CS 1340 Introduction to Computing Concepts

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Aug 28 2019, Lecture 2

Agenda

- Agenda:
  - Walk through the tools we will use (anaconda, pycharm)
  - Walk through the examples from last lecture
  - Two python programs
  - Variables and Data types
  - Sequence data types

Demo

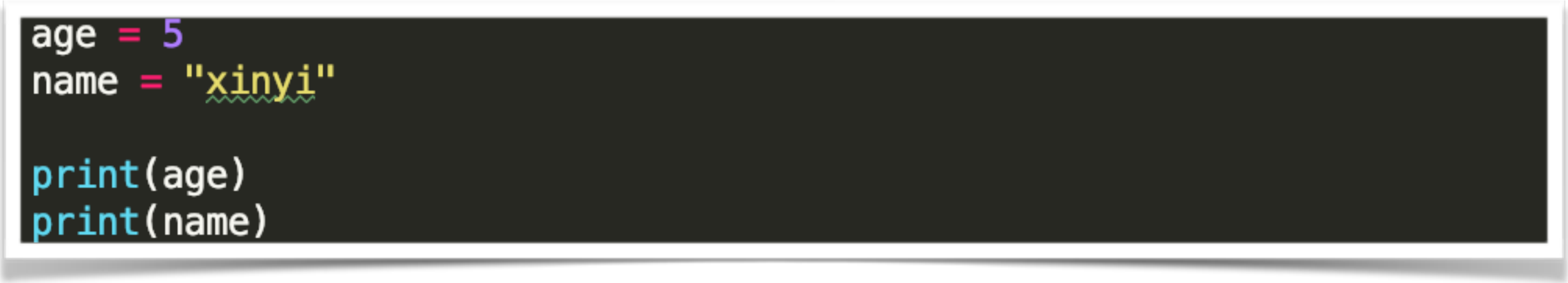
Python programming language

- A program consists of:
  - Values and types: *4, 'Hello world'*
  - Variables, a name refers to a value
    - an assignment statement creates new variables and give them values
  - Statements, a unit of code that the Python interpreter can execute. We have seen *print and assignment*
  - Expressions, a combination of values, variables and operators, *1* + *1*
  - ...

Variables and Data Types

- Variables
  - containers for storing data values.
  - no command for declaring a variable.
  - created the moment you first assign a value to it.

For example, Create two variables to store age and name



```
age = 5
name = "xinyi"

print(age)
print(name)
```

Variables and Data Types

- Variable Names
  - Variable names can contain only letters, numbers, and underscores. They can start with a letter or an underscore, but not with a number.
  - Spaces are not allowed in variable names, but underscores can be used
  - Avoid using Python keywords and function names as variable names
  - Variable names should be short but descriptive.
  - Case Sensitive

For example, first_name, message_1, age are valid names,

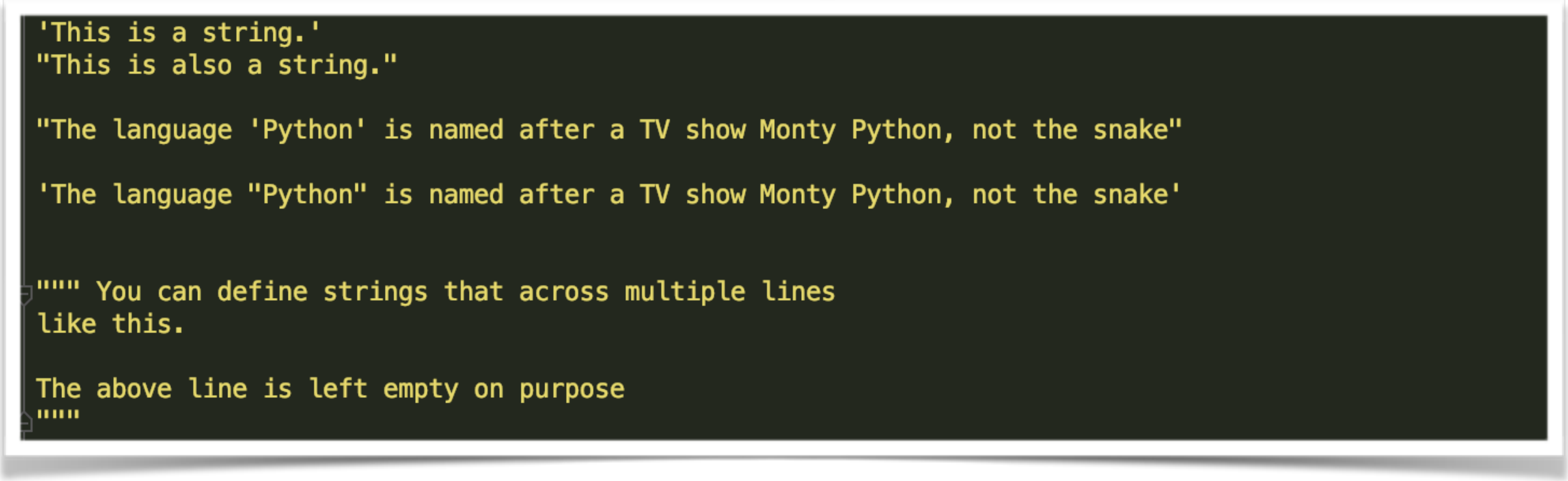
but not 1_message, print

Variables and Data Types

- Common Data types
  - Strings
  - Integer
  - Float
  - Boolean

Strings

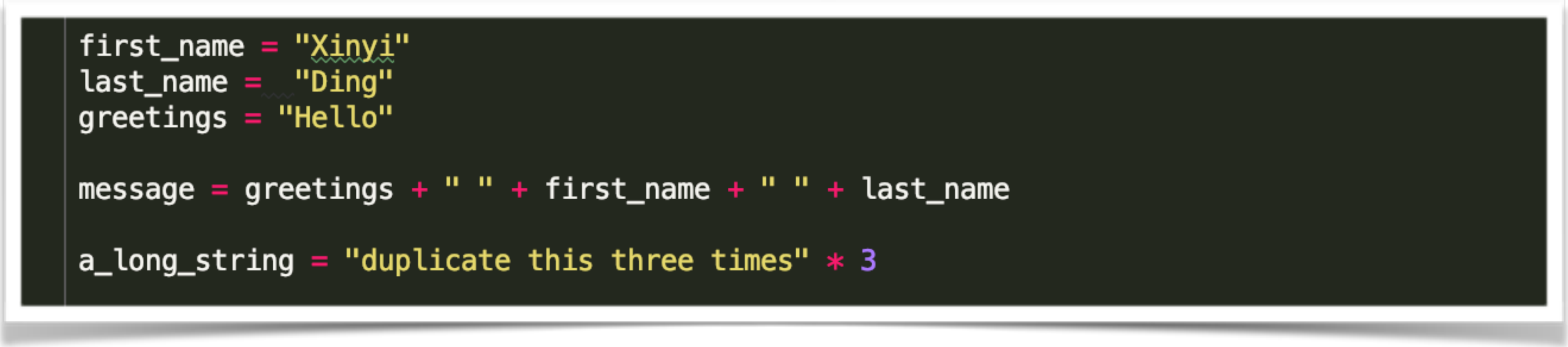
- Strings
  - A series of characters
  - Can use "" or '' to specify
  - Unmatched can occur within the string
  - Use triple double-quotes for multi-line string



```
'This is a string.'
"This is also a string."

"The language 'Python' is named after a TV show Monty Python, not the snake"

'The language "Python" is named after a TV show Monty Python, not the snake'


""" You can define strings that across multiple lines
like this.

The above line is left empty on purpose
"""
```

Strings Manipulation

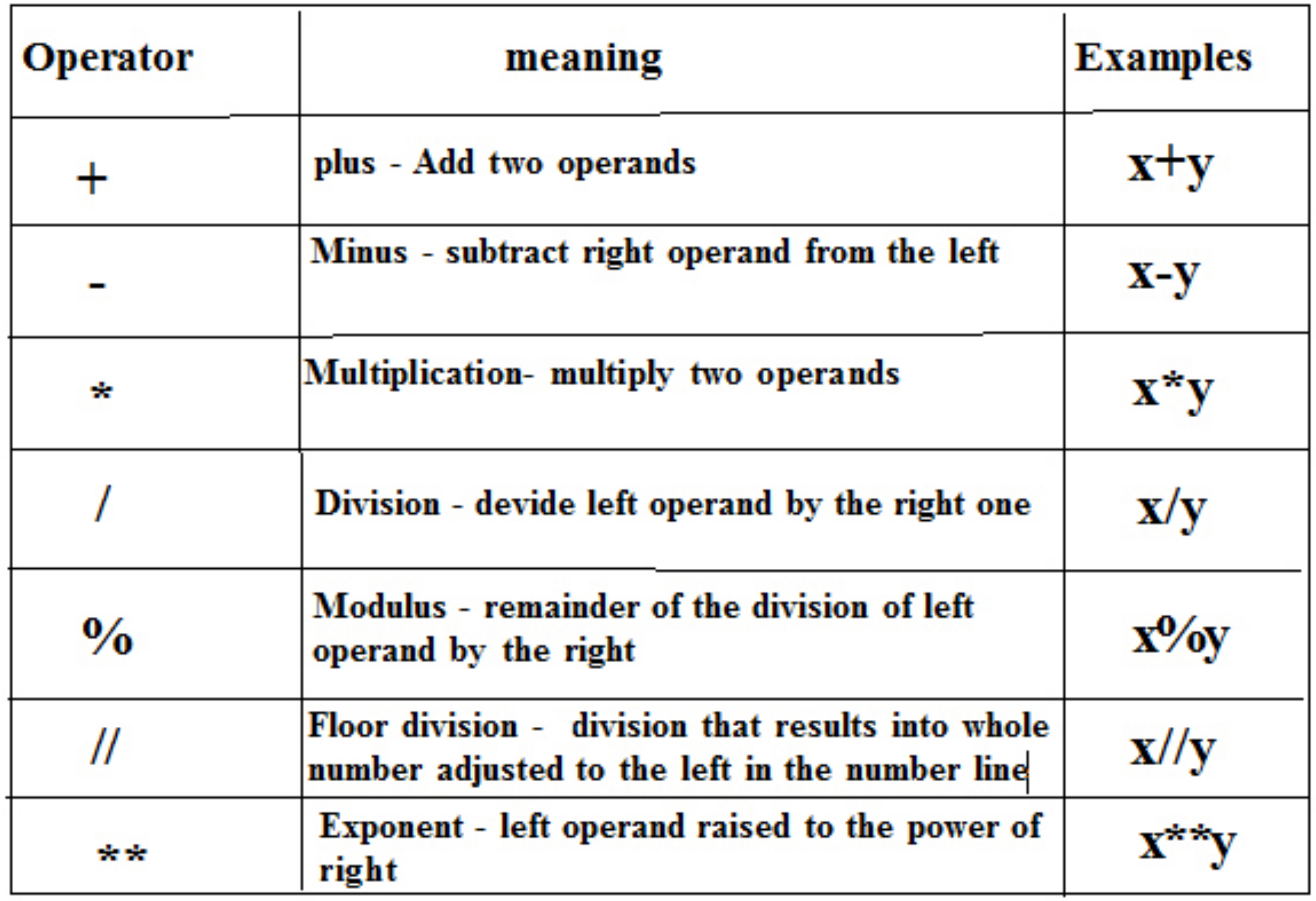
- String concatenation



```
first_name = "Xinyi"
last_name =  "Ding"
greetings = "Hello"

message = greetings + " " + first_name + " " + last_name

a_long_string = "duplicate this three times" * 3
```

Numbers

- Integers
  - x = 3
  - y = 12345
- Floats
  - pi = 3.1415926
  - e = 2.71828

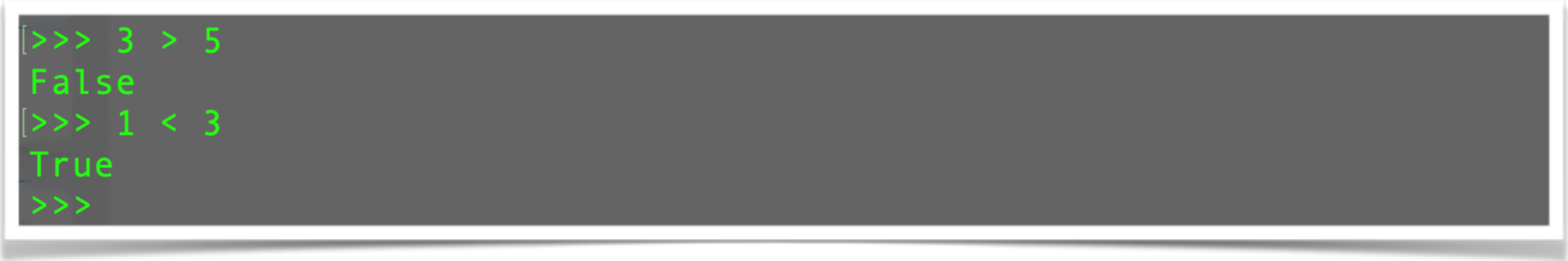


Operator	meaning	Examples
+	plus - Add two operands	x+y
-	Minus - subtract right operand from the left	x-y
*	Multiplication- multiply two operands	x*y
/	Division - devide left operand by the right one	x/y
%	Modulus - remainder of the division of left operand by the right	x%y
//	Floor division - division that results into whole number adjusted to the left in the number line	x//y
**	Exponent - left operand raised to the power of right	x**y

Arithmetic operators

Boolean

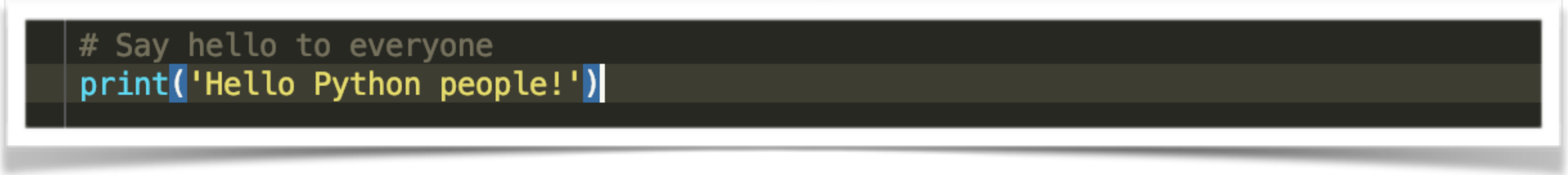
- The Boolean Type
  - either True or False



```
>>> 3 > 5
False
>>> 1 < 3
True
>>>
```

Comments

- Comments
  - Start comments with # -the rest of line is ignored by the Python interpreter.
  - Python does not support multiline comments like C/C++ or Java.

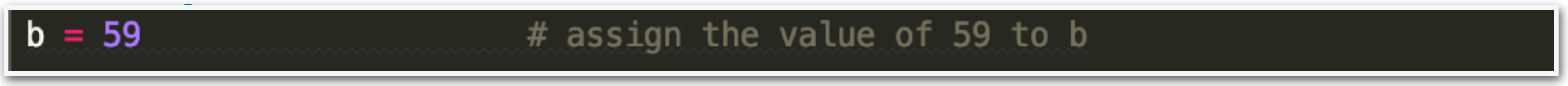


```
# Say hello to everyone
print('Hello Python people!')
```

However, there is nothing to stop you to use multi-line docstrings as multiline comments.

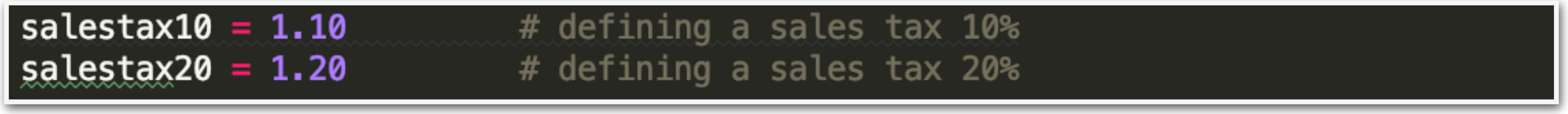
Comments

- Good comments
  - be short, straight to the point, and add informative value.
- Example of bad comment



```
b = 59                    # assign the value of 59 to b
```

- Example of good comment



```
salestax10 = 1.10         # defining a sales tax 10%
salestax20 = 1.20         # defining a sales tax 20%
```

Whitespace

- Whitespace is meaningful in Python: especially indentation and placement of newlines.
  - Use a newline to end a line of code.
    - Use \ when must go to the next prematurely
  - No braces {} to mark blocks of code in Python... Use consistent indentation instead
  - Often a colon appears at the start of a new block
  - (E.g. for functions and class definitions)

Assignment

- Binding a variable in Python means setting a name to hold a reference to some object
  - Assignment creates references, not copies(like java)
- A variable is created the first time it appears on the left side of an assignment expression:
  - x = 3
- Multiple assignment
  - x, y = 3, 5