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**Assignment one**

**Section A: Definitions**

**Database**: A database is a structured collection of data organized and stored electronically in a computer system. It can be accessed, managed, and updated efficiently. Databases can be relational, hierarchical, network, object-oriented, or other types.

**Table**: In the context of relational databases, a table is a collection of data organized into rows and columns. Each row represents a record, and each column represents a field or attribute.

**Record**: A record, also known as a tuple or row, is a single instance of data within a database table. It contains a set of related data fields or attributes.

**Field**: A field, also known as an attribute or column, is a single data element within a record. It represents a specific characteristic or property of the entity being modelled. **Primary Key**: A primary key is a unique identifier for each record in a table. It ensures that each row in the table can be uniquely identified and accessed. Primary keys can consist of one or multiple fields.

**SQL**: SQL (Structured Query Language) is a standardized programming language used for managing relational databases. It is used to create, retrieve, update, and delete data from databases.

**Query**: A query is a request for data or information from a database. It is typically written in SQL and is used to retrieve specific data that meets certain criteria.

**Index**: An index is a data structure that improves the speed of data retrieval operations on a database table. It is created on one or more columns of a table and allows for faster lookup of data based on the indexed columns.

**Normalization**: Normalization is the process of organizing data in a database efficiently to reduce redundancy and dependency. It involves breaking down larger tables into smaller, related tables and defining relationships between them to minimize data duplication and ensure data integrity.

**Database Management System (DBMS)**: A DBMS is software that enables users to create, manage, and interact with databases. It provides various functionalities such as data storage, retrieval, manipulation, and security.

**Section B: Discussions**

**Purpose of a Primary Key**: The primary key serves as a unique identifier for each record in a table. It ensures data integrity by preventing duplicate records and facilitates efficient data retrieval and updates. For example, in a "Students" table, the Student ID column can serve as the primary key, ensuring each student record is uniquely identified by their student ID number.

**Difference between DBMS and Database**: A database is a structured collection of data, while a DBMS is software used to manage, manipulate, and interact with that data. A database is a passive entity, while a DBMS is an active software tool that enables users to interact with the database by performing tasks such as data entry, retrieval, modification, and administration.

**Importance of Normalization**: Normalization is crucial in database design as it helps eliminate data redundancy and dependency, leading to better data organization and integrity. By breaking down larger tables into smaller, related tables and defining relationships between them, normalization reduces the risk of data anomalies such as insertion, update, and deletion anomalies. For example, in a normalized database, student information like name and address would be stored in a separate table from course information, linked by a student ID, which improves data integrity and consistency.