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Final Assignment
SQL and databases

1a. DBMS stands for **D**ata**b**ase **M**anagement **S**ystem, and it is a database **software** program that manages databases. A DBMS serves as an interface between the database and its end users, allowing users to retrieve, update and manage how information is organized. A DBSM also facilitates oversight and control of databases, enabling different administrative operations within the database.

1b. Data redundancy means data is duplicated in more than one place. When it comes to data, we want to reduce data redundancy, which means that we avoid having the same data in several different places/tables.

1c. Third normal form normalization is a database schema design which states that you should eliminate fields in a table that do not depend on the key. To achieve 3NF, a table must be already in 2NF, non-primary key columns should not depend on the other non-primary key columns and there should not be transitive functional dependency. Generally, a relational database relation is described as "normalized" if it meets 3NF.

1d. AVG in SQL is a function that returns the average value of a numeric column.

2. SQL databases are relational databases that use SQL and have a predefined schema. SQL databases are vertically scalable, and table based. Advantages with SQL: easy to use and setup, compatibility with many other tools, good at structured data and high-performance workloads. Disadvantages with SQL: the database design process is time-consuming, and it can be difficult to scale.

NoSQL databases are non-relational databases that have dynamic and unstructured data. NoSQL databases are horizontally scalable, and they are not table-based, NoSQL databases are document, key-value, graph, or wide-column stores. Advantages with NoSQL: no need for model design, rapid development cycles, speed and it runs well on the cloud. Disadvantages with NoSQL: slower response time, the technology is still maturing, and it is not suited for interconnected data.

3. JSON is a text-based data format following JavaScript object syntax that can be used independently from JavaScript, and many programming environments feature the ability to read and generate JSON. It is used for transmitting data in web applications. JSON is best for simple applications with simple requirements for data interchange. For applications with complex requirements for data interchange, it is better to use XML, for example in enterprise.

4. Data integrity is the maintenance and assurance of accuracy and consistency of data over the data's entire life cycle. We do not want data that is not up-to-date or repeating data, if we have those, we have a data integrity problem. Data Integrity answers the question of whether data is accurate, consistent, and can be trusted. We can ensure and maintain data integrity with the following steps: always validate input data, implement access controls, keep an audit trail, always backup the data, adopting security best practices, educate the workforce.

5. SQL Server is a relational DBMS built on SQL developed by Microsoft. SQL Server is tied to TSQL which is Microsoft's implementation of SQL that adds a set of proprietary programming constructs.

6. A table is formed up with rows and columns, which store the information of any object, and is used to retrieve that data. The view is a result of an SQL query and it is a virtual table. The view can show a whole table, parts of a table or joins of different tables.

7. We can design a business with the business logic in the database code or in the application code. Generally, we need to think about how easy we want to make changes when we design an application, if we want to easily change the logic, we need to put the logic in the application, it is more difficult to change the logic in database.