Name : Sharvari Yashwant Patil
PRN : 2020BTECS00077

Assignment No. 12

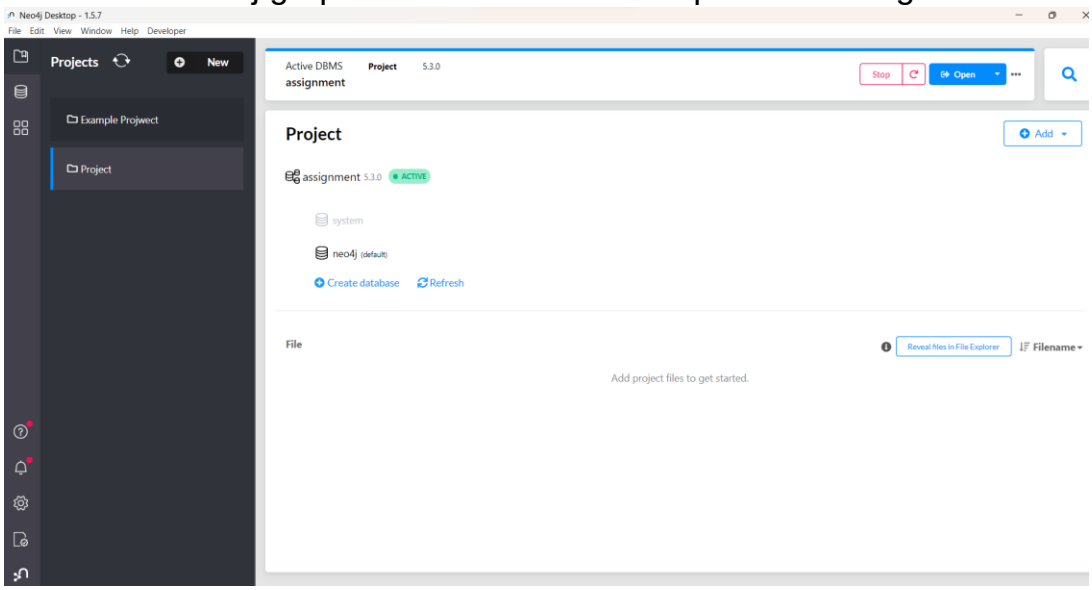
Spatial and Geographic Data

Geospatial is the natural domain for Graph Database
Use Neo4j and Neo4j Spatial

Problem Statement : Finding Things Close to Other Things.
Application in : location-based services on the web

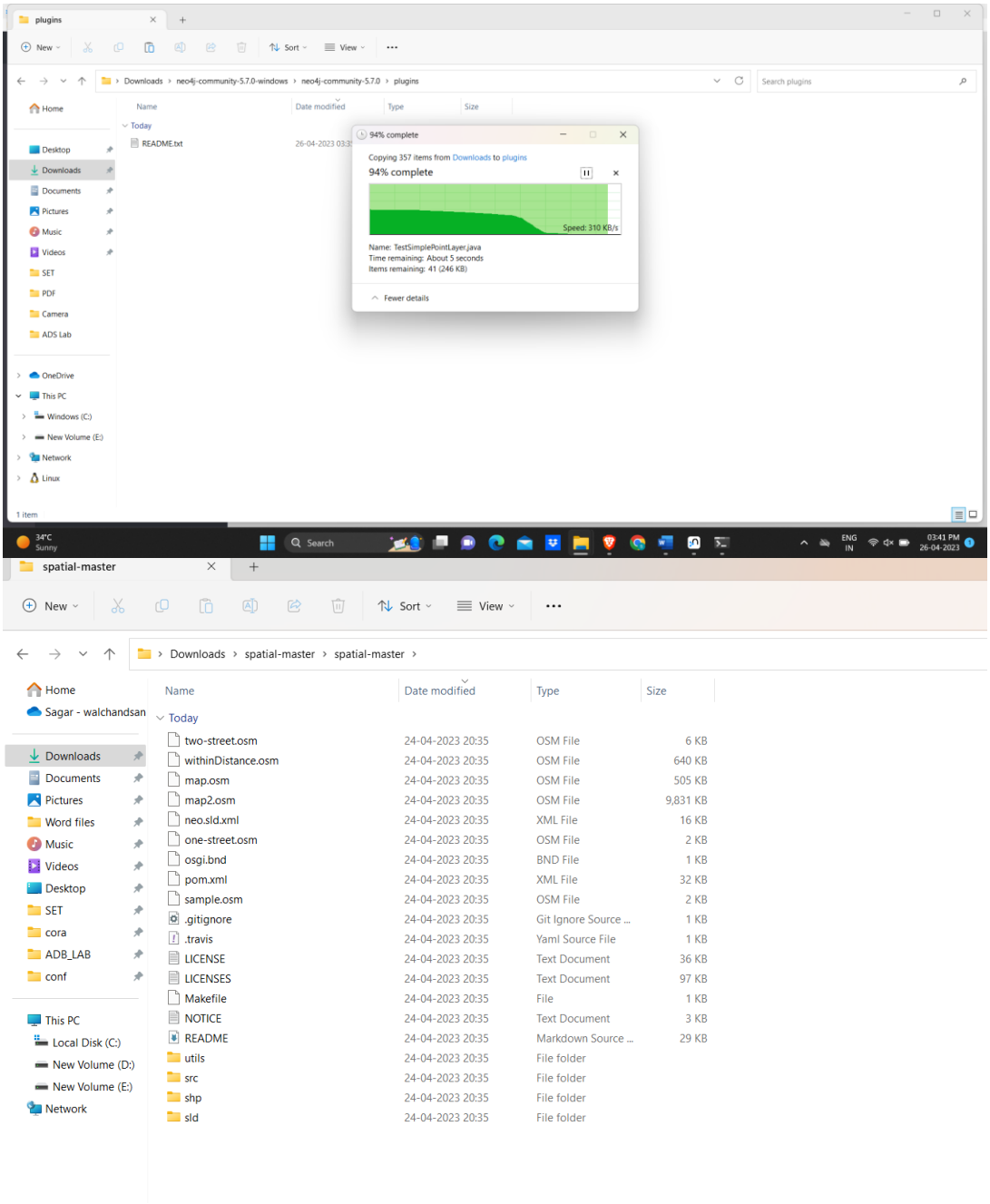
Task :

1. Use Neo4j graph database installed in previous assignments.

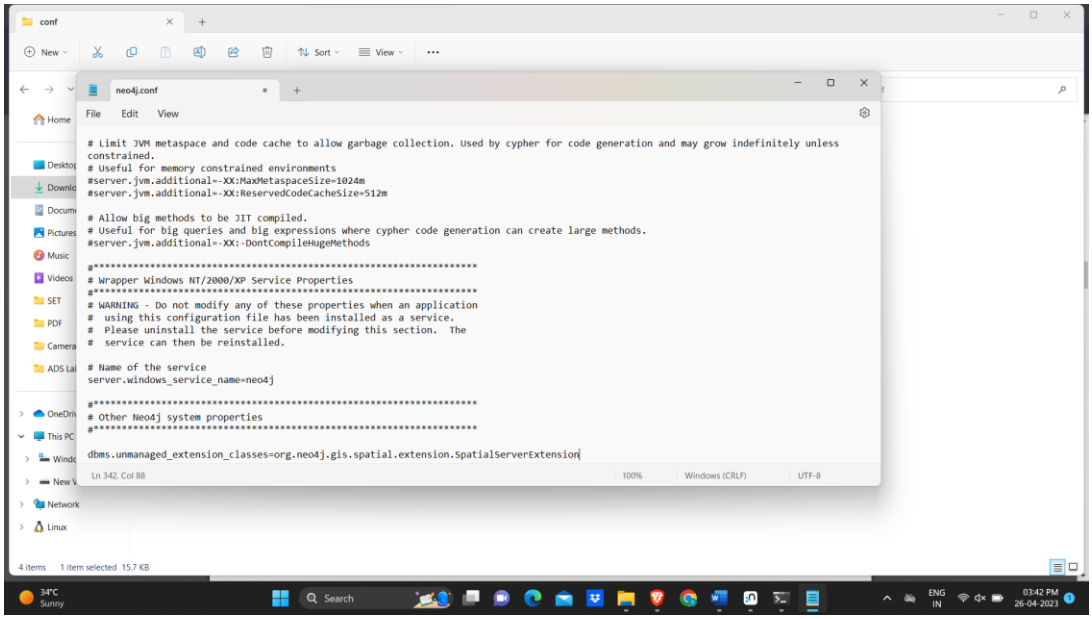


2. Install/configure Neo4jSpatial (https://github.com/neo4jcontrib/spatial) from GitHub. It is the Neo4j plug-in that facilitates geospatial operations on data stored in Neo4j.

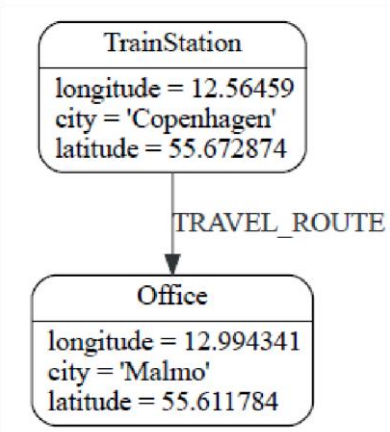
Name : Sharvari Yashwant Patil
PRN : 2020BTECS00077



Name : Sharvari Yashwant Patil
PRN : 2020BTECS00077



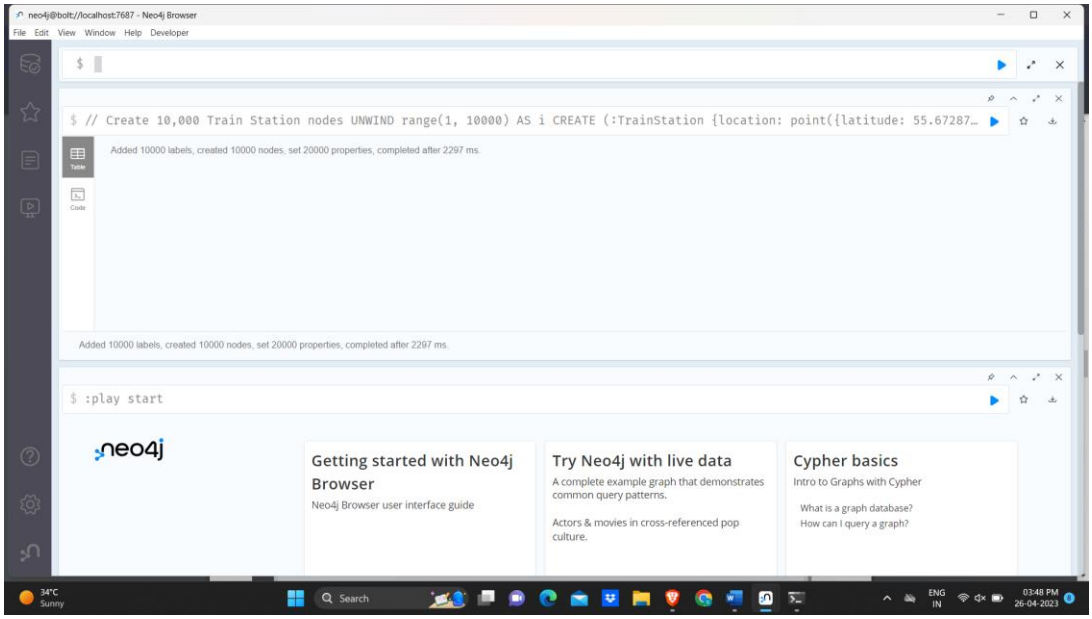
3. Write CQL (Cypher Query Language) script to add randomly 10,000 location points as follows. Assume any data.



Cypher script :

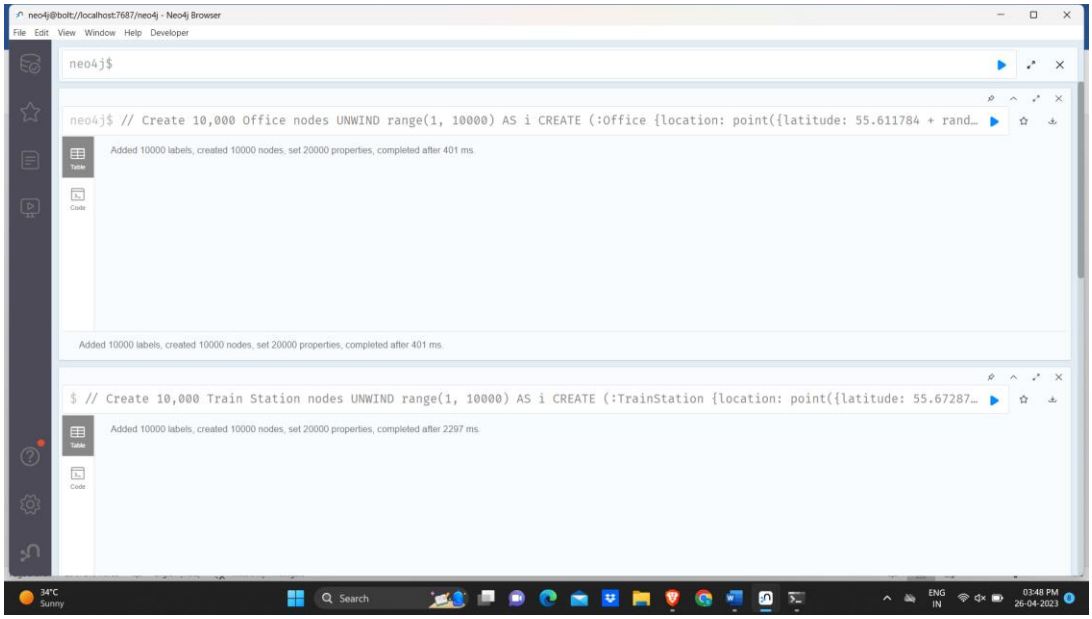
```
// Create 10,000 Train Station nodes

UNWIND range(1, 10000) AS i CREATE (:TrainStation {location:
point({latitude: 55.672874 + rand()*0.5, longitude: 12.56459 +
rand()*0.5}), city: 'Copenhagen'});
```

Name : Sharvari Yashwant Patil
PRN : 2020BTECS00077



// Create 10,000 Office nodes

UNWIND range(1, 10000) AS i CREATE (:Office {location: point({latitude: 55.611784 + rand()*0.5, longitude: 12.994341 + rand()*0.5}), city: 'Malmo'});

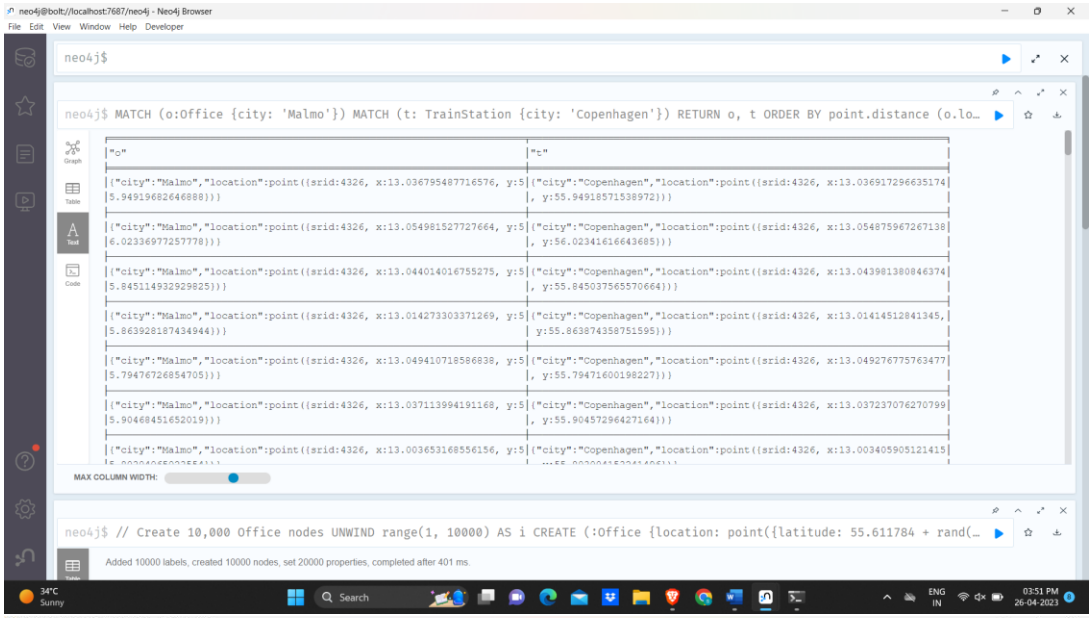


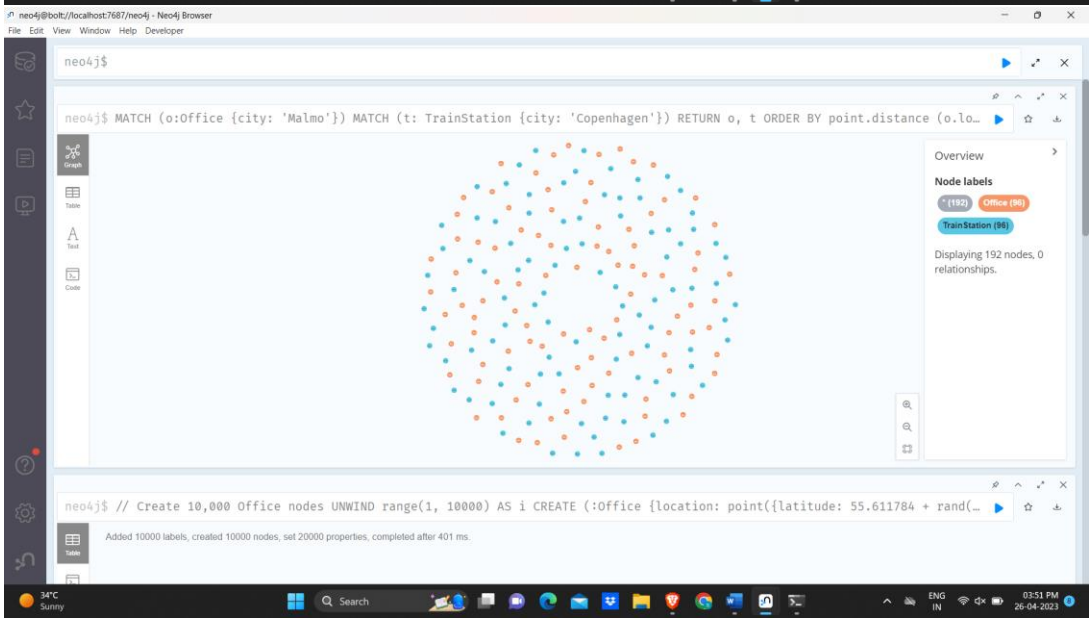
4. Use the point() , distance() function of Neo4j to answer the queries “***which things close/nearest to which other things***”.

5. Demonstrate the result by firing different cypher queries (write CQL statement).

Name : Sharvari Yashwant Patil
PRN : 2020BTECS00077

1. Find the nearest train station to each office in Malmo:

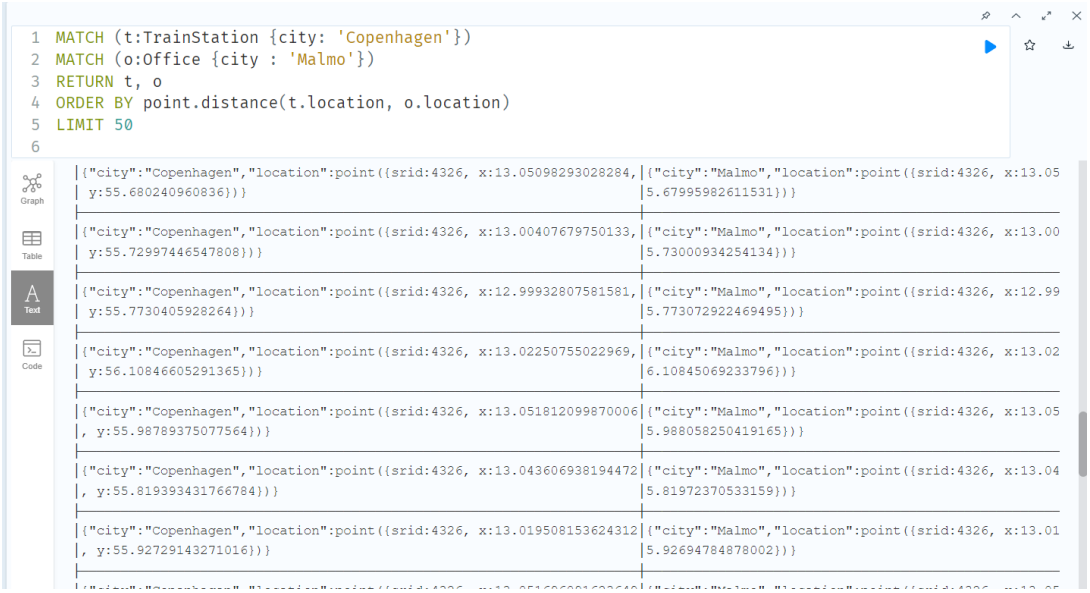




2. Find the closest Office to each Train Station in Copenhagen:

Name : Sharvari Yashwant Patil
PRN : 2020BTECS00077

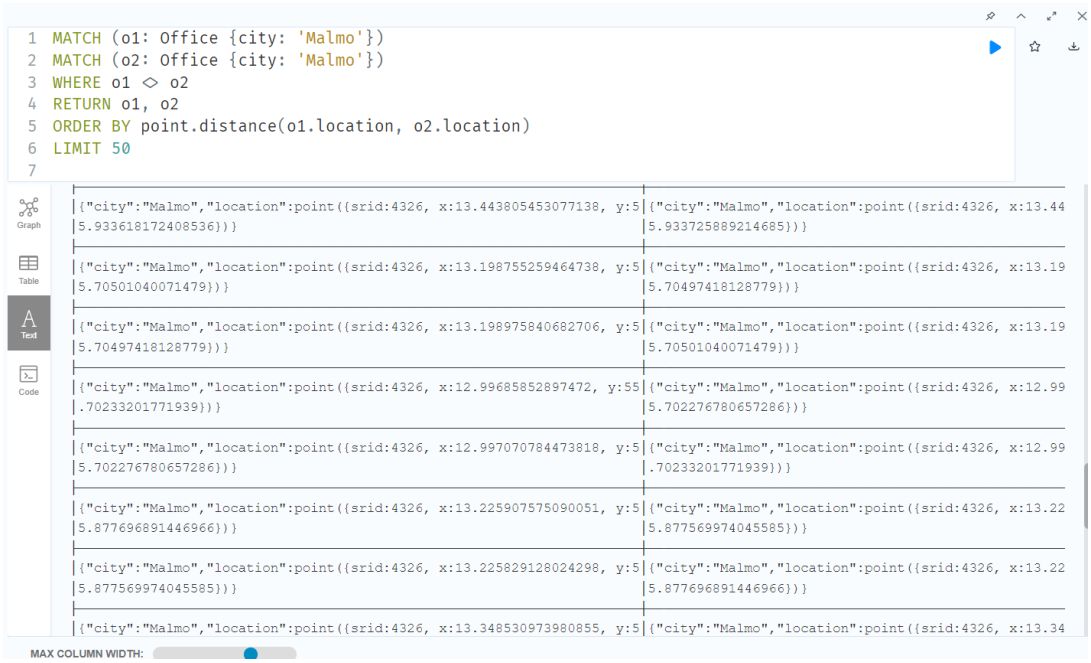
```
MATCH (t:TrainStation {city: 'Copenhagen'})
MATCH (o:Office {city : 'Malmo'})
RETURN t, o
ORDER BY point.distance(t.location, o.location)
LIMIT 50
```



{"city":"Copenhagen","location":point({srid:4326, x:13.05098293028284, y:55.680240960836})}	{"city":"Malmo","location":point({srid:4326, x:13.05 5.67995982611531})}
{"city":"Copenhagen","location":point({srid:4326, x:13.00407679750133, y:55.72997446547808})}	{"city":"Malmo","location":point({srid:4326, x:13.00 5.73000934254134})}
{"city":"Copenhagen","location":point({srid:4326, x:12.99932807581581, y:55.7730405928264})}	{"city":"Malmo","location":point({srid:4326, x:12.99 5.773072922469495})}
{"city":"Copenhagen","location":point({srid:4326, x:13.02250755022969, y:56.10846605291365})}	{"city":"Malmo","location":point({srid:4326, x:13.02 6.10845069233796})}
{"city":"Copenhagen","location":point({srid:4326, x:13.051812099870006, y:55.98789375077564})}	{"city":"Malmo","location":point({srid:4326, x:13.05 5.988058250419165})}
{"city":"Copenhagen","location":point({srid:4326, x:13.043606938194472, y:55.819393431766784})}	{"city":"Malmo","location":point({srid:4326, x:13.04 5.81972370533159})}
{"city":"Copenhagen","location":point({srid:4326, x:13.019508153624312, y:55.92729143271016})}	{"city":"Malmo","location":point({srid:4326, x:13.01 5.92694784878002})}

3. Find the closest Office to each other Office in Malmo.

```
MATCH (o1: Office {city: 'Malmo'})
MATCH (o2: Office {city: 'Malmo'})
WHERE o1 <> o2
RETURN o1, o2
ORDER BY point.distance(o1.location, o2.location)
LIMIT 50
```



{"city":"Malmo","location":point({srid:4326, x:13.443805453077138, y:55.933618172408536})}	{"city":"Malmo","location":point({srid:4326, x:13.44 5.933725889214685})}
{"city":"Malmo","location":point({srid:4326, x:13.198755259464738, y:55.70501040071479})}	{"city":"Malmo","location":point({srid:4326, x:13.19 5.70497418128779})}
{"city":"Malmo","location":point({srid:4326, x:13.198975840682706, y:55.70497418128779})}	{"city":"Malmo","location":point({srid:4326, x:13.19 5.70501040071479})}
{"city":"Malmo","location":point({srid:4326, x:12.99685852897472, y:55.70233201771939})}	{"city":"Malmo","location":point({srid:4326, x:12.99 5.702276780657286})}
{"city":"Malmo","location":point({srid:4326, x:12.997070784473818, y:55.702276780657286})}	{"city":"Malmo","location":point({srid:4326, x:12.99 .70233201771939})}
{"city":"Malmo","location":point({srid:4326, x:13.225907575090051, y:55.877696891446966})}	{"city":"Malmo","location":point({srid:4326, x:13.22 5.877569974045585})}
{"city":"Malmo","location":point({srid:4326, x:13.225829128024298, y:55.877569974045585})}	{"city":"Malmo","location":point({srid:4326, x:13.22 5.877696891446966})}
{"city":"Malmo","location":point({srid:4326, x:13.348530973980855, y:5	{"city":"Malmo","location":point({srid:4326, x:13.34

MAX COLUMN WIDTH:

Note : Follow the submission guidelines.

Deadline : 23/04/2023

Dr. B. F. Momin
Course Coordinator