



Intro to Python and Computer Science

Fall 2021 Science Honors Program
Instructors: Serena Killion and Dorothee
Grant



Syllabus

Week 1: Intro to CS, Setting up IDE, print hello world, and data types

Week 2: More Data Types and Standard Python library

Week 3: Logic: Booleans, Control Flow

Week 4: Lists and Dictionaries

Week 5: User input and Loops

Week 6: Nested data and nested loops

Week 7: Functions, Importing and Modular Code

Week 8: File Input/Output

Week 9: Object Orientated Programming



Overview of Course

- Attain a working knowledge of the Python programming language and a basic foundation of the fundamentals of Computer Science
 - Classes run from 10 to 12
 - 45-60 minutes of lecture time and 45-60 minutes of coding time.
-
- We will adapt the syllabus to the needs of the students.
 - Please turn on your video
 - Use the chat or microphone to ask questions and interact
 - No homework and no grades, this is all about learning and having fun
 - Breakout rooms will be used for group work



What is computer
science?



The study of algorithms

The study of solutions to problems

The study of problems with NO SOLUTIONS

Includes the theory, design, development and application of computer hardware and software

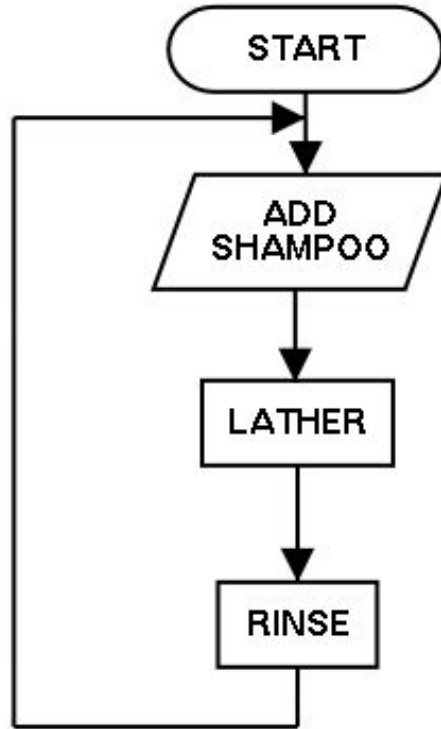


What is an algorithm?

A process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.

Let's think of some real life examples.

Algorithm for washing hair



When would you stop washing your hair?

If a robot was doing this when would they know when to stop?

A problem is considered computable if there is an algorithm for it.





What is Python?

Popular programming language first released.

- Readability → reusable and maintainable
- Ease of use boosts developer productivity
 - Python code is typically $\frac{1}{3}$ to $\frac{1}{5}$ the size of equivalent C++ or Java code
- Large collections of support libraries
- Integration with other programs and frameworks
- Enjoyment

Downsides?

- Execution speed



Who uses Python

- Google for search engine
- Youtube
- Lyft
- Dropbox
- Civilization IV Game
- JPMorgan, Chase, Citadel apply Python to financial market forecasting
- NASA for scientific programming tasks
- And so on



What is an IDE?

(Integrated Development Environment)

- Software application for programmers that consolidates common developer tools into a single graphical user interface
- Includes:
 - Text editor
 - Compiler
 - Debugger
 - Syntax Highlighters
 - And perhaps more!



Let's get started!

```
print('Hello world!')
```