Chapter 0:
Introduction to Python

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January 23, 2023

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1. The Language

- Created in 1991 by Guido van Rossum (now at Google)
  - Named for Monty Python
- This language has undergone many changes since its inception. We're currently on version 3.10.

The philosophy

- Its design philosophy emphasizes code readability, and
- Its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java.

Some Features of Python

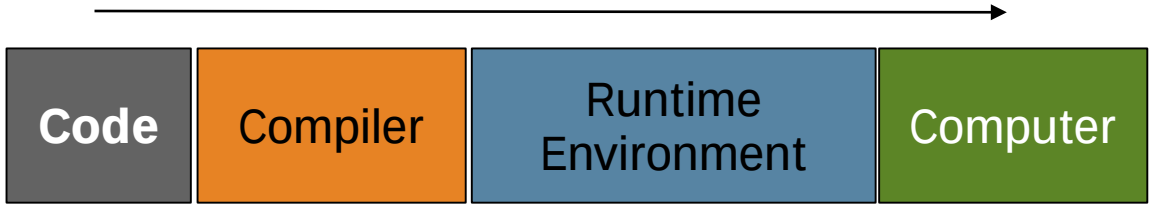
- Simple
- Easy to Learn
- Open Source (Free)
- High-Level Language
- Portable
- Interpreted
- Object-Oriented
- Extensible
- Embeddable
- Extensive Libraries

Python

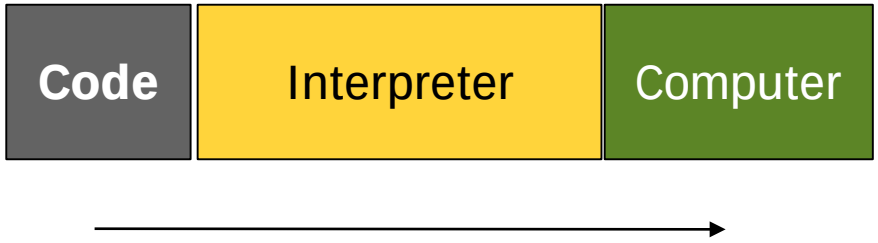
- Useful as a scripting language
  - script: A small program meant for one-time use
  - Targeted towards small to medium-sized projects
- Interpreted
  - Not compiled like Java
  - Code is written and then directly executed by an interpreter
  - Type commands into an interpreter and gets immediate results

Compilation vs. Interpretation

Java:

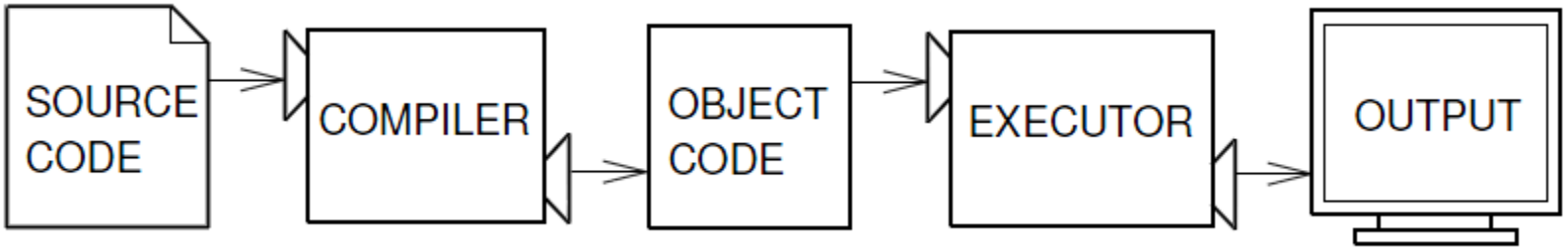


Python:



A Comparison

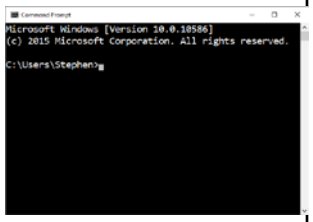
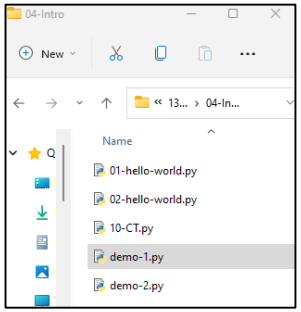
test.py



2. Software Installation

- You will have to install the following software:
  - Python (latest version, 3.xx)
    - Python (Interactive Interpreter, aka Shell)
    - Python (IDLE)
  - PyCharm or an equivalent IDE
    - Professional Version
    - Community Version (Free to all)

3. Python Software Tools

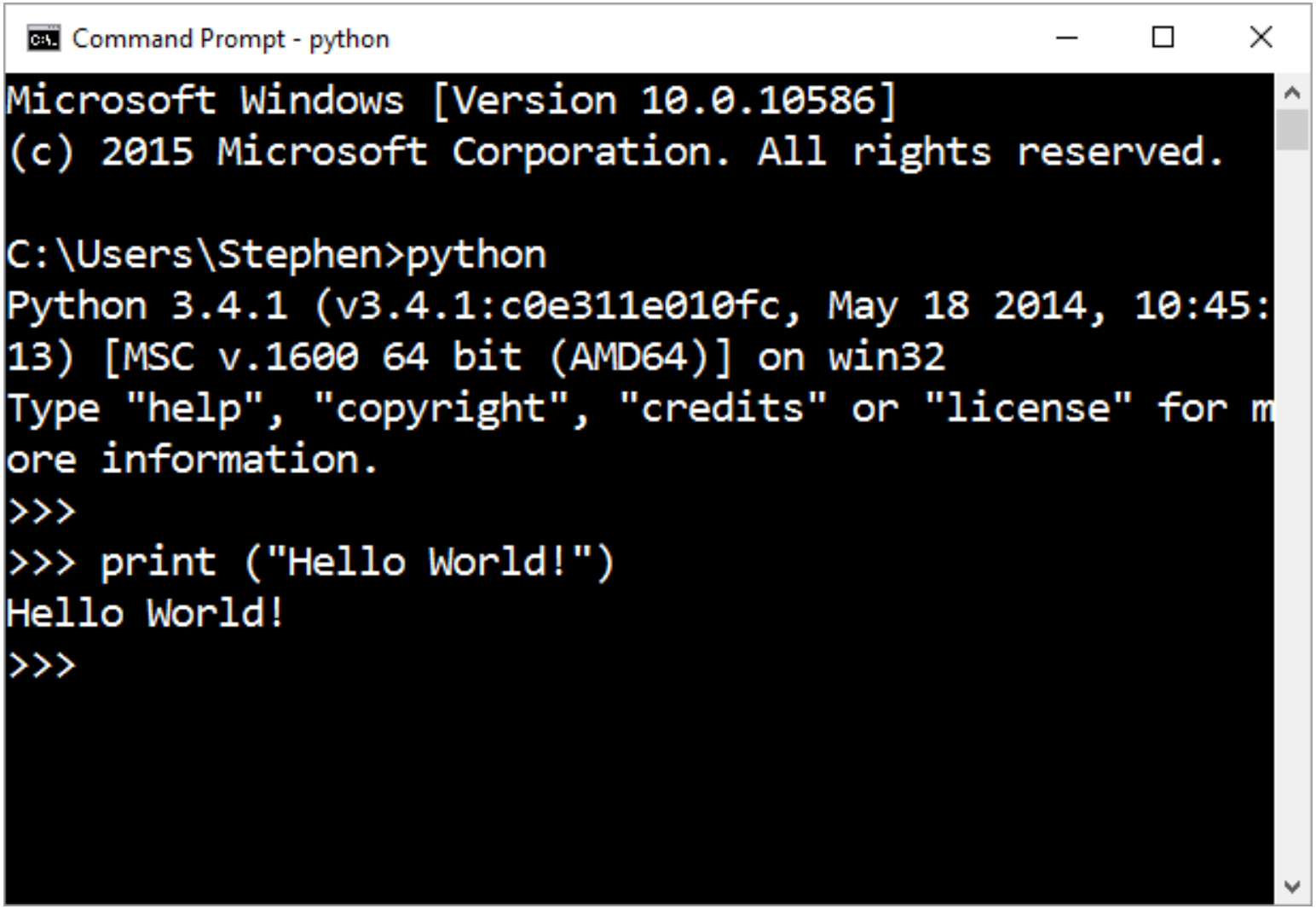
Mode of Coding	Interactive Interpreter (Shell)	Edit + Execution	Simple IDE	Professional IDE
Tools	Depends on the OS	Editor + OS	IDLE	PyCharm
				

Interactive Shell

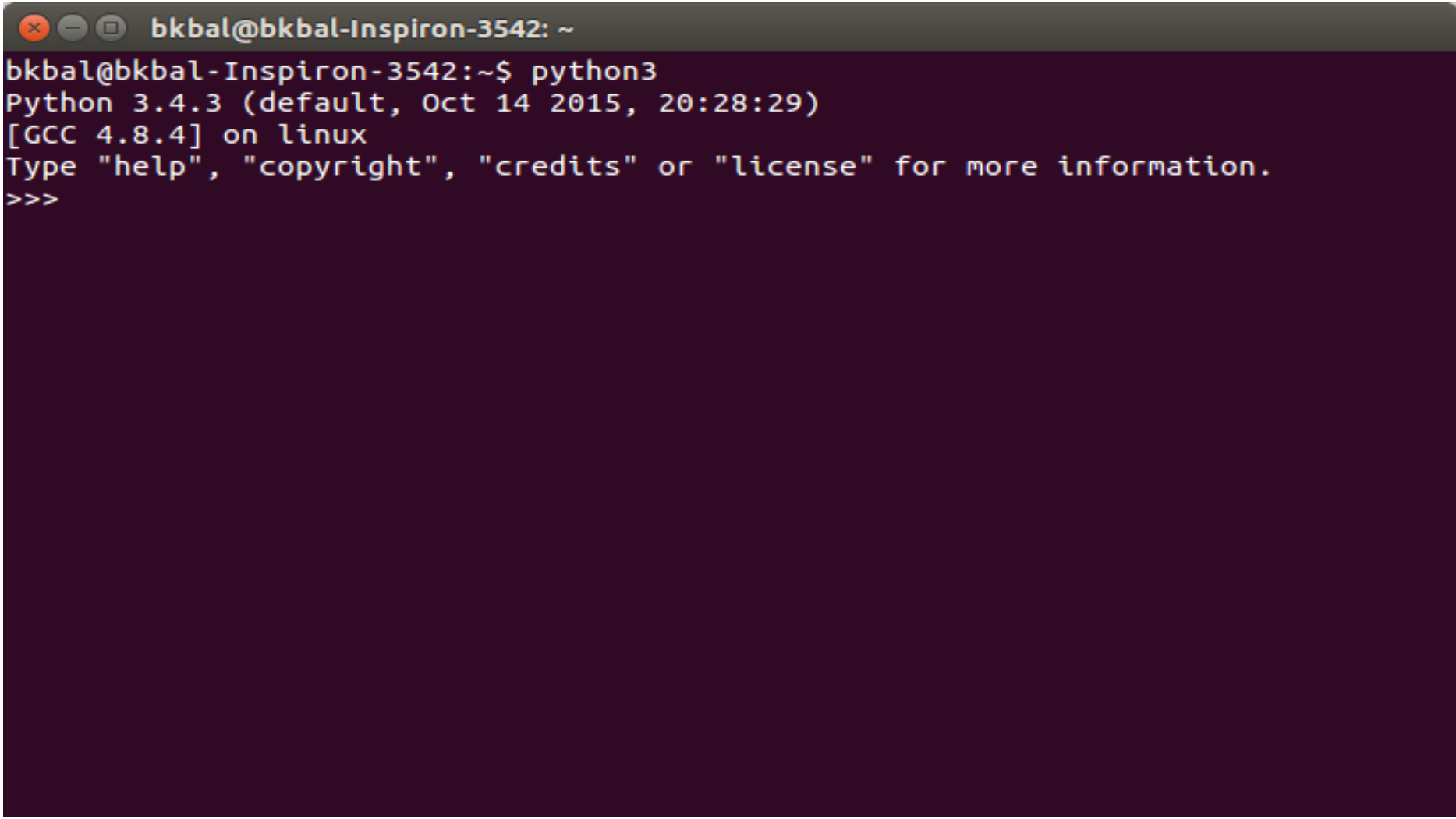
- Shell Loop: Read – Eval – Print

```
C:\Users\CS\1336-Examples\04-Intro>python
Python 3.10.1 (tags/v3.10.1:2cd268a, Dec  6 2021,
19:10:37) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for
more information.
>>> print("Hello World!")
Hello World!
>>> "Welcome to 1336"
'Welcome to 1336'
>>>
```

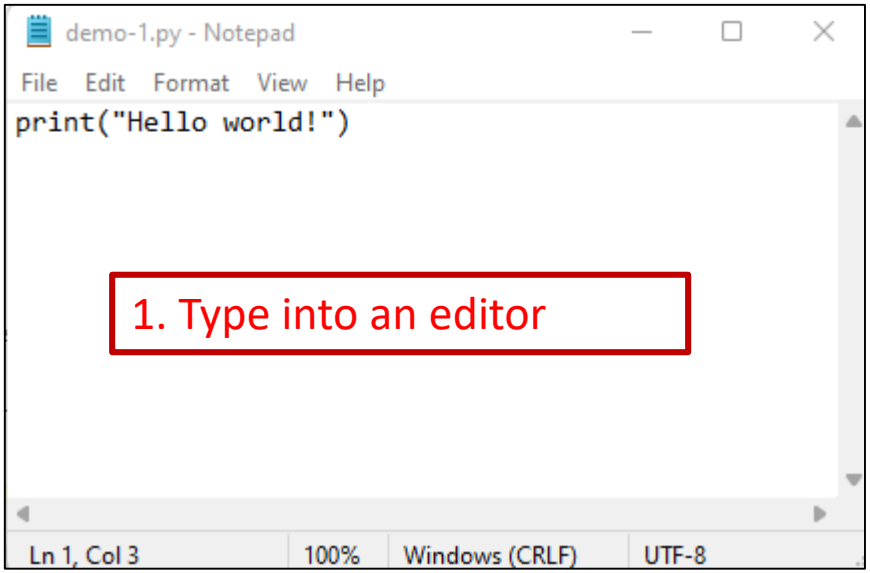
Shell: PC

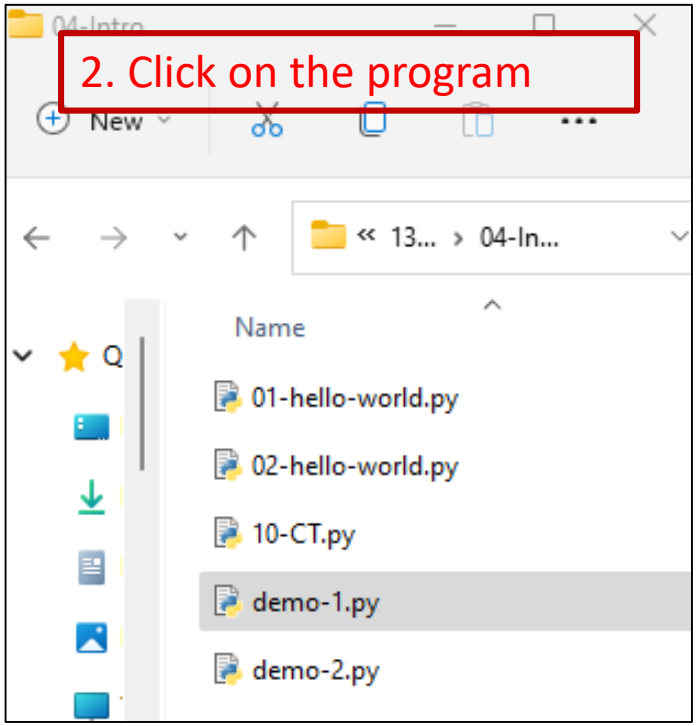

Command Prompt - python
Microsoft Windows [Version 10.0.10586]
(c) 2015 Microsoft Corporation. All rights reserved.
C:\Users\Stephen>python
Python 3.4.1 (v3.4.1:c0e311e010fc, May 18 2014, 10:45:
13) [MSC v.1600 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for m
ore information.
>>>
>>> print ("Hello World!")
Hello World!
>>>

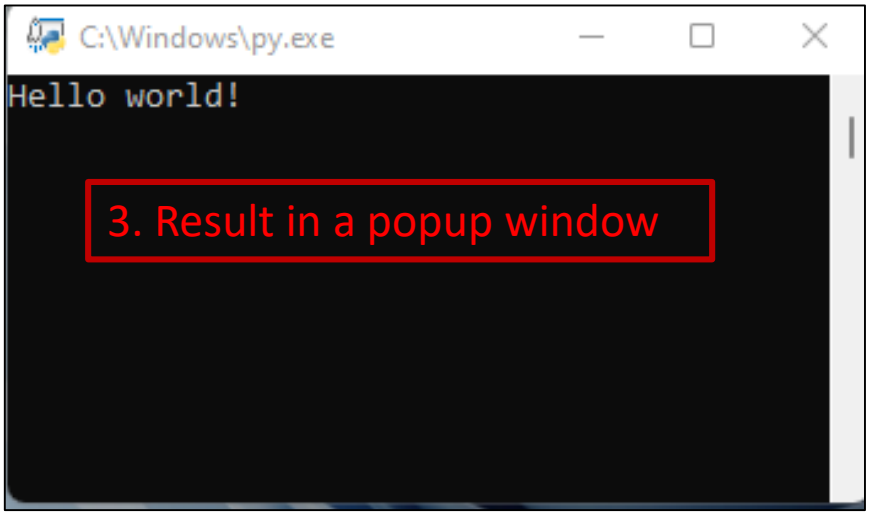
Command: Linux



Editor + Execution







IDLE

Integrated DeveLopment Environment

Python 3.4.1 Shell

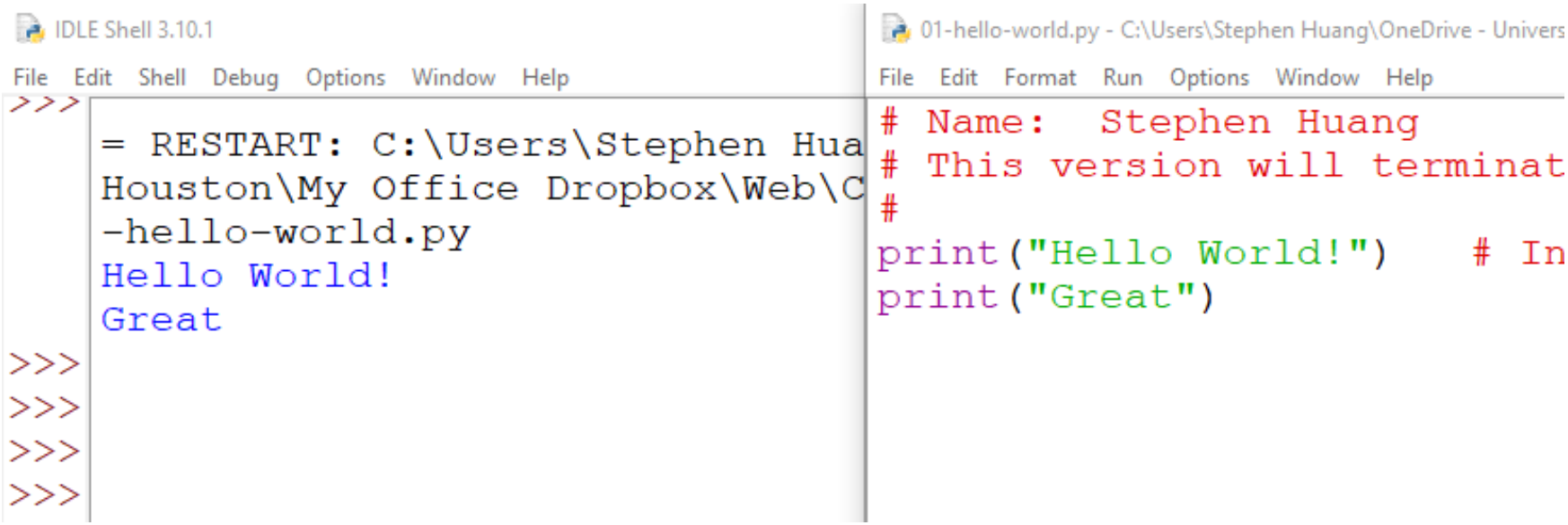
File Edit Shell Debug Options Windows Help

```
Python 3.4.1 (v3.4.1:c0e311e010fc, May 18 2014, 10:45:13) [MSC v.1600 64
bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> print ("Hello, world!")
Hello, world!
>>>
```

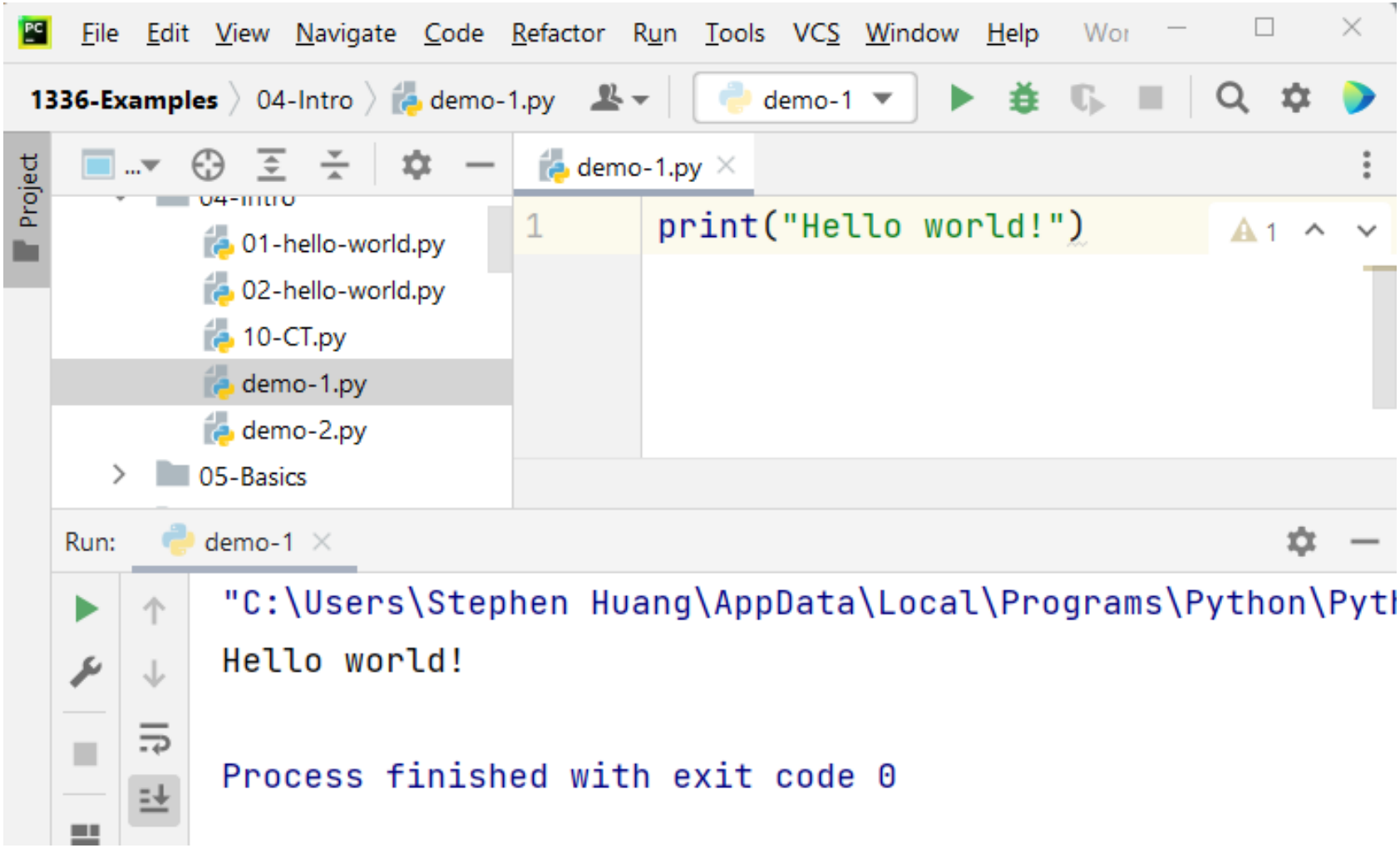
Ln: 5 Col: 4

IDLE

- IDLE with an open file



PyCharm IDE


File Edit View Navigate Code Refactor Run Tools VCS Window Help
1336-Examples 04-Intro demo-1.py
demo-1
Project
demo-1.py
1 print("Hello world!")
01-hello-world.py
02-hello-world.py
10-CT.py
demo-1.py
demo-2.py
05-Basics
Run: demo-1
"C:\Users\Stephen Huang\AppData\Local\Programs\Python\Pyt
Hello world!
Process finished with exit code 0

To Do:

- Install, Install, Test
  - Install Python 3.10 Community Edition (free)
  - Install PyCharm
  - Test
    - Run Python interactively, type `print("Hello world.")`
    - Create a directory "1336" and Edit a "test.py" file in there
    - Run the file in command mode and in Windows Explorer
    - Use IDLE to open the test file and execute it
    - Configure PyCharm
    - Open the "1336" directory in PyCharm
    - Modify "test.py" using PyCharm

Popular IDEs for Python

Name	Cost	Source
PyDev	Free	https://www.eclipse.org/
PyCharm	Free*	https://www.jetbrains.com/pycharm/
Visual Studio	Free*	https://code.visualstudio.com
IDLE	Free	https://docs.python.org/3/library/idle.html
Spyder	Free	https://github.com/spyder-ide/spyder

3. Other Issues

- Compatibility: Python 3 is not backwards compatible.
  - Python 3.0 implements a lot of very useful features and breaks backward compatibility.
  - It does it on purpose, so the great features can be implemented even despite the fact Python 2.x code may not work correctly under Python 3.x.

Other Issues

- You don’t have to terminate a statement. An end-of-line (“return”) does that.
- You can override end-of-line by using ‘\’.

Whitespace

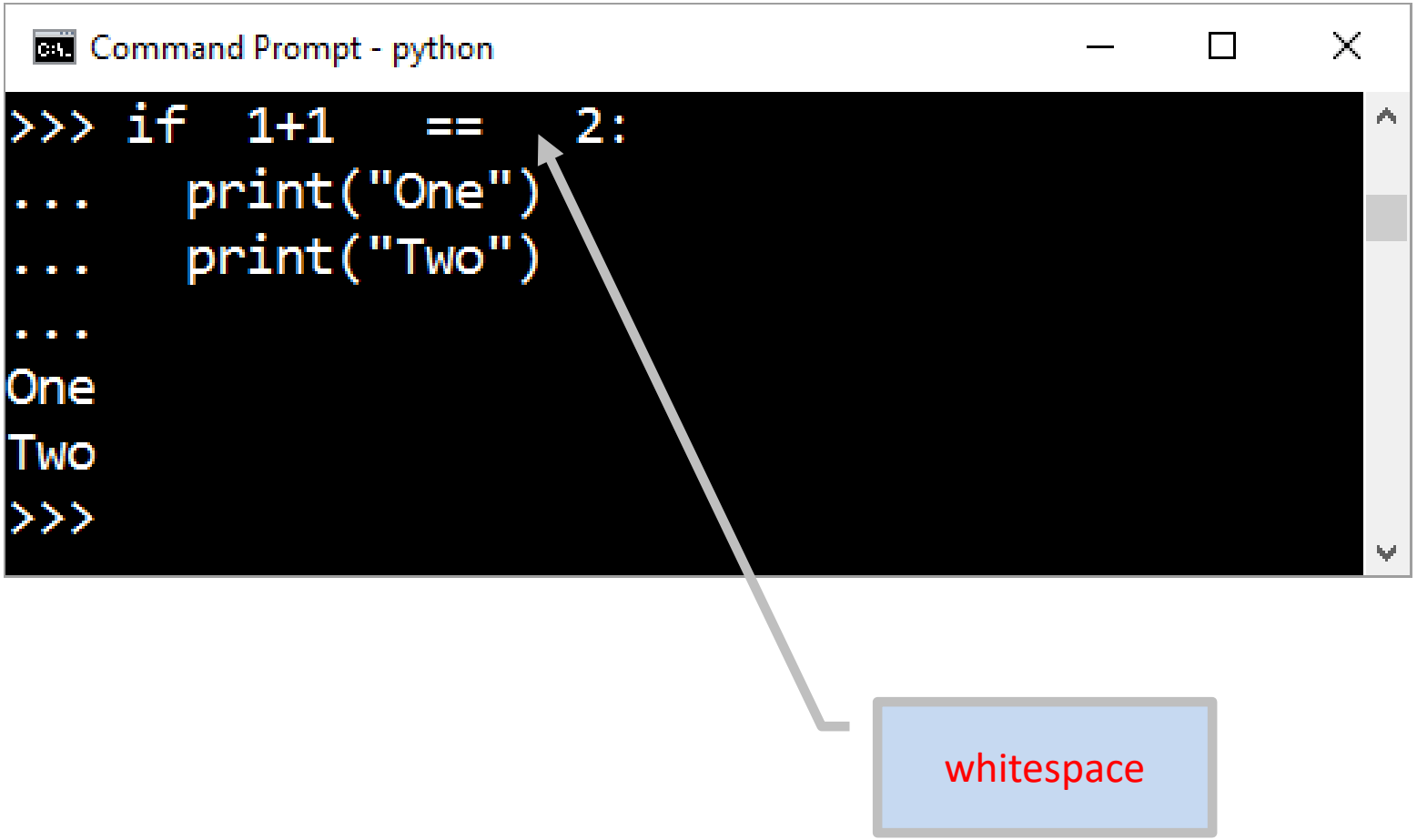
- Whitespace is not significant in Python source code except the indentation level of your statements is significant.
- Indentation is the whitespace at the very left of your statements.

Interactive prompt

- Lines beginning with ">>>" and "..." indicate input to Python (these are the default prompts of the interactive interpreter).
- Everything else is output from Python.

- http://www.secnetix.de/olli/Python/block_indentation.hawk

Example


Command Prompt - python
>>> if 1+1 == 2:
... print("One")
... print("Two")
...
One
Two
>>>
whitespace

Example

Command Prompt - python
>>> if 1+1 == 2:
... print ("Hello ")
... print("world!")
...
Hello
world!
>>>
whitespace
indentation
Command Prompt - python
>>> if 1 + 1 == 2:
... print ("Hello ")
... print ("world!")
...
Hello
world!
>>>

Environment

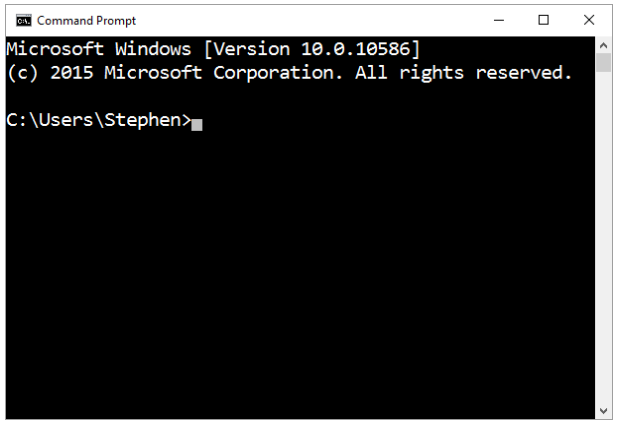
- Interactive Mode, including IDLE, reads one statement at a time. (>>>)
- IDE, such as PyCharm, reads the whole Python program.
  - Thus it is possible for the compiler/interpreter to do some optimization.
- There may be some differences in the implementation. You probably won't even notice it.

Installing Python

- Go to python.org
- Click on Download tab
- Click on Download Python 3.x.y (latest version)
- Give permission to open python-3.x.0.msi
- Click and select Save
- Find python-3.x.y.msi in your download folder
- Install it by double click

Installation

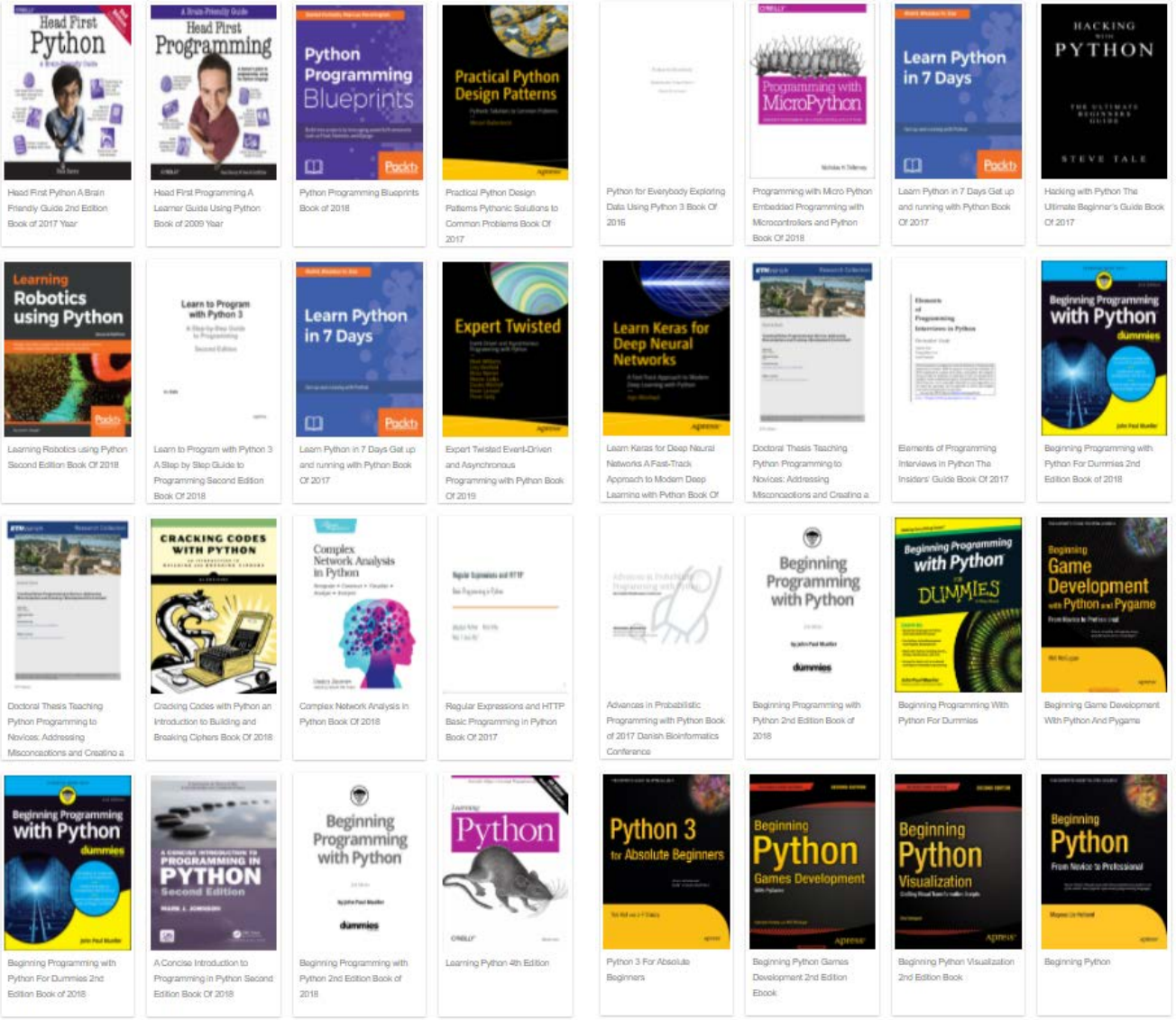
- Install python including IDLE, pip, and documentation
- Create shortcuts and file association



5. Resources

- Python Website www.python.org
- Official Python Tutorial https://docs.python.org/3.6/tutorial/
- Tutorial ("A Byte of Python"): https://python.swaroopch.com/
- PyCharm IDE: https://www.jetbrains.com/pycharm-edu/
- Think Python
  - http://greenteapress.com/wp/think-python-2e/
- Free Python Textbook
  - https://www.programming-book.com/python/

Free Python Textbooks



Head First Python A Brain Friendly Guide 2nd Edition Book of 2017 Year

Head First Programming A Learner Guide Using Python Book of 2009 Year

Python Programming Blueprints Book of 2018

Practical Python Design Patterns Pythonic Solutions to Common Problems Book Of 2017

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Doctoral Thesis Teaching Python Programming to Novices: Addressing Misconceptions and Creating a

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