6102 report: unified queries set:

Unified queries in SQL, MongoDB and Neo4j allow us to combine and execute queries across different databases. Our model offers a versatile range of applications. It allows us to retrieve direct connections from a specified city and determine the corresponding distances. We can also calculate the total or average distance for routes originating from a specific location. Additionally, the model can list cities based on a predefined threshold for the number of connections, providing a comprehensive analysis through a unified query set.

In our research, we finalized the four queries sets to compare the execution ability of processing the queries using three databases. The first question is to get roads from Richmond to Atlanta with distance that is greater than 500 miles. Using WHERE in SQL, which allows us to filter data based on a certain specific condition. We can achieve the same purpose with ‘gte()’ function in MongoDB, WHERE clause in Neo4j.

Further queries focus on calculation statistical information and identifying specific relationships. We used AVG(), aggregation, UNION, MATCH, JOIN, lookup() functions for completing the calculation of the top 5 average distance per city pairs, finding cities that are at most 2 hops from Richmond and finding the shortest path between Richmond and Amman with at most 2 hops.

Additionally, we used a newly introduced MongoDB function called deque. This double ended queue is a data structure that allows insertion and deletion of elements from both ends. It can be used to store and manipulate collections of data. We use deque in MongoDB, JOIN clause in SQL for retrieving data from two or more different tables to get information. For Neo4j we used SHORTESTPATH() to identify paths with the fewest hops between nodes.

Unified queries across SQL, MongoDB and Neo4j provide a robust framework for data retrieval and data manipulation. The diverse range of query capabilities across these databases allows for flexible data processing, enabling complicated data analysis and insights. Our work illustrates that while each database has its own unique functions or clauses to call the queries, they can be used in conjunction to achieve common goals.