💡 Variables and User Input

👋 Heads Up! This content is intended to be used in a facilitated session with mentors. Feel free to browse the materials here, but be aware that if you choose to work through this material in advance, you will still be expected to start from scratch and follow along with the rest of the class.

Variables

Learning Objectives:

- Understand that we can put data into a "box" that we can then reference later on, using the label on that box.
- Identify what kinds of data we would store as a string, integer, or float.
- Understand the term "data type".

Introduction

Give a brief (verbal) description of what a variable is. Analogies such as a box with a label or a suitcase with a tag are both good examples to lean on.

Strings

Demonstrate:

- Creating a variable that is a string.
- Using type() to show that it is a string.
- Really simple string formatting to substitute variables into a string.

Create a new file: `variables_playground.py`

Walk through (and have the students follow along on their own computers) an example to demonstrate the ideas listed above, for example:

```
day = "Saturday"
print(type(day))

message = f"Today is {day}!"
print(message)
```

Set a small challenge similar to the example you walked through, some ideas:

- Expand on the above example to also include the current month in the sentence.
- Create a variable to represent a person's name, then output a greeting to that person.

Integers and Floats

Demonstrate:

- Creating a variable that is an integer.
- Using type() to show that it is an integer.

- Really simple mathematical operations.
- Mathematical operations with integers and floats.
- Overriding variables, i.e. change the value of a variable.
- Commenting code and using print statements as a debugging tool.

Open: `variables_playground.py`

Walk through (and have the students follow along on their own computers) an example to demonstrate the ideas listed above, for example:

```
# Integers
# Run distance in m
run1_dist = 1400
run2_dist = 1800

# Addition
total_distance = run1_dist + run2_dist

# Floats
# Run distance in km
run3_dist = 1.7
run4_dist = 1.35

# Addition
total_distance = run3_dist + run4_dist

# Division and Multiplication
print(run1_dist / 1000)
print(run4_dist * 1000)
```

Set a small challenge similar to the example you walked through, some ideas:

- Create a variable to represent the goal distance, and calculate how far is left to run in both meters and kilometers.

Strings and Numbers

Demonstrate:

- Trying to add a string and integer.
- Using an integer as a string.
- Multiplying a string by an integer.
- Typecasting between string, integer and float.

Open: `variables_playground.py`

Walk through (and have the students follow along on their own computers) an example to demonstrate the ideas listed above, for example:

```
run5_dist = "5000"
print(run5_dist + 3)
print(run5_dist + "3")
print(run5_dist * 3)
print(run5_dist * 3.0)

# Typecasting
print(int(run5_dist) + 3)
print(str(3))
```

User Input

Learning Objectives:

- Collect user input.
- Store and use user input.

Demonstrate:

- Collecting user input.
- Storing user input in a variable.
- Using the user input in logic.
- Casting variables to a different data type.

Create a new file: `user_input_playground.py`

Walk through (and have the students follow along on their own computers) an example to demonstrate the ideas listed above, for example:

```
name = input("What is your name? ")
hobby = input("Do you have a favourite hobby? ")
print(f"This is {name}, likes {hobby}.")

age = input(f"Hi {name}, how old are you? ")
years_until_100 = 100 - int(age)
print(f"Wow, {name}! You'll be 100 in {years_until_100} years!")
```