M7.3.b Web Languages for Data Storage and Management

Tuto/Lab 5: Graph DB with neo4j

Part 1: Installing work environment

The current lab can be done using neo4j online services or using local neo4j desktop. A short guide is provided hereafter for both modes.

Online:
- either using neo4j sandbox (3 days access that can be extended with 7 more days). You should connect and create an account on https://neo4j.com/sandbox
- or using neo4j cloud Aura BD. You should also connect and create an account on https://neo4j.com/product/auradb/ Once connected you can get free access to 1 month instance of Aura DB with up to 64 Go data.

Desktop:
- Download and install https://neo4j.com/download/neo4j-desktop/ You will be provided an activation key. Copy it before closing the window thus you can paste it once asked for. You can then load Movie sample data set to be used for this lab. If needed, installation guide is given as video or illustrated steps page following the same link above.

Short guide
#### 1- Steps with neo4j sandbox

Connect to https://neo4j.com/sandbox and clic on Launch the free Sandbox. You will be asked to create an account.
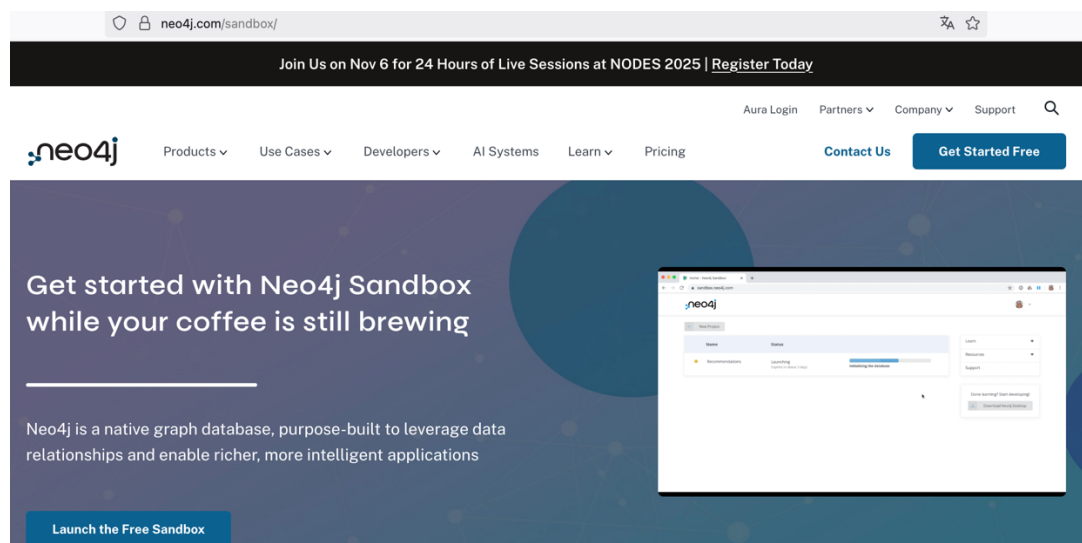
One connected to can then select a training project. In this lab we will be using the movies project. Select the Movies project and click on Create and Download credentials. Save the downloaded text file to use it later connecting to the db instance.
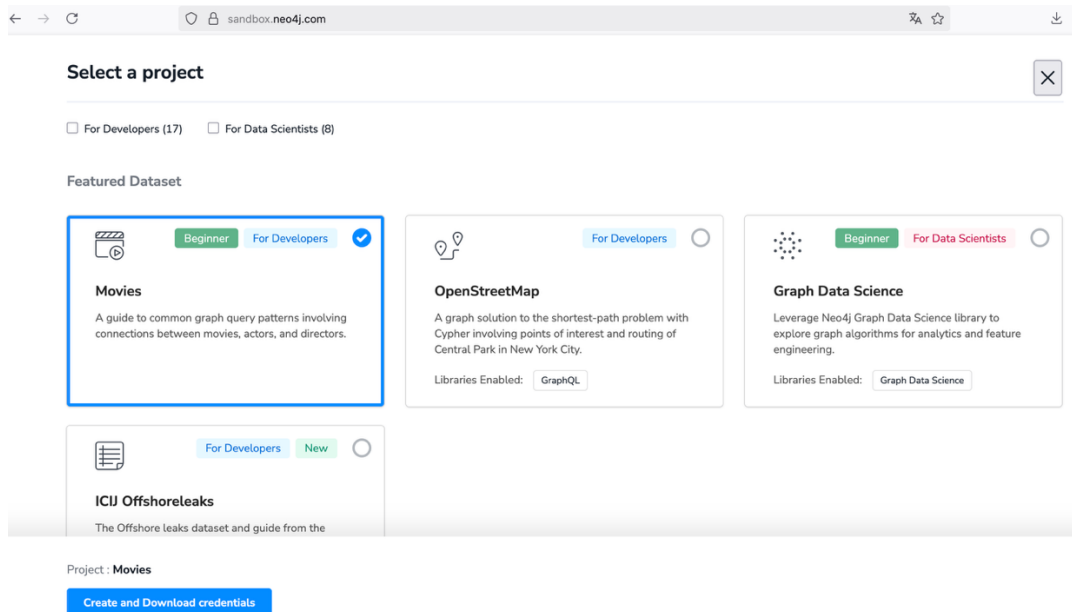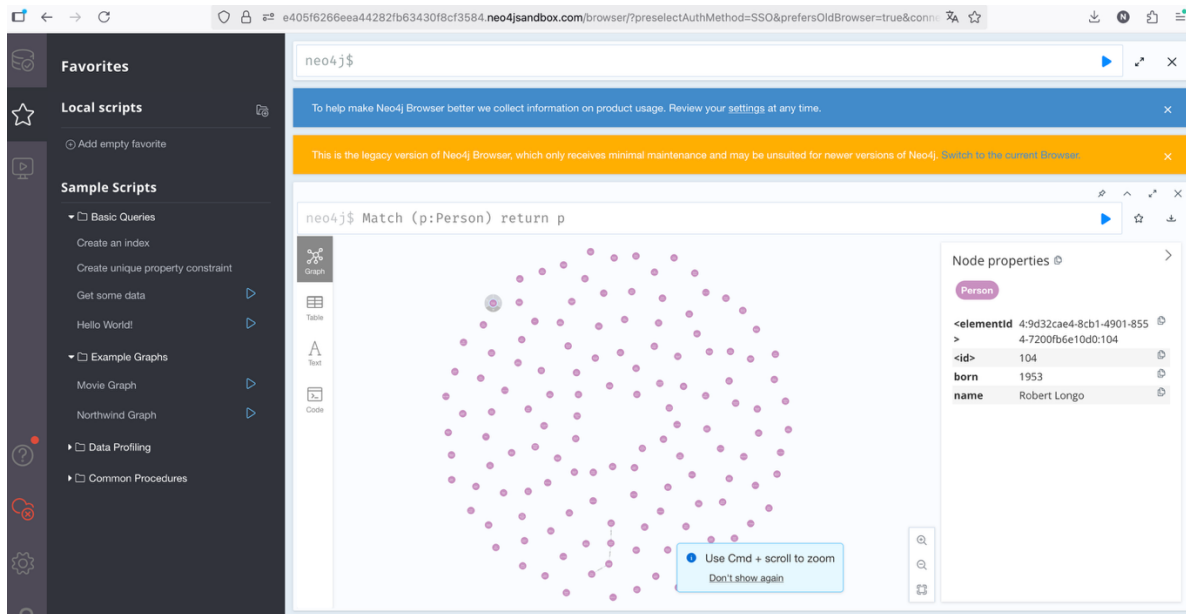

In the following view, click on Open to connect to the sandbox neo4j Browser.
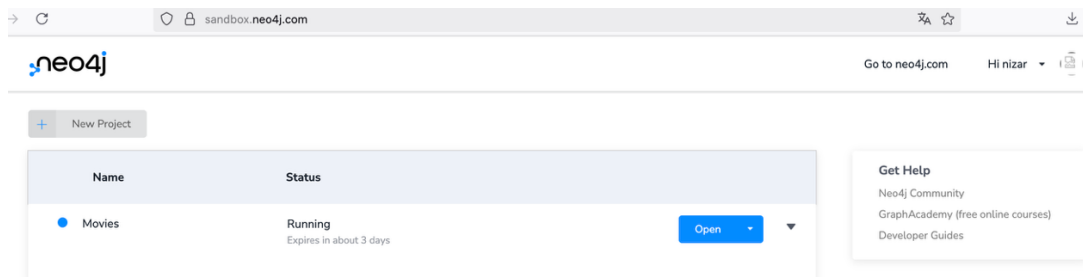
In the following view go to Favorite -> Local Scripts -> Example Graphs -> Movie Graph
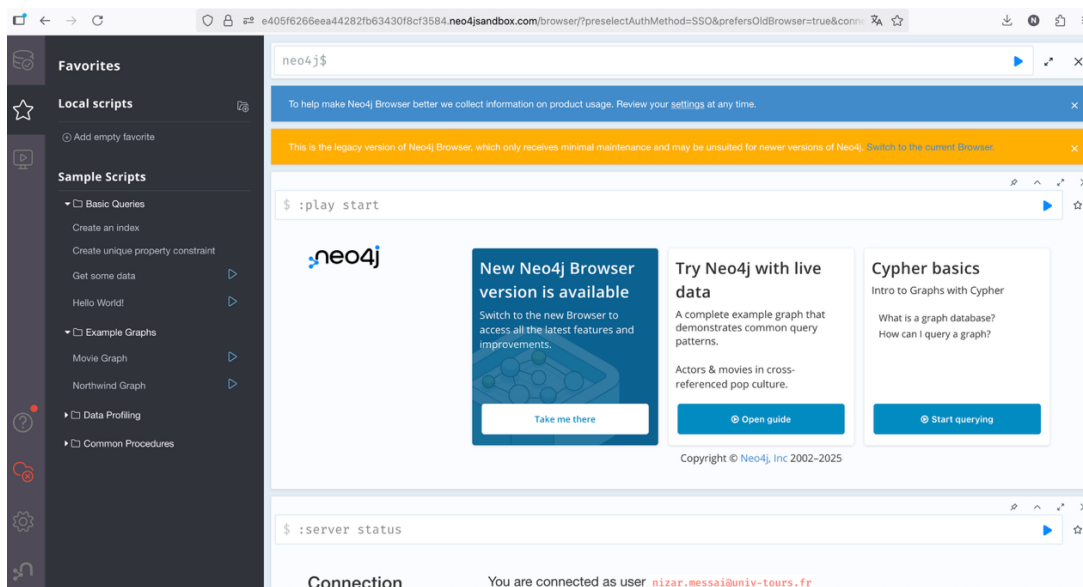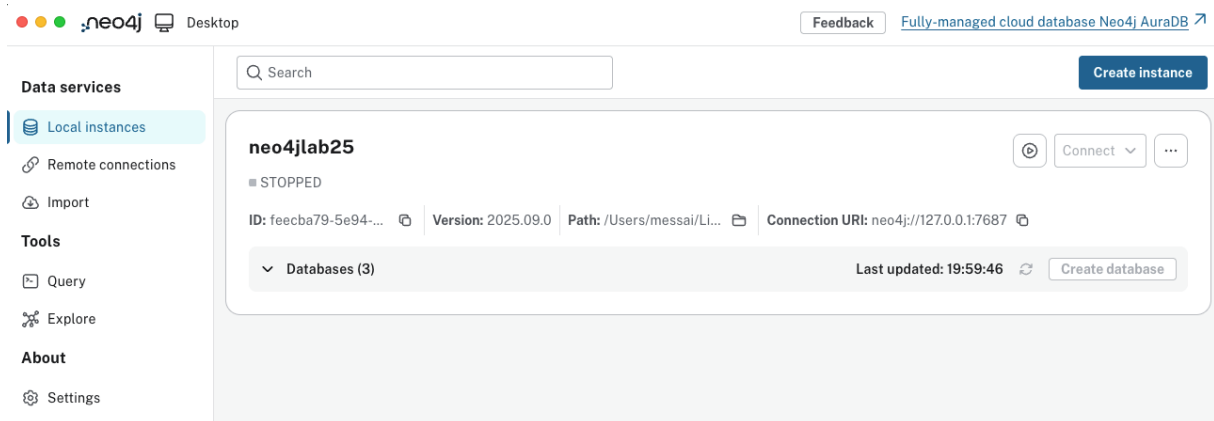
In the query Tab newt to neo4j$ write the following Cypher query:
MATCH (p:Person) RETURN p
And look at the obtained answer.

2- Steps with neo4j desktop

Run neo4j Desktop. Go to Local instances and Click on Create instance.

In the following view create an instance with the following information:
- Instance name: neo4jlab25
- Database user: neo4j
- Password : neo4jlab

In the following step, start the instance if not started yet and create a database with the name movieslab

At this level, neo4jlab25 instance with the created db neo4jlab is running. You can either continue interacting with the db on new4j Desktop or switch to neo4j Desktop browser. We will be choosing the second option because it maintains the Movies sample which is no longer the case with neo4j Desktop.

In a new web browser tab connect to http://127.0.0.1:7474/browser/ and provide the password you previously created for the instance and click on Connect.
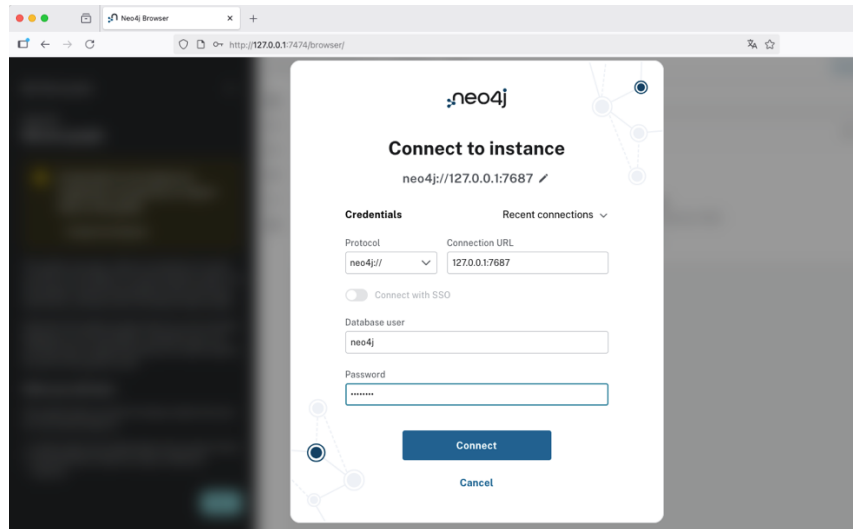
In the following view click on DATASET and follow the steps in the left-side. At each step one or more Cypher queries are provided. Copy-paste each query on the query tab and run it.
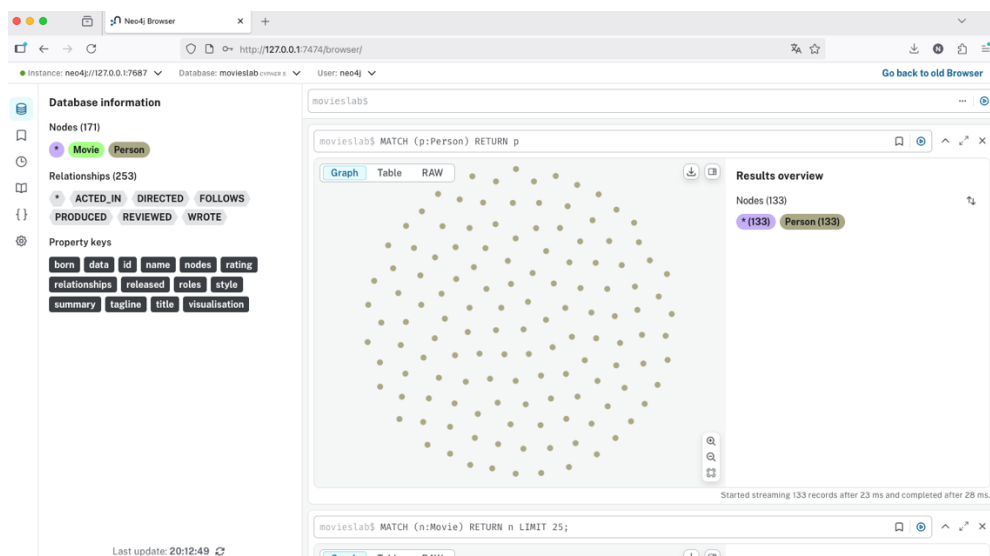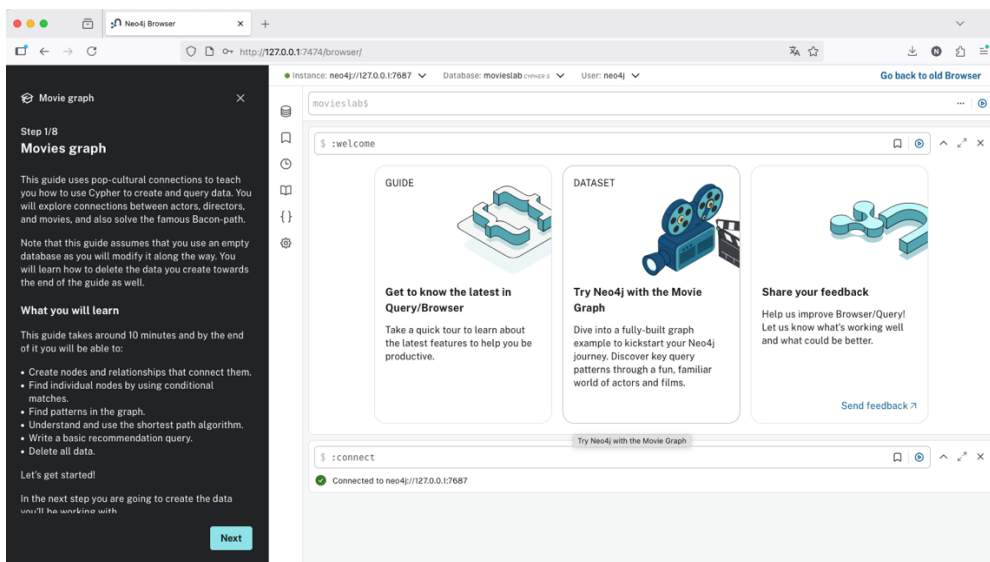
Part 2: Cypher queries on Movie graph DB

1. Return all nodes and relationships in the database.
2. Count the nodes and arcs in the graph
3. Given the movie The Departed (https://www.imdb.com/title/tt0407887/?ref_=fn_al_tt_1)
enter the following nodes and arcs (WARNING: run the code in one block! Otherwise, the
instructions to create the arcs must be preceded by a MATCH to retrieve the respective
nodes involved).

```
CREATE (departed:Movie {title:'The Departed', released:2006, tagline:'Good and Evil'})
CREATE (leo:Person {name:'Leonardo Di Caprio', born: 1974})
CREATE (matt:Person {name:'Matt Damon', born: 1970})
CREATE (leo)-[:ACTED_IN {roles: ['Billy']}]->(departed)
CREATE (matt)-[:ACTED_IN {roles: ['Colin Sullivan']}]->(departed);
MATCH (jack:Person {name: 'Jack Nicholson'})
MATCH (departed:Movie {title:'The Departed'})
CREATE (jack)-[:ACTED_IN {roles: ['Frank Costello']}]->(departed)
```

The code creates:
- The movie instance (properties: title, released)
- 3 main actors (properties: name, born)
- The respective ACTED_IN relationships (properties: role)

4. Return the movie The Departed and all nodes related to it
5. Return all people connected to a movie
6. Return the actors, i.e., people who acted (ACTED_IN) in a movie, as actors
7. Return the actors who are also directors, i.e., have directed (DIRECTED) a movie (:Movie)
8. Return the actors who also directed a movie in which they acted (ACTED_IN); also return
the related movie
9. Return the reviewers, i.e., the people who reviewed (REVIEWED) a movie
10. Return the movies that have been reviewed by different reviewers; return these as well
11. Return the movies released (released) after 2010
12. Return the actors who starred in the film released after 2010; also return the film
13. Return all pairs of actors who starred in the same movie released after 2010; also return
the movie. How does the result of this query change from that of the previous query?
14. Return all pairs of actors who have acted together in more than one movie
15. Return, for each reviewer, all reviewers followed directly or indirectly through another
reviewer
16. Return the 12 nodes reachable by up to 3 jumps (in any direction) from Clint Eastwood
17. Return the ages of the actors who starred in the film Apollo 13 (make the difference
between the release date of the film and the actor's year of birth)
18. Calculate the average age of the actors who starred in the movie Apollo 13
19. Calculate the average age of the actors for each film
20. Return the top-10 movies with the lowest average age (use order by and limit clauses)