Welcome to this CoGrammar Lecture: Getting Started with Python

The session will start shortly...

Questions? Drop them in the chat.
We'll have dedicated moderators answering questions.

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SKILLS FOR LIFE
SKILLS BOOTCAMPS

Department for Education

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Getting Started with Python

September 2024

Software Engineering Session Housekeeping

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(Fundamental British Values: Mutual Respect and Tolerance)**
- No question is daft or silly - **ask them!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. Moderators are going to be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Academic Sessions. You can submit these questions here: **Questions**

Software Engineering Session Housekeeping cont.

- For all **non-academic questions**, please submit a query: **www.hyperiondev.com/support**
- Report a **safeguarding** incident: **www.hyperiondev.com/safeguardreporting**
- We would love your **feedback** on lectures: **Feedback on Lectures**

Skills Bootcamp Progression Overview

To be eligible for a certificate of completion, students must fulfil three specific criteria. These criteria ensure a high standard of achievement and alignment with the requirements for the successful completion of a Skills Bootcamp.

✅ Criterion 1 - Meeting Initial Requirements

Criterion 1 involves specific achievements within the first two weeks of the program. To meet this criterion, students need to:

- Attend a minimum of 7-8 hours per week of guided learning (lectures, workshops, or mentor calls) within the initial two-week period, for a total minimum of 15 guided learning hours (GLH), by no later than 15 September 2024.
- Successfully complete the Initial Assessment by the end of the first 14 days, by no later than 15 September 2024.

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Skills Bootcamp Progression Overview

✅ Criterion 2 - Demonstrating Mid-Course Progress

Criterion 2 involves demonstrating meaningful progress through the successful completion of tasks within the first half of the bootcamp.
To meet this criterion, students should:

- Complete 42 guided learning hours and the first half of the assigned tasks by the end of week 7, no later than 20 October 2024.

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Skills Bootcamp Progression Overview

✅ Criterion 3 - Demonstrating Post-Course Progress

Criterion 3 involves showcasing students' progress after completing the course. To meet this criterion, students should:

- Complete all mandatory tasks before the bootcamp's end date. This includes any necessary resubmissions, no later than 22 December 2024.
- Achieve at least 84 guided learning hours by the end of the bootcamp, 22 December 2024.

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Learning Objectives & Outcomes

- Download and install Python, VS Code on current operating system.
- Navigate the file system using basic terminal commands and execute “Hello World” Python script from the terminal, and from VS Code.
- Describe how computers work (Input -> Processing -> Output)
- Define programming, algorithm, variable (definition and naming convention), syntax, comments and why they are needed

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Learning Objectives & Outcomes

- Differentiate between primitive and non–primitive data types
- Declare variables using different data types in Python.
- Perform basic operations using the data types.
- Perform basic boolean operations using the truth table
- Write and execute conditional statements using if, elif, and else.

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Poll

How do you think programming can solve problems?

- By manually fixing issues on the computer
- By providing step-by-step solutions on a paper guide
- By writing code that automates tasks

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Poll

Why is learning to think logically important for programming?

- It helps you memorise code faster
- It makes your code look more organised
- It helps you solve problems systematically

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Hello World!

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Setting Up Your Environment

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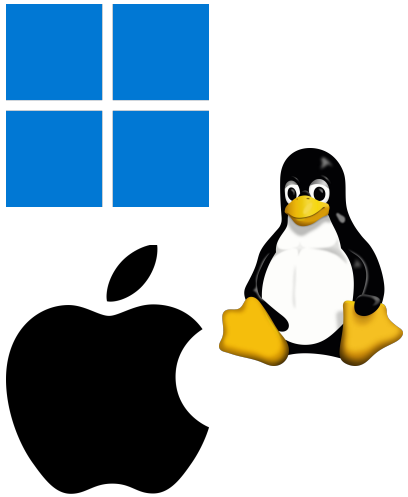
Installing Python, VS Code, and Thonny

Let's get your development environment ready



Programming language of choice. Easy to learn and use.

IDE of choice. Makes it easier to write code, not only for Python

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The Terminal

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What is a Terminal ?

- **Definition:** A **text-based interface** that allows users to interact with their computer's operating system by **typing commands**. Also called **CLI** or **Command Line Interface**.
- **Why It's Important**:
  - **Direct Control**: Perform actions **quickly** and **efficiently** by typing **commands** instead of using a **GUI**.
  - **Automation**: Execute scripts to **automate** repetitive tasks.
  - **Access to System Tools**: Use powerful system commands and tools that may not be available in the GUI.

Basic Commands

- pwd - Prints the current working directory.
- ls - Lists the contents of the current directory.
- cd <directory> - Changes directory to the specified directory.
- python filename.py - Executes a python script.
- pip install package_name - Installs Python software packages.
- mkdir <directory> - Creates a new directory.
- touch <file> - Creates a new file.
- rm <file> - Removes a file.

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How Computers Work?

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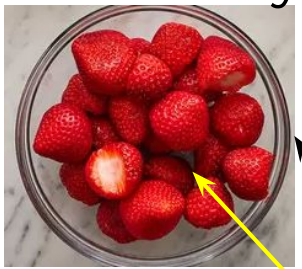
How Computers Work?
Basic Fruit Smoothie - Use Case

Ice

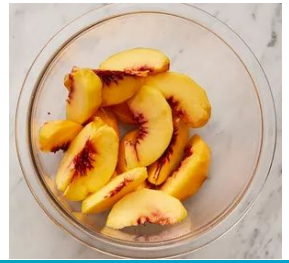
Orange Juice

Banana

Strawberry



Peach



Input

container

content

Recipe

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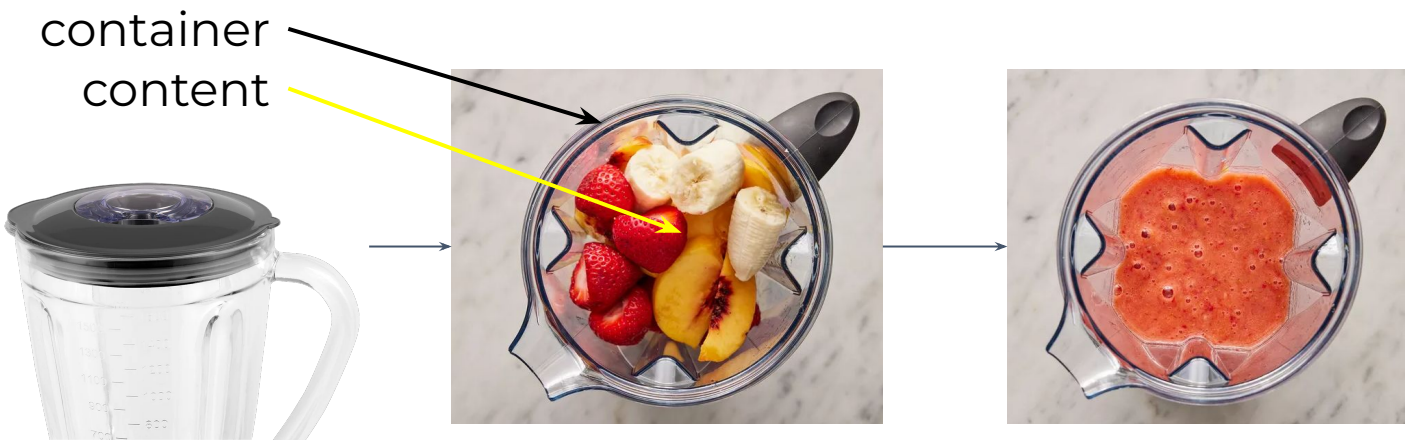
How Computers Work?
Basic Fruit Smoothie - Use Case



Processing

Recipe

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How Computers Work?
Basic Fruit Smoothie - Use Case

container
content

Output

Recipe

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Basic Programming Concepts

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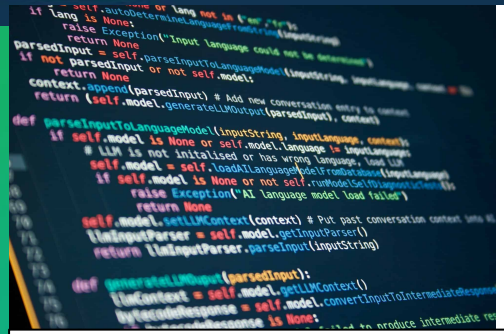
Programming Basics



Programming is the process of writing instructions that a computer can understand and execute to perform specific tasks.

An algorithm is a step-by-step set of instructions designed to perform a specific task.

Syntax: rules for writing code and Comments: notes for the programmer.

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Programming Basics
Variables

- **Variable**: Memory location used to store data, which can be changed or used later in the program.
- **snake_case** is a variable naming convention where each word is in lower case, and separated by underscores
- Python **reserved words** designate special language functionality. No other variable can have the same name as these keywords. eg print as for like def or class is

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Programming Basics
Variables

```
drink_name = "smoothie"
banana = 12
orange_juice = 30.0
strawberry_juice = 20.5
mix_juice = banana + orange_juice + strawberry_juice
print(f"You have {mix_juice} litres of juice.")
```

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Let's take a break

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Data Types

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Data Types and Variables in Python

A **data type** is a **characteristic** of a variable that tells a computer system **how to interpret** the value of a piece of data.

Primitive Data Types				Non-Primitive Data Types			
Primitive data types are the most basic data types. They are the building blocks for more complex data types.				Non-primitive data types (also known as complex or composite data types) are built upon primitive data types.			
int	**float**	**bool**	**string**	**list**	**set**	**tuple**	**dict**
1, -1	3.14, -1.0	True, False	"Hello"	[1,2]	{1, 'a'}	(1.0,0)	{'x':0.1, 'y':0.2}

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Conditional Statements

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Boolean Logic and Truth Tables

Boolean values:

True, False

Operators:

and: **Both** conditions must be **true**

or: At **least one** condition must be **true**

not: **Inverts** the boolean value

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Boolean Logic and Truth Tables

Truth Table:

Let **A** and **B** booleans expressions, either **True** or **False**

A	B	A & B	A | B	NOT A
False	False	False	False	True
False	True	False	True	True
True	False	False	True	False
True	True	True	True	False

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Conditional Expressions and Signs

Comparison operators:

==	: Equal to
!=	: Not equal to
<	: Less than
>	: Greater than
<=	: Less than or equal to
>=	: Greater than or equal to

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Conditional Statements

Conditional statements help your program make decisions and adapt its behavior accordingly. There are primarily three types of conditional statements in programming:

```
if condition:
    # code block to execute if condition is true
elif another_condition:
    # code block to execute if another_condition is true
else:
    # code block to execute if none of the above conditions are true
```

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Conditional Statements

- **if** statement:
  - It executes a block of code if the **specified condition** is **true**.
  - Otherwise it skips the block of code

```
age = 16
if age >= 18:
    print("You are eligible to vote")
```

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Conditional Statements

- **if-else** statement:
  - It executes a block of code if the **specified condition** is **true**.
  - Otherwise it executes the block of code in the **else** section

```
age = 16
if age >= 18:
    print("You are eligible to vote")
else:
    print("You are not eligible to vote yet")
```

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Conditional Statements

- **if-elif-else** statement:
  - It executes a block of code if the **specified condition** is **true**.
  - Otherwise it executes the block of code in the **elif** section
  - If all **elif** conditions are **false** the it executes the **else** code block

```
age = 85
if age >= 90:
    print("Class: A")
elif age >= 80:
    print("Class: B")
elif age >= 70:
    print("Class: C")
else:
    print("Class: D")
```

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Poll

Which command is used to list files in a directory in the terminal?

- **ls**
- **cd**
- **mkdir**
- **rm**

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Poll

```python
x = 5
y = 10
z = 8

if x > y and x < z:
    print("Answer 1")
elif x < y or x > z:
    print("Answer 2")
elif not (x == y or x == z):
    print("Answer 3")
else:
    print("Answer 4")
```

What is the purpose of the elif keyword in Python?

- Answer 1
- Answer 2
- Answer 3
- Answer 4

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Lesson Conclusion and Recap

Recap the key concepts and techniques covered during the lesson.

- **Installing Development Tools**: Setting up Python, VS Code, and Thonny for coding. Demonstrated installation and basic configuration
- **Navigating the File System**: Using terminal commands to manage files and directories. Covered commands like `cd`, `ls`, and `mkdir`
- **Running Python Scripts**: Executing Python scripts from the terminal and VS Code. Illustrated running a "Hello World" script.
- **Basic Programming Concepts**: Understanding programming fundamentals, including algorithms, variables, and syntax. Explained their roles with examples.
- **Conditional Statements and Boolean Logic**: Using `if`, `elif`, and `else` for decision-making and boolean operators for logic. Demonstrated with practical examples.

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Practical: E-commerce Checkout with Age-based Discount

1. **Objective:** You're building a simple checkout system for an e-commerce store. When a customer checks out, they need to enter their age, total order price, and account balance. The system will categorise them into an age group and apply a discount if they qualify. Then it will check if the balance is sufficient to complete the purchase, taking into account any applicable discounts.
2. **Steps to Implement:**
   - Take User Inputs:
     i. Get the customer's age, total order price, and account balance.
   - Categorize Age and Apply Discount:
     i. If the customer is aged 18-25, apply a 10% discount.
     ii. If the customer is aged 26-60, apply a 5% discount.
     iii. If the customer is under 18 or over 60, no discount is applied.
   - Calculate Discounted Price:
     i. Adjust the total order price based on the applicable discount.
   - Check Balance:
     i. Compare the customer's account balance with the discounted price.
     ii. If the balance is enough, proceed with the order.
     iii. If the balance is insufficient, calculate the shortfall and inform the user.

Resources

- **Software:**
  - https://www.python.org/downloads/
  - https://code.visualstudio.com/download
- **Additional Resources**
  - HackInScience — Python Exercises
  - https://www.codewars.com/
- **Books:**
  - https://greenteapress.com/wp/think-python-2e/
  - https://python.land/introduction-to-python/variable

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Questions and Answers

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Thank you for attending

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