effectively function as a pointer to a snapshot of your changes. When you want to add a new feature or fix a bug, no matter how big or small, you spawn a new branch to encapsulate your changes. This makes it difficult for unstable code to get merged into the main codebase.

Configure Git

Configure Git

Before we move forward with the lab, let's configure Git. Git uses a username to associate commits with an identity. It does this by using the **git config** command. Set the Git username with the following command:

```
git config user.name "Name"
```

Replace **Name** with your name. Any future commits you push to GitHub from the command line will now be represented by this name. You can even use **git config** to change the name associated with your Git commits. This will only affect future commits and won't change the name used for past commits.

Let's set your email address to associate them with your Git commits.

```
git config user.email "user@example.com"
```

Replace **user@example.com** with your email-id. Any future commits you now push to GitHub will be associated with this email address. You can also use **git config** to change the user email associated with your Git commits.

Add a new feature

In this section, we'll be modifying the repository to add a new feature, without affecting the current iteration. This new feature is designed to improve the food count (from the file food_count.py) output. So, create a branch named **improve-output** using the following command:

```
git branch improve-output
```

Move to the `improve-output` branch from the master branch.

```
git checkout improve-output
```

Here, you can modify the script file without disturbing the existing code. Once modified and tested, you can update the master branch with a working code.

Now, open `food_count.py` in the nano editor using the following command:

```
nano food_count.py
```

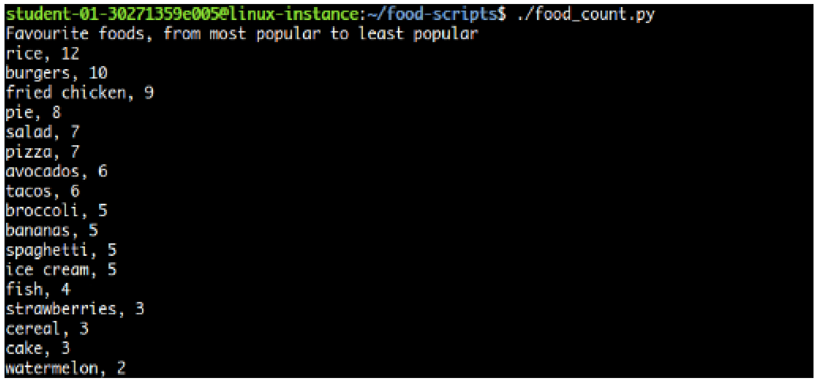
Add the line below before **printing for loop** in the `food_count.py` script:

```
print("Favourite foods, from most popular to least popular")
print("Favourite foods, from most popular to least popular")
```

Save the file by pressing Ctrl-o, the Enter key, and Ctrl-x. Then run the script `food_count.py` again to see the output:

```
./food_count.py
```

Output:



```
student-01-30271359e005@linux-instance:~/food-scripts$ ./food_count.py
Favourite foods, from most popular to least popular
rice, 12
burgers, 10
fried chicken, 9
pie, 8
salad, 7
pizza, 7
avocados, 6
tacos, 6
broccoli, 5
bananas, 5
spaghetti, 5
ice cream, 5
fish, 4
strawberries, 3
cereal, 3
cake, 3
watermelon, 2
```

After running the `food_count.py` script successfully, commit the changes from the `improve-output` branch by adding this script to the staging area using the following command:

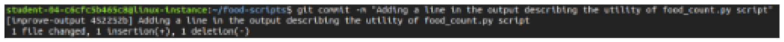
```
git add food_count.py
```

```
git add food_count.py
```

Now, commit the changes you've done in the `improve-output` branch.

```
git commit -m "Adding a line in the output describing the utility of food_count.py script"
```

Output:



```
student-04-c6cfc5b465c8@linux-instance:~/food-scripts$ git commit -m "Adding a line in the output describing the utility of food_count.py script"
[improve-output 452252b] Adding a line in the output describing the utility of food_count.py script
 1 file changed, 1 insertion(+), 1 deletion(-)
```

Click *Check my progress* to verify the objective.

Add a feature

Check my progress

Fix the script

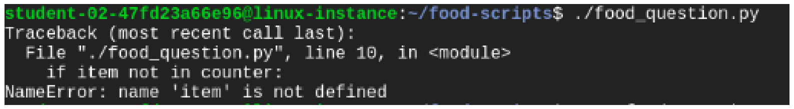
In this section, we'll fix the script food_question.py which displayed an error when

Fix the script

In this section, we'll fix the script food_question.py, which displayed an error when executing it. You can run the file again to view the error.

```
./food_question.py
```

Output:



```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ ./food_question.py
Traceback (most recent call last):
  File "./food_question.py", line 10, in <module>
    if item not in counter:
NameError: name 'item' is not defined
```

This script gives us the error: "**NameError: name 'item' is not defined**" but your colleague says that the file was running fine before the most recent commit they did.

In this case, we'll revert back the previous commit.

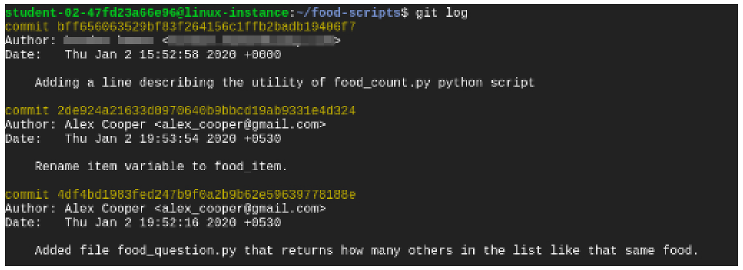
For this, check the git log history so that you can revert back to the commit where it was working fine.

```
git log
```

Output:

```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ git log
```

Output:



```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ git log
commit bff656063529bf83f264156c1ffb2badb19406f7
Author: [redacted] <[redacted]>
Date:   Thu Jan 2 15:52:58 2020 +0000

    Adding a line describing the utility of food_count.py python script

commit 2de924a21633d0970640b9bbcd19ab9331e4d324
Author: Alex Cooper <alex_cooper@gmail.com>
Date:   Thu Jan 2 19:53:54 2020 +0530

    Rename item variable to food_item.

commit 4df4bd1983fed247b9f0a2b9b62e59639778188e
Author: Alex Cooper <alex_cooper@gmail.com>
Date:   Thu Jan 2 19:52:16 2020 +0530

    Added file food_question.py that returns how many others in the list like that same food.
```

Here, you'll see the commits in reverse chronological order and find the commit having "**Rename item variable to food_item**" as a commit message. Make sure to note the commit ID for this particular commit.

To revert, use the following command:

```
git revert [commit-ID]
```

Replace `[commit-ID]` with the commit ID you noted earlier.

This creates a new commit again. You can continue with the default commit message on the screen or add your own commit message.

Then continue by clicking Ctrl-o, the Enter key, and Ctrl-x.

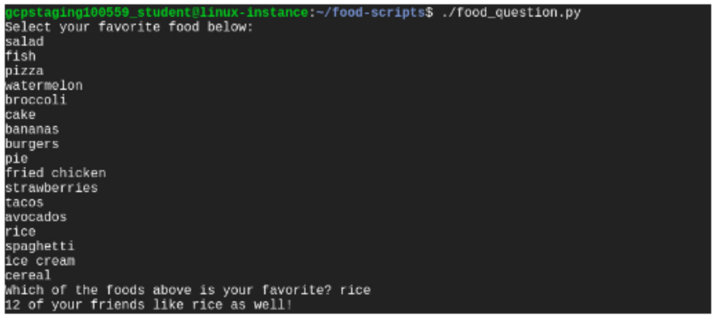
Now, run `food_question.py` again and verify that it's working as intended.

Then continue by clicking Ctrl-o, the Enter key, and Ctrl-x.

Now, run `food_question.py` again and verify that it's working as intended.

```
./food_question.py
```

Output:



```
gcpstaging100559_student@linux-instance:~/food-scripts$ ./food_question.py
Select your favorite food below:
salad
fish
pizza
watermelon
broccoli
cake
bananas
burgers
pie
fried chicken
strawberries
tacos
avocados
rice
spaghetti
ice cream
cereal
Which of the foods above is your favorite? rice
12 of your friends like rice as well!
```

Merge operation

Merge operation

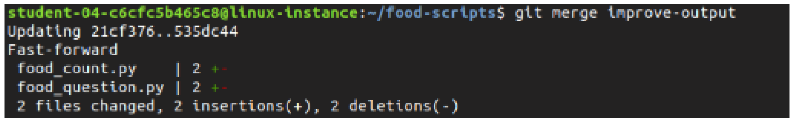
Before merging the branch `improve-output,` switch to the master branch from the current branch `improve-output` branch using the command below:

```
git checkout master
```

Merge the branch `improve-output` into the master branch.

```
git merge improve-output
```

Output:



```
student-04-c6cfc5b465c8@linux-instance:~/food-scripts$ git merge improve-output
Updating 21cf376..535dc44
Fast-forward
 food_count.py    | 2 +-
 food_question.py | 2 +-
 2 files changed, 2 insertions(+), 2 deletions(-)
```

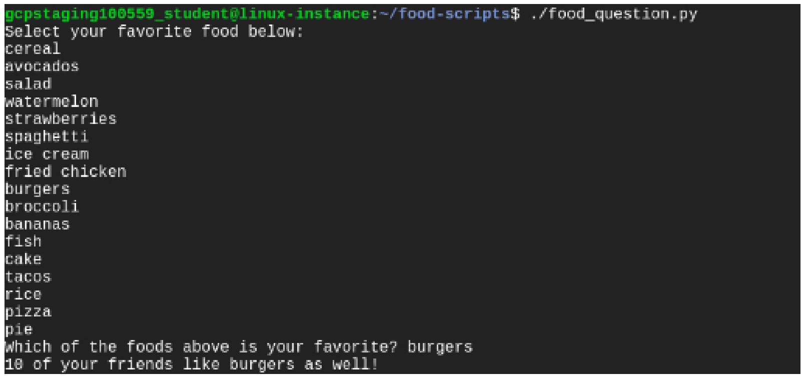
Now, all your changes made in the `improve-output` branch are on the master branch.

```
./food_question.py
```

Output:

```
gcpstaging100559_student@linux-instance:~/food-scripts$ ./food_question.py
```

Output:

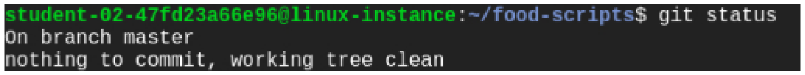


```
gcpstaging100559_student@linux-instance:~/food-scripts$ ./food_question.py
Select your favorite food below:
cereal
avocados
salad
watermelon
strawberries
spaghetti
ice cream
fried chicken
burgers
broccoli
bananas
fish
cake
tacos
rice
pizza
pie
Which of the foods above is your favorite? burgers
10 of your friends like burgers as well!
```

To get the status from the master branch, use the command below:

```
git status
```

Output:



```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ git status
On branch master
nothing to commit, working tree clean
```

To track the git commit logs, use the following command:

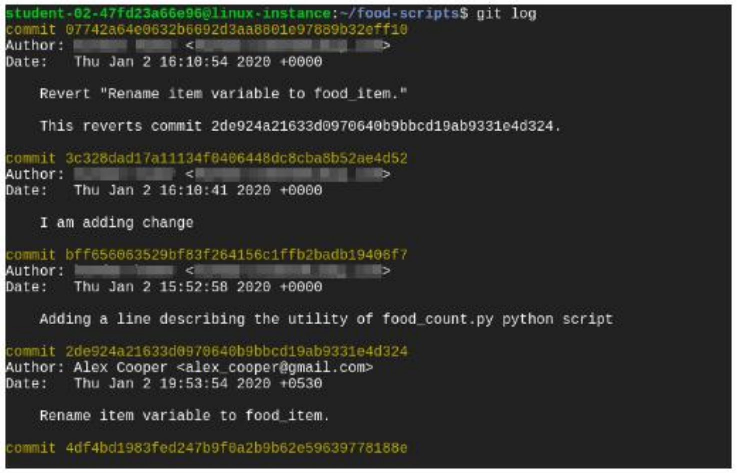
```
git log
```

```
nothing to commit, working tree clean
```

To track the git commit logs, use the following command:

```
git log
```

Output:



```
student-02-47fd23a66e96@linux-instance:~/food-scripts$ git log
commit 07742a64e0632b6692d3aa8801e97889b32eff10
Author: [redacted] <[redacted]>
Date:   Thu Jan 2 16:10:54 2020 +0000

    Revert "Rename item variable to food_item."

    This reverts commit 2de924a21633d0970640b9bbcd19ab9331e4d324.

commit 3c328dad17a11134f0406448dc8cba8b52ae4d52
Author: [redacted] <[redacted]>
Date:   Thu Jan 2 16:10:41 2020 +0000

    I am adding change

commit bff656063529bf83f264156c1ffb2badb19406f7
Author: [redacted] <[redacted]>
Date:   Thu Jan 2 15:52:58 2020 +0000

    Adding a line describing the utility of food_count.py python script

commit 2de924a21633d0970640b9bbcd19ab9331e4d324
Author: Alex Cooper <alex_cooper@gmail.com>
Date:   Thu Jan 2 19:53:54 2020 +0530

    Rename item variable to food_item.

commit 4df4bd1983fed247b9f0a2b9b62e59639778188e
```

Enter **q** to exit.

Click *Check my progress* to verify the objective.

Enter **q** to exit.

Click *Check my progress* to verify the objective.

Revert changes

Check my progress

Congratulations!

In this lab, you successfully created a branch from the master branch to add a new feature. You also rolled back a commit to where the script worked fine, and then merged it to the master branch. This will help as you work with colleagues who are simultaneously on the same repository.

End your lab

When you have completed your lab, click **End Lab**. Qwiklabs removes the resources you've