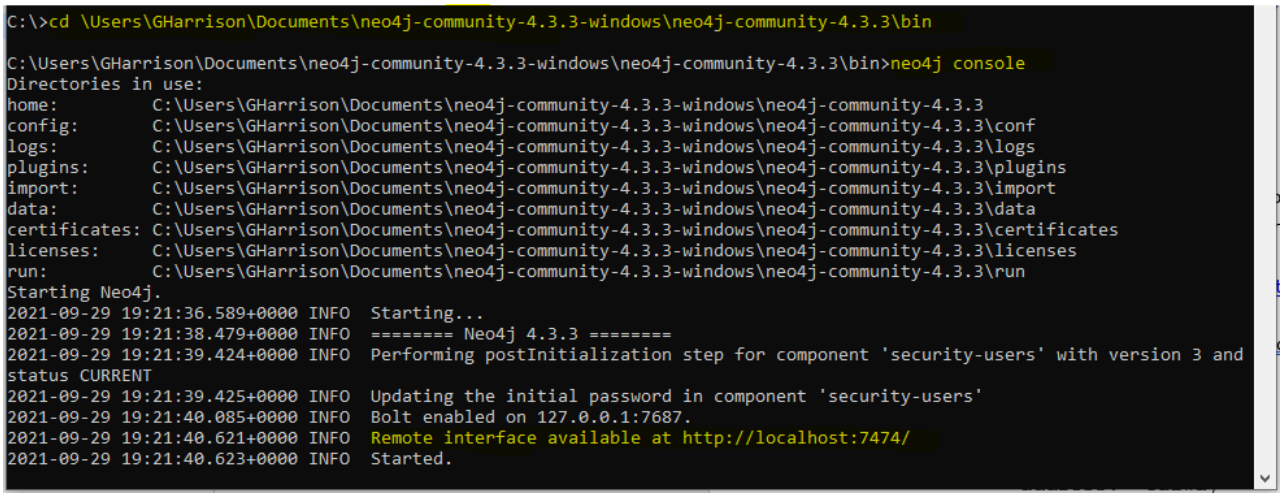
Applied Databases

Topic 6 Exercise Sheet

Part 1

- Run Neo4j as follows:
  - Open a Windows Command prompt/PowerShell and change to the `bin` folder of the Neo4j installation.
  - Run `neo4j console`



- Then open a browser to http://localhost:7474

- Create the following nodes with a label `:Student` with the following properties:
    - name: "Tom"
    - sid: "G001"
    - age: 23
    - sex: "M"
    - address: "Galway"
    - hair: "brown"
    - email: "tom@gmail.com"

```
create(:Student{
sid:"G001",name:"Tom",age:23,sex:"M",address:"Galway",hai
r:"brown",email:"tom@gmail.com"})
```

    - name: "Sean"
    - sid: "G002"
    - age: 19
    - sex: "M"
    - address: "Galway"
    - email: "sean@gmail.com"

```
create(:Student{
sid:"G002",name:"Sean",age:19,sex:"M",address:"Galway",em
ail:"sean@gmail.com"})
```

    - name: "Bob"
    - sid: "G003"
    - age: 22
    - sex: "M"
    - address: "Mayo"
    - email: "bob123@hotmail.com"
    - twitter: "@bob123"

```
create(:Student{
sid:"G003",name:"Bob",age:22,sex:"M",address:"Mayo",email
:"bob123@gmail.com",twitter:"@bob123"})
```

- name: "Mary"
- sid: "G004"
- age: 20
- sex: "F"
- address: "Mayo"
- hair: "blonde"
- email: "mary19@gmail.com"
- twitter: "@mary19"
- snapchat: "mary19"

```
create(:Student{
sid:"G004",name:"Mary",age:20,sex:"F",address:"Mayo",hair
:"blonde",email:"mary19@gmail.com",twitter:"@mary19",snap
chat:"mary19"})
```

- name: "Alice"
- sid: "G005"
- age: 28
- sex: "F"
- address: "Roscommon"
- email: "alice@hotmail.com"
- snapchat: "alice123"

```
create(:Student{sid:"G005",name:"Alice",age:28,sex:"F",ad
dress:"Roscommon",email:"alice@hotmail.com",snapchat:"ali
ce123"})
```

- name: "Pat"
- sid: "G006"
- age: 24
- sex: "M"
- address: "Roscommon"
- email: "pat@hotmail.com"
- twitter: "patABC"

```
create(:Student{
sid:"G006",name:"Pat",age:24,sex:"M",address:"Roscommon",
email:"pat@hotmail.com",snapchat:"patABC"})
```

- Create the following nodes with a label `:Lecturer` with the following properties:
    - name: "Alan"
    - sid: "L001"
    - age: 57
    - sex: "M"
    - address: "Galway"
    - email: "alan@gmit.ie",
    - twitter: "@alan"

```
create(:Lecturer{
sid:"L001",name:"Alan",age:57,sex:"M",address:"Galway",email
:"alan@gmit.ie"})
```

    - name: "Mary"
    - sid: "L002"
    - age: 47
    - sex: "F"
    - address: "Mayo"
    - email: "mary@gmit.ie
    - hair: "brown"

```
create(:Lecturer{
sid:"L002",name:"Mary",age:47,sex:"F",address:"Mayo",email:"ma
ry@gmit.ie"})
```

- Find the average age of Students, rounded to the nearest whole number.

```
MATCH (n:Student) RETURN round(avg(n.age))
```

- Show the name of each student and his/her age.

```
MATCH (n:Student) RETURN n.name,n.age
```

- Find the age of the youngest Student.

```
MATCH (n:Student) RETURN min(n.age)
```

- Show the names of students who have a *twitter* attribute.

```
MATCH (n:Student) WHERE n.twitter IS NOT NULL
RETURN n.name
```

- Show the number of students who have a *twitter* attribute.
```
MATCH(n:Student) RETURN  count(n.twitter)
```

- Show the average of age of people in their 20s, 30s and 40s rounded to one decimal place.
```
MATCH(n) WHERE n.age>=20 AND n.age<=49
RETURN round(avg(n.age),1)
```

- Show all the properties for the Student *Tom.*
```
MATCH (n:Student{name:"Tom"}) return keys(n)
```

- Increase everyone's age by 1.
```
match(n) set n.age=n.age+1 return n
```

- Return the name and age of all males living in Galway.
```
MATCH (n) where n.sex="M" and n.address="Galway" RETURN
n.name, n.age
```

- Create the following nodes with both :Student and :Lecturer labels
    - name: "Yvonne"
        - age: 37
        - sex: "F"
        - address: "Galway"
        - email: yvonne@gmit.ie
        - twitter: "@yv12"
    - name: "Walter"
        - age: 44
        - address: "Galway"
        - email: walter@gmit.ie
        - hair: "black"

```
create(:Lecturer:Student{name:"Yvonne",age:37,sex:"F",address:
"Galway",email:"yvonne@gmit.ie",twitter:"yv12"})

create(:Lecturer:Student{name:"Walter",age:44,sex:"M",address:
"Galway",email:"walter@gmit.ie",hair:"black"})
```

or

```
CREATE(:Student:Lecturer{name:"Yvonne",age:37,sex:"F",address:
"Galway",email:"yvonne@gmit.ie",twitter:"@yv12"}),(:Student:Le
cturer{name:"Walter",age:44,address:"Galway",email:"walter@gmi
t.ie",hair:"black"})
```

- Show the name, age and hair colour of everyone who is both a Student and a Lecturer.

```
match(n:Student:Lecturer) return n.name, n.age, n.hair
```

or

```
MATCH(p) WHERE p:Student AND p:Lecturer
RETURN p.name, p.hair
```

- Update the *twitter* attribute of all lectures to have GMIT after their existing twitter name. E.g. "@alan" should become "@alanGMIT".

```
match(n:Lecturer) set n.twitter = n.twitter+"@GMIT"
return n
```

Only updates the *twitter* attribute to have "@GMIT" appended for Lecturer nodes, if they currently have a *twitter* attribute.

- Find the average age of Males and find the youngest Male(s).
Then return the name (as Name) and age (as *Age*) of the youngest Male(s) as well as the average age of Males (as *AverageAge*) and the difference in age between the youngest Male(s) and the average age (as *Difference*).

E.g., If the average age of Males was 30, and the youngest Male was called "Tony" aged 20, the following should be returned:

Name	**Age**	**AverageAge**	**Difference**
Tony	20	30	10

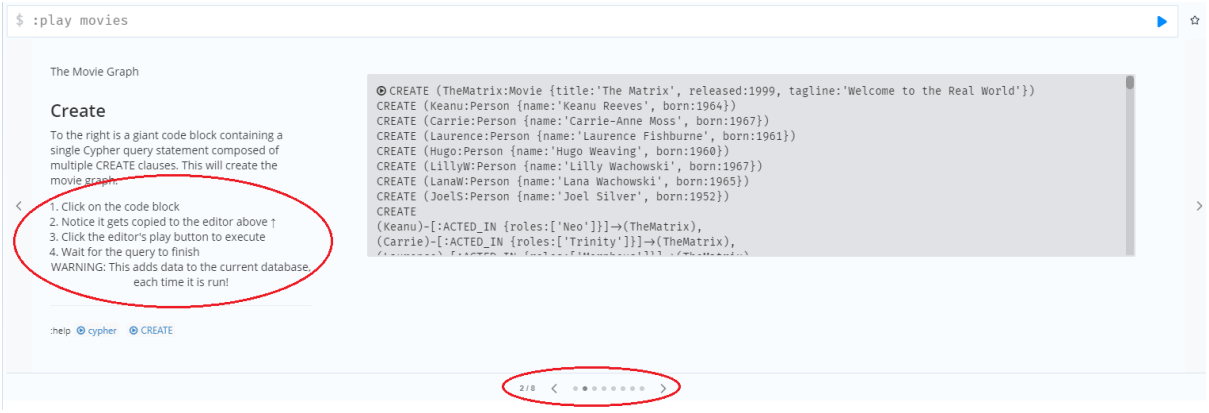
```
MATCH(p{sex:"M"}) WITH avg(p.age) AS avgAge
MATCH(p1{sex:"M"}) WITH min(p1.age) AS minAge, avgAge
MATCH(p2{sex:"M"}) WHERE p2.age = minAge
RETURN p2.name, p2.age, avgAge, avgAge-
p2.age AS Difference
```

Part 2

- Use a new database.
- In the Neo4j Broswer, create a new (blank) database and type the following command:

```
tdb$ :play movies
```

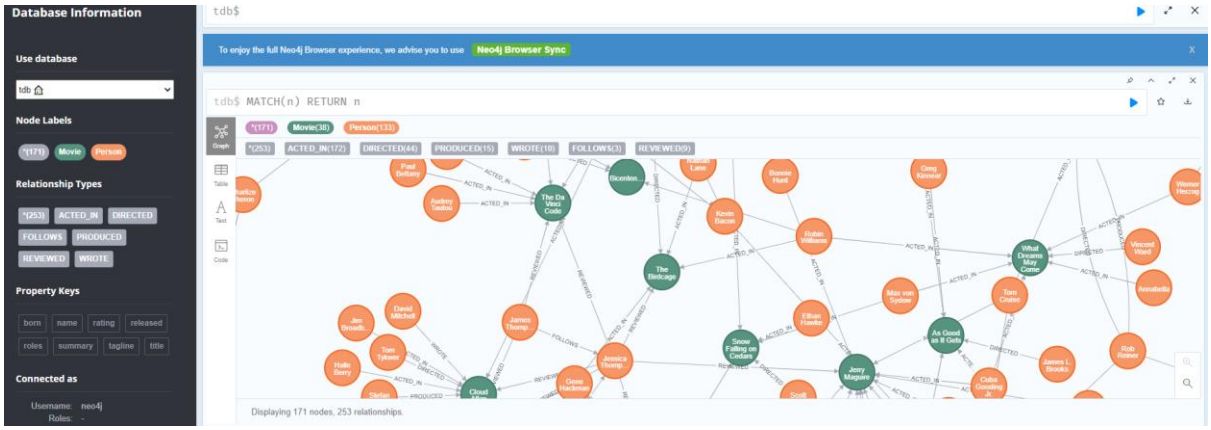
- This will return the following:



- Go to page 2 and follow steps 1 to 4.

- A series of 171 nodes (representing Movies and People) and 253 relationships (such as ACTED_IN, DIRECTED etc.) between the nodes should now be created.

- Type MATCH(n) RETURN n to see all nodes and relationships:



- Show each movie node for movies that were released between 2000 and 2010

```
match(m:Movie) where m.released >= 2000 and m.released <= 2010
return m
```

- Set an attribute called olderThan70 to true for all Persons born in the 1930s.

```
match(p:Person) where p.born >= 1930 and p.born <= 1939
set p.olderThan70 = true
return p
```

- Show the movie title and the year it was released for the first 10 movies in alphabetical order.

```
match(m:Movie) RETURN m.title, m.released ORDER BY m.title LIMIT 10
```

- Show the unique years in which movies were released in chronological order.

```
match(m:Movie) RETURN distinct m.released ORDER BY m.released
```

- Show the title and tagline for movies released in 1999.

```
match(m:Movie{released:1999}) return m.title, m.tagline
```

or

```
match(m:Movie) WHERE m.released=1999 return m.title, m.released
```

- Show the names of the people (as *People)* and the year they were born (as *YOB*) for everyone older than "Robin Williams".

```
MATCH(p:Person{name:"Robin Williams"}) with p.born as williamsBorn
MATCH(p1:Person) WHERE p1.born < williamsBorn
RETURN p1.name AS Person, p1.born as YOB
ORDER BY YOB, Person
```

- Show the number of movies released in 2006 (as *Releases_in_2006)*.

```
MATCH(m:Movie{released:2006}) return count(m) AS Releases_in_2006
```

- Show the name (as *Name*) and born (as *YOB*) the youngest Person(s).

```
MATCH(p:Person) WITH max(p.born) as youngest
MATCH(p1:Person) WHERE p1.born = youngest
RETURN p1.name as Name, p1.born as YOB
```