

EdX 6.00x Notes

Lecture 2:

- Program (*or script*):
 - A sequence of definitions and commands.
- Definitions:
 - Things that gets evaluated and stored away.
- Command (or statement):
 - Things that actually get executed by the Python interpreter in what's called a shell.
 - Things that instruct the interpreter to do something.
- Objects:
 - Each object has a type that defines the kinds of things programs can do to it.
 - Objects are:
 - Scalar: (i.e. cannot be subdivided), or
 - Non-Scalar: (i.e. have internal structure that can be accessed)
- Scalar Objects:
 - int – used to represent integers, e.g., 5 or 10082
 - float – used to represent real numbers, e.g. 3.14 or 25.0
 - bool – used to represent Boolean values True and False
- Type Casting:
 - Converting an object of one type into another by using the name of a type as a function.
 - Python supports Type Casting.
- Assignment:
 - Creating a binding statement between a name and a value stored somewhere in a computer.
- Non-Scalar Objects:
 - Compound things, things whose proportions or components we can get at.
 - String - sequences of characters that are all concatenated together, e.g., “abc”
 - Can be written by using either single or double quotes.
- Operator Overloading:
 - Using the same operator to do different things.
 - The operator uses the type of the object to decide what to do.
- len() function
 - Return the length (the number of items) of an object. The argument may be a sequence (string, tuple or list) or a mapping (dictionary).
- Indexing:
 - Extracts a single element in a string.
 - 'abc'[0] returns the string 'a'.
 - 'abc'[-1] returns the string 'c'.

- Slicing:
 - Returns a substring of a string.
 - `'abc'[1:3]` returns the value `'bc'`.
 - `'abc'[::-1]` returns the substring `'cba'`.
 - Note: If you omit the starting index, Python will assume that you wish to start your slice at index 0. If you omit the ending index, Python will assume you wish to end your slice at the end of the string.
- in and not in:
 - The operators in and not in test for collection membership
 - `'a' in 'abc'` returns the value `True`.
 - `'d' not in 'abc'` returns the value `True`.
- `print()`:
 - Print evaluates each expression in turn and writes the resulting object to standard output.
- `raw_input()`:
 - Takes whatever's typed in as a string of characters by the user and returns that as a string.
 - Note: This is not supported in Python 3.3 and instead uses `input()`
- Straight Line Program:
 - Executes each instruction in turn.
- Comments:
 - Implemented by typing a `#`
 - Helps the user understand the decisions the programmer made.
- Conditional:
 - Simplest branching statement.
 - Consists of:
 - A test (an expression that evaluates to `True` or `False`)
 - A block of code to execute if the test is `True`.
 - An optional block of code to execute if the test is `False`.
 - This is done in Python by an `if` statement with an optional `else` clause.
 - Python is whitespace sensitive and requires an indentation of four spaces after any `if` statements, `else` statements, and other places such as function definitions.
 - Can consist of single Boolean tests (i.e., `if (x > 3)`) or compound Boolean tests (i.e., `if (x > 2 and x < 4)`)
- Note: Double equal sign is used for comparison, single equal sign is used for assignment.
- `elif`:
 - If a previous `if` or `elif` statement returns `False`, a block of code to execute if a new test is `True`.
- Constant Time:
 - The amount of time it takes depends just on the length of the program.
 - In big O notation this would be $O(n)$

