HW 4 - Functions + Conditionals + Loops

Due March 4th, 2026 at 11:59pm

Overview

In this homework assignment, you'll brainstorm for the Final Project and review concepts from the first few homeworks assignments (i.e., GitHub, lists, functions, etc.).

1 Brainstorm for the Final Project

Inside your `yourname/` repository, create a folder named `homework5/`. Within that folder, create a file called `brainstorm.txt`. Answer the following questions below in your `brainstorm.txt` file:

1. List 5 topics related to astronomy, physics, technology, science or math that sound interesting to you.
2. For three of these topics, find a dataset, tool, news article, or paper online that relates to it. Summarize how each source relates to the topic in your own words.
3. Choose one topic and brainstorm how you could Python skills (loops, conditionals, functions, lists/dictionaries, github, version control) to explore, analyze or create something with it.
4. Write down at least two possible project ideas connected to your topic. One should be ambitious (a "dream" version) and the other should be smaller, simpler version that you could realistically finish in a few weeks.

2 Create a Script

Inside your `yourname/homework5/` folder, create a file called `homework5.py`.

3 Homework 1 + 2 Review

3.1 Vocabulary Review

Define or describe the following phrases and commands as comments:

1. Git vs. GitHub
2. Terminal vs. Command Line
3. Local vs. Remote Repository
4. Version Control
5. Staging Area

6. `git add`
7. `git commit`
8. `git push`
9. `git status`
10. `git pull`
11. `pwd`
12. `ls`
13. `cd`
14. `nano`
15. `touch`
16. `mv`
17. `rm`
18. `cat`

3.2 A Directory Tree

Take a look at the directory tree below (Figure 1) to answer the following questions. The questions will build upon each other, keep this in mind.

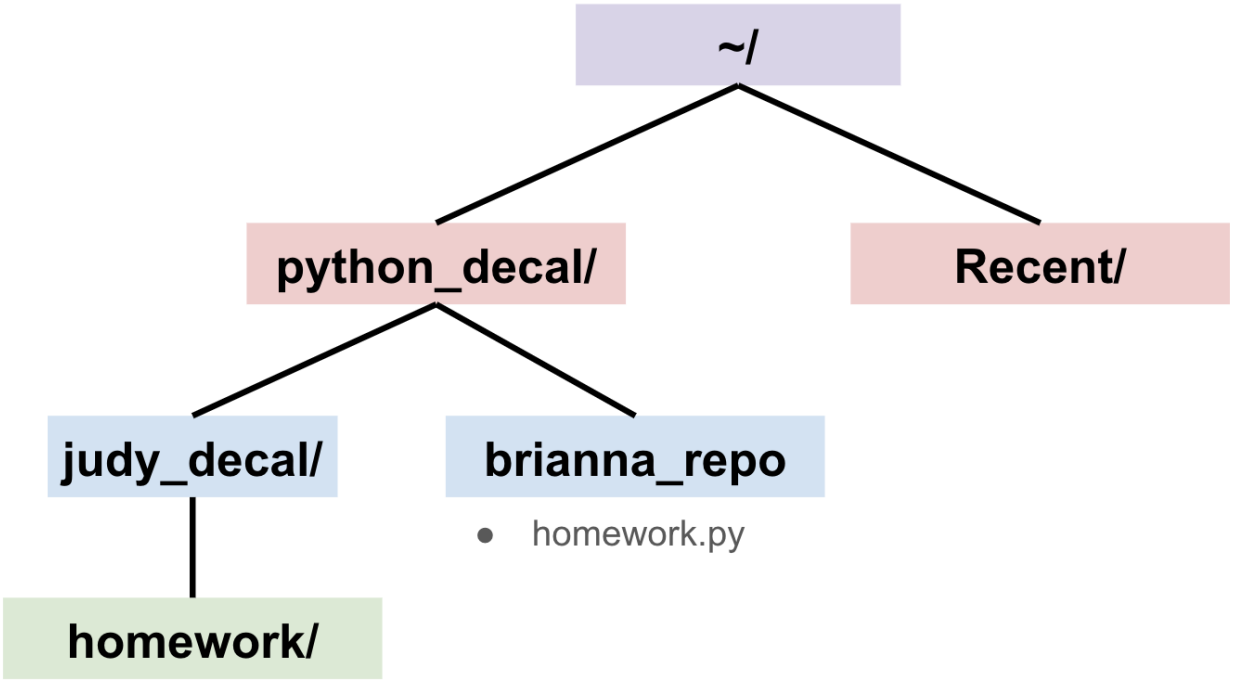

Figure 1: An example directory tree for a student named Judy.

Questions:

- You have been plopped into Judy's directory system. What command will tell you what your

current working directory is?

- The terminal responds by saying you are in ~/python_decal/judy_decal. What command will list all the files in your current working directory?
- Oh no! Brianna just sent out an announcement saying that there was a typo in homework.py. You will need to pull the brianna_repo repository to find the updated file. What command(s) will let you move to the correct repository and pull the latest changes?
- How would you move this new homework.py to the homework/ folder in your personal repository?
- How would you move yourself to the same repository as homework.py?
- You want to see the contents of homework.py in your terminal, how would you do this?
- Great job! You just finished the homework for this week. What command(s) allow you to save the changes and push from your local repository to your remote repository?
- Oh no! Git gave you the following error. What commands should you call to resolve this error and push your homework properly? What does the error mean? (i.e. what did "Judy" do wrong when trying to push?)

```
! [rejected] main -> main (fetch first)
error: failed to push some refs to 'https://github.com
/judy/judy_decal.git'
hint: Updates were rejected because the remote contains
work that you do
hint: not have locally. This is usually caused by another
repository pushing
hint: to the same ref. You may want to first integrate
the remote changes
hint: (e.g., 'git pull ...') before pushing again.
hint: See the 'Note about fast-forwards' in 'git push
--help' for details.
```

- What absolute path will allow you to move to Recents/?

3.3 Draw Your Directory Tree

Draw a picture of the status of your current directory tree (it should look like Figure 1), starting with ~/python_decal_fa25.

- Take a photo of your directory tree drawing
- Name the photo: hw5_my_tree
- Place it inside your homework5/ folder.

4 Homework 3 Review

4.1 Data Types

Write a function that takes any input and returns a string indicating its data type.

```
>>> checkDataType(3.14)
```

```
'float'
>>> checkDataType(True)
'bool'
```

4.2 Conditionals

Write a **function** that takes an integer as input and returns 'Even' if the integer is even, and 'Odd' otherwise.

```
>>> evenOrOdd(7)
'Odd'
>>> evenOrOdd(10)
'Even'
```

5 Loops

Write a **function** that takes a list of integers and returns their sum using a loop (do NOT use the built-in `sum()` function).

```
>>> numbers = [1, 2, 3, 4, 5]
>>> sumWithLoop(numbers)
15
```

6 Homework 4 Review

6.1 Lists

Write a function that takes a list and returns a new list with each element duplicated.

```
>>> duplicateList(['a', 'b', 'c'])
['a', 'a', 'b', 'b', 'c', 'c']
```

6.2 Debugging

There's an error in the following function that's supposed to return the square of a number. Find and correct it:

```
def square(num)
    return num * num
```

7 Running Your Code

7.1 VS Code

Please complete all the parts above before continuing.

7.2 In Your VS Code Terminal:

- Open VS Code.
- Open your `homework5.py` script.

- Pick your favorite function from this problem set.
- Include code at the bottom of your file that calls this function and prints the result.

- Name the screenshot: `hw5_vscode`.
- Save it in your `homework5/` folder.

7.3 On Your Terminal Application:

Please show the output of **all** of your functions.

- Open the terminal (Mac) or Git Bash (Windows).
- Navigate to your `homework5/` folder.
- Open a Python session with the command line.
- Import your file:

```
import homework5 as h5
```

- Run each function with example inputs.
- Take a screenshot of your **entire** script output.
- Name the screenshot: `hw5_commandline`.
- Save it in your `homework5/` folder.

8 Submitting Your Homework

After completing the above assignments and running it in VS Code and on the command line, follow the steps below to save your work and submit to Gradescope.

Steps:

1. Save your work by running the following commands inside your `yourname` repository.

```
git add .
git commit -m "done with hw5"
git push origin main
```

   (Note: You may use any commit message you prefer.)

2. Take a screenshot showing your terminal of calling all of the above steps with their outputs.
3. Name the screenshot: `hw5_changes`.
4. Place it inside your `homework5/` folder.

5. Ensure all screenshots are saved correctly and your code runs without errors. Your `homework4/` folder should now contain:

```
homework5/
```

```
|--- brainstorm.py
|--- homework5.py
|--- hw5_my_tree.png
|--- hw5_changes.png
|--- hw5_commandline.png
|--- hw5_vscode.png
```

6. Go to Gradescope and find the **Homework 5: Review** assignment.
7. Select the option to upload a GitHub repository.
8. Submit your `yourname` repository.

Great job!