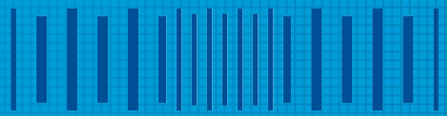
bit.ly/pystarters

SWC PyStarters - Introduction to scientific programming in Python.

May 6th & 13th, 10am-4pm



Sainsbury Wellcome Centre

Schedule

- May 6th AM – Installing Python (Adam)
- May 6th PM – Introduction to Python (Steve)
- May 13th AM & PM– Advanced Python (Joaquin)
- May 13th PM– Wrap up & questions (Adam & Steve)

Structure

- Main zoom room for tutorial
- Breakout rooms for group problems & one to one help
- SWC slack (#pystarters) for questions
  - Zoom chat if you haven't got access yet
- TA will answer your question, or move to breakout room.

TAs:

- Steve, Joaquin & me (when not teaching)
- Federico Claudi, Spencer Wilson, & Lars Rollik

(For admin/zoom, otherwise non-programming questions, ask me)

Why learn Python?

Popularity

- Most popular language for data science [a]
- Fastest-growing major language [a]

a. StackOverflow Survey 2019

Why learn Python?

Free and open source

- Unlike MATLAB, IGOR etc
- Saves your lab money
- More importantly, anyone can use your code (4.3M[2] open Python repositories on GitHub)

b. As 2019-10-25, github.com/oprogramador/github-languages

Why learn Python?

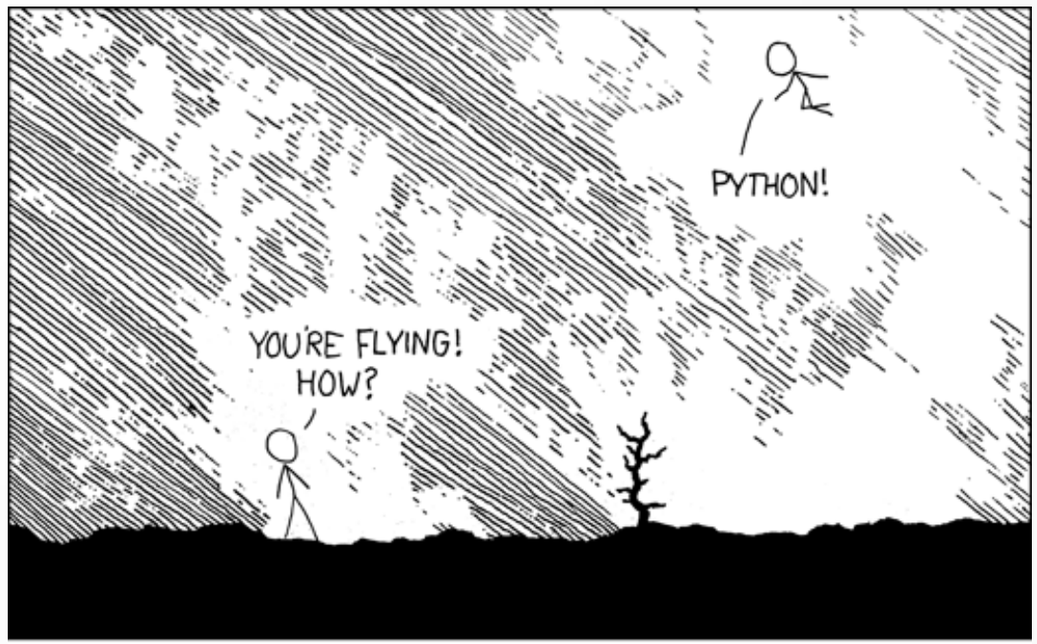
Versatility

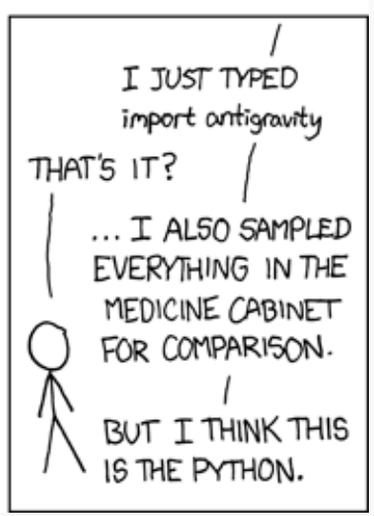
- Not just data analysis / machine learning
  - Visualisation
  - Data acqusition
  - Web development
  - Etc etc ...

Why learn Python?

Packages for everything

- Numpy – numerical computing
- Scipy – scientific computing
- Scikit-image – image analysis
- TensorFlow – deep learning
- Matplotlib – plotting
- Etc etc ...





Downsides

Installation

- Not a single program to download
- Potentially complicated ecosystem

  (if used to e.g. MATLAB)
  - Python versions
  - Installing packages
  - Virtual environments

Installing Python

- Download miniconda installer (link on website)
- Install miniconda (varies with OS)

Windows	MacOS	Linux
• Double click on installer • Accept all defaults, BUT • Check “**Add Anaconda to my PATH environment variable**.”	• Double click on installer • Accept all default options	• cd Downloads • bash Miniconda3-latest-Linux-x86_64.sh • Accept defaults • Press enter to prepend miniconda to PATH (will be your default Python)

Conda environments

- Separate from each other (and system python)
- Allow for incompatible dependencies
- Reproducible workflows, share with:
  - Collaborators
  - Readers of your paper
  - Yourself (HPC etc.)

Creating an environment

- Open a terminal (anaconda prompt on Windows)
- conda create –name pystarters python=3.9
- Accept “y” for yes
- conda activate pystarters

You can make as many different environments as you like, but remember to “activate”

Installing packages

pip install numpy

Arrays & maths etc

pip install matplotlib

Plotting

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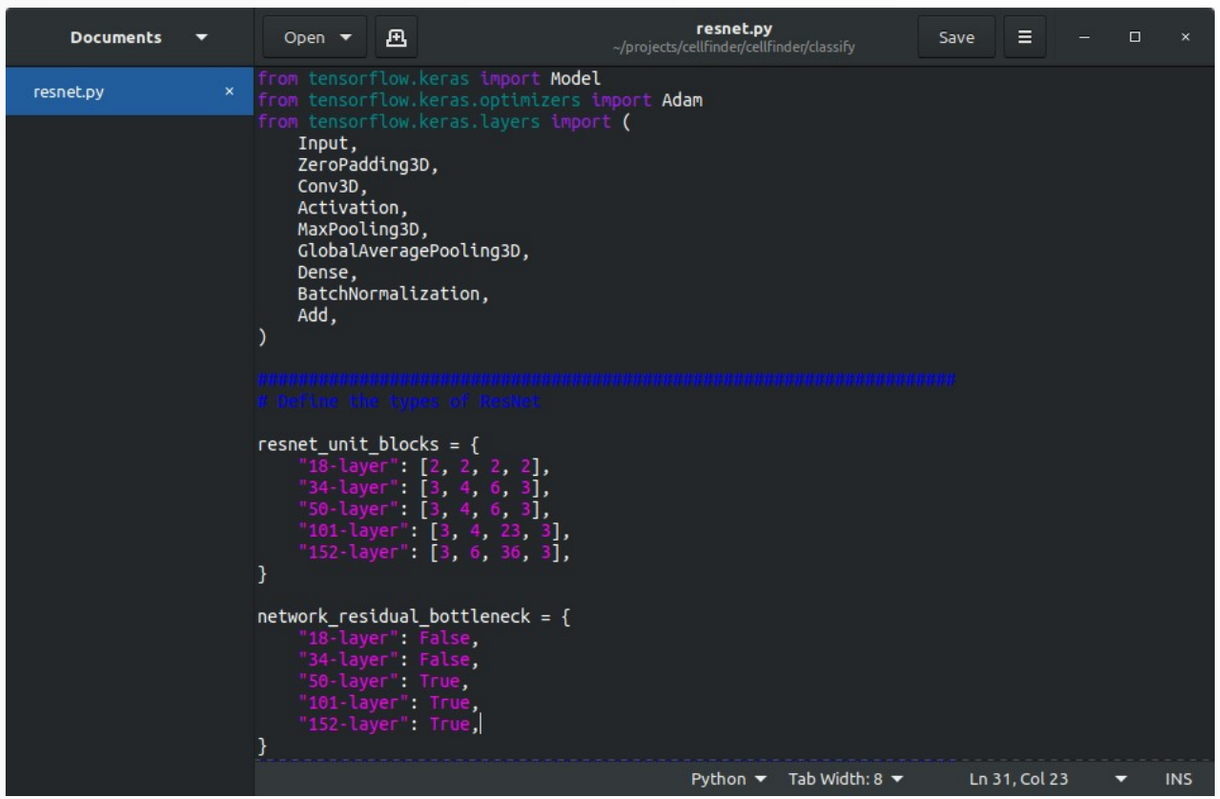
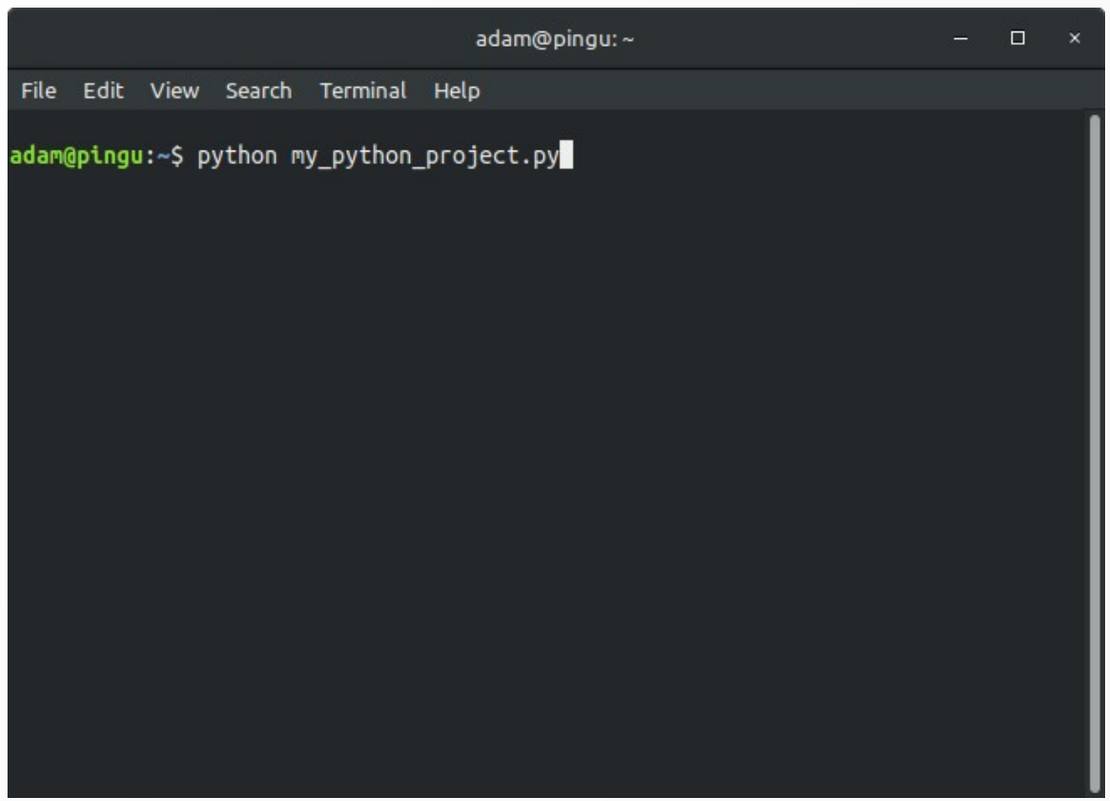
Editing files





IDEs (Integrated Development Environments)

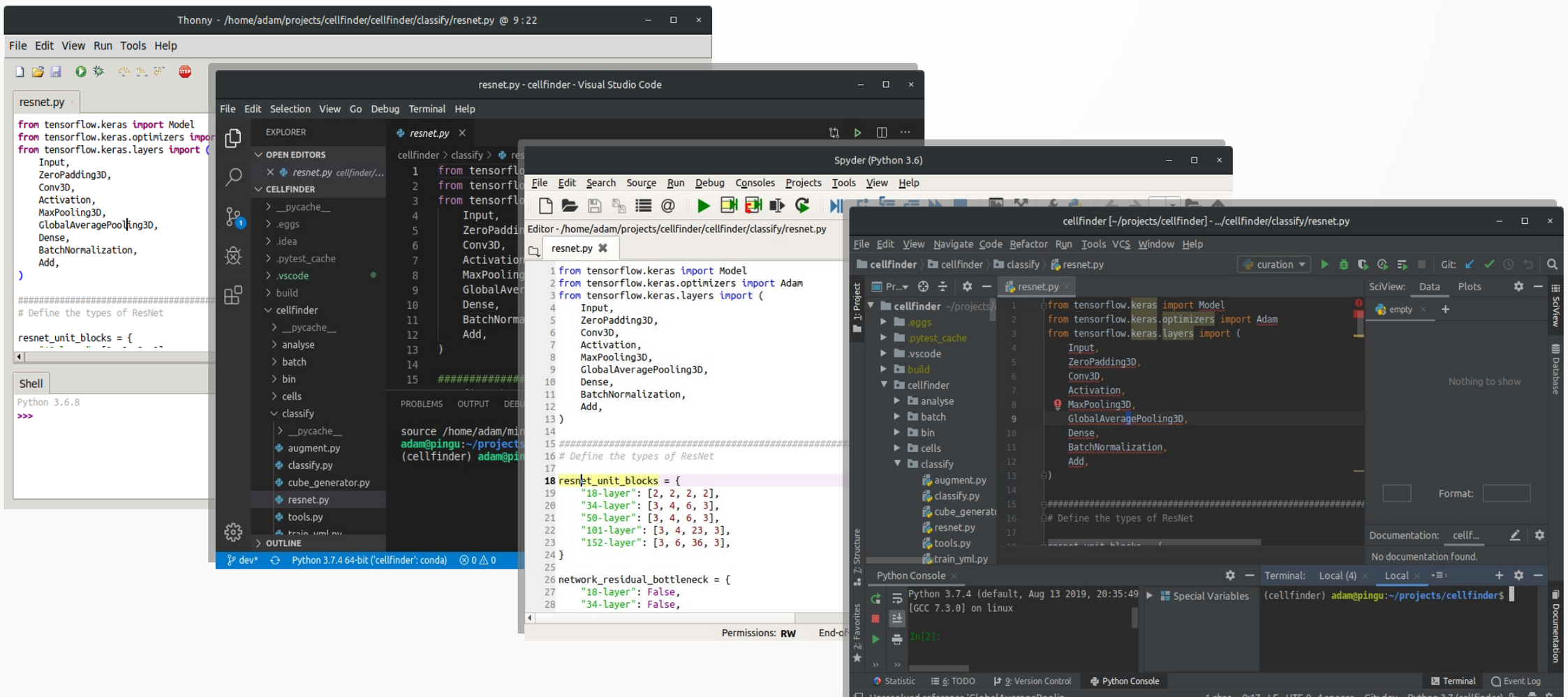
- Friendly to beginners, and used by most developers [a]

- Edit, organise and run your code in one program
- Configure once for each project.
- But … can be unecessarily complicated

a. StackOverflow Survey 2019

IDEs

Everyone has a preference (but essentially all the same).



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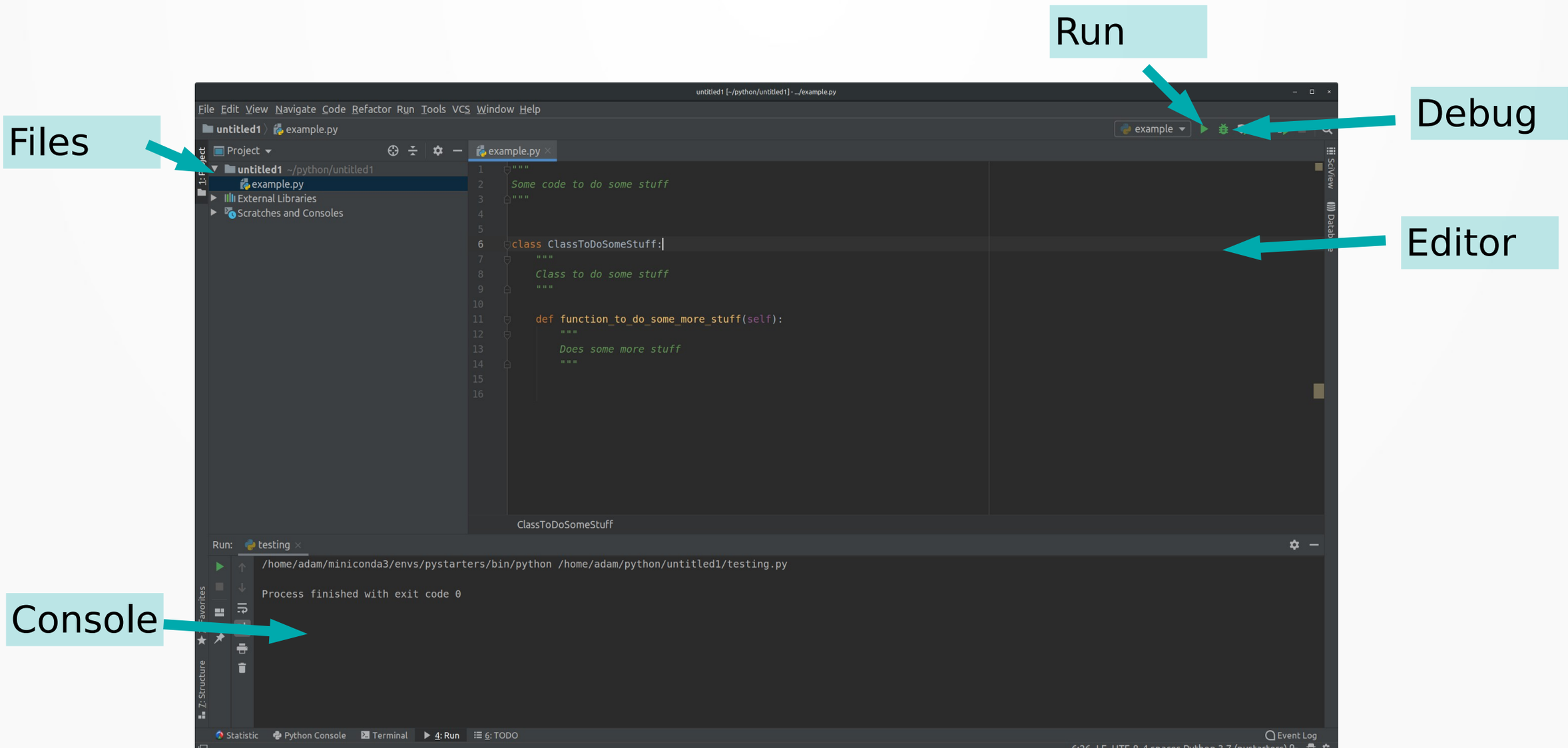
PyCharm



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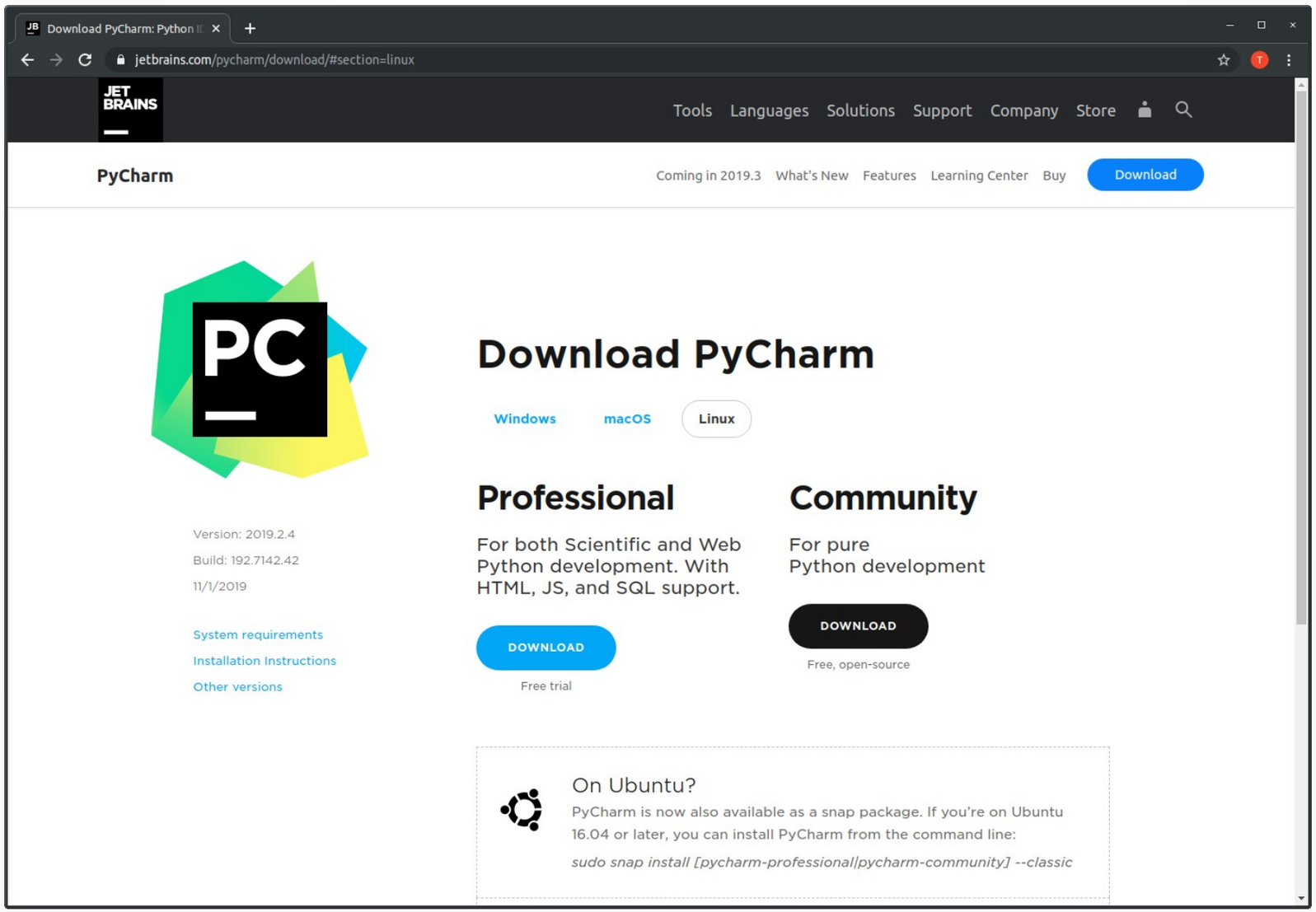
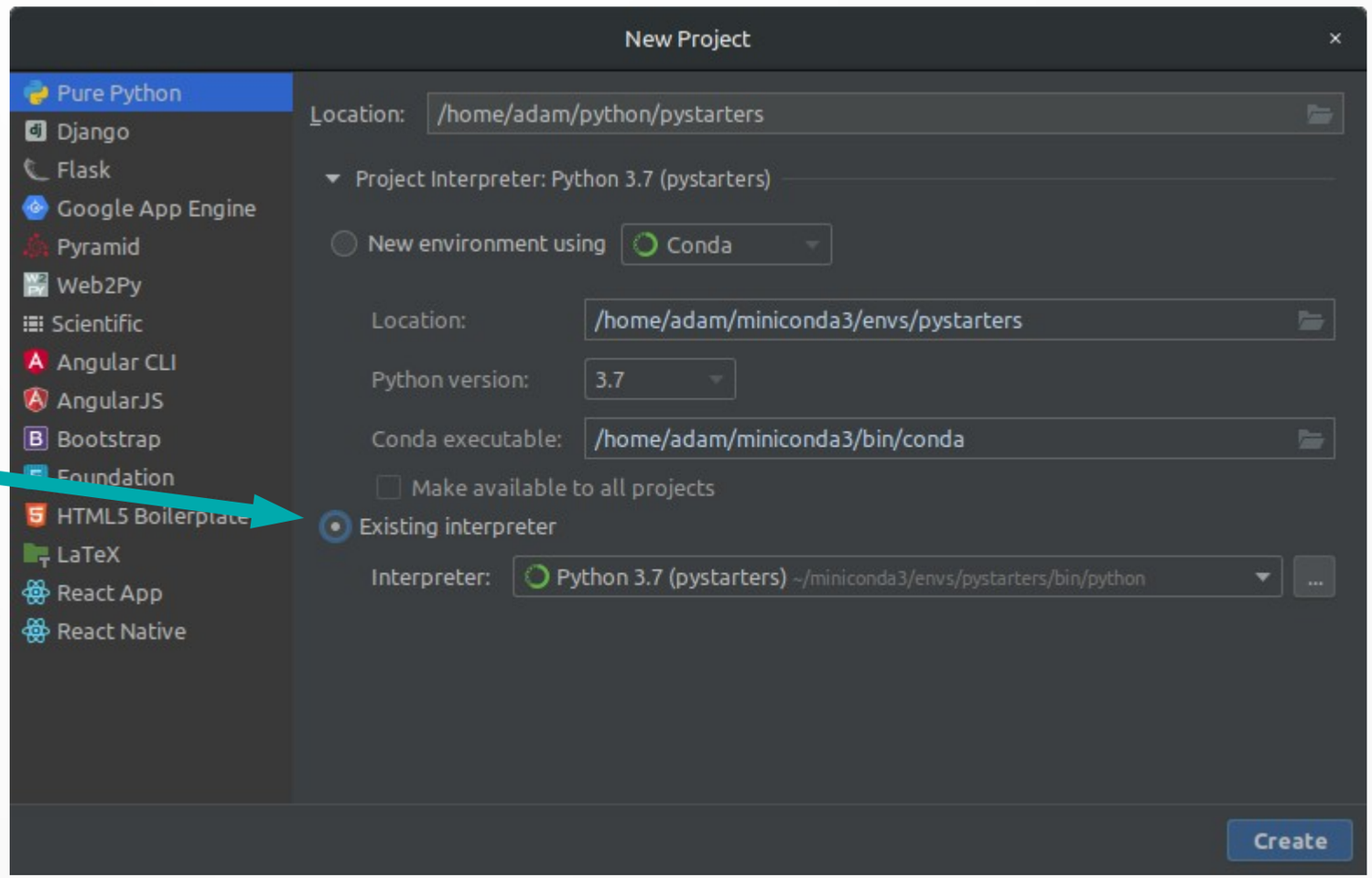
Download



New project

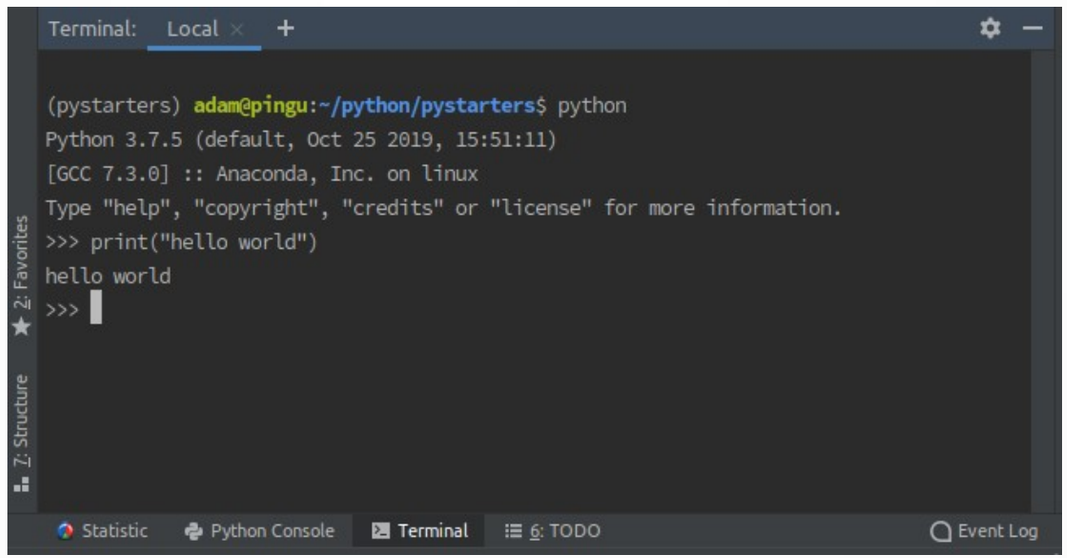
File → New Project

Important to set interpreter

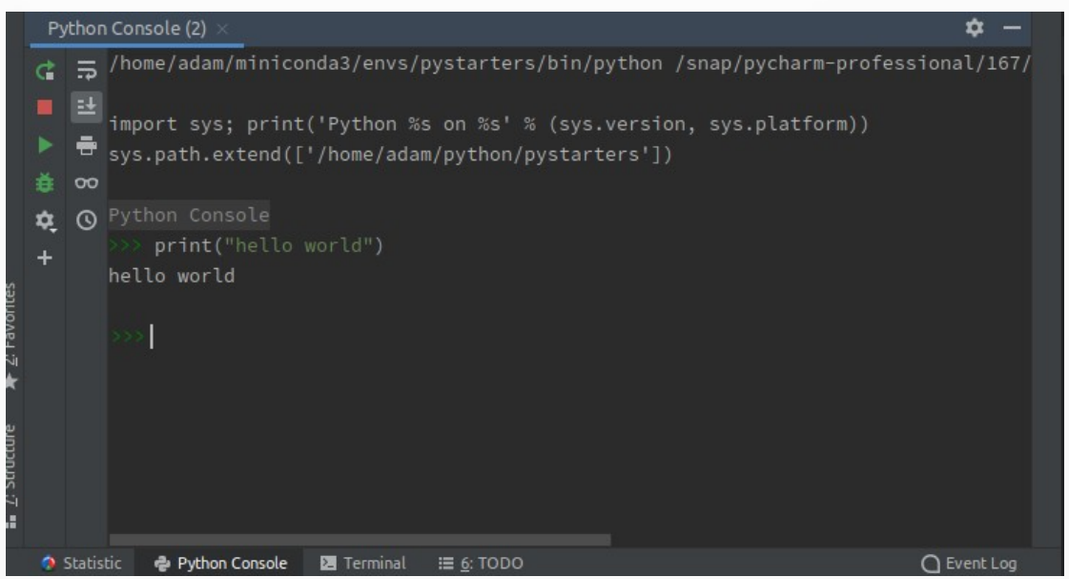


Hello world

Terminal

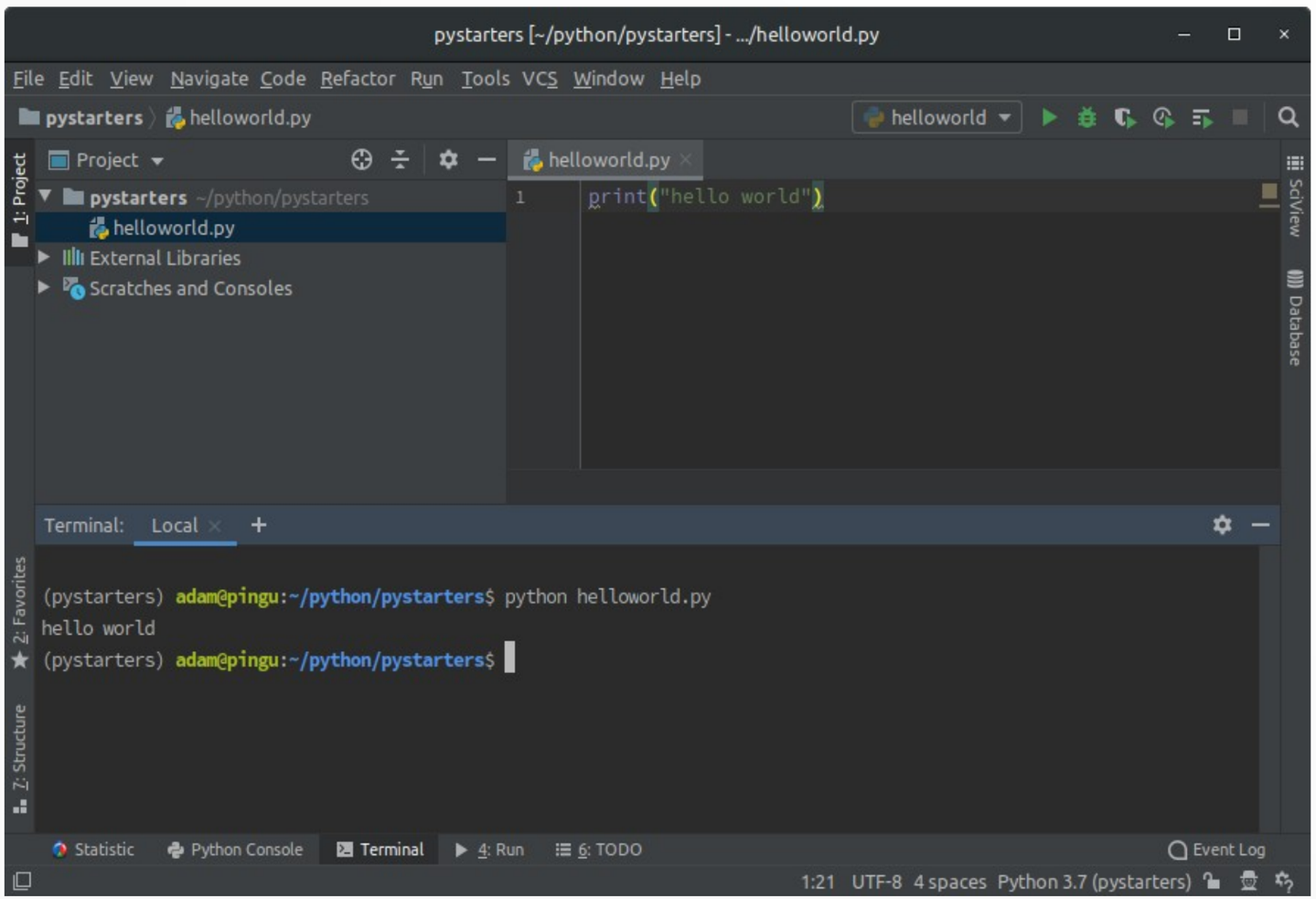


Python console



Hello world

File → New file → “helloworld.py”



Terminal:
python helloworld.py

Or:
Right click →
Run ‘helloworld’