Python Ping-Pong Syllabus

February 9, 2025

Contents

1 Introduction

This course is derived from the The Harvard CS50 Syllabus and study materials are derived from AP Computer Science A. In addition to the skills learned in that course, our Python syllabus prioritizes Python expertise for Pygame Development.

It is highly recommended that you review fractions with your kid as we move along the course.

2 Basic Variables and Print

The student will spend this first class understanding how to create strings and integers and print to the console.

```
print("Hello, World!")
print(9)
```

The student will learn to use variables to store data and print multiple variables along with a sentence.

```
a = 5
b = 10
print("a is:", a, "and b is:", b)
```

No floats or booleans yet to avoid confusion. Keep it simple.

3 Basic If Statements

- `if`, `elif`, and `else`
- Booleans
- `and`, `or`, and `not`
- `<`, `<=`, `>`, `>=`, `==`, and `!=`

At this point you can start debugging assignments for certain days and make them a little bit harder too.

4 Advanced Datatypes

- Floats (print output trimming)
- Lists
- Dictionaries (store advanced data)

Potentially may return to teach the following concepts although not immediately necessary:

- Tuples
- Sets (no duplicates)

5 Loops

- `for` and `while`
- `in`
- `break` and `continue`
- `range()`
- `len()`
- `enumerate()`

Also at this point you want to learn:

- `match`
- Maybe: `.sort()`

6 Debugging

As loops can get buggy, it is important to start debugging now.

- `assert`
- `print`
- comments for advanced control flow
- VSCode debugger

Review the old concepts but up the difficulty of assignments.

7 Functions

- `def`
- `return`
- Return Types
- Call Stack Basics
- Global variables

8 Classes

- `class`
- Objects
- Methods
- Inheritance
- Initializing a Class

9 Libraries

- `import`
- `from`
- `random`
- `time.sleep()`

10 Exception

- `try`, `except`, and `raise`

11 File I/O

- `open()`
- `read()`
- `write()`
- `close()`

At this point, we will start the flagship "code that writes code" assignment.

12 sys Module

Introduction to Linux and basic concepts.

- `sys.exit()`
- `sys.argv`
- How to run other Python files

Additional libraries like`math` may be taught, but aren't necessary for PyGame.

13 Intro to Pygame

???

13.1 Weather App with Pygame

- HTTP requests
- JSON handling
- Rendering