Python for Web Developers 

Learning Journal

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# 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?

The majority of my coding knowledge and practice has come from the courses up to this point with CareerFoundry. I had only ever messed around with some of the free apps on my phone up prior. Those seemed to give a very basic understanding of the skills, and didn’t have any real-world application, so it was all just theoretical. Besides this I also have been into Super Mario World hacking for the Super Nintendo, so I have a very basic understanding of 65c816 Assembly. I would not say I have any proficiency with Assembly, but enough to understand some code and adjust some addresses when needed. I think the biggest help to this course will be what I have learned from CareerFoundry so far, and seeing the parallels between JavaScript and Python I believe will be my biggest help in understanding.

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

Aside from knowing it is a very popular programming language, I wouldn’t say I know much at all. I was told that the syntax is similar-ish to JavaScript, and that it is on the easier side to learn. I have heard about its versatility and seems to be used across a wide range of different applications. To that degree, I would be interested in knowing more about what makes the language so versatile, and how can the skills I learn from this course be used to look into other realms within Python for other potential opportunities.

1. 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 honestly think that there will be many challenges as I work through this course. Based on the Full Stack Immersion portion of the course, there were some areas that were a major struggle for me to make sense of. These are mostly present in areas where the material gets very abstracted, and I am not able to follow the logic. Reflecting on how I overcame those challenges, mostly revolved around looking up alternative solutions on the internet. So, seeing how others approached an idea or concept, or looked for other forms of explanation, as sometimes the CareerFoundry materials were not helpful in this regard. I think knowing this will likely be challenging again, and having my prior knowledge of course flow, should prove helpful in overcoming some of these challenges.

Remember, you can always refer to [Exercise 1.4](https://careerfoundry.com/en/steps/your-cf-team#receiving-support) 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?

Based on what I have learned so far, frontend development pertains to everything that a user will visually see in their browser. While backend development has to do with everything that happens behind the scenes, or the things the user does not see. An analogy that comes to mind of a house, where the frontend has to do with the interior design that you would see, and the backend is the foundation and structure of the house. If I were to be hired to work on the backend, I believe there is a wide range of potential operations I might encounter. The first that comes to mind are database management and maintenance, and some other areas that I have worked on including; working with an API, form validations, security measures having to do with authentication and authorization, and integrating with third-party services. These are the first ones that came to mind; however, I know that there are a whole host of more things that backend developers can do, I might just not be as familiar with them yet.

1. 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”)*

To best figure out what language we should use, let’s start by comparing the two and seeing which might be the best option. To start, some of the similarities between Python and JavaScript are; they are both high-level languages, so the code is executed line-by-line, they are both dynamically typed allowing our variables to assume various types, and an ease of learning so using either won’t be a strain on the team. Highlighting some key difference between the two include; Pythons ease of readability making code easier to read and maintain through indentation, Python has out-of-the-box essentials that come pre-installed for common web operations, Python’s clear syntax and dynamic typing together make for less error prone code, and Python has an interactive shell making testing and debugging more efficient.

In summary, for why we should use Python, we need to consider that due to the simplicity and readability, we would be able to rapidly prototype and develop. The wide range of packages available will allow us to easily integrate needed functionality such as simple math operations and complex data processing. Looking down the line, using Python will allow us to have a much easier time with future maintenance through its clear and readable syntax. Additional built-in features, such as those specifically for web development, will help us reduce our development time and needed effort. Lastly, the community support is very strong and will be of benefit to us when we run into potential issues that are holding us up.

1. 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. I want to gain a deeper understanding of the Python language core concepts. Learning more about how to properly use the basics (functions, loops, etc.) to write code from scratch.
   2. I am excited to get more in the weeds with Django and learn how homing in on the area’s specifics will bolster my web development knowledge.
   3. Mostly, I am wanting to see how I can use the above knowledge to build real-world projects and what all that looks like in real code and how it applies to the full stack.

### 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?

The iPython shell offers a host of benefits to improve the efficiency of our coding compared to the default Python shell. A significant aspect is our ability to read through our code; in the iPython shell, we have syntax highlighting, which helps make our code much more readable. Another quality-of-life improvement is the shell's tab completion and history features. These allow for speeding up coding by offering suggestions for code completion, and the history feature keeps all our past code at quick reference if it needs to be accessed or modified. The shell also offers in-line documentation, which aids in case we need any quick reference material for a particular use case. Lastly, there are built-in debugging and profiling tools that can aid us in our development over the default shell. Overall, the iPython shell offers a host of quality-of-life benefits over the default shell and would make a logical choice for us to use moving forward.

1. 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?** |
| Integer | Represents whole numbers | Scalar |
| Float | Represent decimal numbers | Scalar |
| String | Represents text | Scalar |
| List | A mutable, ordered collection of items | Non-scalar |

1. 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.

There are four key areas that come to mind when thinking about the difference between tuples and lists in Python. The first and most significant one, in my opinion, is mutability, where lists are mutable (can be modified) and tuples are immutable (cannot be modified once created). Secondly, although tuples are immutable, they offer faster performance and a smaller memory footprint, which can be beneficial for large-scale projects. Another way I help to discern the difference in my head is through their use cases. A list would be suitable for collections that might need to be modified, like a shopping list, whereas a tuple would be better for fixed data, like the coordinates of a location on a map. Lastly, the syntax is, of course, different between the two; lists are surrounded by square brackets [ ], and tuples are surrounded by parentheses ( ).

1. 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.

This seems like the most suitable data structure would be a dictionary. Being mutable, the dictionary would allow for modifications to the app, such as adding new flashcards or updating existing ones. An important feature of the dictionary is its ability to use key-value pairs for structuring the data. This allows each word to have a direct association with its definition and category, making the data easy to organize and retrieve. Lastly, the dictionary data structure can accommodate expandability over time. For instance, if a new feature such as synonyms or example sentences were added, the dictionary could easily incorporate this new data.

While lists and tuples are useful, they lack the direct association between a word and its details that dictionaries offer. Lists could be used for storing flashcards sequentially, but they don’t provide the same level of organization as dictionaries. Tuples, being immutable, are less practical for an app where users are expected to add and modify content frequently.

### 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!)*

|  |
| --- |
| destination = input(“Where do you want to travel? “)  available\_destinations = [“Paris”, “Tokyo”, “New York”]  if destination in available\_destinations:  print(f”Enjoy your stay in {destination}!”)  else:  print(“Oops, that destination is not currently available.”) |
|  |

1. 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.

Logical operators in Python are quite straightforward. I think of them as the bridge between different conditions in my code. There are three main ones: and, or, and not.

* **and** is like a strict gatekeeper. It only lets a situation pass as True if both conditions on either side are True. It's perfect when I need everything to line up just right.
* **or** is more of a friendly neighbor. It's satisfied if either condition is True. So, it's my go-to when I’m okay with multiple scenarios.
* **not** is the contrarian. It flips things around. If something is True, not says it's False, and vice versa. It's great for reversing a condition's logic.

I think of them as the building blocks for making decisions in my code. They're good for directing the flow based on various scenarios.

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

Functions in Python are blocks of code that are designed to perform a specific task. They are defined using the def keyword and can receive input in the form of parameters and return a value. Functions are useful for several reasons:

* **Reusability**: They allow code to be written once and used multiple times, reducing redundancy.
* **Organization**: Functions help in organizing code into manageable blocks, making it more readable and maintainable.
* **Modularity**: They allow for dividing a complex problem into smaller, more manageable parts.

Functions are essential for efficient and effective programming, especially as the complexity of the programs increases.

1. 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.

**Goal 1: Understanding Python Core Concepts**

Progress: I have been working to try to solidify the basics into my brain. There are many parallels between what I know from JavaScript and their counterparts in Python, so I’m trying to bolster those connections. I am trying to have my recall be quick with these concepts, as sometimes my brain feels overloaded, and I don’t properly recall some basics quickly. I still need to improve in this regard (about coding in general) to boost my confidence in the field. To that degree, I have been going through the lessons and spending time on each of the practice exercises within.

**Goal 2: Learning Django for Web Development:**

There is not much progress to speak of in this area, as I have not gotten far enough into the lessons to have had any experience with Django. This will change once we get more lessons under our belt and get into that content.

**Goal 3: Building Real-World Projects:**

I have not made much progress in this regard, as I am still getting some of the basic understandings under my belt. I am not sure if I could make something or real-world use in Python just yet. I have been tinkering around with the provided code examples and practice exercises to gain better understanding and confidence. Once I think of a cool project idea that I can work on concurrently, I will start to outline the project, but nothing solid has come to mind yet.

### 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 crucial in Python for persisting data beyond the lifecycle of a program. If data isn't stored in files, it would be lost when the program terminates, leading to a lack of data persistence. This is particularly important for applications that require data retrieval after the program has been closed, such as databases, user settings, or any form of data analysis.

1. 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 in Python refer to the process of converting a Python object into a byte stream (serialization) and vice versa (deserialization). This is done using the pickle module, where pickle.dump() serializes an object. Pickling is particularly useful when one needs to store complex Python objects, like lists, dictionaries, or custom classes, and retrieve them later in their original state. However, it's important to note that pickling is Python-specific and should be used carefully due to security concerns when loading pickled data from untrusted sources.

1. 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?

In Python, os.getcwd() is used to find out the current working directory. To change the current working directory, os.chdir(path) is used, where path is the target directory path.

1. 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?

To prevent a script from terminating due to an error, I would use try-except blocks. This allows the script to "try" to execute a block of code and "catch" any exceptions or errors in the "except" block. By handling exceptions, the script can continue running even if an error occurs, or it can gracefully exit or log the error for further investigation.

1. 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 feel that my learning progress is going reasonably well so far. The holiday season has brought a bit of a slowdown, which felt like a necessary break, though I did find myself needing to refresh a few concepts upon returning. What I take pride in most is the quality of my work. I've approached each lesson as if it were a task assigned by an employer, and I believe this mindset has elevated the standard of my output.

However, my challenges aren't exclusive to Python. I sometimes struggle with retaining and recalling certain concepts. It's as if some details don't fully stick, leading me to occasionally draw a blank at the start of a task. This requires a bit of time for me to get the gears turning again. This issue isn't new; I experienced it with previous materials too. Embarking on this career change is indeed daunting!

In essence, my goal is to build confidence in my abilities, ensuring I can bring value to a future employer. To achieve this, I recognize the importance of staying updated on earlier materials and concepts, especially as I encounter more complex topics. Keeping everything fresh in my mind is crucial for my ongoing development in this field.

### 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?
2. What are objects and classes in Python? Come up with a real-world example to illustrate how objects and classes work.
3. In your own words, write brief explanations of the following OOP concepts; 100 to 200 words per method is fine.

|  |  |
| --- | --- |
| **Method** | **Description** |
| Inheritance |  |
| Polymorphism |  |
| Operator Overloading |  |

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

|  |  |
| --- | --- |
| **Data type** | **Definition** |
|  |  |
|  |  |
|  |  |

1. In what situations would SQLite be a better choice than MySQL?
2. Think back to what you learned in the Immersion course. What do you think about the differences between JavaScript and Python as programming languages?
3. 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?

### 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.

1. You’ve finished Achievement 1! Before moving on to Achievement 2, take a moment to reflect on your learning in the course so far:
   1. What went well during this Achievement?
   2. What’s something you’re proud of?
   3. What was the most challenging aspect of this Achievement?
   4. Did this Achievement meet your expectations? Did it give you the confidence to start working with your new Python skills?
   5. 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 can always refer to [Exercise 1.4](https://careerfoundry.com/en/steps/your-cf-team#receiving-support) 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.*)

1. In your own words, describe the steps you would take to deploy a basic Django application locally on your system.
2. 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](https://docs.djangoproject.com/en/3.2/ref/templates/language/#templates) 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 |  |

1. 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](https://docs.djangoproject.com/en/3.2/ref/models/querysets/). 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:
   1. What went well during this Achievement?
   2. What’s something you’re proud of?
   3. What was the most challenging aspect of this Achievement?
   4. 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.