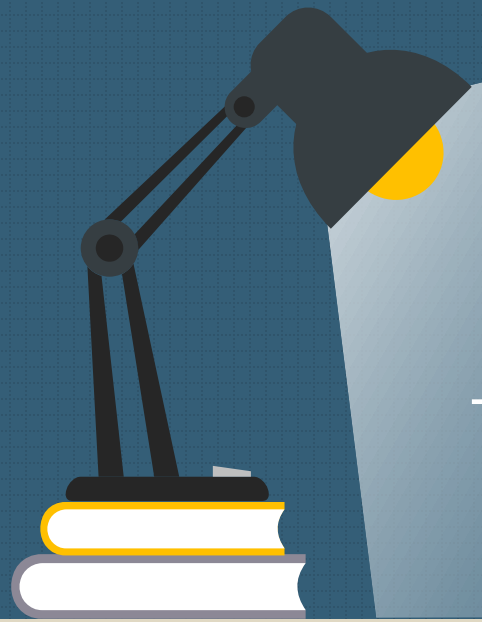

EPPS6354 Information Management

Assignment 2

Dohyo Jeong

University of Texas at Dallas

Assignment 2

Q1

- What are the differences between relation schema, relation and instance? Give an example using the university database to illustrate.

Understanding the differences between relation schema, relation, and instance is crucial in the context of database management systems, specifically relational databases. Here's a detailed explanation of each term, followed by an example using a university database to illustrate these concepts:

1) **Relation Schema**: A relation schema is a blueprint that defines the structure of a relation, including the name of the relation, and the names and types of each column. It is essentially the metadata that describes the relation. A relation schema is static, meaning it does not change often.

2) **Relation**: A relation, in the context of a relational database, is a table composed of rows and columns. The term "relation" is used interchangeably with "table". It is the structure defined by the schema and can store actual data. Each row in the relation represents a record, and each column represents an attribute of the data.

3) **Instance**: An instance of a database refers to the contents of a database at a particular point in time. It's a snapshot of the data in all the relations (tables) of the database. Instances of a relation are dynamic, meaning they can change over time as data is inserted, updated, or deleted.

Assignment 2

Q1

- What are the differences between relation schema, relation and instance? Give an example using the university database to illustrate.

1) **Relation Schema**: Consider a relation schema for a table named Students, which might be defined as Students(SID: integer, Name: varchar, Major: varchar, Year: integer). This schema outlines that the Students table will have four columns: SID (student ID, an integer), Name (a variable character string), Major (also a variable character string), and Year (an integer representing the year in school).

2) **Relation (Table)**: Based on the above schema, the Students relation (or table) would be structured to hold records of students, with each record comprising an SID, Name, Major, and Year. However, at this point, we're only talking about the structure without referring to any specific data.

3) **Instance of the Relation** (Specific Data at a Time): An instance of the Students table would be the actual data contained in the table at any given time.

Assignment 2

Q2

- Draw a schema diagram for the following bank database:

a) Medical Record Management System:

- This system is used to store and manage patients' medical records. The purpose is secure storage of patient data and updates by medical professionals. Features include patient information input, viewing diagnostic records, prescription management, and communication among doctors.

b) Library Loan Management System:

- Used by libraries to manage book loans, the purpose is to systematically track book loans and returns. Features include loan tracking, overdue notifications, book search, and member information management.

c) Hotel Reservation System:

- Utilizes a database for hotel reservations and room management. The purpose is efficient management of customer reservations and room allocations. Features include room reservations, room availability checking, payment processing, and reservation history tracking.

Assignment 2

Q3

- Name and describe three applications you have used that employed a database system to store and access persistent data. (e.g. airlines, online trade, banking, university system)

1. Appropriate Primary Keys

- branch: branch_name - Since branch names uniquely identify branches, branch_name can serve as the primary key.
- customer: ID - Given that customer names uniquely identify customers but may not be unique across the entire database (e.g., two customers might have the same name but different IDs), ID remains the primary key.
- loan: loan_number - Each loan has a unique loan_number that identifies it.
- borrower: This is a linking table for the many-to-many relationship between customer and loan. The primary key would be a composite key of ID and loan_number.
- account: account_number - Each account is uniquely identified by its account_number.
- depositor: This table represents the many-to-many relationship between customer and account, with a composite primary key of ID and account_number.

Assignment 2

Q3

- Name and describe three applications you have used that employed a database system to store and access persistent data. (e.g. airlines, online trade, banking, university system)

2. Appropriate Foreign Keys
Given the primary keys, the foreign keys can be identified as follows:

1) loan:
- branch_name (FK) referencing branch(branch_name): Links each loan to a specific branch.

2) borrower:
- ID (FK) referencing customer(ID): Links the borrowing relationship to a specific customer.
- loan_number (FK) referencing loan(loan_number): Links the borrowing relationship to a specific loan.

3)account:
- branch_name (FK) referencing branch(branch_name): Links each account to a specific branch.

4) depositor:
- ID (FK) referencing customer(ID): Links the depositing relationship to a specific customer.
- account_number (FK) referencing account(account_number): Links the depositing relationship to a specific account.


Thank
you!