The Emergence of Python

Day 1

FinTech
Lesson 2.1

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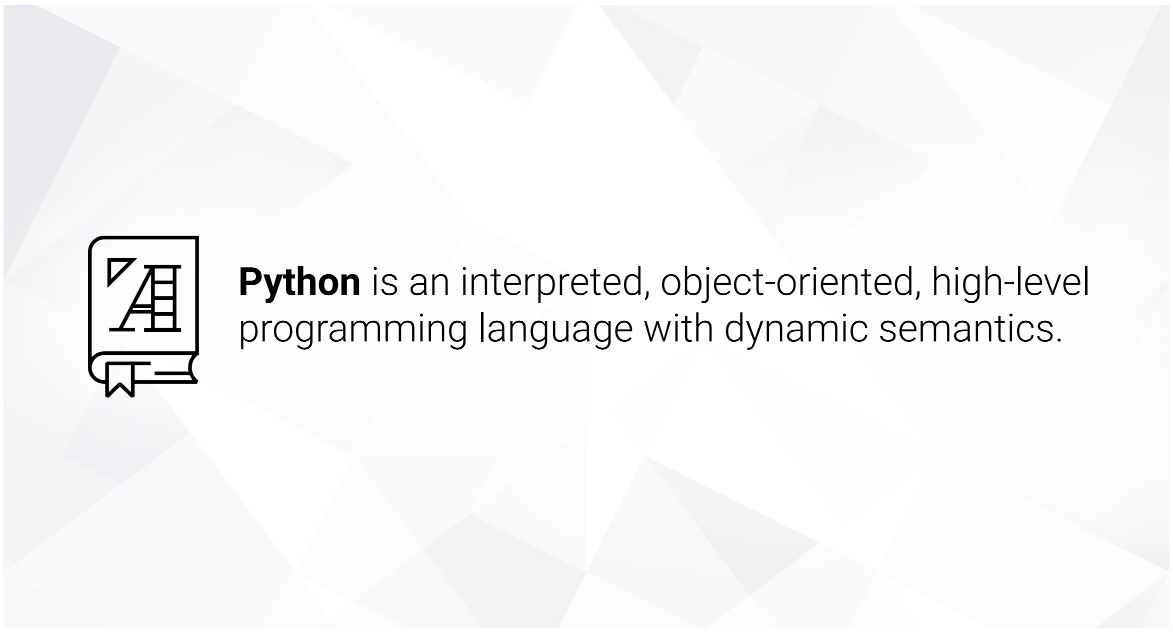
Class Objectives

By the end of today's class, you will be able to:

- Open a project using JupyterLab.
- Pseudocode a task using Python comments.
- Create, store, and retrieve data using Python variables.
- Control program flow with conditional logic.
- Repeat blocks of code with loops.



Python is an interpreted, object-oriented, high-level programming language with dynamic semantics.

Python

Python offers the following features:

Easy-to-Read Syntax	Modularity	Cross-Platform Capability	Robust Modeling, Financial Analytics, and Data Science Platform
Human-readable syntax that makes it easier to understand and debug applications	A wide variety of standard and advanced libraries that can be easily imported into user applications Many well-known data science and visualization libraries such as NumPy, Pandas, and Plotly	Runtime environments can be deployed on Windows, Mac, Linux	Supports a number of financial analytic and data science libraries such as Pandas, NumPy, Matplotlib, SciPy, and SciKit

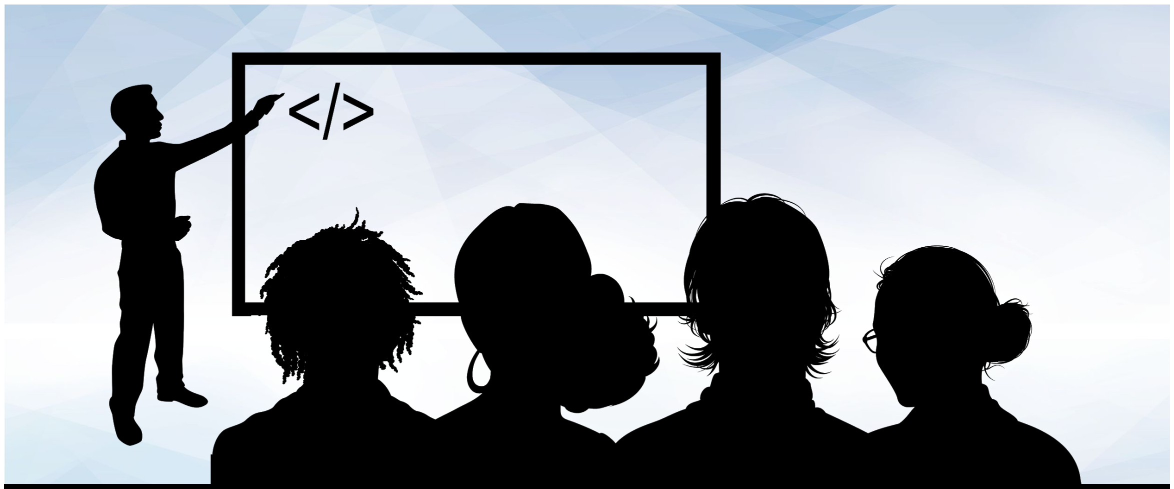
JupyterLab

JupyterLab is the next version of Jupyter Notebook—an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text.

JupyterLab

JupyterLab offers the following features:

- Enables you to work with documents and activities such as Jupyter Notebooks, text editors, terminals, and custom components in a flexible, integrated, and extensible manner.
- Offers a unified model for viewing and handling data formats: images, CSV, JSON, markdown, PDF, Vega, Vega-Lite, etc.
- Arranges multiple documents and activities side by side in the work area using tabs and splitters.
- Includes extensions that can customize or enhance any part of JupyterLab, including new themes, file editors, and custom components.



Instructor Demonstration
JupyterLab

JupyterLab Environment Setup

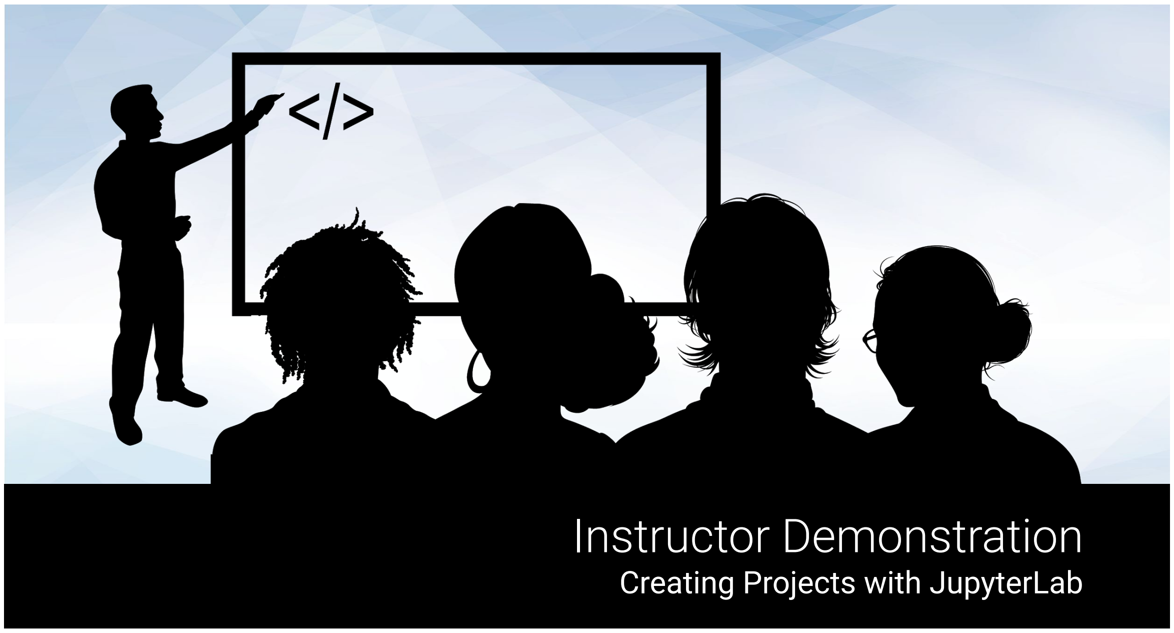
JupyterLab is provided through the Anaconda distribution.

Activate your Anaconda dev environment via the terminal to get started with JupyterLab!

```
conda activate dev
```

Environment Issues: They Happen to All of Us

JupyterLab or Anaconda not working? **NO WORRIES**. Raise your hand and a TA will provide assistance.



Instructor Demonstration

Creating Projects with JupyterLab

Activity: Create a JupyterLab Project

In this activity, you will create a JupyterLab project and run a Python `hello world` print statement in a Python notebook.

(Instructions sent via Slack)

Suggested Time:
10 Minutes

Let's Review: Create a JupyterLab Project

01 What is JupyterLab?

02 What are some of the advantages of JupyterLab?

03 Where are files saved when created in JupyterLab: on the file system or on a separate server?

04 How many activities can be opened in one launcher?

05 What are JupyterLab projects?

06 How do you create a project in JupyterLab?

07 What can go into a JupyterLab project?

Review Time: 5 minutes

Variables

Variables are reserved allocations in memory that can hold defined values.

Variables

Variables have three main operations: **create, put,** and **retrieve.**

01

To create a variable, `declare` it.

02

To put a value in a variable, `assign` it.

03

To retrieve a variable, `call` it.

Variables

Python has five standard data types:

01 Number (integer, float, etc.)

02 String

03 List

04 Dictionary

05 Tuple

Activity: Hello Variable World

In this activity, you will learn how to perform calculations and operations using variables.

(Instructions sent via Slack)

Suggested Time:
10 Minutes

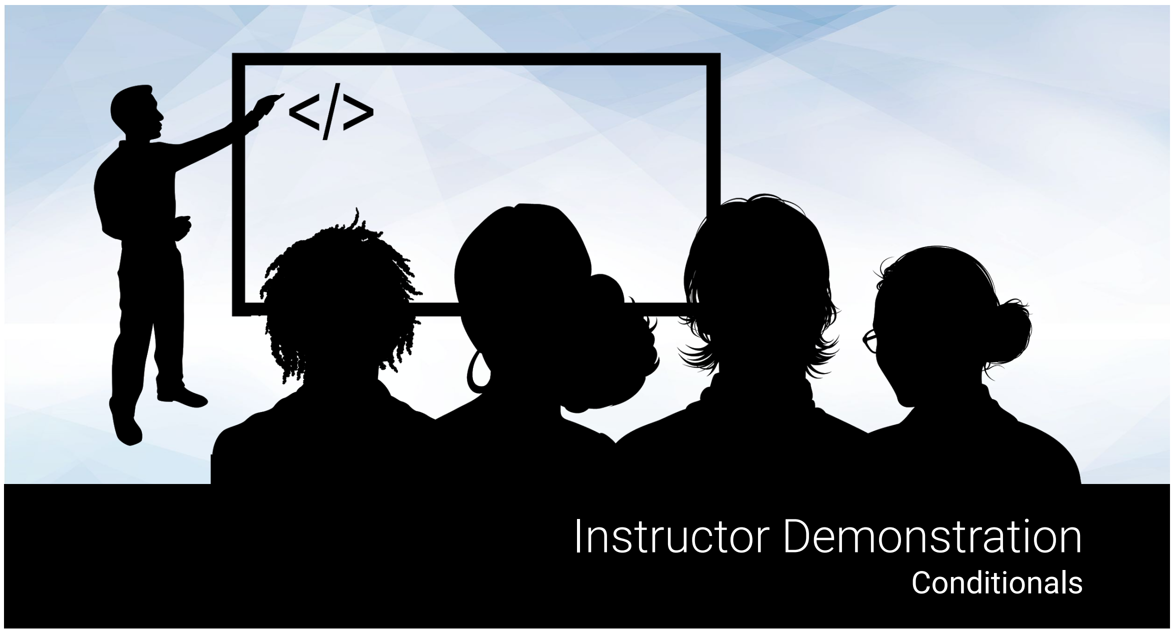
Time's Up! Let's Review.

Conditionals

Conditionals are Boolean expressions that evaluate a condition to determine whether it is true or false. The result of the evaluation (true or false) determines the corresponding action.

Conditionals

```
if pedestrian:
    do_not_hit()
```



Instructor Demonstration

Conditionals

Activity: The Conditional Conundrum

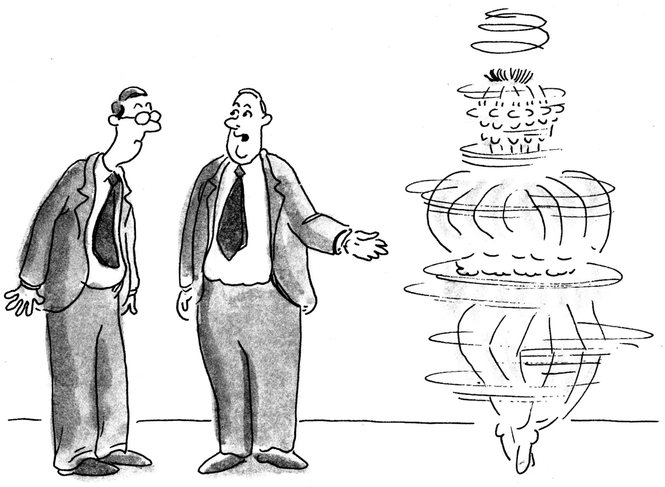
In this activity, you will learn how to perform calculations and operations using variables.

(Instructions sent via Slack)

Suggested Time:
15 Minutes

Time's Up! Let's Review.

For Loops

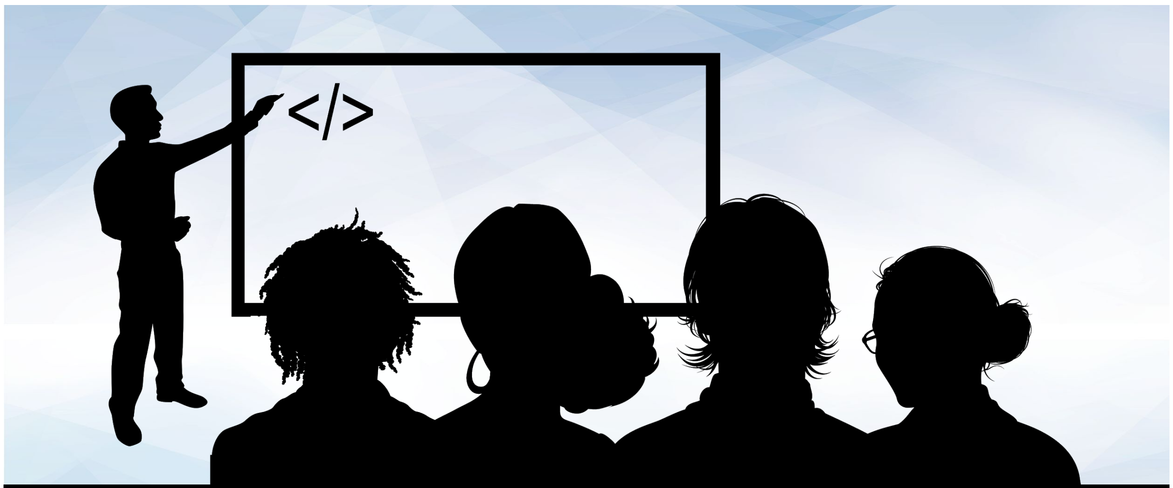


“Bob is our infinite loop specialist.”

A **for loop** is used for iterating over a sequence such as a list or dictionary.

For Loops

```python
# Loop through a range of numbers (0 through 4)
for x in range(5):
    print(x)

print("---------------------------------")

# Loop through a range of numbers (2 through 6 - yes 6!, Up to, but not including, 7)
for x in range(2, 7):
    print(x)

print("---------------------------------")

# Iterate through letters in a string
word = "Peace"
for letters in word:
    print(letters)

print("---------------------------------")
```



Instructor Demonstration
Loops

Activity: Loop De Loop

In this activity, you will work with for loops in a Python file.

(Instructions sent via Slack)

Suggested Time:
15 Minutes

Time's Up! Let's Review.

Pseudocoding

Pseudocoding is the process of devising the specific requirements and behaviors of an application in human-readable language.

Pseudocoding

Some questions to consider:

What does my application need to do to achieve the result?	What behaviors should my application exhibit?	How should my application perform?
Example: Calculate an average	Example: Login management	Application should be highly available and data should be able to be queried in real-time
Set a sum value A and a count value B and return a value that is equal to A / B.	Evaluate a username and password. If they match the security credentials, then log in; else do not log in and display an error.	Replicated cluster nodes such as Hadoop/EMR and MongoDB

Pseudocoding

Pseudocode Example:

```
"""
   Pseudocode for a cheer-leading program:

   1. Initialize “cheer” variable to a
      string to be cheered
   2. Create a for loop and iterate through
      each character in "cheer" variable
      2.1 Print each letter to screen with a cheer
   3. Print exclamations to screen ("Woohoo!!!")
"""
```

Python Code Example:

```
# Create a variable named cheer
cheer = "Python"

# Below string can be used to add fun
cheer_symbol = "*\O/*"
cheer_symbol_2 = "\( ˆo^)/\(ˆ_ˆ )"

# Loop through a string
fox x in cheer:
    #Print each letter with a cheer
    print("Give me a " + x + "!")
    print(x + "!")

# Print excitement to screen
print("\nWhat does that spell?!")
print(cheer + "!\nWoohoo! Go " + cheer + "!")
print(cheer_symbol * 3)
print(cheer_symbol_2)
```

Activity: Conditionally Yours, Part 1

In this activity, you will pseudocode a solution to identify whether or not a stock should be purchased based on a specific threshold of percent increase or decrease.

(Instructions sent via Slack)

Suggested Time:
10 Minutes

Challenge:
Conditionally Yours, Part 2

In this activity, you will leverage the pseudocode created in the last activity to develop a program that will recommend whether or not a stock should be purchased based on a specific threshold of percent increase or decrease.

(Instructions sent via Slack)

Suggested Time:
15 Minutes

Let's Review: Pseudocoding

- How did pseudocoding improve or hinder your coding process?
- What are some best practices for pseudocoding?
- True or false: Pseudocode should include lines of code.
- How do you identify a dependent statement in pseudocode?

Review Time: 5 minutes

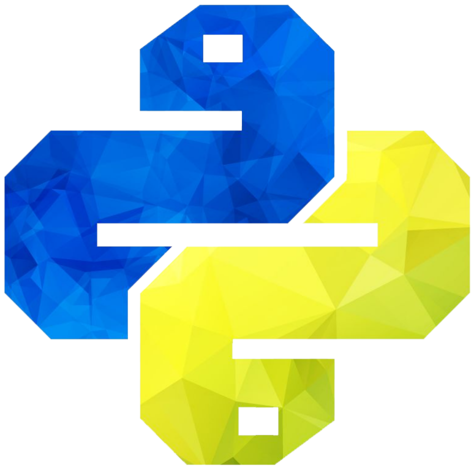
Preview Homework

Decompress

Give Yourselves a Round of Applause!

Rejoice! You went to infinity and beyond today! Great, great, great work surviving today's mental battles with Python.

And it seems you've gained some Python prowess since the beginning of class—your fingers are looking kind of buff.



Today’s Class

Here’s a high-level view breakdown of what you learned today:

- How to work with JupyterLab projects
- Python syntax and keywords
- Variables
- Conditionals
- For loops
- Pseudocoding