ERASMUS MUNDUS JOINT MASTER DEGREE
MASTER IN ASTROPHYSICS AND SPACE SCIENCE

Introduction to Active Galctic Nuclei

Tutorial 0: Python Crash Course

Isidora Jankov

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University of Belgrade
Faculty of Mathematics

Preliminaries

You can reach me via email: ijankov@proton.me

Materials covered here available at: https://github.com/cefeida42/mass-agn

AGN tutorials:

Fridays, 13h @ Department of Astronomy, Faculty of Mathematics

Classroom 809 (5th floor)

List of Tutorials (Dragana + Isidora

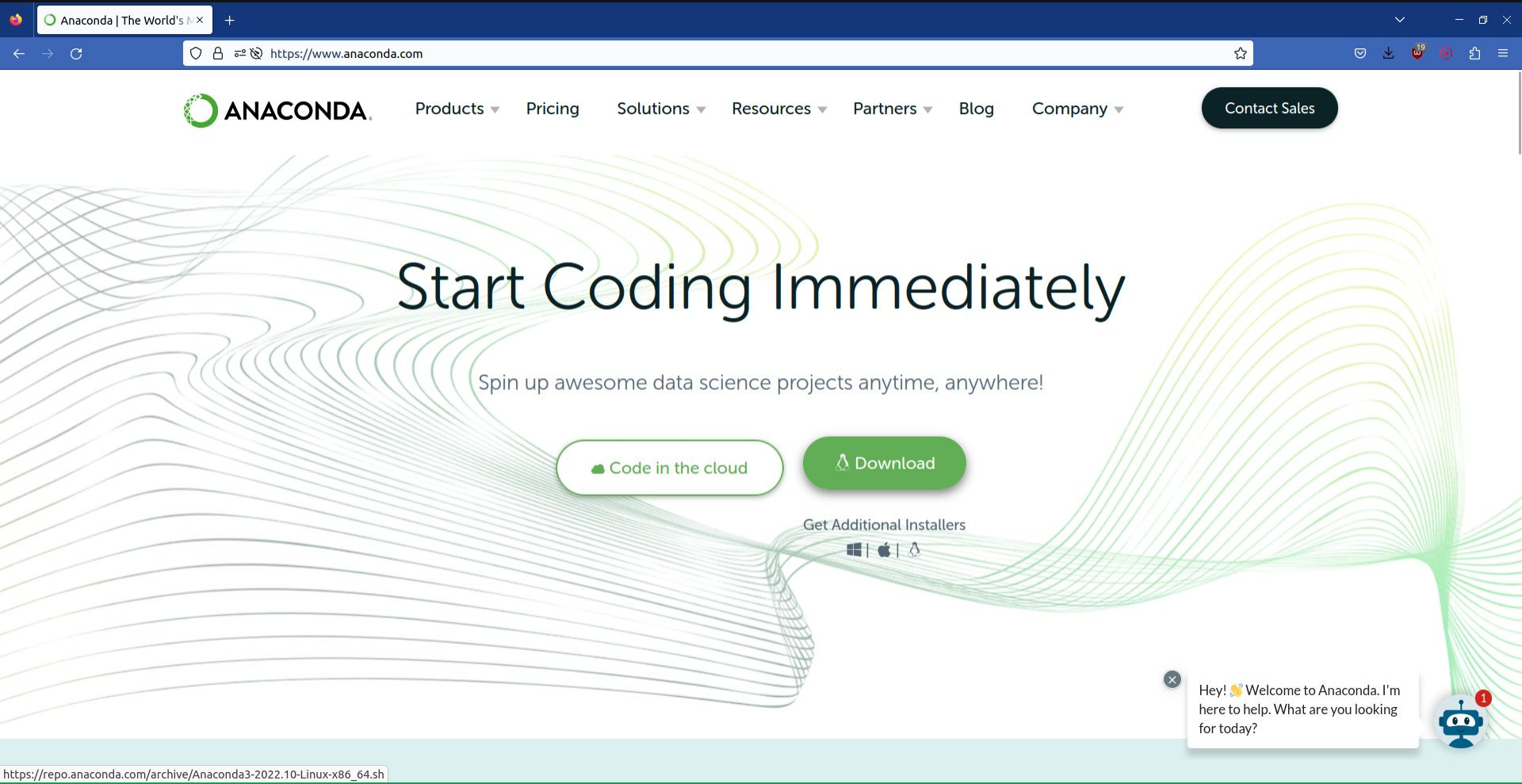
0. Python intro & review (10.3)

1. SDSS database: intro + data access (17.3)
2. AGN spectral fittings and measuring line parameters with FANTASY (24.3, DI)
3. Modeling of the BLR with CLOUDY [short report required] (13.3, DI)
4. Black hole mass and accretion rate [short report required] (7.4)
5. How to find an/AGN quasar? [short report required] (21.4)
6. Photo Reverberation Mapping [short report required] (28.4)

Today, we will cover:

- Python syntax refresher
- **NumPy** basics
- Generating plots with **matplotlib**
- Manipulating data with **pandas**

Installing Python



https://www.anaconda.com/

Miniconda

Miniconda is a free minimal installer for conda. It is a small, bootstrap version of Anaconda that includes only conda, Python, the packages they depend on, and a small number of other useful packages, including pip, zlib and a few others. Use the `conda install` command to install 720+ additional conda packages from the Anaconda repository.

See if Miniconda is right for you.

System requirements

- License: Free use and redistribution under the terms of the EULA for Miniconda.
- Operating system: Windows 8 or newer, 64-bit macOS 10.13+, or Linux, including Ubuntu, RedHat, CentOS 7+, and others.
- If your operating system is older than what is currently supported, you can find older versions of the Miniconda installers in our archive that might work for you.
- System architecture: Windows- 64-bit x86, 32-bit x86; macOS- 64-bit x86 & Apple M1 (ARM64); Linux- 64-bit x86, 64-bit aarch64 (AWS Graviton2), 64-bit IBM Power8/Power9, s390x (Linux on IBM Z & LinuxONE).
- The `linux-aarch64` Miniconda installer requires `glibc >=2.26` and thus will **not** work with CentOS 7, Ubuntu 16.04, or Debian 9 ("stretch").
- Minimum 400 MB disk space to download and install.

On Windows, macOS, and Linux, it is best to install Miniconda for the local user, which does not require administrator permissions and is the most robust type of installation. However, if you need to, you can install Miniconda system wide, which does require administrator permissions.

Latest Miniconda Installer Links

Latest - Conda 23.1.0 Python 3.10.9 released February 7, 2023

Platform	Name	SHA256 hash

https://docs.conda.io/en/latest/miniconda.html

Create a new conda environment for this course:

```
conda create -n mass_agn python=3.10

conda activate mass_agn

conda install numpy matplotlib pandas seaborn scipy notebook
```

To open a Jupyter notebook, type in terminal:

```
jupyter-notebook
```