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?

Other than the CF Full Stack Dev course, I have worked on a variety of projects that involved some degree of web dev frequently over the past 12 years. Mostly I have functioned in the manager role with only an as-needed understanding of the high-level concepts involved. The most involved programming work I have done solo was in C# via Unity to develop an Augmented Reality capable companion application for a textbook.

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

I know very little about Python. I would like to know more of its capabilities for general awareness and as a potential solution resource in the future.

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 do not expect any major challenges other than time availability. This is because my 3rd child was just born very recently, and the early new-born phase can really strain the work schedule.

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?

Frontend web development focuses on the part of a website or web application that users interact with directly, like the layout, design, and user interface elements. Backend web development, on the other hand, deals with the server-side logic, databases, and application functionality that support the frontend.

If hired to work on backend programming for a web application, you would be responsible for operations such as managing databases, ensuring data is securely stored and retrieved, handling server-side logic, implementing APIs, and ensuring efficient server performance and scalability.

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”)*

Similarities:

* Both are interpreted languages, meaning they don't need to be compiled before running.
* They support multiple programming paradigms, including object-oriented, procedural, and functional programming.
* Both have large, active communities, providing extensive libraries, frameworks, and tools.

Differences:

* JavaScript is primarily used for frontend development to create interactive web pages, though it can also be used for backend development with Node.js.
* Python is a general-purpose language often used for backend development, data analysis, machine learning, and automation due to its simplicity and readability.
* JavaScript runs natively in web browsers, making it essential for web development, while Python is known for its ease of use and readability, making it popular for rapid development and prototyping.

I would suggest Python for our project because it is easy to learn and understand, making it quicker for new developers to get up to speed. Python also has simple built-in package management with tools like pip, which streamlines the process of installing and managing dependencies. It comes with out-of-the-box essentials, reducing the need for additional configuration. Python's efficient development flow allows for rapid development and iteration, and it has strong community support, providing plenty of resources and libraries to help us solve problems effectively.

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?

Increased breadth of knowledge with regard to development

Enhanced Data Analysis Skills

Explore Automation and Scripting

### 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?

IPython is a more powerful and user-friendly environment for interactive coding and experimentation. It provides features like syntax highlighting, auto-completion, and magic commands, which make it easier and faster to write and test code interactively. There are better tools for debugging, allowing for more efficient problem-solving. Also, It supports displaying plots, images, and other rich media inline, which is useful for data analysis and visualization.

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 (int) | Represents whole numbers without a fractional part (e.g., 5, -3). | Scalar |
| Float (float) | Represents numbers with a fractional part (e.g., 3.14, -0.001). | Scalar |
| String (str) | Represents sequences of characters (e.g., "hello", "123"). | Non-scalar |
| List (list) | Represents ordered collections of items, which can be of different types (e.g., [1, "apple", 3.14]). | 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.

Tuples are used for fixed collections of items and can be used as keys in dictionaries due to their immutability.  
Lists, due to their mutability, are typically used when you need a collection that may change over time.

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.

For a language-learning app with flashcards, a dictionary would be the most suitable data structure. Here's why:

* Flexibility: Dictionaries allow you to store key-value pairs, making it easy to associate vocabulary words (keys) with their definitions and categories (values).
* Ease of Access: You can quickly look up definitions and categories using the vocabulary word as the key.
* Expandability: As you develop the app further, dictionaries can be easily expanded to include additional information (e.g., example sentences, pronunciation).

### 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!)*

|  |
| --- |
| # Travel app script  # Ask the user where they want to travel  destination = input("Where would you like to travel? ")  # Define the travel destinations  destination\_1 = "England"  destination\_2 = "Germany"  destination\_3 = "Italy"  # Check the user's input and respond accordingly  if destination == destination\_1:  print(f"Enjoy your stay in {destination\_1}!")  elif destination == destination\_2:  print(f"Enjoy your stay in {destination\_2}!")  elif destination == destination\_3:  print(f"Enjoy your stay in {destination\_3}!")  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 used to combine conditional statements. There are three main logical operators:

* and: Returns True if both statements are true.
* or: Returns True if at least one statement is true.
* not: Reverses the result, returns False if the statement is true.

For example:

* True and False returns False.
* True or False returns True.
* not True returns False.

They help control the flow of the program by allowing more complex conditions.

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

Functions in Python are blocks of reusable code that perform a specific task. They are defined using the def keyword, followed by the function name and parentheses.  
Functions are useful because they:

* Promote Code Reusability: You can call the same function multiple times without rewriting the code.
* Improve Readability: Breaking code into functions makes it easier to read and understand.
* Simplify Maintenance: Bugs are easier to find and fix in smaller, well-defined functions.

You use functions when you have repetitive tasks or when you want to organize your code into logical sections.

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.

* Increased breadth of knowledge with regard to development
  + Learning the fundamentals helps me to gain a basic understanding of Python’s uses compared to other language approaches
* Enhanced Data Analysis Skills
  + Begin to understand the capability of Python in this area due to its ease of data exploration and manipulation
* Explore Automation and Scripting
  + Do not see this yet at such an early stage

### 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?

Data is lost once the script is finished. Need storage for permanence.

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 are serialized representations of objects, allowing you to save complex data structures to a file and load them later using the pickle module. You would use pickles when you need to save and load complex data structures like lists, dictionaries, or custom objects.

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?

os.getcwd() command is used to find out which file directory you’re currently working on  
os.chdir() command lets your Python interpreter change its current working directory

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?

Utilize a try-except-else-finally block.

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.

Going more smoothly than expected. Proud to see the previous course coding experience paying off in facilitating learning this new language more quickly. Do not perceive any particular struggles beyond normal hurdles of gaining familiarity and implementing new information.

### 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?

OOP is a programming style that uses objects to represent data and methods. Objects are instances of classes, which can be thought of as blueprints for creating objects.

The benefits of OOP include:

* Modularity: Code is organized into classes and objects, making it easier to manage and understand.
* Reusability: Classes can be reused across different programs, reducing redundancy.
* Scalability: OOP makes it easier to handle larger and more complex programs by breaking them down into manageable pieces.
* Maintainability: OOP helps keep code organized, making it easier to update and maintain.

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

In Python, classes are blueprints for creating objects. They define the properties (attributes) and behaviors (methods) that the objects created from the class will have. An object is an instance of a class, representing a specific entity with the defined properties and behaviors.

Example:

* ‘Tool’ is a class that defines the attributes ‘name’, ‘tool\_type’, and ‘purpose’, and a method ‘use\_tool’ to describe the action of using the tool.
* An object would be a specific tool created from this class.

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

|  |  |
| --- | --- |
| **Method** | **Description** |
| Inheritance | allows a class (called a child or subclass) to inherit attributes and methods from another class (called a parent or superclass). This helps in reusing code and creating a hierarchy of classes. For example, a ‘Dog’ class can inherit from an ‘Animal’ class, getting all its properties and behaviors while adding its own specific ones. |
| Polymorphism | means "many shapes." In OOP, it allows methods to do different things based on the object they are acting upon. For example, a method called ‘speak()’ could make a ‘Dog’ object bark and a ‘Cat’ object meow, even though the method name is the same. |
| Operator Overloading | allows custom definitions for standard operators (like +, -, \*, etc.) for user-defined classes. For example, you can define how the ‘+’ operator works for a ‘Vector’ class so that adding two ‘Vector’ objects together results in a new ‘Vector’ with summed components. |

### 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 organized collections of data that allow us to store, manage, and retrieve information efficiently. They are used in various applications, such as websites, apps, and other software systems. Advantages of using databases are as follows: organization, efficiency, security, scalability, and data integrity.

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

|  |  |
| --- | --- |
| **Data type** | **Definition** |
| INT (Integer) | Represents whole numbers without decimal points |
| VARCHAR (Variable Character) | Stores variable-length strings |
| DATE | Stores date values in the format ‘YYYY-MM-DD’ |

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

SQLite is best suited for scenarios where simplicity, ease of setup, and lightweight performance are more important than the advanced features and scalability offered by MySQL. (ie. Mobile apps, embedded devices, small web projects)

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

Python feels more accessible and less intimidating from a beginner perspective. It is also more straightforward and readable. JS seems to be more versatile since it ties into the web so well and has asynchronous capabilities.

1. 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?

Honestly, I don’t think I know enough about it to be able to accurately anticipate its limitations. Know it is not particularly used for mobile dev and that the GUI libraries are considered weaker than other languages is all that I can really say in confidence.

### 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?

An Object-Relational Mapper (ORM) is a tool that allows developers to interact with a relational database using an object-oriented paradigm. Instead of writing raw SQL queries, an ORM lets you manipulate database tables as if they were regular Python objects.

1. 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?

The project went well overall. One aspect of the app that I did particularly well was the user interface design for the terminal. I made sure it was user-friendly and intuitive, with clear prompts and error handling to guide users through creating, viewing, searching, updating, and deleting recipes. This helped ensure a smooth user experience.

If I were to start over, I would focus on adding an option to exit from functions such as updating a recipe. Currently, once you start a function, you must complete it or restart the app to return to the main menu. Implementing an exit option within these functions would provide users with more flexibility and control, allowing them to easily return to the main menu without completing an action they no longer wish to perform.

1. 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.

I've gained experience in creating a recipe management application using Python. This project involved building a database-driven application with SQLAlchemy to manage recipes. I designed a user interface in the terminal to create, view, search, update, and delete recipes. The app uses a MySQL database to store recipe data, including ingredients, cooking time, and difficulty levels, which are calculated based on specific criteria. Through this project, I developed skills in database interactions, user input validation, and modular programming in Python.

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? No major conceptual walls
   2. What’s something you’re proud of? Timely and Consistent Progress
   3. What was the most challenging aspect of this Achievement? Understanding Environment setup and linking
   4. Did this Achievement meet your expectations? Did it give you the confidence to start working with your new Python skills? yes
   5. What’s something you want to keep in mind to help you do your best in Achievement 2? Take it one piece at a time. No rush.

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.