

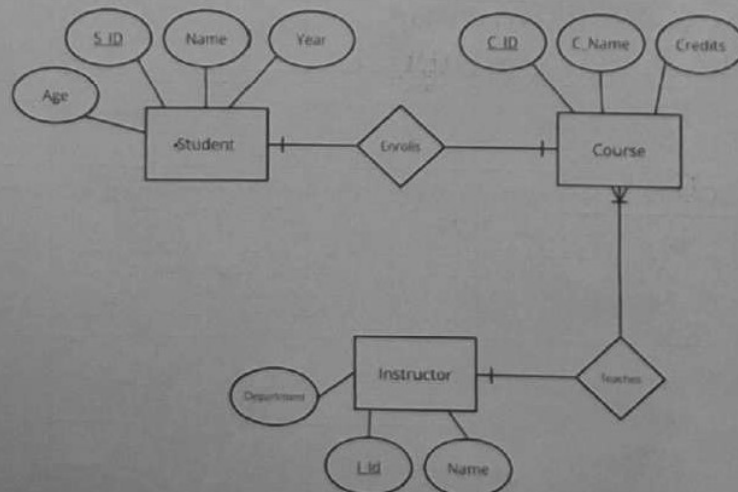
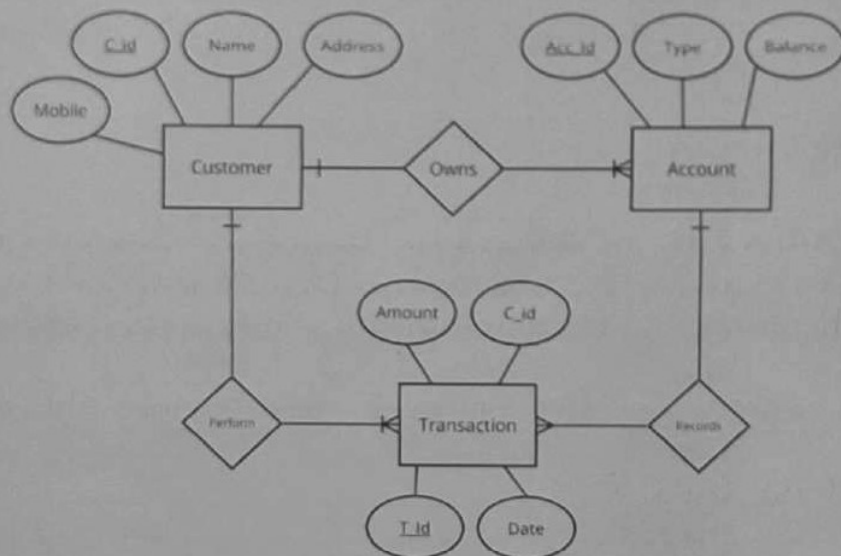
## PRACTICAL-2

DATE: \_\_\_\_\_

**AIM:** Draw E-R diagram and convert entities and relationships to relationtable for a given scenario.

- A. Two assignments shall be carried out i.e. consider two different scenarios (eg. bank, college)
- B. Write relational algebra queries for a given set of relations.

### INPUT:-



A) Convert Entity and Relationship to relation table for a given scenario.

i). Bank System :-

a). Entities :-

- Customer (CustomerID, Name, Address, Mobile)
- Accounts (AccountID, AccountType, Balance, CustomerID)  
Foreign Key : CustomerID references Customer.  
CustomerID
- Transactions (TransactionID, Date, Amount, AccountID)  
Foreign Key : AccountID references Account.  
AccountID

b). Relationship :-

- Owns : A relationship between Customer and Account.
- Performs : A relationship between Account and Transaction.
- Records : A relationship between Account and Transaction.

\* Conversion of Entity and Relationship to Relational Table :-

a). Customer :-

Attribute	Type	Key
CustomerID	INT	Primary Key
Name	VARCHAR	
Address	VARCHAR	
Mobile	VARCHAR	

b). Account :-

Attribute	Type	Key
AccountID	INT	Primary Key
AccountType	VARCHAR	
Balance	DECIMAL	
customerID	INT	Foreign Key

c). Transaction :-

Attribute	Type	Key
TransactionID	INT	Primary Key
Date	DATE	
Amount	DECIMAL	
AccountID	INT	Foreign Key

d). Owns (Relationship) :-

Relationship Name	Primary Entity	Foreign Entity	Foreign Key
Owns	Customer	Account	'customerID' in Account References 'customerID' in Customer

e). Performs (Relationship) :-

Relationship Name	Primary Entity	Foreign Entity	Foreign Key
Performs	Customer	Transaction	'customerID' in Transaction References 'customerID' in Customer

f). Records (Relationship) :-

Relationship Name	Primary Entity	Foreign Entity	Foreign Key
Records	Accounts	Transaction	'AccountID' in Transaction References 'AccountID' in Accounts

## ii). College System :-

### a). Entity :-

- Student (StudentID, Name, Age, Year)
- Course (CourseID, CourseName, Credits)
- Instructor (InstructorID, Name, Department)

### b). Relationship :-

- Enrolls In : A relationship between Student and Course.
- Teaches : A relationship between Instructor and Course.

## \* Conversion of Entity and Relationship to Relational Table :-

### a). Student :-

Attribute	Type	Key
StudentID	INT	Primary Key
Name	VARCHAR	
Age	INT	
Year	INT	

### b). Course :-

Attribute	Type	Key
CourseID	INT	Primary Key
CourseName	VARCHAR	
Credits	INT	

c). Instructor :-

Attribute	Type	Key
InstructorID	INT	Primary Key
Name	VARCHAR	
Department	VARCHAR	

d). Enrolls (Relationship) :-

Attribute	Type	Key
StudentID	INT	Foreign Key (References 'Student.StudentID')
CourseID	INT	Foreign Key (References 'Course.CourseID')

e). Teaches (Relationship) :-

Attribute	Type	Key
InstructorID	INT	Foreign Key (References 'Instructor.InstructorID')
CourseID	INT	Foreign Key (References 'Course.CourseID')



B). Write relational algebra queries for a given set of relations,

i). Bank System :-

- Find all customers with a balance greater than \$10,000

$\sigma_{\text{Balance} > 10000} (\text{Account}) \bowtie (\text{Customer})$

- List all transactions of a accountID = 123

$\sigma_{\text{AccountID} = 123} (\text{Transaction})$

- Find all accounts owned by (customerID = 101)

$\sigma_{\text{CustomerID} = 101} (\text{Account})$

ii). College System :-

- Find all students enrolled in a specific course.

$\sigma_{\text{courseID} = 305} (\text{Student\_course}) \bowtie \text{Student}$

- List all courses taught by a specific instructorID = 202

$\sigma_{\text{InstructorID} = 202} (\text{Teaches}) \bowtie \text{Course}$

- Find all instructors teaching in a specific department = 'Computer Science'

$\sigma_{\text{Department} = \text{'Computer Science'}} (\text{Instructor}) \bowtie \text{Teaches} \bowtie \text{Course}$