

Introduction to Python

CSCI20

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What is Python?

- Python is a **programming language**
- A **programming language** consists of **instructions** for a computer - they tell the computer what to do
- These instructions are more human readable than what the computer uses at the lowest level
 - 0's and 1's (electronic circuits)
- By telling the computer what to do, we can make it carry out instructions to **solve problems**

What is Python? (con't)

- A set of instructions that solve problems is called an

Algorithm

ALGORITHM (Webster's Dictionary):

A step-by-step procedure for solving a problem or accomplishing some end

Algorithms

- We will first learn about the **set of instructions** that Python lets us use to tell the computer what to do
- And then we will see how to combine these sets of instructions to carry out **algorithms**

Algorithms for computing

- As you may know, **algorithms** exist in many disciplines outside of computing
- For example, cooking!
 - Cooking is about following some set of instructions (a recipe) to solve a problem (I'm hungry)
- What makes computers different from cooking?
 - Cooking manipulates food, but computing manipulates **data**

Data

- What kind of data can you think of?
- Numbers
- Text
- Media: music, selfies etc.

So we have Algorithms and Data...but...

- One last thing we need for us to tell computers what to do... Structure!
- We need to be precise in how we ‘instruct’ the computer
- Computers are good at a lot of things, but are very bad at understanding unstructured, ambiguous commands

Example

The following sentence:

“I saw a man on a hill with a telescope.”

What is this sentence saying?

- There’s a man on a hill, and I’m watching him with my telescope.
- There’s a man on a hill, who I’m seeing, and he has a telescope.
- There’s a man, and he’s on a hill that also has a telescope on it.
- I’m on a hill, and I saw a man using a telescope.
- There’s a man on a hill, and I’m sawing him with a telescope.

Structure

- Humans can interpret context and meaning
- Computers cannot easily do that...
- So we must have a structure that the computer understands and interprets correctly
 - That's what programming languages (like Python) are for!
- Structure also lets us read code in a consistent way, and it lets other people understand your code more quickly and easily

Put it all together...

Algorithm + Data + Structure = **Program**

Computer Programming
is a mix of these three
elements.

Let's write some code!

- Python is an **interactive** language
 - You can type something in and immediately see the result
- We're going to give Python some commands and see what it does
- Then we'll explore some of the **data and structure** we are working with when programming in Python
- I will post everything I write in Wing on the course website

Wing 101

- Wing 101 is an **IDE** (Integrated Development Environment)
- Lets you write and run Python code easily
- We'll talk about its features in the next few weeks

Let's start!