Python Summer Course

Course 1: Python Basics & Objects

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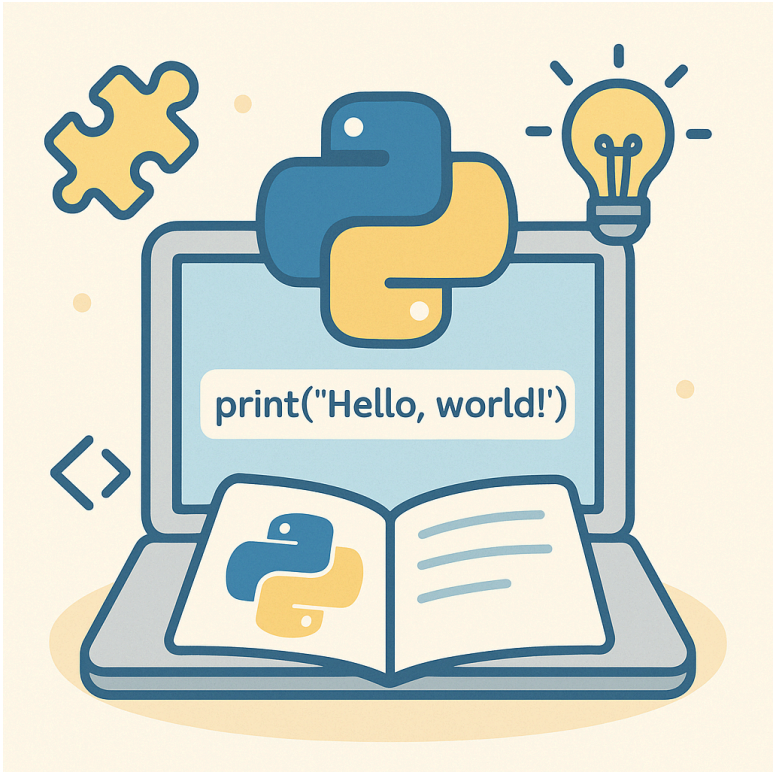
Downloading Pyodide

Introduction



My first code

Python Code | Start Over | Run Code

```
1  print("Hello World!")
2  print("Welcome to the Python Summer Course!")
```

Downloading package: ipython

What is programming ?

> “Computer programming or coding is the composition of sequences of instructions, called programs, that computers can follow to perform tasks. It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages.”
> — Wikipedia

Why Learn with Python?

✅ Easy to read and write; its simple syntax is close to English

✅ Beginner-friendly: widely used in teaching and well-documented

✅ Versatile: used in data science, AI, web development, automation...

✅ Cross-platform: runs on Windows, macOS, and Linux

⚠️ Slower performance compared to compiled languages like C/C++

⚠️ Not ideal for mobile app development or real-time systems

Setting Up Python: How It Works

Python is an interpreted language:

- You write source code in `.py` files
- The Python interpreter reads and executes your code line by line

To run Python code, you need:

- The **Python interpreter**
- A code editor (e.g. VS Code, Thonny, Jupyter Notebook)

What do I use?

Python Code | Start Over | Run Code

```
1 import sys # We will see what it means later
2 # By the way, this is how we write comments in Python
3
4 print("I print who is running my Python")
5 print(sys.executable)
```

💡 Installation Options

✅ Option 1: Install Python Locally (e.g. Download from python.org)

✅ Option 2: Use Environment management (e.g. Anaconda)

✅ Option 3: Use Python in the Browser (e.g.. Google Colab)

G Google Colab

1. Go to colab.research.google.com
2. You may have to login to your Google acount
3. Create a new Notebook
4. Start programming!

notebooks in 2 mins

- Write text (Markdown) => + Text
- Write code (Python) = > + Code
- Run cells

Python as a Calculator

You can just write operation directlx into the cells

Python Code | Start Over | Run Code

```
1  3 + 1
```

Your turn: try it out using `+ - * / % ** //`

`print()` and `input()` in Python

These are basic but powerful tools for **interacting with the user**.

`print()`: Display output

`input()`: Get user input

Used to **ask the user for information**. Always returns a **string**.

Example

```
1 user_name = input("What is your name? ")
2 print("Nice to meet you,", user_name)
```

⚠️ If you need a number from `input()`, use `int()` or `float()`:

```
1 age = int(input("Enter your age: "))
2 print("In 5 years, you'll be", age + 5)
```

Variable

A variable is a name that stores a value in your program, like a labeled box that holds data.

It lets you remember values (like numbers, text, results of calculations)

You can use or change the value later

Python creates the variable when you assign it a value

Variable: example

Python Code | Start Over | Run Code

```python
# Assign values to variables
name = "Alice"
age = 30
height = 1.65

# Use variables in expressions
print("Name:", name)
print("Age in 5 years:", age + 5)
print("Height in cm:", height * 100)

# Change the values
name = "Bob"
age = age - 5
print("Name: ", name)
print("Age: ", age)
```

Types

A type in Python defines what kind of data a value is, and what you can do with it.

Python Code | Start Over | Run Code

```python
# Integer
age = 25
print("Age:", age, "->", type(age))

# Float
height = 1.75
print("Height:", height, "->", type(height))

# String
name = "Alice"
print("Name:", name, "->", type(name))

# Boolean
is_student = True
print("Is student:", is_student, "->", type(is_student))
```

Everything is an Object in Python

Objects have data (attributes) and behaviors (methods)

You can call methods with dot syntax: object.method()

Even simple things like numbers and strings are full objects

Everything is an Object in Python

An object is an instanciation of a `class` (we will see what a `class` is later).

Python Code | Start Over | Run Code

```
# String is an object with methods
text = "hello"
print(text.upper())        # 'HELLO'
print(text.replace("l", "x"))  # 'hexxo'

# Method (function) of an object is also an object!
func = text.upper
print(type(func))

# Even types are objects
print(type(42))
print(type("hi"))
print(type(int))
```

String Manipulation in Python

Strings are sequences of characters: you can access, combine, and transform them easily.

Python Code | Start Over | Run Code

```
1 text = "Python"
2 print(text[0])
3 print(text[-1])
4 print(text[1:4])
```

Common string methods

Python Code | Start Over | Run Code

```
1 print("hello".upper())
2 print("HELLO".lower())
```

Common string methods

Python Code ⟳ Start Over ▷ Run Code

```
1 print("Python".startswith("Py"))
```

Python Code ⟳ Start Over ▷ Run Code

```
1 print("data,science".split(","))
```

Python Code ⟳ Start Over ▷ Run Code

```
1 print("  clean  ".strip())
```

Common string methods

Python Code | Start Over | Run Code

```
1 text = "My name is {} and I am  {}".format("Bob", 40)
2 print(text)
```

Common string methods

Python Code | Start Over | Run Code

```
1  # Chain of methods
2  text = " my veRy UGly?? ## text    "
3  clean_text = text.strip().replace("?", "").replace("#", "").replace("  ", " ").lo
4  print(clean_text)
```

Concatenation and repetition

Python Code | Start Over | Run Code

```
1  "Py" + "thon"          # 'Python'
2  "ha" * 3               # 'hahaha'
```

Strings are **immutable**: you can't change them directly, but you can create new ones.

Boolean Conditions in Python

Boolean conditions are used to **ask questions** in your code: they return either `True` or `False`.

Common comparison operators:

- `==` → equal
- `!=` → not equal
- `<`, `>`, `<=`, `>=` → less/greater than (or equal)

Python Code | Start Over | Run Code

```
1  x = 10
2  print(x > 5)      # True
3  print(x == 10)    # True
4  print(x != 7)     # True
```

Combine conditions using:

- `and`: both must be True
- `or`: at least one must be True
- `not`: negates the condition

Python Code | Start Over | Run Code

```
1  age = 20
2  has_id = True
3
4  print(age >= 18 and has_id)
5  print(age < 18 or not has_id)
```

The `if` Statement

The `if` statement allows your program to **make decisions** based on conditions.

- Runs code only when the condition is `True`
- Can include `elif` (else-if) and `else` branches
- Python uses indentation to define the blocks

```
1 if condition:
2     # do something
3 elif other_condition:
4     # do something else
5 else:
6     # fallback
```

The `if` Example

Python Code | Start Over | Run Code

```
1  age = 18
2
3  if age >= 18:
4      print("You can vote!")
5  else:
6      print("Sorry, too young.")
```

The `for` Loop

The `for` loop lets you **repeat a block of code** for each item in a sequence.

- Commonly used to loop over lists, strings, or ranges
- Automatically stops when the sequence ends

```
for item in sequence:
    # do something with item
```

Example: Looping over a list

A list in Python is an ordered collection of items (like numbers, strings or any objects) that can be changed, added to, or removed; written with square brackets `[]`. (see Course 2)

Python Code | Start Over | Run Code

```
1  fruits = ["apple", "banana", "cherry"]
2
3  for fruit in fruits:
4      print("I like", fruit)
5
6  # If you need the index too
7  for i, fruit in enumerate(fruits):
8      print("Fruit number", i)
9      print("I like", fruit)
```

Example: Looping with `range()`

Python Code | Start Over | Run Code

```
1 for i in range(1, 4):
2     print("Number:", i)
```

Example: Looping with `break` and `continue`

Python Code | Start Over | Run Code

```
1  stop = 5
2  for i in range(10):
3      if i < 3:
4          continue
5      print("Number:", i)
6
7      if  i == stop:
8          break
```

The `while` Loop

A `while` loop repeats a block of code **as long as a condition is `True`**.

- Good for loops where you **don't know in advance how many times to repeat**
- The condition is checked **before** each loop

```
while condition:
    # code to repeat
    # Can use continue and break
```

Example: Counting with `while`

Python Code | Start Over | Run Code

```python
count = 1

while count <= 3:
    print("Count is:", count)
    count += 1

while True:
  count -= 1
  if count < -3:
    break
```

Your turn!

Write a Python program that:

1. Greets the user using their name (`input()` + `print()`)
2. Asks 3 multiple-choice questions (list of questions + list of answers)
3. Uses if statements to check answers (use object method to make it UPPER or lower case and then compare to the right answer)
4. Uses a for or while loop to ask questions one by one (and `input()` + `print()`)
5. Keeps track of the score using a variable and `if-else` statements to increment the score

Solution

Python Code | Start Over | Run Code

```python
print("Welcome to the Python Quiz!")

name = input("What's your name? ")
print("Hi", name + "!", "Let's begin.\n")

score = 0

questions = [
    "What is 2 + 2?",
    "What is the capital of France?",
    "What returns \"python\".upper() do in Python?"
]

answers = [
    "4",
    "paris",
    "PYTHON"
]

```