Robotics From Scratch

Lesson 1 - Notes and Supplementary Material

THE PYTHON WORKFLOW

- Open Thonny or another Python IDE.
- Type code in the **Editor**.
- Use **Run/Stop/Debug Controls** to start/stop/check code.
- See outputs and errors in the **Shell/Output (bottom area)**.

STATEMENTS & SYNTAX

- One instruction per line.
- Indentation matters (usually 4 spaces).
- **Case Sensitive:** `print` is not `Print`.

COMMENTS

- Use # to leave notes/explanations.
- Example: `# This is ignored by Python`

PRINTING OUTPUT

- Print to the screen: `print("Hello, world!")`
- Print variables: `print(name)`

DATA TYPES

- `int` – whole numbers (`7`)
- `float` – decimals (`2.5`)
- `str` – text in quotes (`"robot"`)
- `bool` – `True`, `False`

VARIABLES

- Assign values: `distance = 47`
- Name can include letters, numbers, _, but not start with a number
- Good: `speed`, `my_name`

USER INPUT & CONVERSIONS

- Get user input: `name = input("Name? ")`
- Input is always a string (`str`)
- Convert to int/float for math:
  `age = int(input("Age? "))`

ARITHMETIC OPERATORS

- `+` add, `-` subtract, `*` multiply, `/` divide
- Example: `print(10 / 3)` outputs 3.333...

Expanded Study Guide

Getting the Most from Thonny

- **Editor**: Type, save, and run code files.
- **Controls**: Use green triangle (Run), red square (Stop).
- **Shell**: Get instant feedback, see errors and program output.

Core Python Concepts

- A **statement** is an instruction; Python runs one at a time from top to bottom.
- Typing # starts a **comment**; it won't appear in your program's output.
- Python will point out where your code goes wrong using error messages in the shell.

Math & Numbers

- Try out: `print(8 % 3)` – this gives the remainder (2) , Google "python modulo".
- Integer division with `//`: `print(10 // 3)` gives 3 vs $3.\overline{3333}$ with only `/`

Variables and Types

- Variables can hold different types: numbers, text, True/False values.
- You can reassign variables: `score = 5`, later `score = score + 2`.

Asking for Input & Doing Math

- Always convert input when you want to do math!

```
num1 = int(input("Enter a number: "))
num2 = int(input("Another number: "))
print("Sum:", num1 + num2)
```

Optional Home Exercises

1. Write a script that prints your full name and favorite food.
2. Ask the user for a number, then print double its value.
3. Make a calculator that multiplies two numbers from user input.
4. Experiment: Try dividing by zero and observe the error!

Look Ahead: Next Class Topics!

- **Boolean logic:** exploring True, False, and logical operators (`and`, `or`, `not`)
- **Comparison operators:** how to test if things are equal, greater, or smaller
- **if / elif / else statements:** making your program react to data
- **Using conditions in code:** making interactive programs that respond based on your input

Curious? Search "Python if statements" or "Python boolean logic" and try small examples ahead of time!

Bring your questions and discoveries to class! Practice, and have fun.