SCRIPTING AND PROGRAMMING LABORATORY FOR DATA ANALYSIS

Lecture 9

(More on the exam +) a project on the dynamics of stellar systems

Structure of the exam

- Introduction (and motivation)
- project goal and strategy to achieve it
- explanation of your analysis, of the used code and the results

Important: *you should write your own notebook!*

Better a simple analysis you did on your own, than something very elaborate that someone else did for you.

If you really want to do so, you are allowed to use external packages and algorithms we did not cover during the class, *as long as you are able to explain what those do and what you did.*

Structure of the exam

You should be prepared to talk for no more than 20 minutes about what you did. *Please make sure to rehearse and stay on time.*

We will then ask you questions related to your project, why you have chosen a given strategy, and so forth. We may ask you something related to what we explained during the lectures, especially what is closely related to your project.

IMPORTANT! Make sure to follow a logical order when you present your analysis and try to be as clear as possible.

This will be important also for your future career!

Exam rounds (appelli d'esame)

1	20/06/2022
2	09/09/2022
3	16/11/2022
4	27/01/2023
5	24/02/2023
6	30/03/2023

You can agree with us for a given time and date.

Please bare in mind that there is a time limit before your graduation, after which all your exams should be recorded!

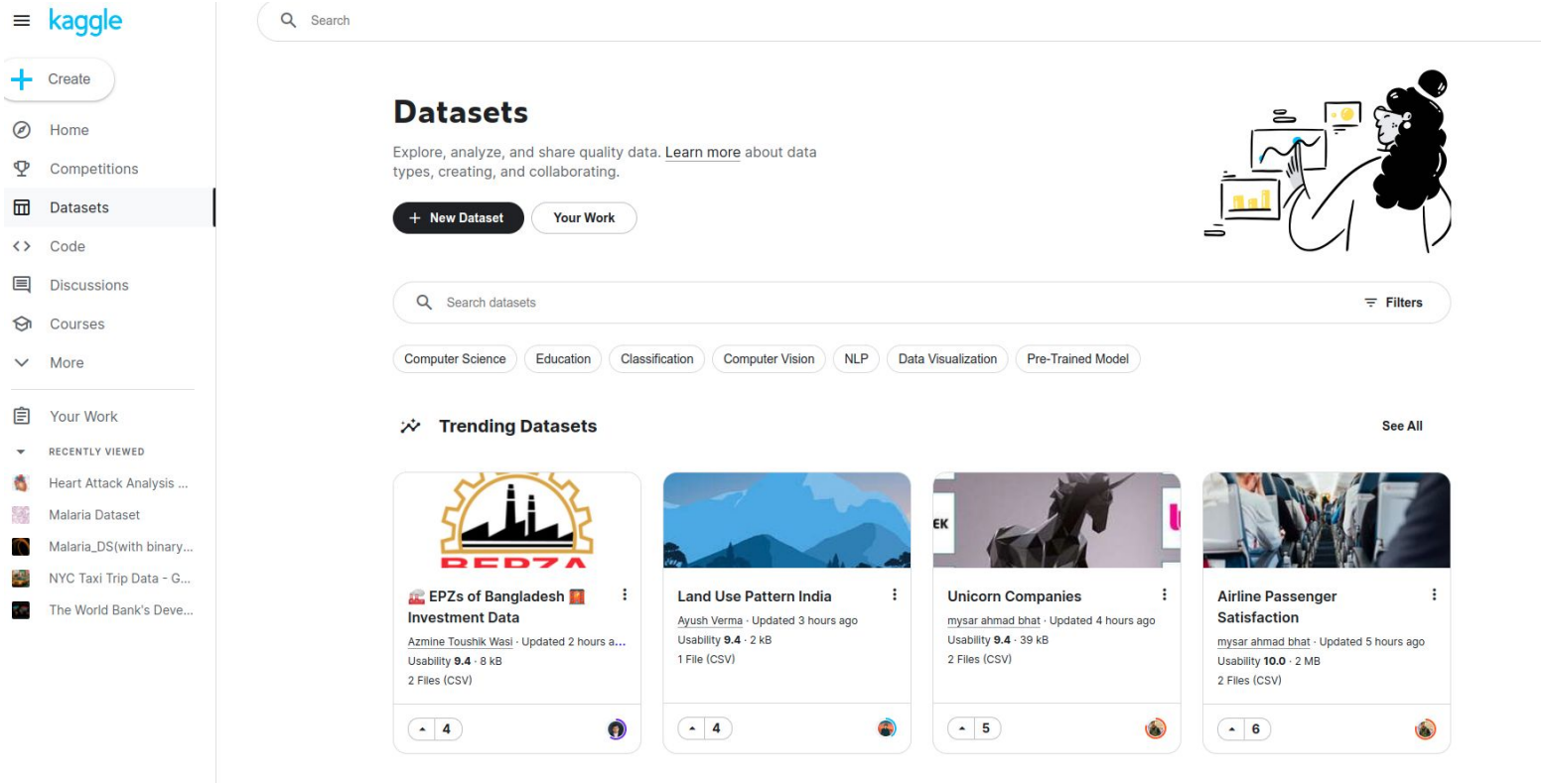
Make sure to enrol in the suitable time frame, to avoid your graduation being delayed.

Where to find your dataset

- Datasets we used during the lectures (even today) and you want to explore and analyze further
- Datasets you have at hand from other sources (e.g. if you have your own weather station, or you want to get some data/diagnostic from your computer…)
- Ask us for some astronomy/simulation data, if you want!
- Online databases

Work on something you like!

Online databases: Kaggle



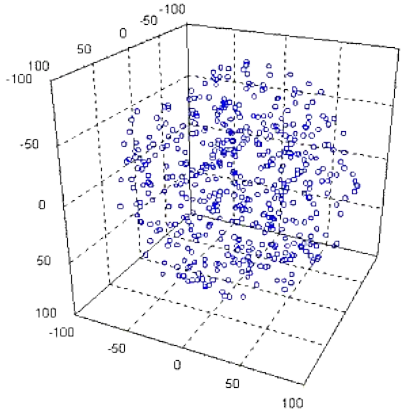
Other online databases

- data.gov
- Global Earth Observatory
- Earthdata
- Gapminder https://www.gapminder.org/data/
- World Bank
- …

Examples

How to analyze an N-body astrophysical simulation

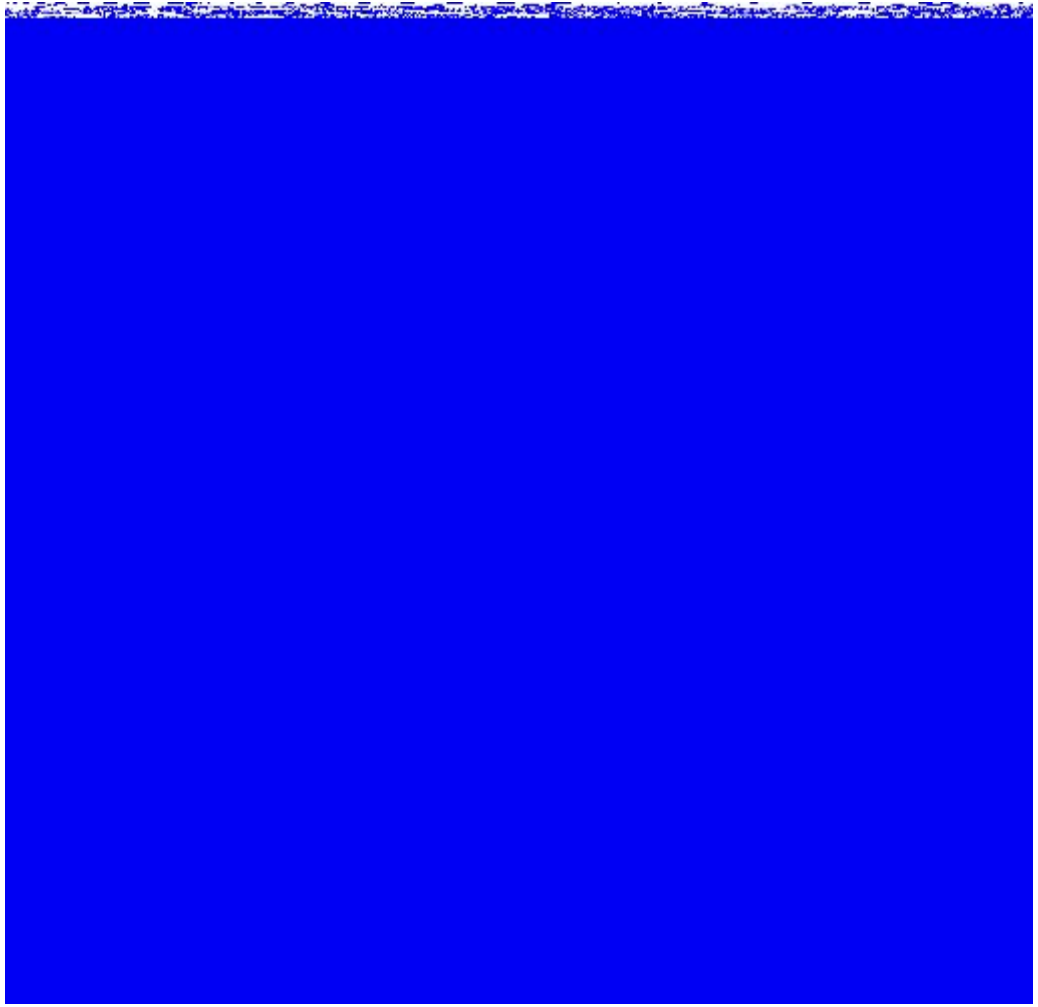
What is an N-body simulation



Numerical integration of the forces acting on *N* particles for a time *t*. The forces can have different nature.

In Astronomy:

The force is typically GRAVITY (even just Newtonian!)

The particles can be stars, dark matter, gas…

Today: only stars, all treated as POINT MASSES! (remember the two-body problem?)