Deep Learning

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I833 SS2019

Before we start:

- Go to:
  - \\prakt\deeplearning\-insertpath-\
- run:
  - start.bat
- Wait :)

Who are we?

What will you learn today?

What will you learn today?

- A bit about Python and Anaconda
- How to use a Jupyter notebooks
- Hello World in Python
- Train your first ML model:
  - How to recognize hand written digits?

What will you learn in this course?

- Image Processing:
  - Deep Convolutional Neural Networks
- Natural Language Understanding
  - RNN / LSTM
  - Embeddings and Attention
- Reinforcement Learning
  - Temporal difference learning and Deep Q-Networks
  - How to play Flappy Bird :)

Any questions?

What would you like to learn?

python™

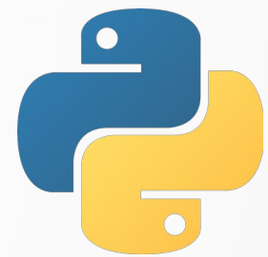
Who knows Python already?

How many lines of Python code did you write?

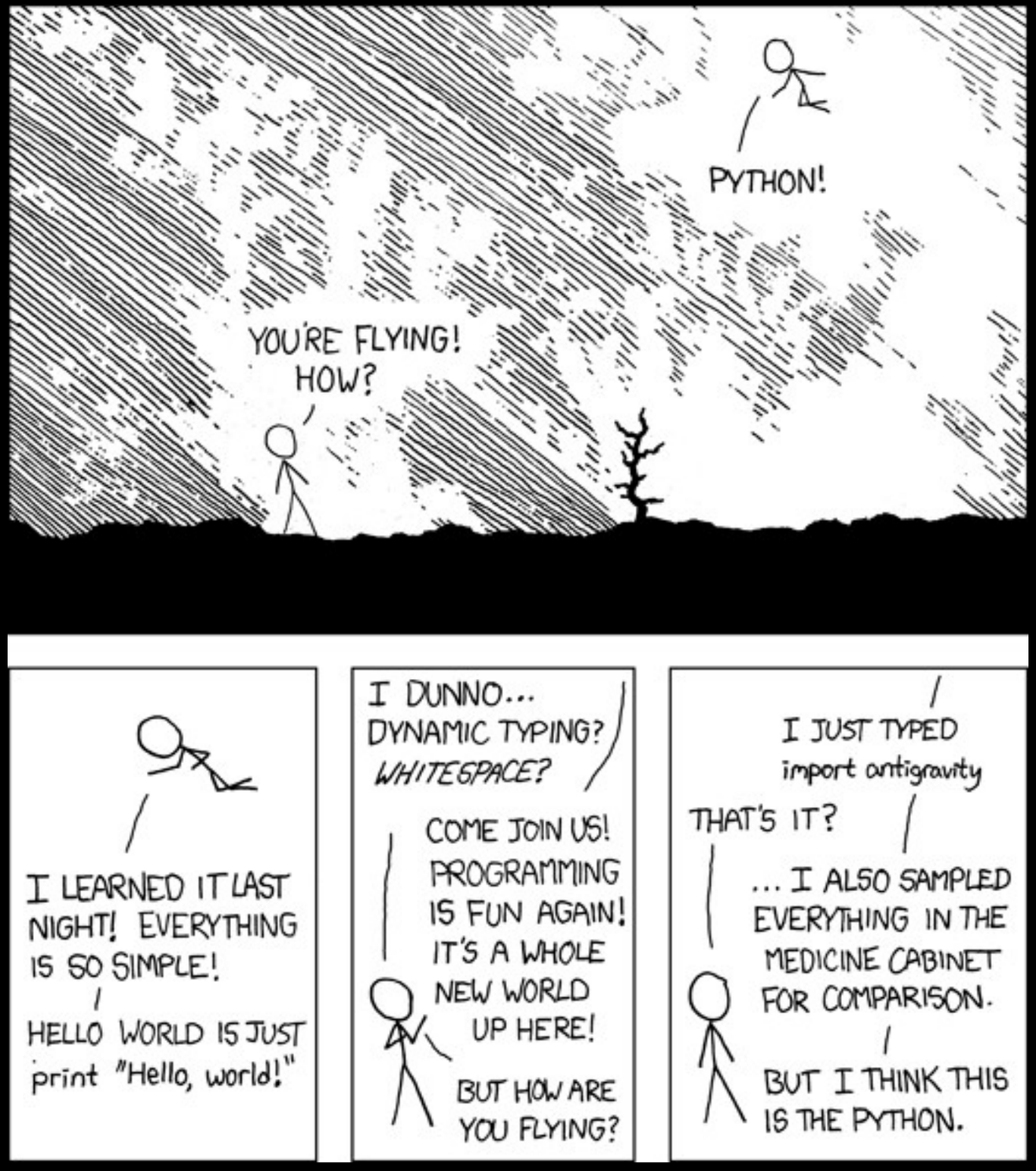
When one teaches, two learn.

Robert A. Heinlein

Python Facts



- 1990 created by Guido van Rossum
- Functional / Imperative / Object-oriented
- Dynamic / Duck typing
- Interpreted Language
- Default language for many ML / DL Frameworks
  - TensorFlow
  - PyTorch
  - Kears


PYTHON!
YOU'RE FLYING! HOW?
I LEARNED IT LAST NIGHT! EVERYTHING IS SO SIMPLE!
HELLO WORLD IS JUST print "Hello, world!"
I DUNNO... DYNAMIC TYPING? WHITESPACE?
COME JOIN US! PROGRAMMING IS FUN AGAIN! IT'S A WHOLE NEW WORLD UP HERE!
BUT HOW ARE YOU FLYING?
I JUST TYPED import antigravity
THAT'S IT?
... I ALSO SAMPLED EVERYTHING IN THE MEDICINE CABINET FOR COMPARISON.
BUT I THINK THIS IS THE PYTHON.

Why Python?

- C is fast at run time but slow to write
- Python is slower at runtime but fast to write

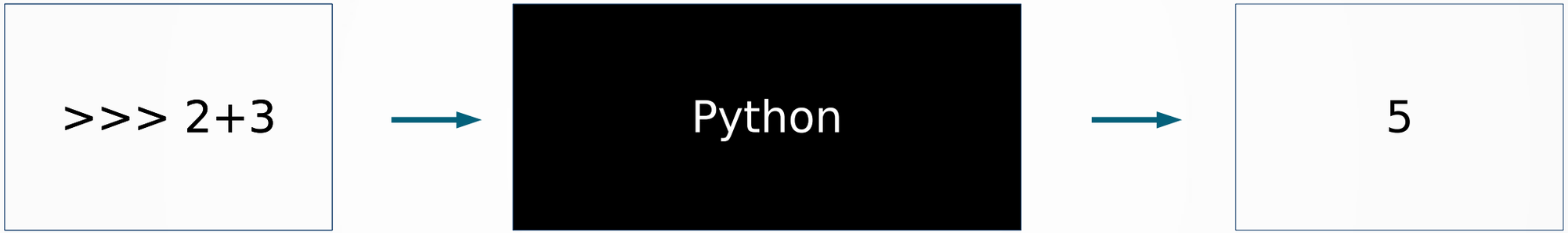
- Idea:
  - Write computational heavy code in C/C++
  - Prototype in Python

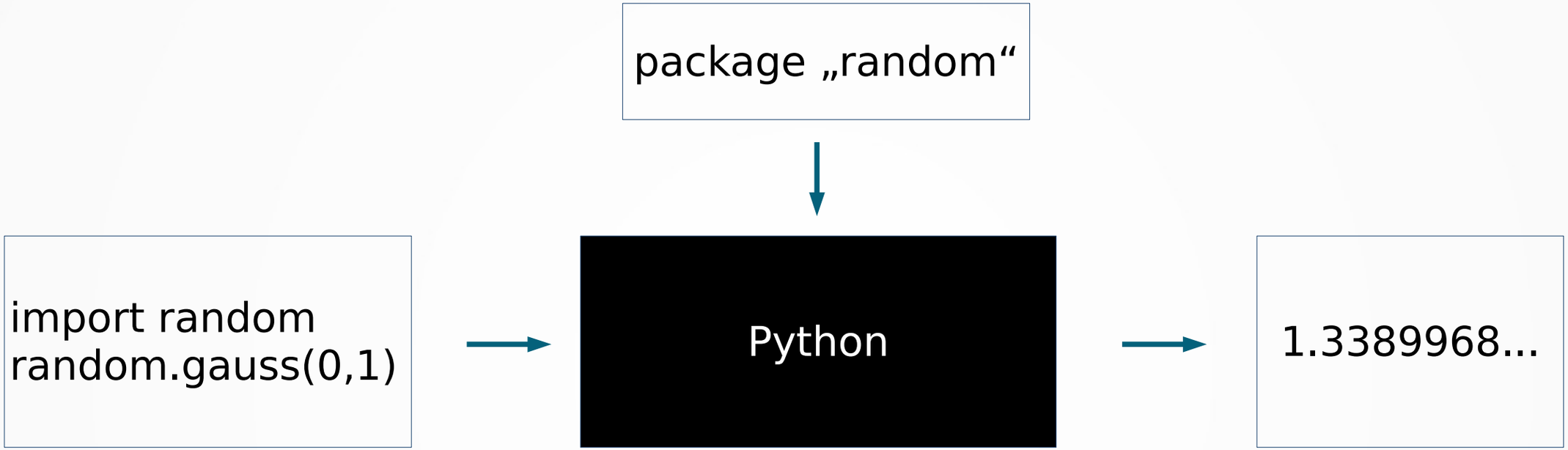
The Zen of Python

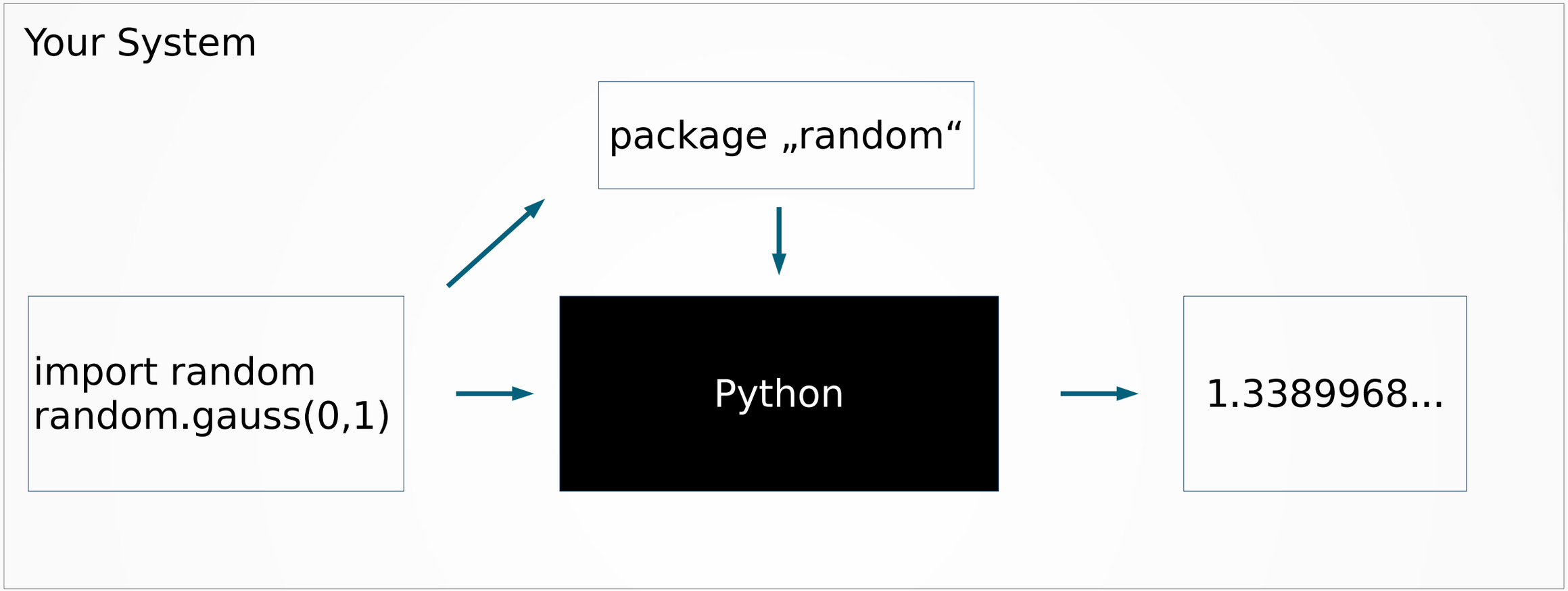
- If the implementation is hard to explain, it's a bad idea.
- If the implementation is easy to explain, it may be a good idea.

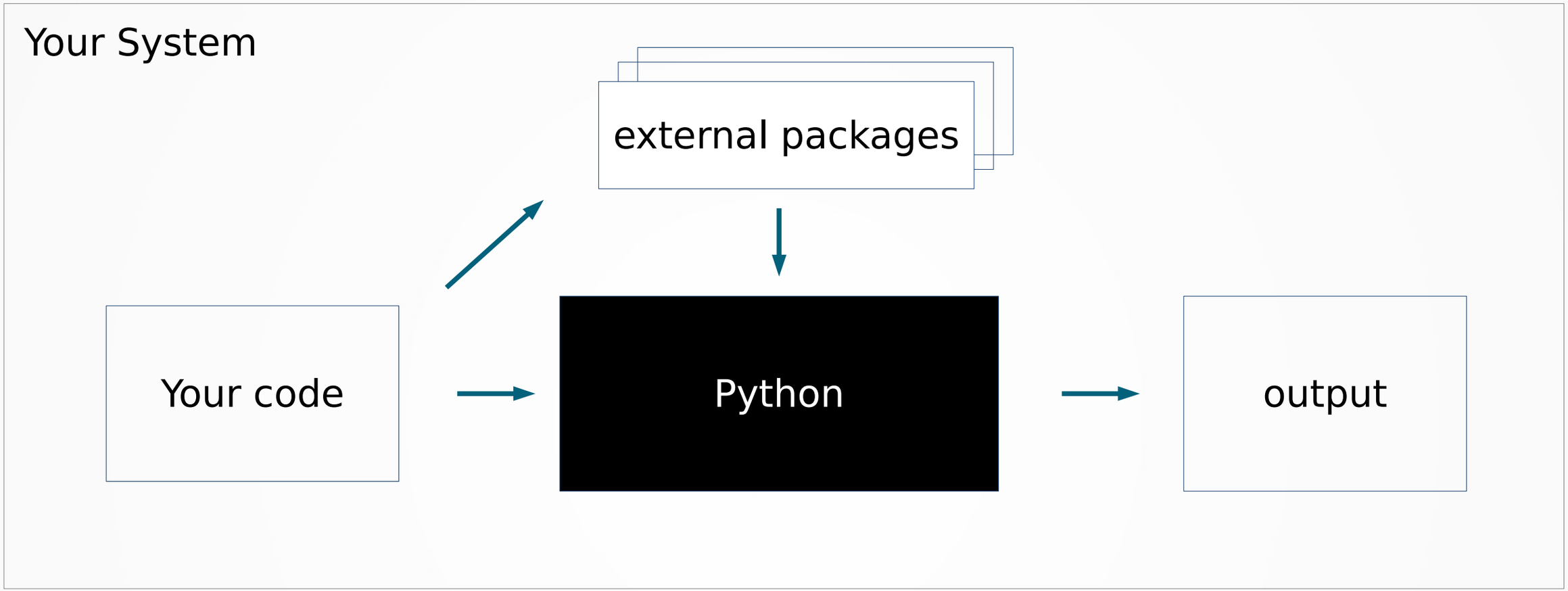
To read more type “import this“

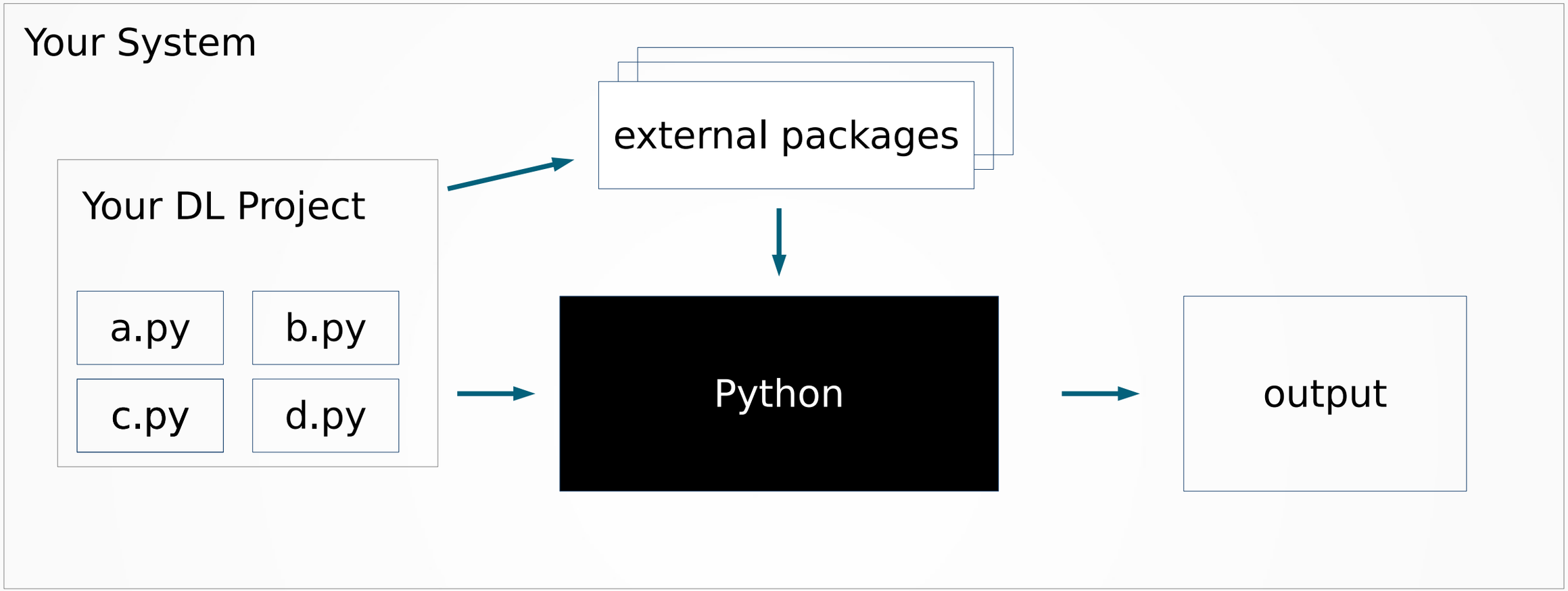
Packages

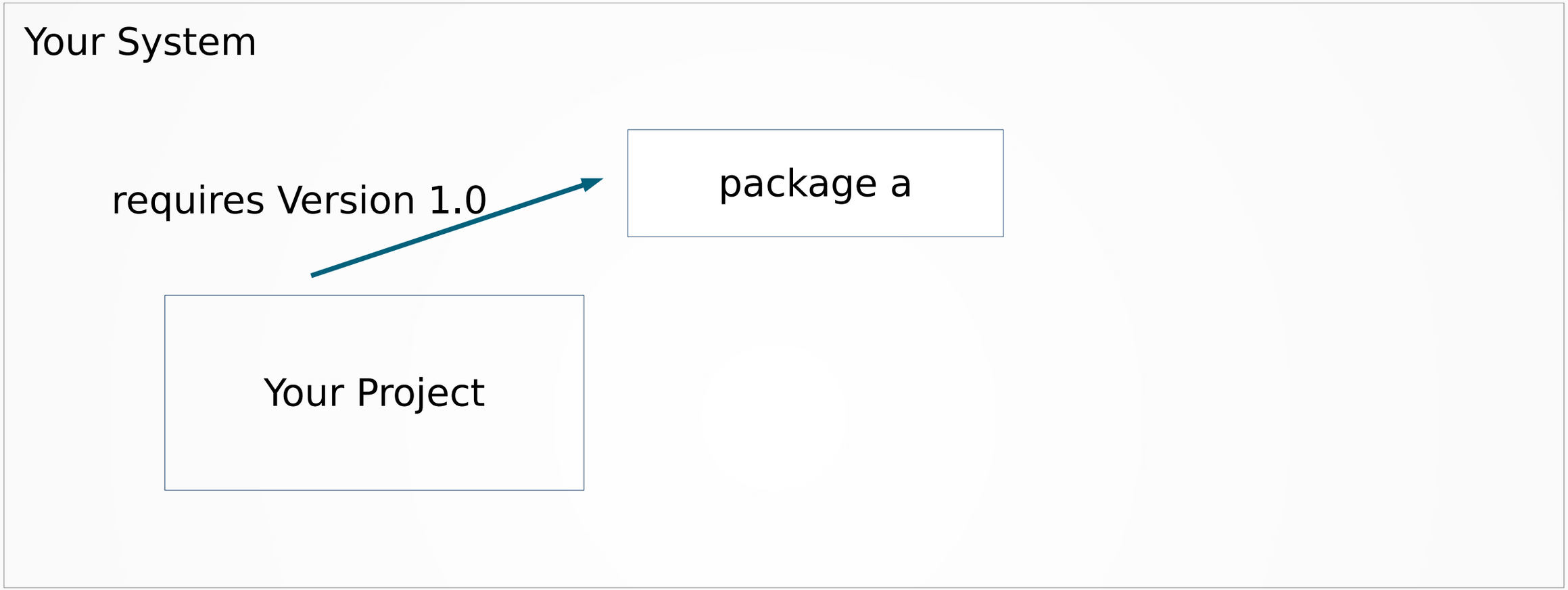

>>> 2+3
Python
5

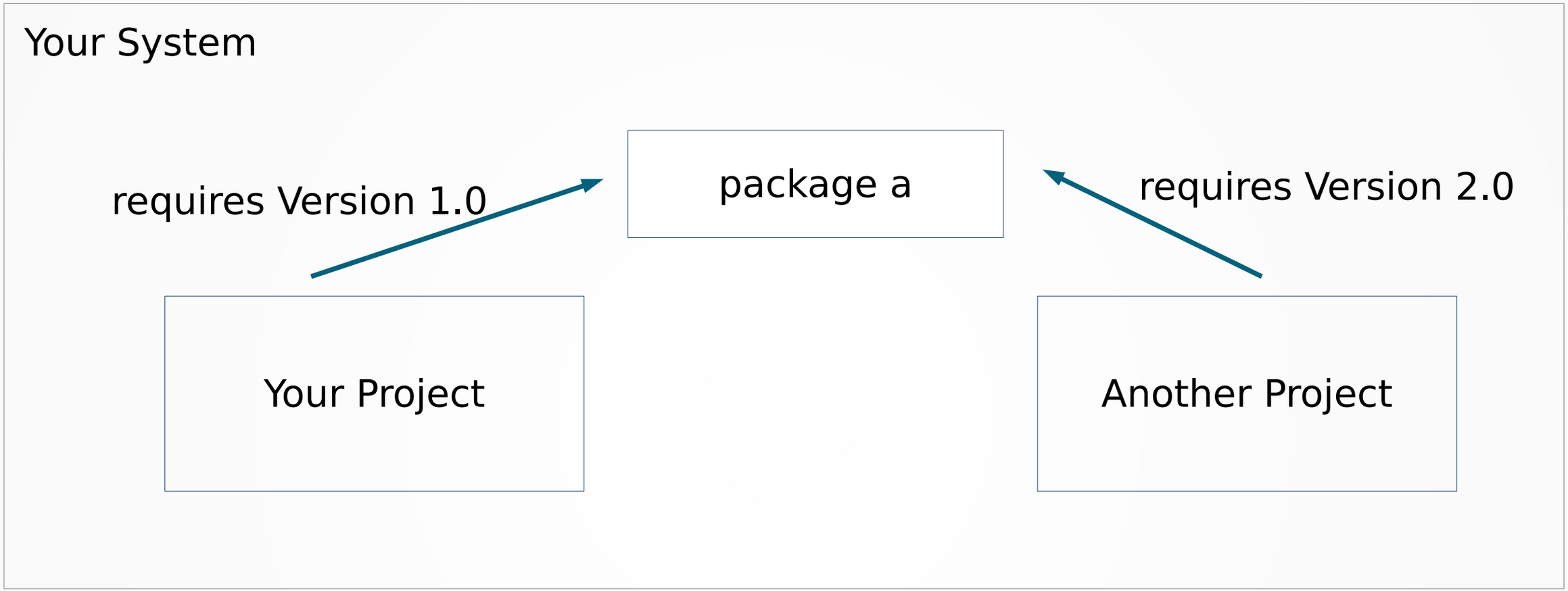

package „random“
import random
random.gauss(0,1)
Python
1.3389968...

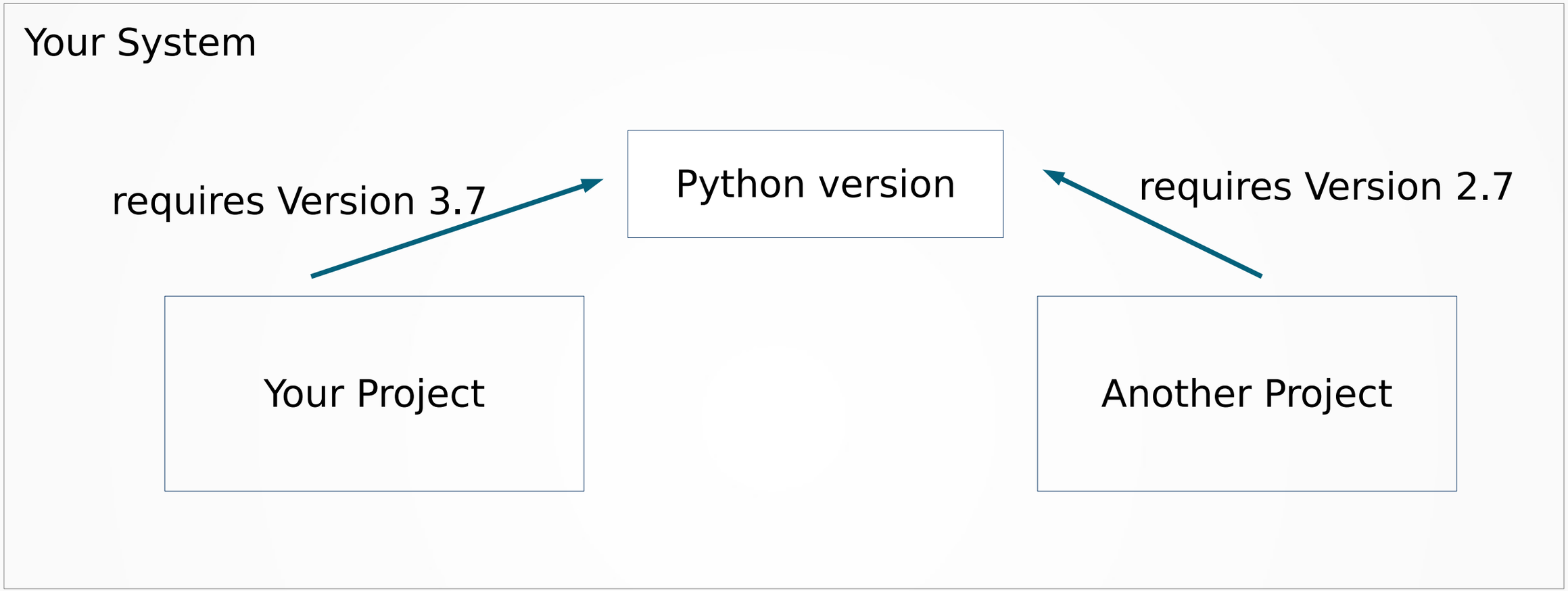

Your System
package „random“
import random
random.gauss(0,1)
Python
1.3389968...

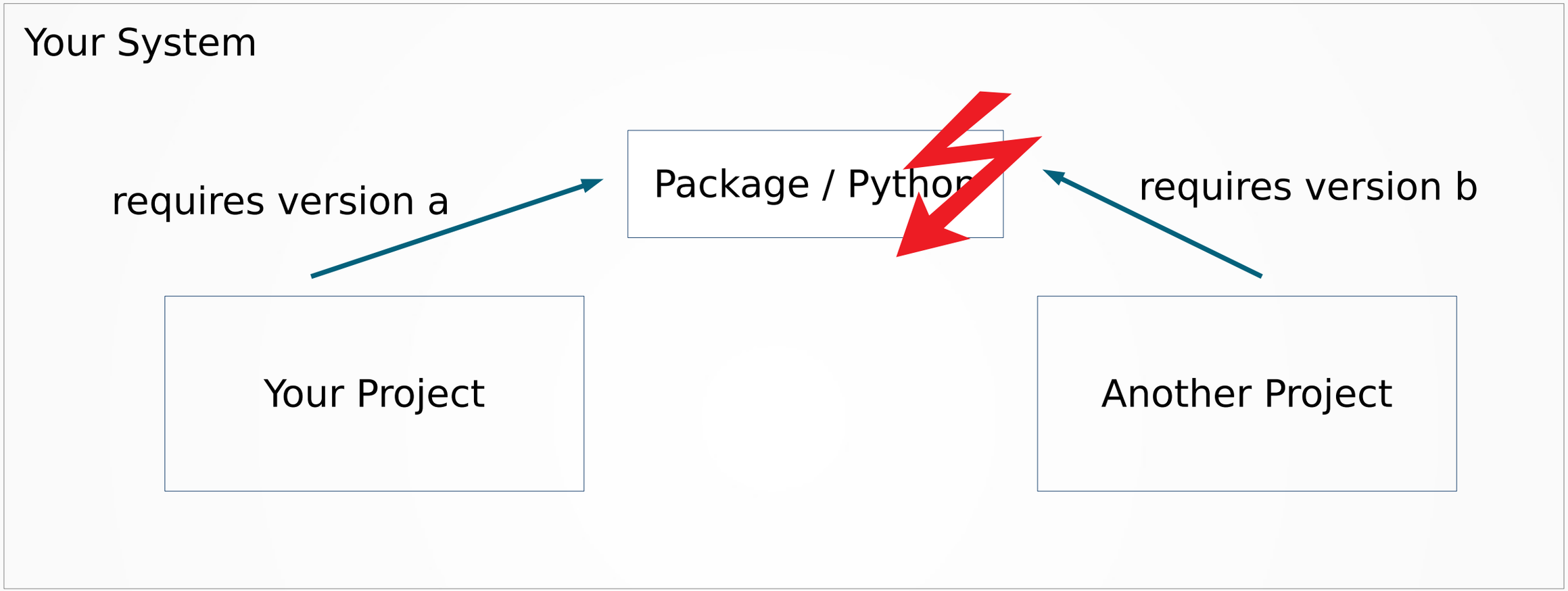

Your System
external packages
Your code
Python
output


Your System
external packages
Your DL Project
a.py
b.py
c.py
d.py
Python
output

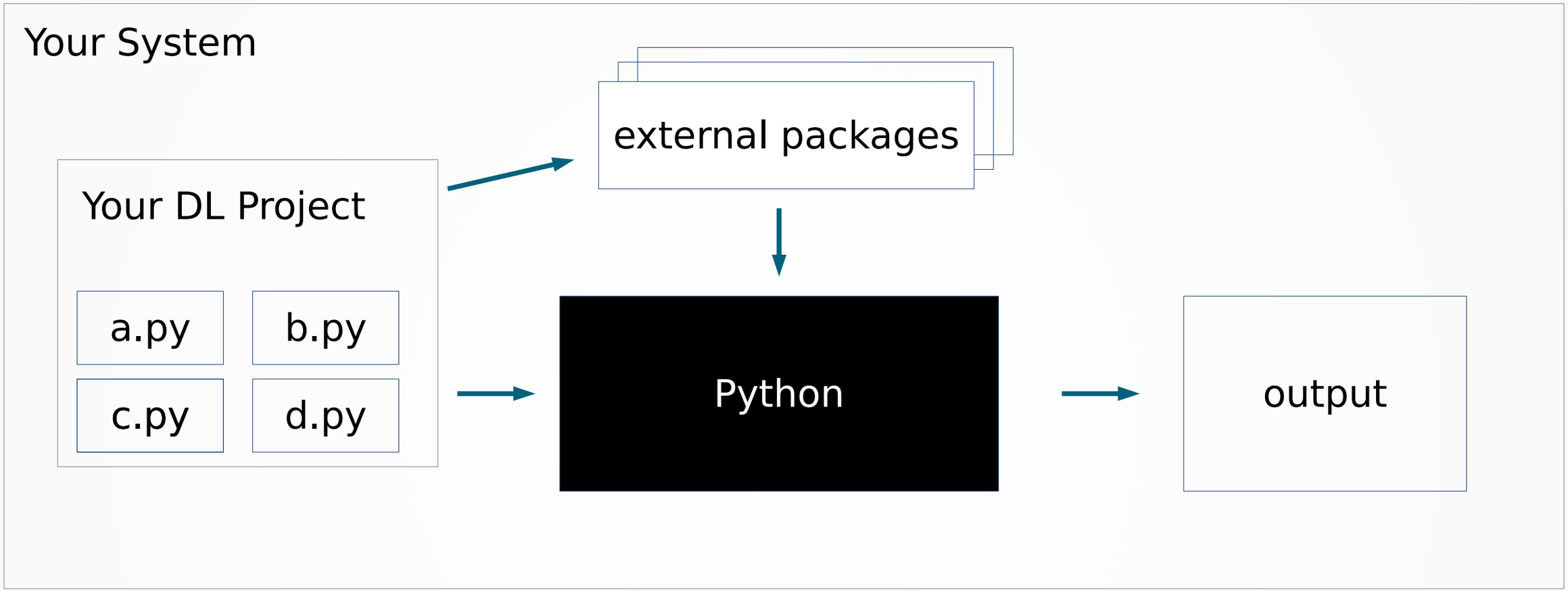

Your System
requires Version 1.0
package a
Your Project

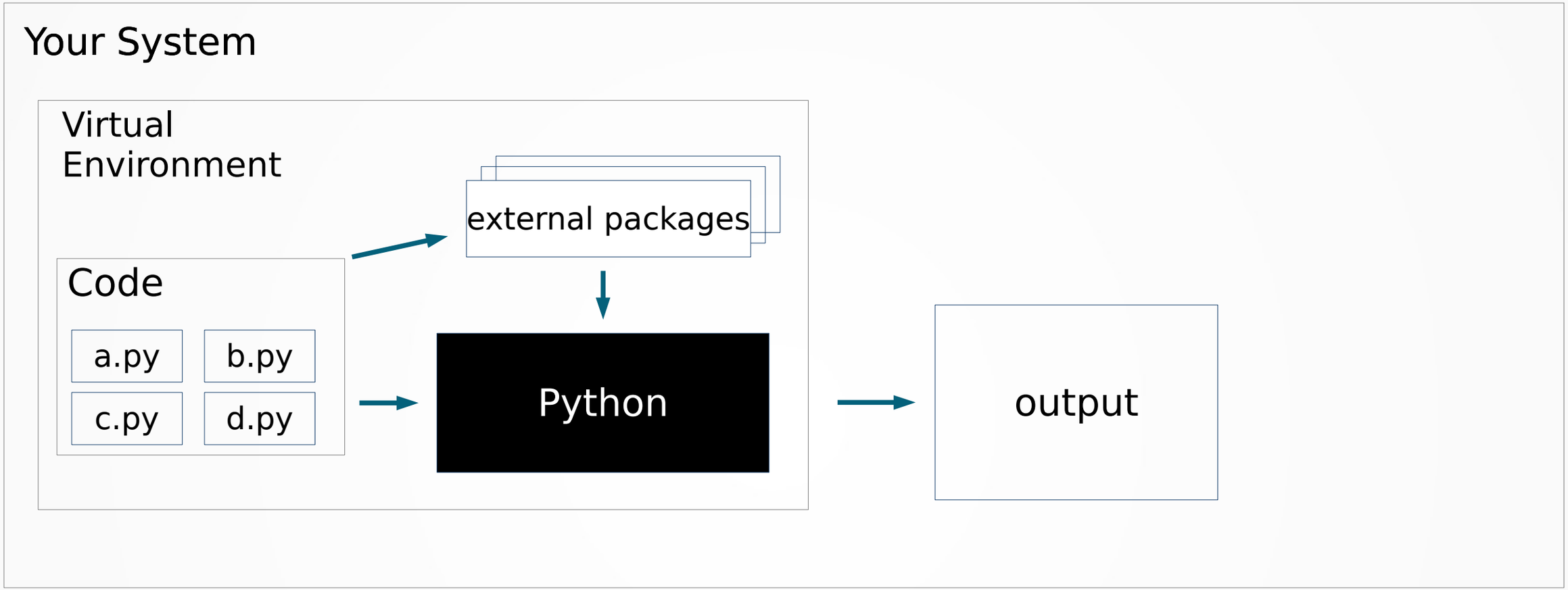

Your System
requires Version 1.0
package a
requires Version 2.0
Your Project
Another Project

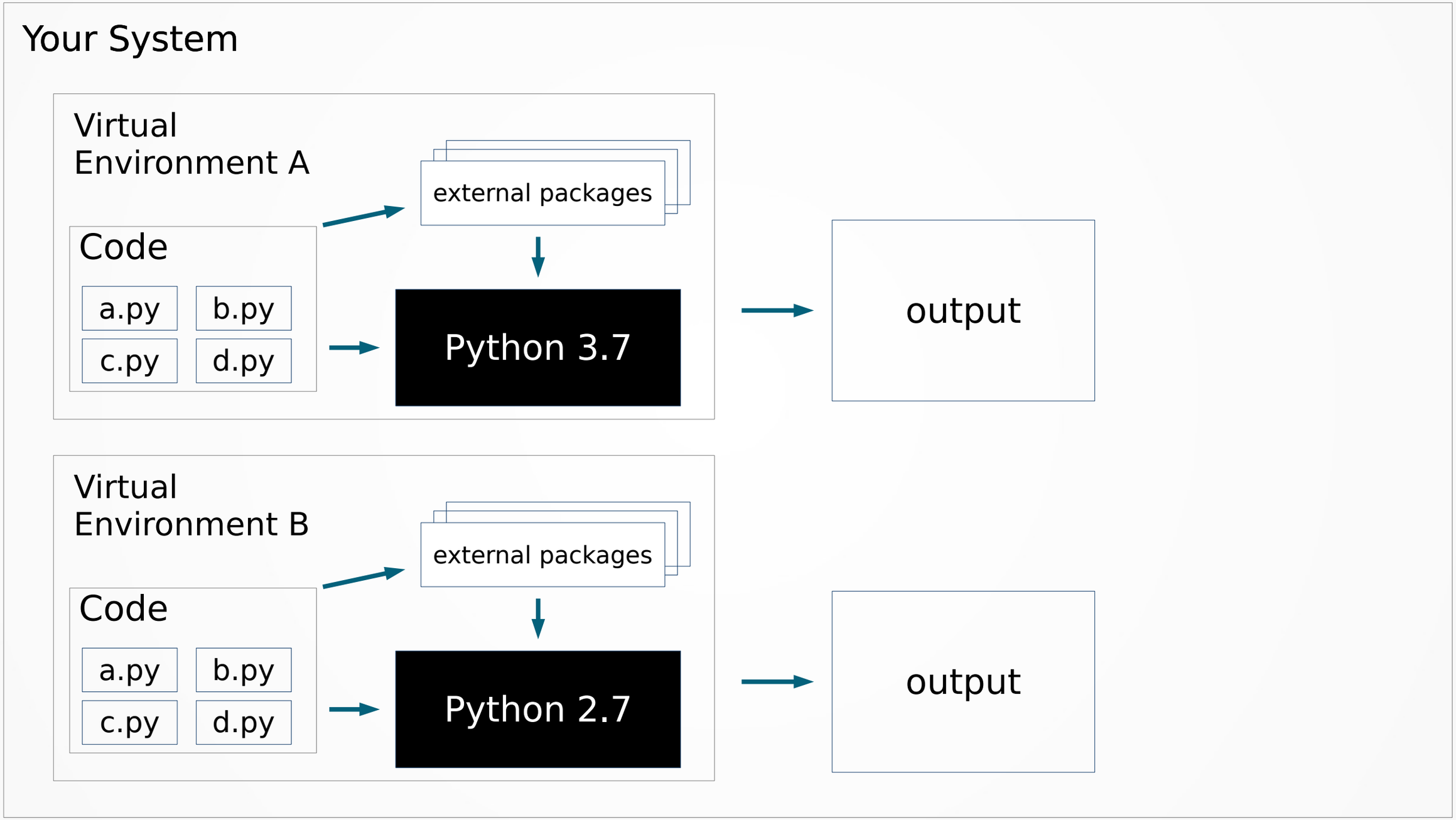

Your System
requires Version 3.7
Python version
requires Version 2.7
Your Project
Another Project


Your System
requires version a
Package / Python
requires version b
Your Project
Another Project

Virtual Environments


Your System
external packages
Your DL Project
a.py
b.py
c.py
d.py
Python
output


Your System
Virtual
Environment
external packages
Code
a.py
b.py
c.py
d.py
Python
output


Your System
Virtual Environment A
external packages
Code
a.py
b.py
c.py
d.py
Python 3.7
output
Virtual Environment B
external packages
Code
a.py
b.py
c.py
d.py
Python 2.7
output


ANACONDA®

Anaconda

- Is Python and R distribution
- contains a
  - A Python interpreter
  - Package management tool (conda)
  - data science packages (TensorFlow etc)
- Available for Windows, MacOS, Linux
- Simplifies the Python setup process on Windows

Let‘s code!