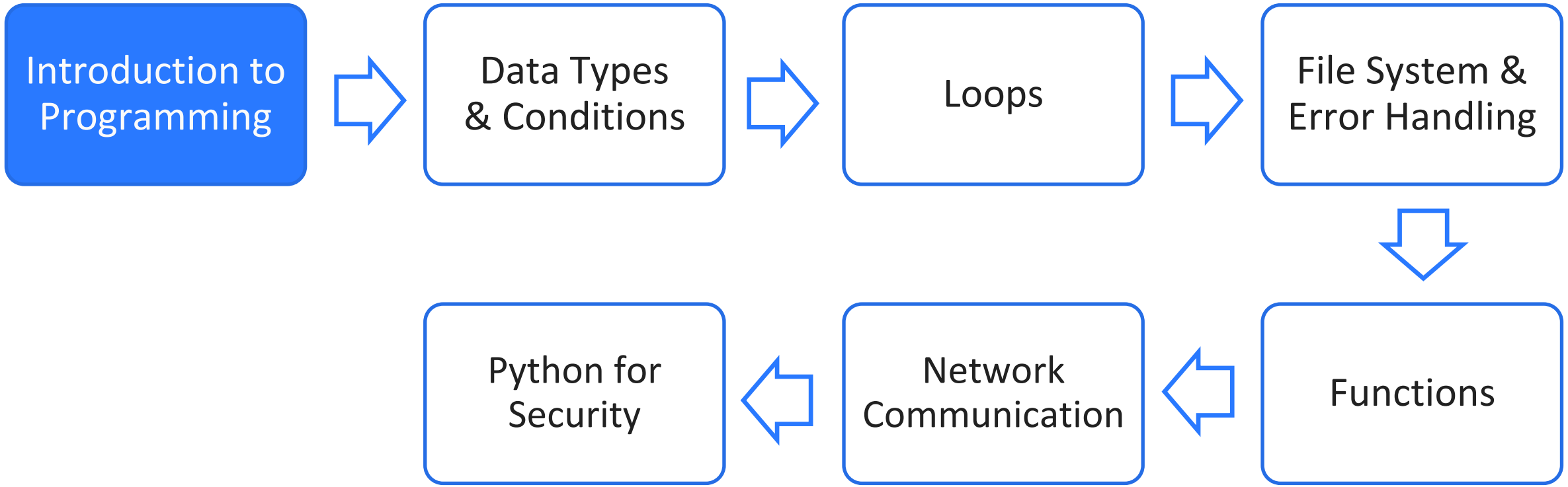
Cybersecurity Professional Program

Introduction to Programming

Introduction to Python for Security

Course Path


Introduction to Programming
Data Types & Conditions
Loops
File System & Error Handling
Functions
Network Communication
Python for Security

Objectives

Python is a dynamic programming language developed for network manipulations and computing operations.

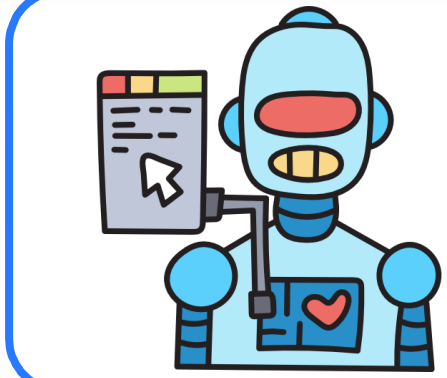
This lesson is an introduction to the Python programming language and development environment.

- Introduction to Programming
- Python Installation
- Python IDE
- Python Environment & PyCharm
- Basic Syntax

Introduction to Programming

Introduction to Programming

Computer Instructions



- A computer doesn’t understand code like humans do.
- It understands basic instructions called **machine code**.
- A computer’s CPU handles its instructions and calculations.

> Machine code is a language that enables fast execution. It can be regarded as the lowest level source code.

What Is Programming?

Programs

Programs are lists of instructions the computer performs in sequential order.
They typically include mathematical operations.

Source Code

A program written in a high-level programming language

> A programming language includes a set of instructions that yield various types of results.

What Is Python?

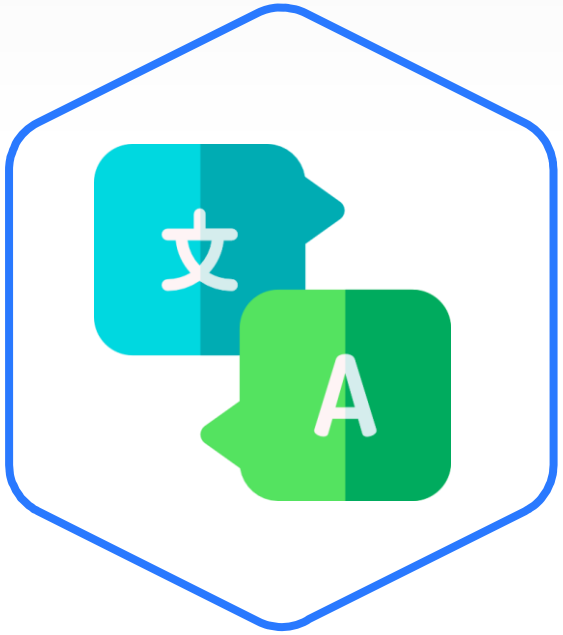
- A high-level programming language
- Easy to deploy and learn
- Python's design emphasizes code readability.

> Python is not meant for low-level programming.

Python vs. Other Languages

Python		C#		Java
Easy to learn		Hard to learn		Hard to learn
Works in any environment		Works in specific environments		Works in any environment
Many libraries	V	.NET libraries	V	Few libraries
Large community		Large community		Large community
Syntax is easy to learn		Syntax is difficult to learn		Syntax is difficult to learn
Many frameworks		.NET framework		Many frameworks

Python Interpreter



- Python is an interpreter language.
- Reads instructions from top to bottom and left to right, with exceptions
- Performs instruction validation
- Results are returned per instruction, in sequential order.

> The interpreter can be run from within CLI using the ***py*** command or installed in the IDE.

Compiler vs. Interpreter

Compiler	Interpreter
It takes more time to compile; however, the code execution is faster.	Execution takes more time, and each instruction must be compiled in real time.
The code is compiled for a specific operating system.	Code can be executed in any environment that includes the interpreter.
The source code is typically unavailable, and the compiled data can be read.	The source code is available and readable.
Once the binary is compiled, the source code is no longer needed.	The code is needed each time the program is executed.

Python 2 vs. Python 3

Python 2		Python 3
Python 2 code is considered legacy code.		Python 3 replaced Python2 at the beginning of 2020.
Many older libraries built for Python 2 are not forward-compatible.		Most new libraries are being developed strictly for use with Python 3.
Strings are stored as ASCII characters by default.	V	Strings are stored as Unicode characters by default.
Calculations are rounded to the nearest whole number.		Calculations are not automatically rounded.
Print "Hello"		***Print("Hello")***

Python Types

CPython is the original implementation of Python.

Jython is an implementation of Python designed to run on the Java platform.

IronPython is an implementation of Python that can be integrated into the .NET framework.

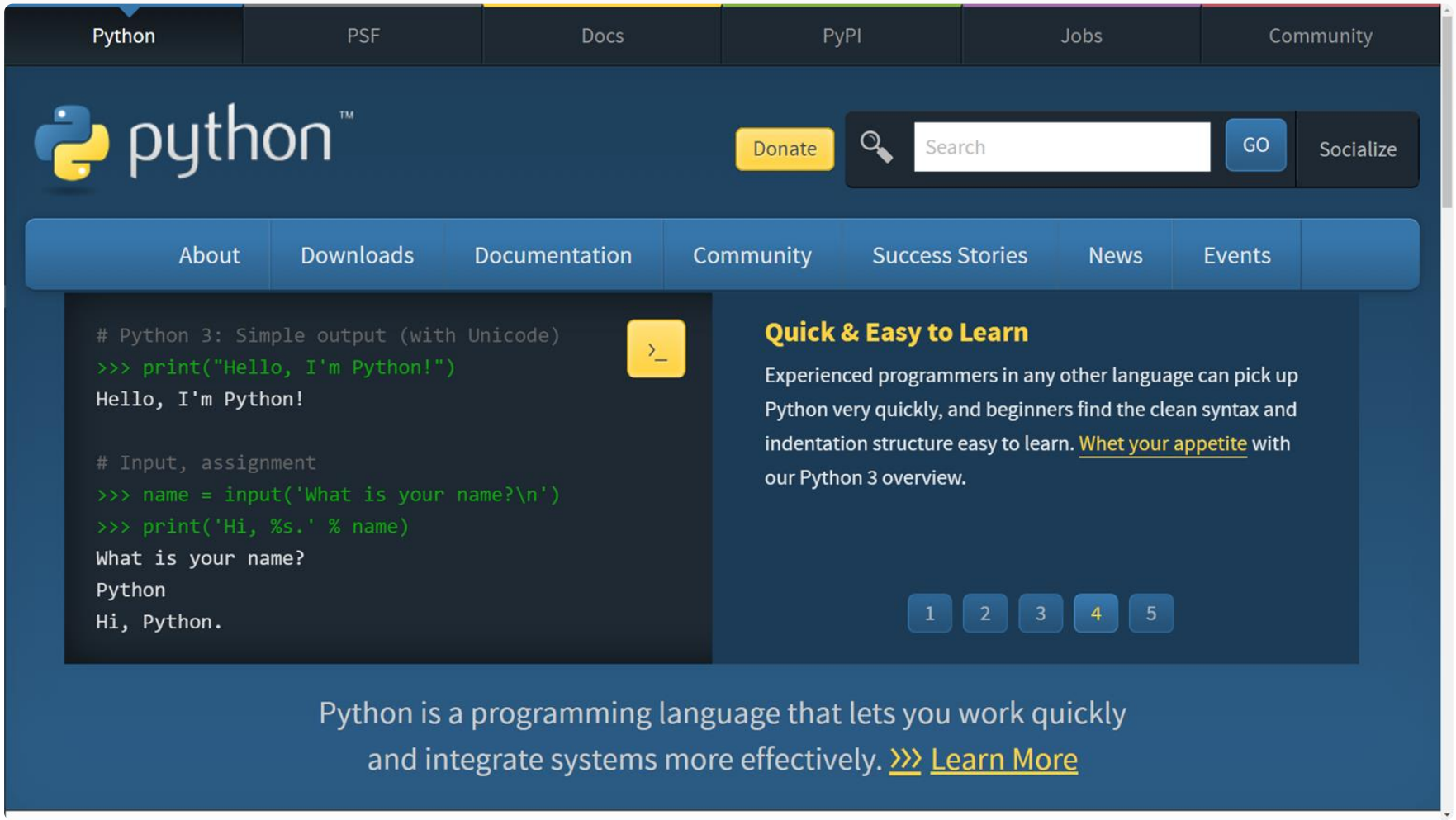
Introduction to Programming

Python Installation

Python Installation

Python Website

- Simple installation process
- The website where you can download Python is Python.
- Python 3 includes better support for development.



Installation Process

- Python installation for Windows is the same as any other installation.
- By default, Python 3 is installed in the ***AppData*** directory.
- It is recommended to add Python to the path.

Python Installation

Python in CLI

Running the Python CLI interpreter in Windows is done using the CMD, by adding Python to the path.

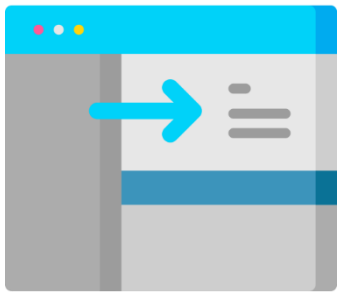
Running either ***py*** or ***python3*** launches the interpreter.

```
Microsoft Windows [Version 10.0.22000.613]
(c) Microsoft Corporation. All rights reserved.

C:\Users\John>py --version
Python 3.x.x

C:\Users\John>py
Python 3.x.x (v3.x.x, Oct 4 2021, 19:00:18) [MSC v.1929
64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for
more information.
>>>
```

Introduction to Programming

Python IDE

Working with IDE



- Integrated Development Environment
- A program dedicated to specific software development
- IDE is easier to use than CLI.
- Includes many useful tools for software development

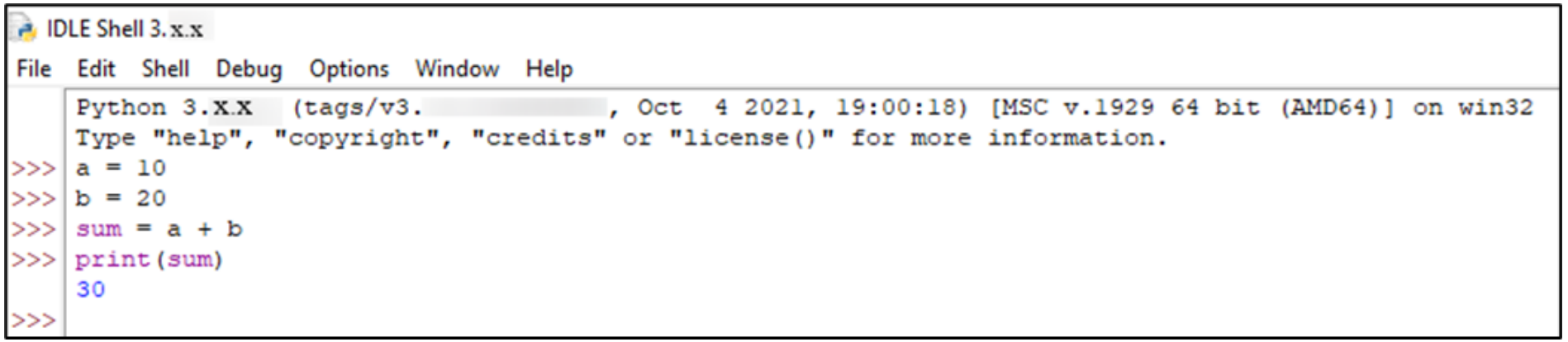
> One of the most useful IDE programs is **PyCharm**, which is used for Python programming.

Python IDE

Python's Integrated Development and Learning Environment (IDLE)

IDLE has two main windows: one for Shell and the other for editing.

IDLE is a cross-platform program that works on Windows, UNIX, and macOS.



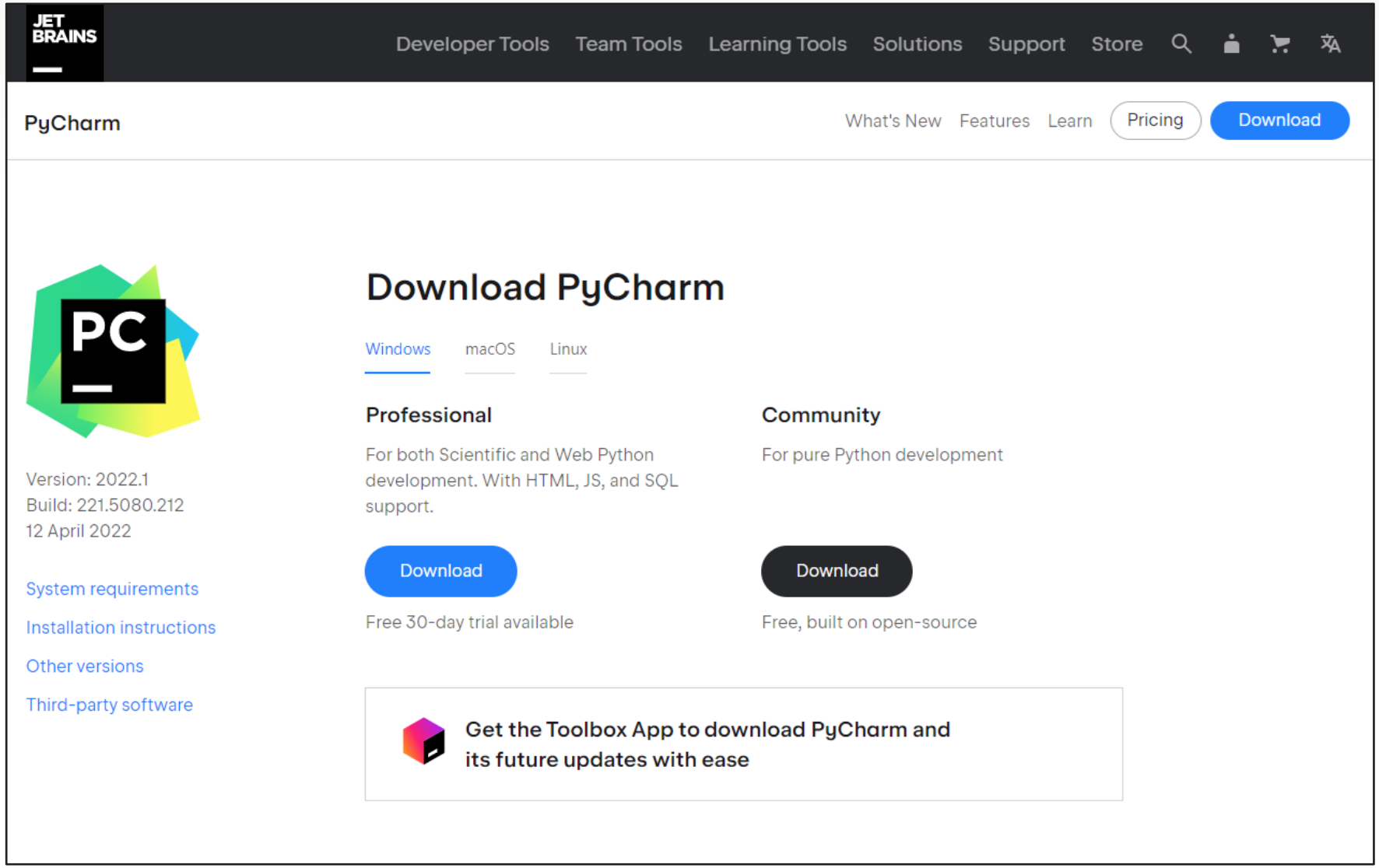
Python IDE

PyCharm

PyCharm was developed by JetBrains.

Free community version: PyCharm

Simple Windows installation, with some required configuration



Introduction to Programming

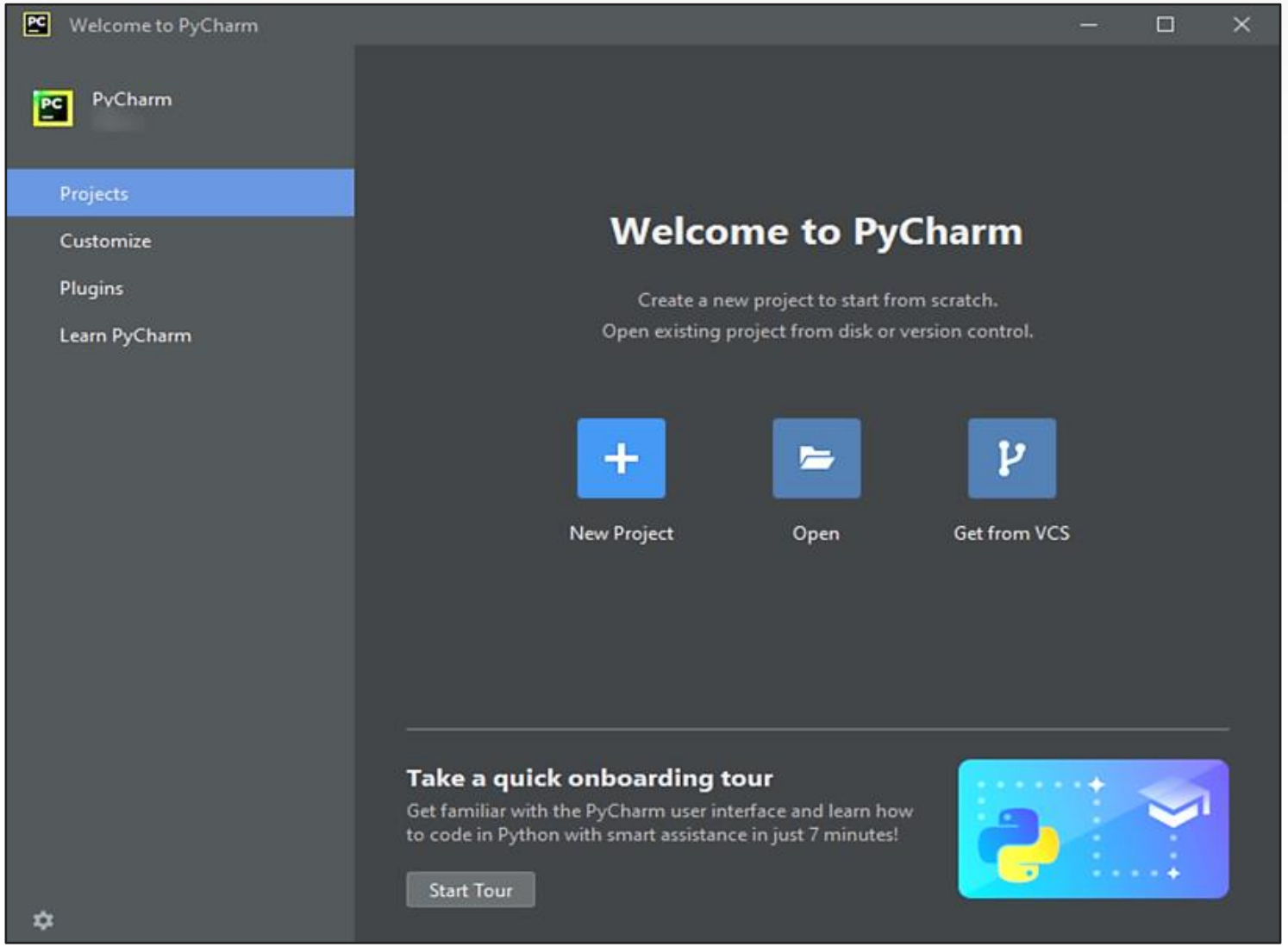
Python Environment & PyCharm

New Project

During development, treat a program like a project.

Projects help organize files and create a dedicated environment.

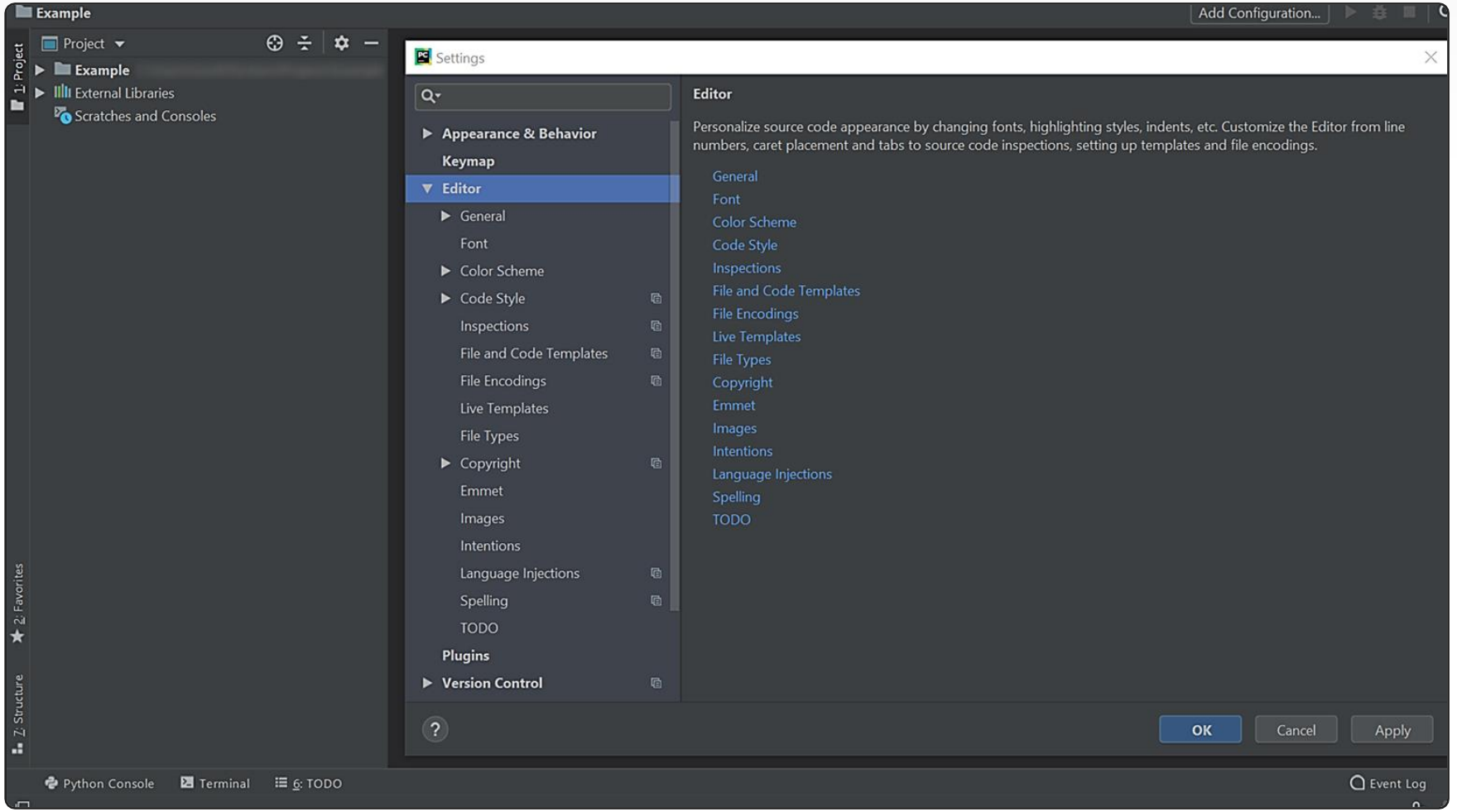
Projects are created using the ***New Project*** option.



PyCharm Settings

PyCharm visual themes can be extensively configured.

Most default settings can be left as is, but some require selection.

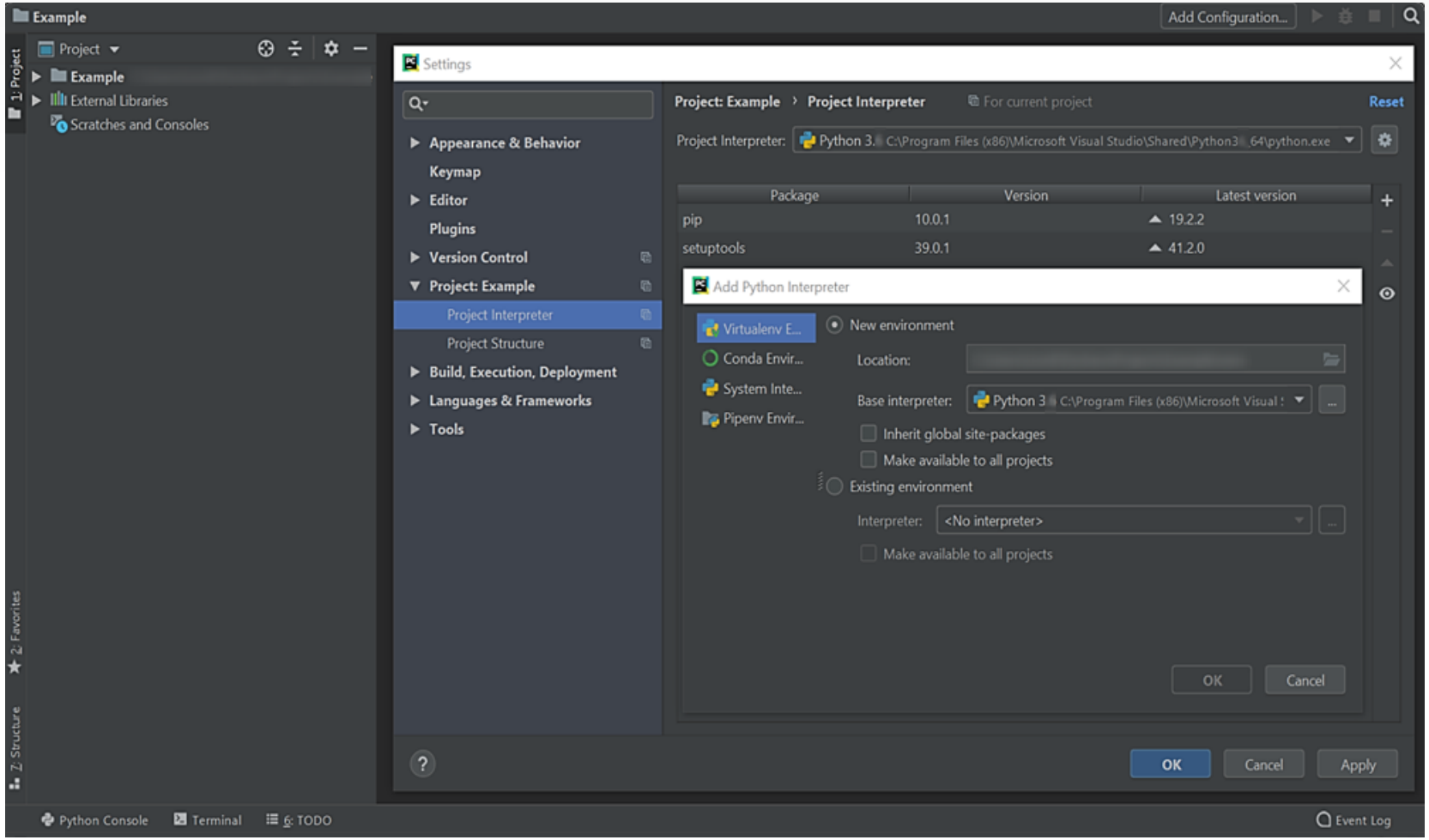


Interpreter Configuration

PyCharm allows selection of different interpreters for different projects.

Python installation should be automatically detected.

Configuration is done via **Settings** > ***Project Interpreter***.

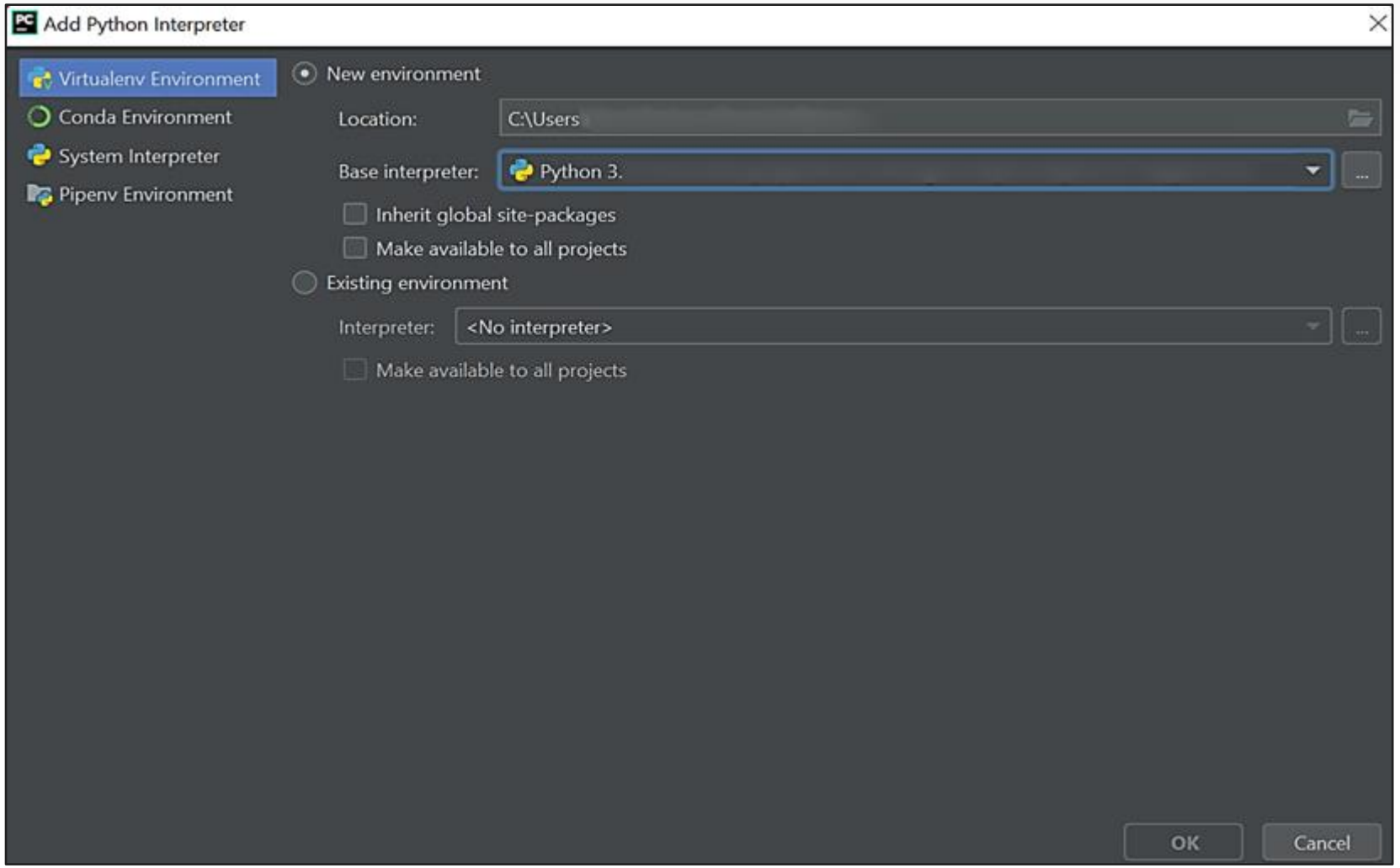


PyCharm Virtual Environment

PyCharm allows virtual environment tools to create isolated projects.

The purpose of a virtual environment is to manage all project settings.

Virtual environment creation is relatively easy.

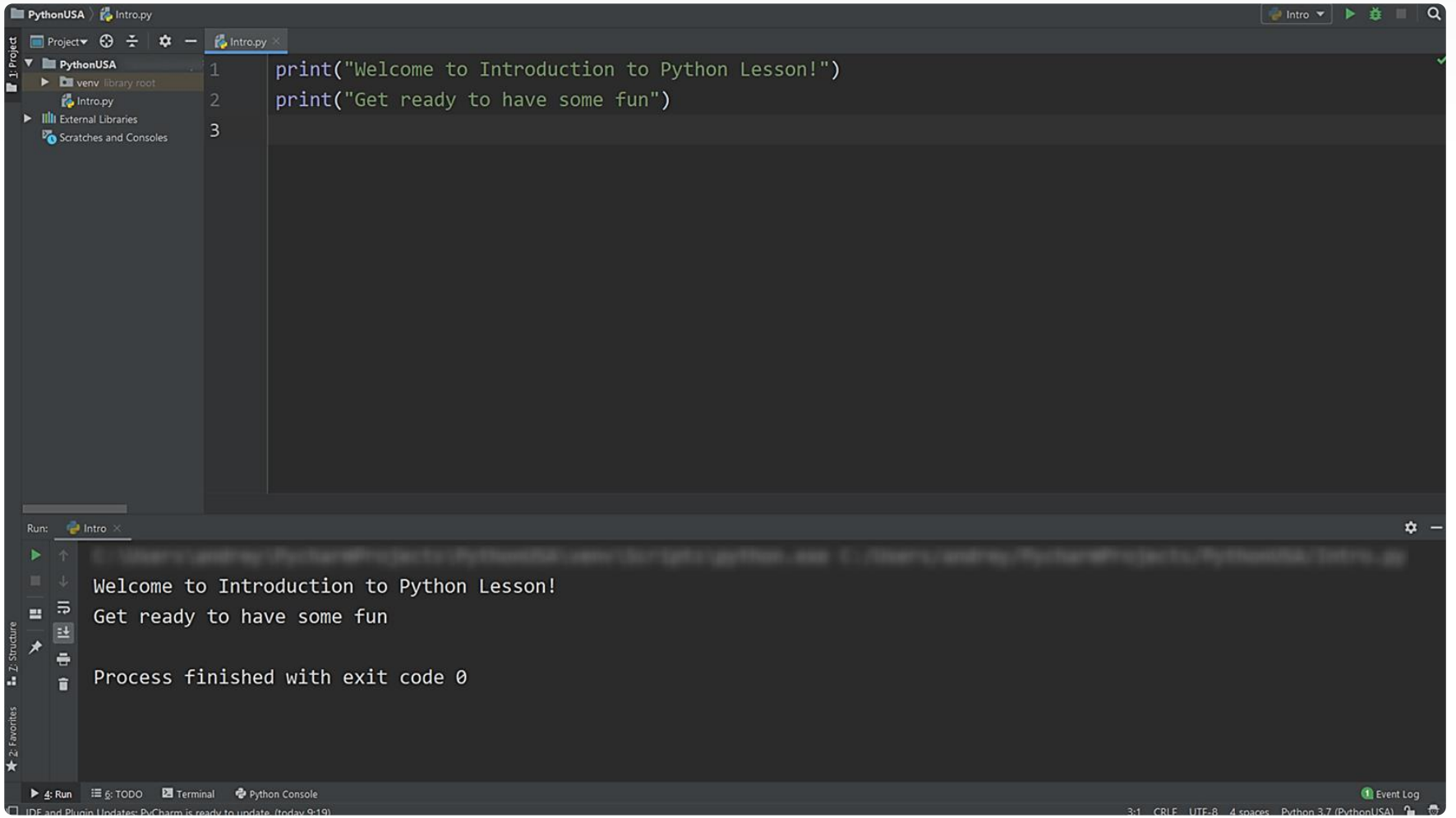


PyCharm Code Execution

PyCharm has several ways to execute code.

After execution, the console will appear with the results and errors.

The console informs the developer if there are mistakes in the code.



Python Environment & PyCharm

Lab PY-01-L1

Installing Python

15–20 Min.

Mission

Install Python and PyCharm Community Edition on your Windows system.

Steps

- Download and install Python 3.
- Download and install PyCharm Community Edition from JetBrains.

Environment & Tools

- Browser
- Python 3
- PyCharm

Related Files

- Lab document

Introduction to Programming

Basic Syntax

Python Data Types

String

Any text - “ or ‘ used to delineate it.

Any Postive or Negative WHOLE Number

Integer

Float

Any Postive or Negative WHOLE Number or DECIMAL number

True/False - One or the Other

Boolean

Python Syntax

```
#This is a comment
print("Hello World!")

#prints Hello World!

"""
This is how
a multi-line string
Comment looks.
"""
```

Hashtag (*#*) renders an entire line as a comment.

Three quotation marks (""") are used in the beginning and end of multi-line comments.

Three quotation marks can be used in ***print()*** to print multi-line strings.

Standard Syntax Principles

```
number = 1
number = number + 5
#add 5 to number

print("Hello World!")
#prints Hello World!
```

Most programing languages are case-sensitive.

Statements must be fully written.

Case-sensitive means that **x** is not the same as **X**, and **John** is not **john**.

Basic Syntax

Code Handling

```
def main():
    print("Main function")
    print("Second line")

main()


class = 5
#this variable name cannot
be used and will trigger an
error
```

Whitespace: Invisible characters that make the code more readable

Keywords: Python's reserved words and instructions

Indentation: A mechanism that associates a block of code with a condition, loop, or class

Basic Syntax

Lab PY-01-L2

Comments and Print

10–15 Min.

Mission

Use Python to build a program that will print a string to the console.

Steps

- Print messages.
- Use comments.

Environment & Tools

- Windows
- Python 3
- PyCharm

Related Files

- Lab document

Lab PY-01-L3

PyCharm Personalization

10–15 Min.

Mission

Customize your PyCharm environment.

Steps

- Change the PyCharm look.

Environment & Tools

- Windows
- Python 3
- PyCharm

Related Files

- Lab document

Programming Fundamentals

TDX Arena Lab Homework

Mission

> Use TDX Arena for additional practice working with variables and data types.

Steps

Sign in to the **TDX Arena** platform.

Navigate to the **Practice Arena**.

Navigate to the **Python Programming** course.

Select ***PY01 Programming Fundamentals***.

Select the ***Variables and Data Types*** lab.

*Complete the homework **before** the next class.*

*Complete any labs or challenges you **did not finish** in class.*

Variables and Data Types

Thank You

Questions?