ST10337933-INSY6112-A1

ARAAV DHANRAJ

QUESTION 1:

Recommendation: NoSQL Database

Definition of a NoSQL Database: Non-relational database systems, or NoSQL databases, are made to effectively manage massive volumes of both structured and unstructured data. It is perfect for applications with changing data needs since it prioritizes scalability, quick performance, and real-time processing. (Google, N/A).

Motivation for choosing NoSQL Database:

Real time processing: NoSQL databases' quick read and write speeds facilitate real-time analytics and quick updates, e.g. notifications and feeds. (Google, N/A).

Scalability: Unlike traditional databases, NoSQL databases may rapidly increase their capacity as data and traffic increase, typically without experiencing any downtime. (Google, N/A).

Faster queries: Unlike traditional databases, which are normalized to reduce data duplication, NoSQL is built for fast searching. Database queries typically yield faster results because they don't require complex joins. (Google, N/A).

Types of data stored:

Media and posts: This includes posts, images, videos and other user-generated content. (Google, N/A).

Metadata: This includes user profiles ang geolocations. (Google, N/A).

Real-Time-Data: This includes user behaviour for personalized recommendations, and trending topics. (Google, N/A).

Interactions and comments: This includes storing likes on posts, comments and tracks the user's overall engagement. (Google, N/A).

Types of NoSQL Databases:

The 5 main types of NoSQL Databases include:

Document databases: Document databases, sometimes referred to as document-oriented databases or a document store, are used to store and query semi-structured data. Since data is stored in a document that looks like JSON and is similar to the data objects that developers use in application code, it is easier to design and change applications without consulting a primary schema. (Google, N/A).

Graph databases: Graph databases arrange the data as nodes in a graph to display the relationships between data elements. Richer representations of data relationships are made possible by the connections between nodes (edges), which are represented as first-class components and facilitate simpler storage and navigation. (Google, N/A).

Key-value databases: A key-value database, sometimes known as a key-value store, is the most fundamental type of NoSQL database. To store data in a "key-value" structure, a value—which could be a string, number, Boolean, or complex object—is matched with a distinct key. (Google, N/A).

In-memory-databases: In-memory databases store data in memory, they provide incredibly low latency for real-time applications. Redis and Valkey are examples of in-memory NoSQL databases. (Google, N/A).

Column-orientated databases: Wide-column stores, sometimes referred to as column-oriented databases, use rows to store and retrieve data and are organized in a group of columns. Although relational databases and wide-column storage both use a tabular style, each row in a single table may have a different column name and layout. (Google, N/A).

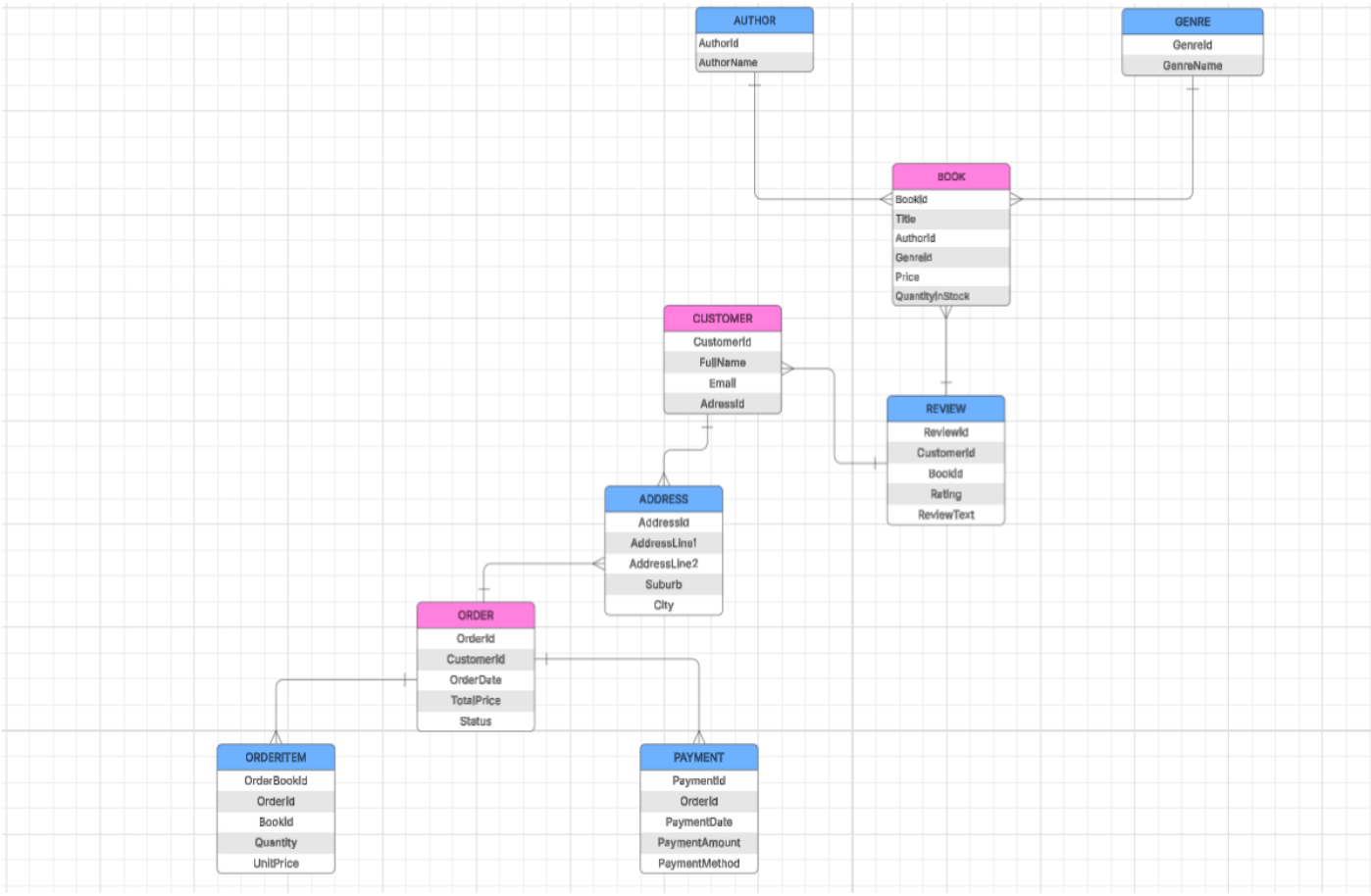
The 3 V's:

Volume: The platform generates large amounts of media daily, which includes posts and user interactions, using a NoSQL database ensures that there is enough storage which ensure the system works. (Google, N/A).

Velocity: Real time interactions (for e.g. livestreams and posts) demand rapid processing, NoSQL databases can handle high write and read with low latency. (Google, N/A).

Variety: Social media allows numerous types of media photos, GIFS, videos, livestreams and reactions. This requires a database to store and managed all these different inputs, NoSQL caters for all these different types of media. (Google, N/A).

QUESTION 2:



Description:

The ERD for the online bookstore illustrates 9 interconnected entities, the diagram shows how customers interact with books, orders and reviews. The primary entities include Customer, Book, Order, Payment, Review, Address, Author and Genre. Each of the entities have a unique identifier and a set of attributes. Customers can place orders and write a single review, books can be apart of multiple orders and receive reviews from numerous customers, each order has a single payment but allows the customers to use the same payment method.

Reference List:

Google Cloud, N/A. What is a NoSQL Database. [online] Available at: https://cloud.google.com/discover/what-is-nosql [Accessed 20 November 2015].

LucidChart (2025) Database Entity-Relationship Diagram, lucidchart. Available at: https://lucid.app/lucidchart/e19b168f-a504-4bb9-95f9-1ae5caab48a1/edit?page=0_0&invitationId=inv_ca26da29-d3de-4992-a7a6-31a7e5ac2ec0# (Accessed: 28 March 2025).