

CAREER*FOUNDRY*

Python for Web Developers Learning Journal

Objective

We find that the students who do particularly well in our courses are those who practice metacognition. Metacognition is the art of thinking about thinking; developing a deeper understanding of your own thought processes. With the help of this Learning Journal, you'll broaden your metacognitive knowledge and skills by reflecting on what you learn in this course.

Thanks to this Learning Journal, when you finish the course you'll have a complete and detailed record of your learning journey and progress over time. We really recommend that you take the time to complete this Journal; students do better in CF courses and in the working world as a result!

Directions

First complete the pre-work section before you start your course. Then, once you've begun learning, take time after each Exercise to return to this Journal and respond to the prompts.

There will be 3 to 5 prompts per Exercise, and we recommend spending about 10 to 15 minutes in total answering them. Don't overthink it—just write whatever comes to mind!

Also make sure that, once you've started filling this document in, you upload it as a deliverable on the platform. This is so that your mentor can also see your Journal and how you're progressing over time. Don't worry though—what you write here won't affect how you're graded for the Exercise tasks. The learning journal is mostly for you and your self-evaluation!

Pre-Work: Before You Start the Course

Reflection questions (to complete before your first mentor call)

1. What experiences have you had with coding and/or programming so far? What other experiences (programming-related or not) have you had that may help you as you progress through this course?

My experience with programming consists of some self-taught python I used in a previous job combined with everything I've learned about Full Stack Development within the Immersion course here at Career Foundry notably javascript, react, node js, rest api, api integration, automated testing, angular, typescript.

2. What do you know about Python already? What do you want to know?

I am familiar with the general syntax of the language, function creation, the data structures it uses, how it can be used for making simple scripts, as well as a basic understanding of how to use it for data wrangling within a library such as pandas. I want to take my Python knowledge deeper into what it has to offer for Web Development, especially its backend capabilities and the frameworks that it can be deployed within (Django, Flask). Ultimately being able to combine it with what I've learned about front end programming, JS/React/CSS/UI Design and also to contrast/alternative with backend programming and api creation used within Node environment.

3. What challenges do you think may come up while you take this course? What will help you face them? Think of specific spaces, people, and times of day of week that might be favorable to your facing challenges and growing. Plan for how to solve challenges that arise.

I think one challenge will be reorienting myself to Python's specific syntax as well and formatting specificity, after spending so much time programming with JS/React syntax over the last few months of the Immersion course. I do think the only solution here will be to put in that time resetting muscle memory, perhaps by also spending some time on sites like codewars / codepen to drill that language.

Within the Immersion course I developed a good balance between pushing through certain problems on my own but also being wary to avoid those ruts where it becomes counterproductive just trying to brute force a problem. Never forgetting that a Mentor/Tutor is just a quick slack dm away who can help you unlock a problem and not lose the momentum.

Remember, you can always refer to [Exercise 1.4](#) of the Orientation course if you're not sure whom to reach out to for help and support.

Exercise 1.1: Getting Started with Python

Learning Goals

- Summarize the uses and benefits of Python for web development

- Prepare your developer environment for programming with Python

Reflection Questions

1. In your own words, what is the difference between frontend and backend web development? If you were hired to work on backend programming for a web application, what kinds of operations would you be working on?

The difference between frontend and backend programming is the focus that frontend programming has on the client facing /end user side of a piece of web based software. FE consumes the information that has been channeled through an API and most often presents it as a stylized visual interface and it also handles the interactions that an end user makes at the client side and channels them back through an API to be processed by the backend. Backend programming is concerned with the business logic of an application, and handles the data management and retrieval and security of an application and it is configured to send and receive transactions that occur via requests/transactions made on the front end.

2. Imagine you're working as a full-stack developer in the near future. Your team is asking for your advice on whether to use JavaScript or Python for a project, and you think Python would be the better choice. How would you explain the similarities and differences between the two languages to your team? Drawing from what you learned in this Exercise, what reasons would you give to convince your team that Python is the better option?

(Hint: refer to the Exercise section "The Benefits of Developing with Python")

There is a general degree of overlap to be considered between JS/Py and some relevant distinctions to be stated that should impact our design. Both are considered high level programming languages that require interpretation from extremely human readable code down into machine code/bytecode. This means that both are known for ease of entry when it comes to newcomer developers getting up to speed. Javascript tends to be geared for browser based applications, especially within frameworks like react, vue whereas Python has an extremely wide range of applications that includes Web Development but spans many leaothor domains including Machine Learning, Data Science/Data Visualization. Both languages are extremely popular and have robust package options but for the purposes of our project python seems to be the better fit. It comes with many critical operations (calculations, http routing, file manipulation) preloaded to built in packages. While JS also has a deep bench of packages, I would argue that pip is equally extensive and the ease of use with pip would be a great boost for development.

3. Now that you've had an introduction to Python, write down 3 goals you have for yourself and your learning during this Achievement. You can reflect on the following questions if it helps you. What do you want to learn about Python? What do you want to get out of this Achievement? Where or what do you see yourself working on after you complete this Achievement?

1 - be comfortable working with APIs using Python.

2- understand the deeper capabilities of python (data structures, OOP) that allow it to create more complex applications.

3- have the knowledge to develop a tool that combines front end knowledge of React with backend capabilities of python.

Exercise 1.2: Data Types in Python

Learning Goals

- Explain variables and data types in Python
- Summarize the use of objects in Python
- Create a data structure for your Recipe app

Reflection Questions

1. Imagine you're having a conversation with a future colleague about whether to use the iPython Shell instead of Python's default shell. What reasons would you give to explain the benefits of using the iPython Shell over the default one?

I'd advocate for using the IPython shell whenever possible. With a simple pip download you can have the shell up and running and it provides a much more intuitive REPL environment that preserves the essence of a REPL environment. It automatically handles indentation which on it's own is a major step up from a regular python repl where you are forced to manual enter formatting. It color codes variables, keywords and distinct data types allowing the user to quickly grasp what pieces of code they are dealing with. It also provides tab completion allowing the user to pull up the full array of operations that can be performed on a given object. It also is much more easy to access previously typed out code so it can be easily referenced and reworked over and over as needed within the REPL.

2. Python has a host of different data types that allow you to store and organize information. List 4 examples of data types that Python recognizes, briefly define them, and indicate whether they are scalar or non-scalar.

Data type	Definition	Scalar or Non-Scalar?
str	A sequence of characters, oftentimes but not only used to display readable language. Indexable and has a host of possible operations.	Non Scalar
Tuple	An unordered collection of data, stored within parenthesis. It's elements can be any of the other primitive data types. It is indexable and loopable.	Non Scalar
Int	A discrete numerical unit that does not contain decimals and can be positive or negative.	Scalar
Float	A more complex numerical unit that contains decimal figures and can be positive or negative with set maximum and minimum	Scalar

3. A frequent question at job interviews for Python developers is: what is the difference between lists and tuples in Python? Write down how you would respond.

Lists are a sequential, mutable collection of elements that can take on the form of any of the main python data types. It is indexable and it can be updated with one of it's many methods including operations that remove, add or alter the list itself all while preserving the reference in memory. Tuples are sequential collections of elements contained within parenthesis but the key difference is that they are immutable. Once a tuple is created, you can perform all of the manipulations similar to an array. There is one workaround that involves appending a special type of tuple called a singleton to another tuple in question, thereby altering it through adding and preserving the reference. All other operations involving tuples are generating a completely new data structure with a new reference.

4. In the task for this Exercise, you decided what you thought was the most suitable data structure for storing all the information for a recipe. Now, imagine you're creating a language-learning app that helps users memorize vocabulary through flashcards. Users can input vocabulary words, definitions, and their category (noun, verb, etc.) into the flashcards. They can then quiz themselves by flipping through the flashcards. Think about the necessary data types and what would be the most suitable data structure for this language-learning app. Between tuples, lists, and dictionaries, which would you choose? Think about their respective advantages and limitations, and where flexibility might be useful if you were to continue developing the language-learning app beyond vocabulary memorization.

I'd consider this suitable for an array made up of dictionaries for each card with key attributes that pair with data such as primary : str, translation : str, number of views: int, example : str, gender : str, last attempt accurate : bool, retired: bool.

Storing this as a list would allow for many possibilities for manipulating the elements through sortings, filtering, or making slices of the cards to display n amount of cards in a give exercise for example.

Exercise 1.3: Functions and Other Operations in Python

Learning Goals

- Implement conditional statements in Python to determine program flow
- Use loops to reduce time and effort in Python programming
- Write functions to organize Python code

Reflection Questions

1. In this Exercise, you learned how to use **if-elif-else** statements to run different tasks based on conditions that you define. Now practice that skill by writing a script for a simple travel app using an **if-elif-else** statement for the following situation:

- The script should ask the user where they want to travel.
- The user's input should be checked for 3 different travel destinations that you define.
- If the user's input is one of those 3 destinations, the following statement should be printed: "Enjoy your stay in _____!"
- If the user's input is something other than the defined destinations, the following statement should be printed: "Oops, that destination is not currently available."

Write your script here. (*Hint: remember what you learned about indents!*)

```
dest1 = "Ireland"
dest2 = "India"
dest3 = "Morocco"
destinations = [dest1, dest2, dest3]
dest = input("Where would you like to travel?")

if dest in destinations:
    print(f"enjoy your stay in {dest}")
else:
    print("Oops, not currently available")
```

2. Imagine you're at a job interview for a Python developer role. The interviewer says "Explain logical operators in Python". Draft how you would respond.

When programming there is often a need to check if certain conditions are met. Depending upon whether they are met or not, a program might do something very specific or not do anything at all. Logical Operators are keywords in Python that allow a program to check on specific conditions within a program in just this way.

IF operator checks if some condition is met and executes code only if, AND operator makes sure that multiple conditions are TRUE otherwise it doesn't act, OR operator checks for at least one truth within a group of conditions being checked. These operators can be combined together to create quite complex logic that does very specific behavior spelled out within the explicit conditions at a certain point in a program.

3. What are functions in Python? When and why are they useful?

Functions are bits of code that are explicitly defined at a particular point in a script and can then be called upon x amount of times within a program to execute logic that is needed time over time throughout a program. This reusability makes code much more efficient and eliminates the need to repeat similar/repeated logic over and over.

4. In the section for Exercise 1 in this Learning Journal, you were asked in question 3 to set some goals for yourself while you complete this course. In preparation for your next mentor call, make some notes on how you've progressed towards your goals so far.

I would say so far I've made progress in understanding more deeply the data structures that python offers and how when combined in sensible ways they can be used to execute complex behavior quite simply. E.g. calling functions that contain conditionals a fixed amount of time within a for loop.

Exercise 1.4: File Handling in Python

Learning Goals

- Use files to store and retrieve data in Python

Reflection Questions

1. Why is file storage important when you're using Python? What would happen if you didn't store local files?

File storage is so important when using python because a python script cannot persist data on its own. The aim of most complex programs is to be able to work with and update data and without a way to store that data each script would be working from scratch at each runtime. Without local file storage, all the variables and the data within them get destroyed. Without being able to write and read data in and out of a script, you'd be working with a blank slate each time.

2. In this Exercise you learned about the pickling process with the `pickle.dump()` method. What are pickles? In which situations would you choose to use pickles and why?

Pickles are a complex data type of compressed streams of binary data. They are very useful for storing complex data structures such as dictionaries in .bin files which can then be loading and written to from files external to a given python script.

3. In Python, what function do you use to find out which directory you're currently in? What if you wanted to change your current working directory?

Both functions would be called from the os module. `os.getcwd()` returns a string path of the current directory. `os.chdir()` is called to change directory but requires an argument of the string path to where it's being changed.

4. Imagine you're working on a Python script and are worried there may be an error in a block of code. How would you approach the situation to prevent the entire script from terminating due to an error?

All of the logic within that block of code would be wrapped within a `try` block. This allows the program to attempt the code, but should it fail, you can `except` the error and do things like print out warning messages, execute certain behavior catered to specific error types and then even perform some sort of final operation using the `finally` keyword.

5. You're now more than halfway through Achievement 1! Take a moment to reflect on your learning in the course so far. How is it going? What's something you're proud of so far? Is there something you're struggling with? What do you need more practice with? Feel free to use these notes to guide your next mentor call.

I'm proud of being able to more strongly handle errors within the flow of a program. It's not necessarily a glamorous part of programming but it's critical to writing human friendly software. I think it also forces you to really understand the implications of the code you are writing and all the possibilities within it, which can sometimes be overlooked.

Exercise 1.5: Object-Oriented Programming in Python

Learning Goals

- Apply object-oriented programming concepts to your Recipe app

Reflection Questions

1. In your own words, what is object-oriented programming? What are the benefits of OOP?
Object oriented programming is a style of programming that packages up certain concepts, data and behavior into discrete classes within which you specify an entire system of data attributes, methods and means of interaction that can be used reliably, at scale and as frequently as necessary in a program.

2. What are objects and classes in Python? Come up with a real-world example to illustrate how objects and classes work.

Classes are like the blueprint containing all the necessary data, behaviors, and logic for interacting with objects instances of the particular class. Related to this are the objects themselves. They are the individual instances that are constructed out of the 'blueprint' of the class itself.

3. In your own words, write brief explanations of the following OOP concepts; 100 to 200 words per method is fine.

Method	Description
Inheritance	Inheritance is a concept in oop that allows certain characteristics, data or behavior to be shared further down a hierarchy of similar classes which ultimately derive from a base class. This allows an application to create highly

	specific objects without having to start from scratch, as any critical overlapping information can be passed down to these more specific instances.
Polymorphism	This concept has to do with the way a programming language handles the executing behavior at the call site of a specific class when there is a potential for overlap in the naming of that particular method. Different classes may share a particular method in name but the executed behavior is highly specific to the class. An OOP language develops a hierarchy to understand what behavior gets referenced by a particular method or data attribute, at the top being the behavior dictated by a program within the class instance itself.
Operator Overloading	Python has many built in operations that execute default behavior such as add, sub, str, lt, ne. While their general usage is a major tool for programming, when working with custom classes, calling on these operators will not produce the desired outcome as is. It can be very useful though to lean on this behavior to perform operations with classes, and it just requires specifying unique behavior within the special method e.g. <code>__add__</code> , <code>__str__</code> declared within the body of custom classes.

Exercise 1.6: Connecting to Databases in Python

Learning Goals

- Create a MySQL database for your Recipe app

Reflection Questions

1. What are databases and what are the advantages of using them?

Databases are collections of data stored using some degree of structure that defines how the information is organized and the rules behind how data is entered into and accessed by external applications. In most cases databases are composed of various tables that contain relevant data specific to those tables. An enterprise operation might possess many different databases consisting of various configurations of tables that are related to each other and store the data an operation uses to perform its functions.

2. List 3 data types that can be used in MySQL and describe them briefly:

Data type	Definition
VARCHAR(n)	A sequence of characters, oftentimes written language or coded information. It is most similar to the str type in python.
INT	A discrete numerical unit that can be positive or negative but contains only a whole number.
FLOAT	A more complex number unit that contains decimal figures that could be used to display price figures for example.

3. In what situations would SQLite be a better choice than MySQL?

SQLite would be better suited for more lightweight programming tasks or operations. Storing a single table that contains some basic customer data could be applicable. Not so would be if you have multiple tables containing huge amounts of enterprise data. Additionally SQLite is great for testing purposes as you can perform database queries pointed to a .db file, with the same connections that allow it all to happen within python.

4. Think back to what you learned in the Immersion course. What do you think about the differences between JavaScript and Python as programming languages?

I think ultimately you can write very similar code working across these two languages. I do think Python is so close to pseudocode that it makes development almost entirely thought based where as with JS, there is a degree of translating your logic/ideas into a programming language.

I think working with packages in Python is extremely smooth and intuitive and the language encourages you to write extremely clean, no fluff code.

5. Now that you're nearly at the end of Achievement 1, consider what you know about Python so far. What would you say are the limitations of Python as a programming language?

Compared to my work with JS I would say that doing robust traversal of the DOM is something you should not turn to python for. In general when looking make complex UI behavior I would turn to JS and it's frameworks over Python. Another limitation might be speed in general. As applications begin to scale the busy interpretation from python down to machine code does make an impact on performance (at scale).

Exercise 1.7: Finalizing Your Python Program

Learning Goals

- Interact with a database using an object-relational mapper
- Build your final command-line Recipe application

Reflection Questions

1. What is an Object Relational Mapper and what are the advantages of using one?
2. By this point, you've finished creating your Recipe app. How did it go? What's something in the app that you did well with? If you were to start over, what's something about your app that you would change or improve?
3. Imagine you're at a job interview. You're asked what experience you have creating an app using Python. Taking your work for this Achievement as an example, draft how you would respond to this question.
4. You've finished Achievement 1! Before moving on to Achievement 2, take a moment to reflect on your learning in the course so far:
 - a. What went well during this Achievement?
 - b. What's something you're proud of?
 - c. What was the most challenging aspect of this Achievement?
 - d. Did this Achievement meet your expectations? Did it give you the confidence to start working with your new Python skills?
 - e. What's something you want to keep in mind to help you do your best in Achievement 2?

Well done—you've now completed the Learning Journal for Achievement 1. As you'll have seen, a little metacognition can go a long way!

Pre-Work: Before You Start Achievement 2

In the final part of the learning journal for Achievement 1, you were asked if there's anything—on reflection—that you'd keep in mind and do similarly or differently during Achievement 2. Think about these questions again:

- Was your study routine effective during Achievement 1? If not, what will you do differently during Achievement 2?
- Reflect on your learning and project work for Achievement 1. What were you most proud of? How will you repeat or build on this in Achievement 2?
- What difficulties did you encounter in the last Achievement? How did you deal with them? How could this experience prepare you for difficulties in Achievement 2?

Note down your answers and discuss them with your mentor in a call if you like.

Remember that you can always refer to [Exercise 1.4](#) of the Orientation course if you're not sure whom to reach out to for help and support.

Exercise 2.1: Getting Started with Django

Learning Goals

- Explain MVT architecture and compare it with MVC
- Summarize Django's benefits and drawbacks
- Install and get started with Django

Reflection Questions

1. Suppose you're a web developer in a company and need to decide if you'll use vanilla (plain) Python for a project, or a framework like Django instead. What are the advantages and drawbacks of each?
2. In your own words, what is the most significant advantage of Model View Template (MVT) architecture over Model View Controller (MVC) architecture?
3. Now that you've had an introduction to the Django framework, write down three goals you have for yourself and your learning process during this Achievement. You can reflect on the following questions if it helps:
 - What do you want to learn about Django?
 - What do you want to get out of this Achievement?
 - Where or what do you see yourself working on after you complete this Achievement?

Exercise 2.2: Django Project Set Up

Learning Goals

- Describe the basic structure of a Django project
- Summarize the difference between projects and apps
- Create a Django project and run it locally
- Create a superuser for a Django web application

Reflection Questions

1. Suppose you're in an interview. The interviewer gives you their company's website as an example, asking you to convert the website and its different parts into Django terms. How would you proceed? For this question, you can think about your dream company and look at their website for reference.
(Hint: In the Exercise, you saw the example of the CareerFoundry website in the Project and Apps section.)
2. In your own words, describe the steps you would take to deploy a basic Django application locally on your system.
3. Do some research about the Django admin site and write down how you'd use it during your web application development.

Exercise 2.3: Django Models

Learning Goals

- Discuss Django models, the "M" part of Django's MVT architecture
- Create apps and models representing different parts of your web application
- Write and run automated tests

Reflection Questions

1. Do some research on Django models. In your own words, write down how Django models work and what their benefits are.
2. In your own words, explain why it is crucial to write test cases from the beginning of a project. You can take an example project to explain your answer.

Exercise 2.4: Django Views and Templates

Learning Goals

- Summarize the process of creating views, templates, and URLs

- Explain how the “V” and “T” parts of MVT architecture work
- Create a frontend page for your web application

Reflection Questions

1. Do some research on Django views. In your own words, use an example to explain how Django views work.
2. Imagine you’re working on a Django web development project, and you anticipate that you’ll have to reuse lots of code in various parts of the project. In this scenario, will you use Django function-based views or class-based views, and why?
3. Read Django’s documentation on the Django template language and make some notes on its basics.

Exercise 2.5: Django MVT Revisited

Learning Goals

- Add images to the model and display them on the frontend of your application
- Create complex views with access to the model
- Display records with views and templates

Reflection Questions

1. In your own words, explain Django static files and how Django handles them.
2. Look up the following two Django packages on Django’s official documentation and/or other trusted sources. Write a brief description of each.

Package	Description
ListView	
DetailView	

3. You're now more than halfway through Achievement 2! Take a moment to reflect on your learning in the course so far. How is it going? What's something you're proud of so far? Is there something you're struggling with? What do you need more practice with? You can use these notes to guide your next mentor call.

Exercise 2.6: User Authentication in Django

Learning Goals

- Create authentication for your web application
- Use GET and POST methods
- Password protect your web application's views

Reflection Questions

1. In your own words, write down the importance of incorporating authentication into an application. You can take an example application to explain your answer.
2. In your own words, explain the steps you should take to create a login for your Django web application.
3. Look up the following three Django functions on Django's official documentation and/or other trusted sources and write a brief description of each.

Function	Description
authenticate()	
redirect()	
include()	

Exercise 2.7: Data Analysis and Visualization in Django

Learning Goals

- Work on elements of two-way communication like creating forms and buttons
- Implement search and visualization (reports/charts) features
- Use QuerySet API, DataFrames (with pandas), and plotting libraries (with matplotlib)

Reflection Questions

1. Consider your favorite website/application (you can also take CareerFoundry). Think about the various data that your favorite website/application collects. Write down how analyzing the collected data could help the website/application.
2. Read the Django [official documentation on QuerySet API](#). Note down the different ways in which you can evaluate a QuerySet.
3. In the Exercise, you converted your QuerySet to DataFrame. Now do some research on the advantages and disadvantages of QuerySet and DataFrame, and explain the ways in which DataFrame is better for data processing.

Exercise 2.8: Deploying a Django Project

Learning Goals

- Enhance user experience and look and feel of your web application using CSS and JS
- Deploy your Django web application on a web server
- Curate project deliverables for your portfolio

Reflection Questions

1. Explain how you can use CSS and JavaScript in your Django web application.
2. In your own words, explain the steps you'd need to take to deploy your Django web application.

3. (Optional) Connect with a few Django web developers through LinkedIn or any other network. Ask them for their tips on creating a portfolio to showcase Python programming and Django skills. Think about which tips could help you improve your portfolio.
4. You've now finished Achievement 2 and, with it, the whole course! Take a moment to reflect on your learning:
 - a. What went well during this Achievement?
 - b. What's something you're proud of?
 - c. What was the most challenging aspect of this Achievement?
 - d. Did this Achievement meet your expectations? Did it give you the confidence to start working with your new Django skills?

Well done—you've now completed the Learning Journal for the whole course.