

Introduction to Computer Science and Programming in Python (MIT)

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1 Lecture 1: What is Computation?

- **int** Integers
- **float** Real numbers
- **bool** Boolean
- **NoneType** Special none value
- **type()** can use `type()` to see type of an object.

2 Branching and Iteration

3 String Manipulation, Guess and Check, Approximations, Bisection

- `>>> s = "abc"`
- `>>> len(s)`
- `>>> 3`

4 Decomposition, Abstraction, and Functions

in programming, divide code into modules:

- are self-contained
- used to break up code
- intended to be reusable

- keep code organized
- keep code coherent

5 Tuples, Lists, Aliasing, Mutability, and Cloning

5.1 Tuples

- Immutable
- `>>> tuple = ()`

5.2 List

hot is an alias for warm - changing one changes another.
`append()` has a side effect.

- `>>> a = 1`
- `>>> b = a`
- `>>> print(a)`
- `>>> print(b)`
- `>>>`
- `>>> warm = ["red", "yellow", "orange"]`
- `>>> hot = warm`
- `>>> hot.append("pink")`
- `>>> print(hot)`
- `>>> print(warm)`
- `>>> ["red", "yellow", "orange", "pink"]`
- `>>> ["red", "yellow", "orange", "pink"]`

- 6 Recursion and Dictionaries
- 7 Testing, Debugging, Exceptions, and Assertions
- 8 Object Oriented Programming
- 9 Python Classes and Inheritance
- 10 Understanding Program Efficiency, Part 1
- 11 Understanding Program Efficiency, Part 2
- 12 Searching and Sorting