

Information Management (EPPS 6354) Assignment 2

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Question 1.

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

Relation Schema :

Schema is the overall description of the database. The basic structure of how the data will be stored in the database is called schema.

Relation schema defines the design and structure of the relation like it consists of the relation name, set of attributes/field names/column.

Relation schema: A set of attributes is called a relation schema (or relation scheme). A relation schema is also known as table schema (or table scheme). A relation schema can be thought of as the basic information describing a table or relation. It is the logical definition of a table. Relation schema defines what the name of the table is. This includes a set of column names, the data types associated with each column.

Relational schema may also refer to as database schema. A database schema is the collection of relation schemas for a whole database. Relational or Database schema is a collection of meta-data. Database schema describes the structure and constraints of data representing in a particular domain.

A Relational schema can be described a blueprint of a database that outlines the way data is organized into tables.

Example: *instructor* = (*ID*, *name*, *dept_name*, *salary*)

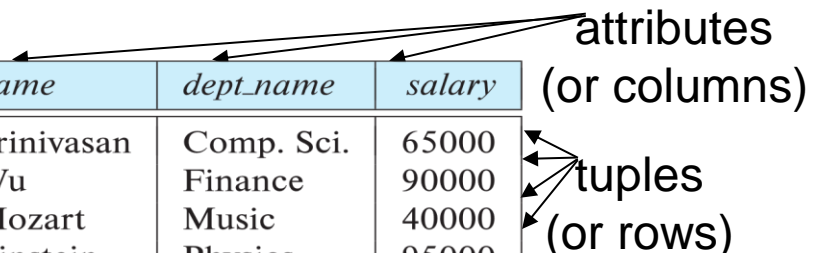
Relation:

In database theory, a relation, as originally defined by E. F. Codd, is a set of tuples where each element d_j is a member of D_j , a data domain.

The table is a relation because it stores the relation between data in its column-row format. The columns are the table's attributes, and the rows represent the data records. A single row is known as a tuple

Each table, sometimes called a relation, in a relational database contains one or more data categories in columns or attributes.

Example of a *Instructor* Relation/Table



| <i>ID</i> | <i>name</i> | <i>dept_name</i> | <i>salary</i> |
|-----------|-------------|------------------|---------------|
| 10101 | Srinivasan | Comp. Sci. | 65000 |
| 12121 | Wu | Finance | 90000 |
| 15151 | Mozart | Music | 40000 |
| 22222 | Einstein | Physics | 95000 |
| 32343 | El Said | History | 60000 |
| 33456 | Gold | Physics | 87000 |
| 45565 | Katz | Comp. Sci. | 75000 |
| 58583 | Califieri | History | 62000 |
| 76543 | Singh | Finance | 80000 |
| 76766 | Crick | Biology | 72000 |
| 83821 | Brandt | Comp. Sci. | 92000 |
| 98345 | Kim | Elec. Eng. | 80000 |

Instance:

Instance is the actual content of the database at a particular point in time

Instances are the collection of information stored at a particular moment. The instances can be changed by certain CRUD operations as like addition, deletion of data. It may be noted that any search query will not make any kind of changes in the instances.

Example –

Let's say a table teacher in our database whose name is School, suppose the table has 50 records so the instance of the database has 50 records for now and tomorrow we are going to add another fifty records so tomorrow the instance have total 100 records. This is called an instance.

Example of a *Instructor* Relation/Table : Instance



| ID | name | dept_name | salary |
|-------|------------|------------|--------|
| 22222 | Einstein | Physics | 95000 |
| 12121 | Wu | Finance | 90000 |
| 32343 | El Said | History | 60000 |
| 45565 | Katz | Comp. Sci. | 75000 |
| 98345 | Kim | Elec. Eng. | 80000 |
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Difference between Schema and Instance :

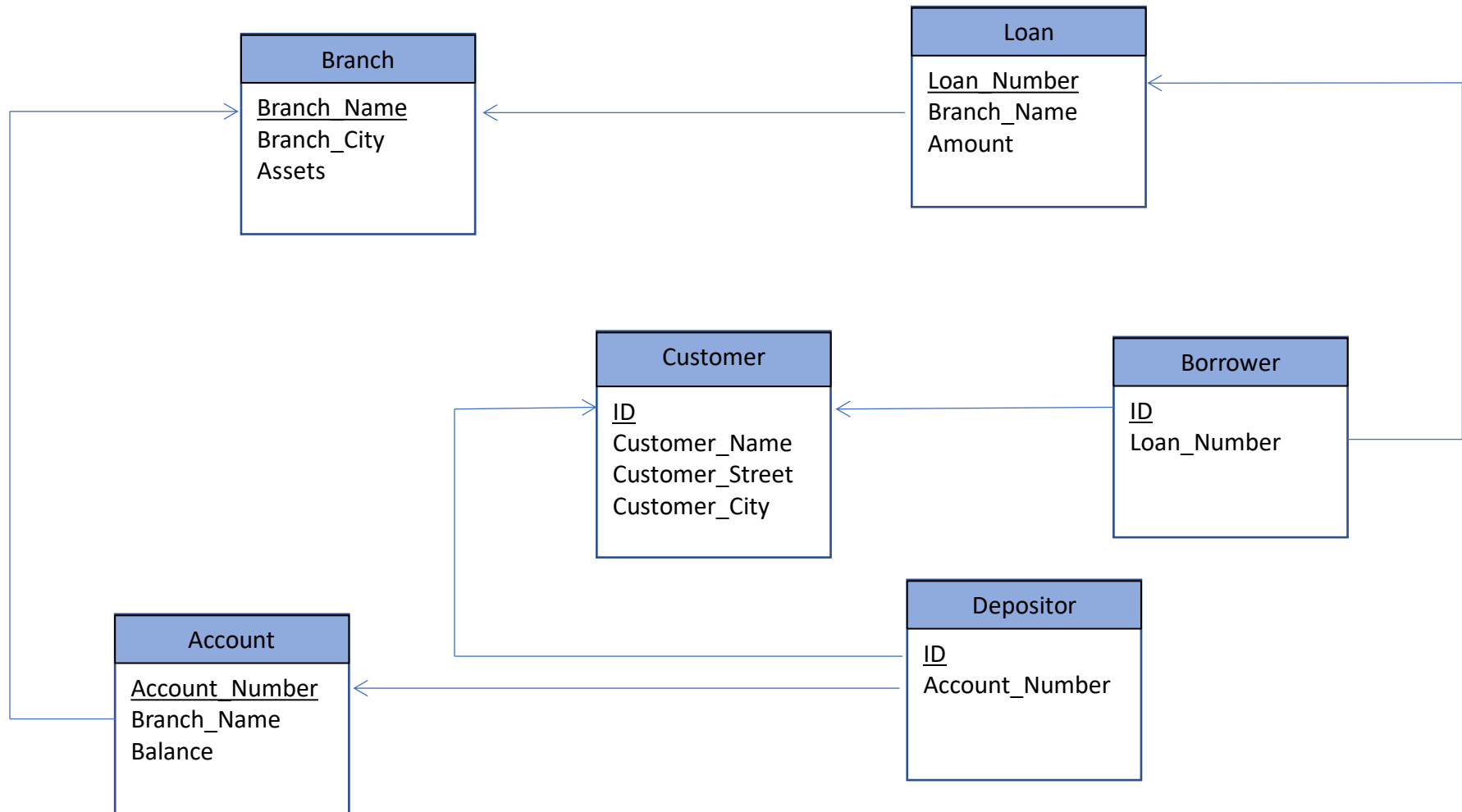
| Schema | Instance |
|--|--|
| It is the overall description of the database. | It is the collection of information stored in a database at a particular moment. |
| Schema is same for whole database. | Data in instances can be changed using addition, deletion, updation. |
| Does not change Frequently. | Changes Frequently. |
| Defines the basic structure of the database i.e how the data will be stored in the database. | It is the set of Information stored at a particular time. |

Question 2.

Draw a schema diagram for the following bank database:

branch(branch_name, branch_city, assets)
customer (ID, customer_name, customer_street, customer_city)
loan (loan_number, branch_name, amount)
borrower (ID, loan_number)
account (account_number, branch_name, balance)
depositor (ID, account_number)

Schema Diagram

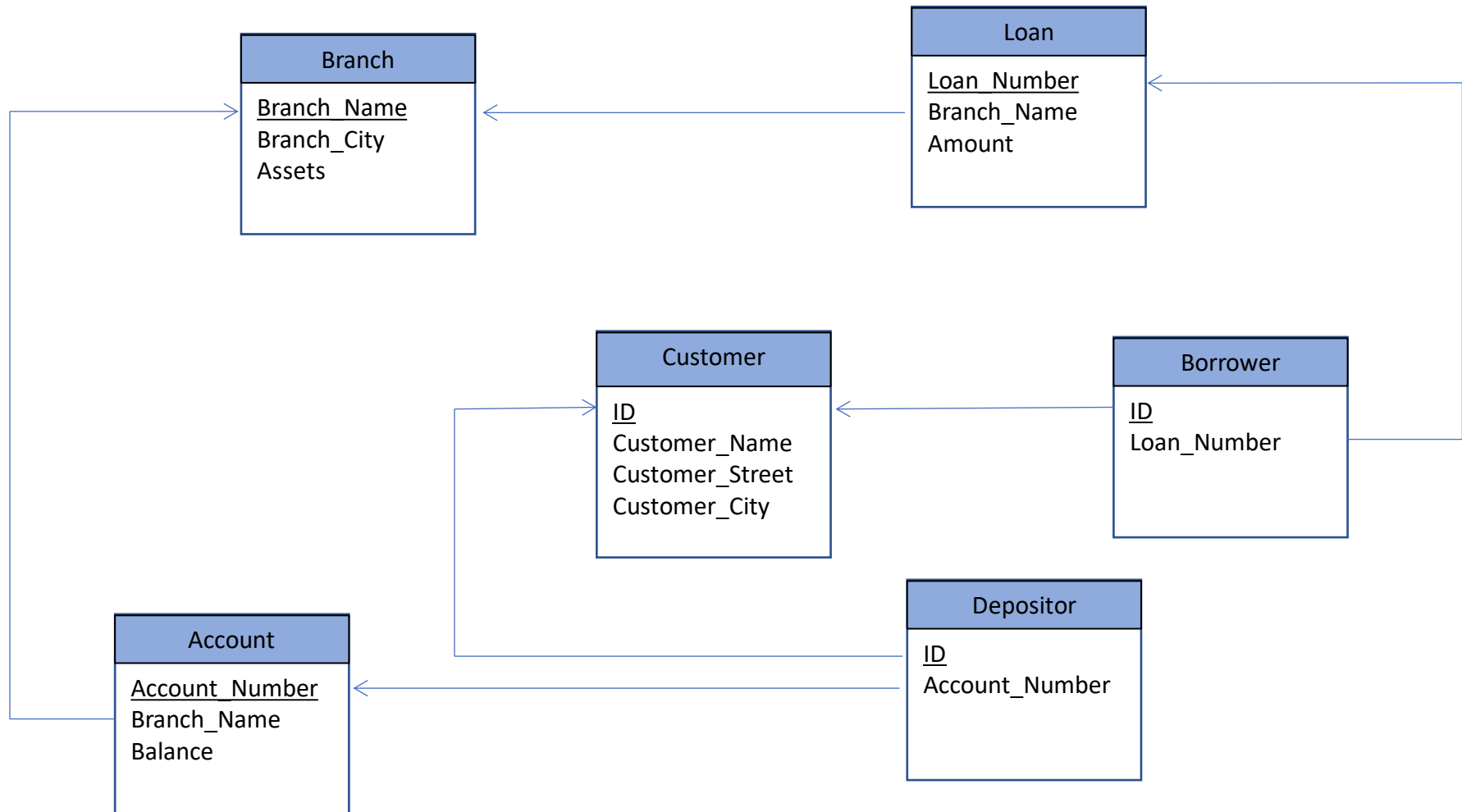


Question 3

Consider the above bank database. Assume that branch names (*branch_name*) and customer names (*customer_name*) uniquely identify branches and customers, but loans and accounts can be associated with more than one customer.

- i. What are the appropriate primary keys? (Underline each in diagram)
- ii. Given your choice of primary keys, identify appropriate foreign keys.

Schema Diagram



i.) Primary Key are:

Branch_Name

ID

ii.) ID (in Borrower and Depositor table)

Account_Number (in Depositor table)

Loan Number (in Borrower Table Table)

Branch Name (in Account and Loan)

