

Title	Assignment 01: Information Management (GISC 6354)
Handed Out	Thursday, February 01, 2024
Name	Victoria Ebeh
Email	Vae230000@utdallas.edu

Q1: What are the differences between relation schema, relation and instance? Give an example using the university database to illustrate.)

1. **Relation Schema:** A relation schema defines the structure of a table in a relational database. It specifies the names and types of attributes (columns) that will be present in the table. A relation schema consists of attributes and domains. For example, The "Department" relation schema may include attributes like department name, building, and budget. It can be written as ***department (dept name, building, budget)***.
2. **Relation:** A relation, often referred to as a table, is the actual implementation of a relation schema. It is a set of rows, where each row represents a record or tuple, and each column represents an attribute. A relation corresponds to a programming-language variable. For example, the "Department" relation includes actual data, such as (Biology, Watson, 90000), (Comp.Sci, Taylor, 100000), where each tuple represents a department.
3. **Instance:** An instance of a relation refers to the specific set of data contained in the relation at a given point in time. It represents the actual rows and values present in the table. A relation instance is comparable to the value of a variable. Its contents may change over time due to updates. The current data in the "Teaches" relation, including all existing course records, forms an instance of that relation. Consider *figure 1* showing a sample of an instance of the "Teaches" relation which shows 15 tuples corresponding to 15 instructors and their class sections.

<i>ID</i>	<i>course_id</i>	<i>sec_id</i>	<i>semester</i>	<i>year</i>
10101	CS-101	1	Fall	2017
10101	CS-315	1	Spring	2018
10101	CS-347	1	Fall	2017
12121	FIN-201	1	Spring	2018
15151	MU-199	1	Spring	2018
22222	PHY-101	1	Fall	2017
32343	HIS-351	1	Spring	2018
45565	CS-101	1	Spring	2018
45565	CS-319	1	Spring	2018
76766	BIO-101	1	Summer	2017
76766	BIO-301	1	Summer	2018
83821	CS-190	1	Spring	2017
83821	CS-190	2	Spring	2017
83821	CS-319	2	Spring	2018
98345	EE-181	1	Spring	2017

Figure 1: Instance of Teaches relation

Q2: 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*)

Figure 2: Schema for bank database.

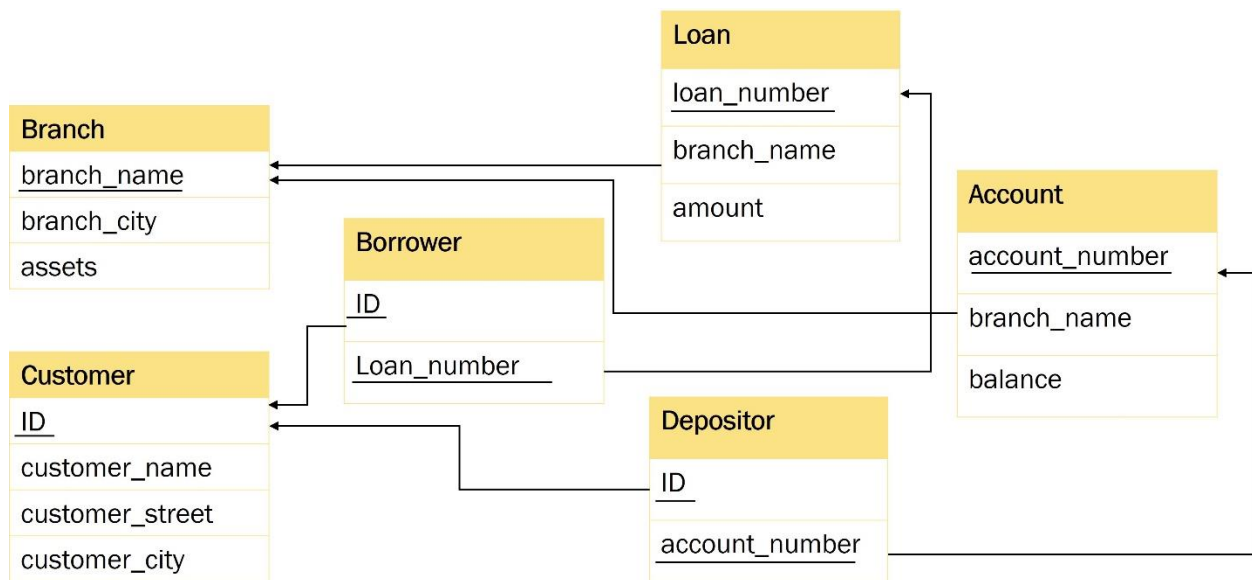


Figure 3: Schema diagram for bank database

Q3: 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)**
Please reference the *figures 2 & 3* above for the primary keys underlined.
- ii. **Given your choice of primary keys, identify appropriate foreign keys**
 1. Loan Relation Schema:

- branch_name in Loan is a foreign key referencing branch_name in Branch.
2. Borrower Relation Schema:
 - ID in Borrower is a foreign key referencing ID in Customer.
 - loan_number in Borrower is a foreign key referencing loan_number in Loan.
 3. Account Relation Schema:
 - branch_name in Account is a foreign key referencing branch_name in Branch.
 4. Depositor Relation Schema:
 - ID in Depositor is a foreign key referencing ID in Customer.
 - account_number in Depositor is a foreign key referencing account_number in Account.