School of Information Technology
Department of Computer Science

COS326 Database Systems
Practical 9 2025

Release Date: 21 October 2025

Submission Date: 28 October 2025 @ 23:59Hrs

Lecturer: Mr S.M Makura

Total: 50 Marks

Objectives

1. Get exposure to the Neo4j graph DBMS.

2. Learn how to create and use a graph for a Neo4j database.

3. Appreciate the differences between SQL and NoSQL databases.

You are expected to have completed the Movie tutorial on Neo4j before you start on this practical exercise. When you are done, you may start working on this practical and do the following:

1. You must submit the following files:

    a. *Task1Queries.txt* with all the CREATE and MATCH queries for Task 1

    b. *Task2Queries.txt* with all the MATCH queries for Task 2

2. Compress the above documents into an archive and upload it to ClickUP

    before the due date/time. The file name for the archive must have your student

number as part of the file name, e.g.

uXXXXXXXX_Surname_Initials*(XXXXXXXX is your student number) e.g*

u12345678_Smith_JN

3. Book for a demo session via Discord to demo the practical.

NO LATE submissions will be accepted after the submission date and time has lapsed.

Do not wait till the last minute to submit and start giving excuses that you faced technical

challenges when you tried to submit.

Task 1: CREATE AND QUERY A GRAPH DATABASE   [25 marks]

1. Using Neo4J, create a database called ***Prac9Neo4j.graphdb.***

2. Study the data description of an X social network in the table below:

Entity type	property: value	relationships	with entity whose label and property is	relationship property:value
Person	**name:** **@Thandi** from: Durban age:	FOLLOWS	**Person,** Johan	since: 2014
			Person, Neo	since: 2011
		POSTED	**Post,** #Trees	date: 20-08-2023
Person	**name:** **@Johan** from: Pretoria	FOLLOWS	**Person,** Thandi	since: 2012
		REPOSTED	**Post,** #Trees	date: 20-08-2023
Person	**name:** **@Neo** from: Cape Town age: 22	FOLLOWS	**Person,** Thandi	since: 2016
			Person, Melanie	since: 2016
		POSTED	**Post,** #Rhinos	date: 05-09-2023
Person	**name:** **@Melanie**	FOLLOWS	**Person,** Johan	since: 2012
			Person, Thandi	since: 2012

	from: Joburg age: 21	LIKED	**Post,** #Rhinos	date: 05-09-2023

Post	**hashtag:**
	
	#Trees
	
	message:
	
	   "provide
	
	   oxygen"
		As above		

Post	**hashtag:** **#Rhinos** message: "are innocent"	As above		

3. Using Neo4j, create and test the queries (write and read clauses) given below and then store them in the file ***Task1Queries.txt.***

Queries:

a.   Write Cypher statements to create the graph as follows:

(18 marks)

      i. Create all the Person nodes and all the FOLLOWS relationships (8)

      ii. Show the current contents (nodes and relationships) of the database. (2)

      iii. Create all the Post status: POSTED, REPOSTED and LIKED

         relationships (6)

      iv. Show the current contents (nodes and relationships) of the database. (2)

b. Write Cypher queries to do the following: **(7 marks)**

   i.   List all the node labels with no duplicates in the list.

  ii.   List names of the people in the graph in alphabetical order.

 iii.   List all the #tags for the posts in the graph in alphabetical order.

  iv.   List all the relationship types with no duplicates.

   v.   List names of the people in the graph who have POSTED & their posts.

  vi.   List all the #tags and messages for the posts which have been REPOSTED.

 vii.   List all the #tags and messages for the posts which have been LIKED.

Task 2: AGGREGATION AND PATH QUERIES   [25 marks]

Create and test the queries for the tasks specified below and then store them in the file

Task2Queries.txt

1. Path and other queries   **(13 marks)**

a. Find the posts that are 1 or 2 links away from the Person Neo. (3)

b. Show the nodes in the path from Melanie to Neo (3)

c. For each person who has POSTED, provide a report to indicate (true/false) whether their post has been REPOSTED. (4)

d. Find the shortest (FOLLOWS) path from Melanie to Neo. (3)

2. Aggregation queries: **(12 marks)**

a. Count the number of nodes in the network (3)

b. For each person, count the number of persons they follow. (3)

c. For each person, count the number of persons who have been following them since 2014. (3)

d. Show the name and number of followers for the person who has the largest number of followers. (3)