University of Central Punjab
Faculty of Information Technology

Introduction to Database Systems
FALL 2024
Assignment-1

CLO #	Course Learning Outcome	Taxonomy Level
CLO2	The students will be able to **analyze** requirements and Design conceptual, logical, and physical database schemas using different data models.	C4

Total Marks: 50

Due Date: November 12, 2023

Instructions:

1. *This is a handwritten assignment. Do the assignment on A4 Pages.*
2. *This is an individual assignment.*
3. *Late submission will cause you to lose 10% per day.*
4. *Copied assignments will get straight ZERO.*
5. *There will be a quiz based on assignment in the same class of the submission date.*
6. *There are 5 questions in total. All questions carry equal marks.*

Question 1

Composite and multivalued attributes can be nested to any number of levels. Suppose we want to design an attribute for a STUDENT entity type to keep track of previous college education. Such an attribute will have one entry for each college previously attended, and each such entry will be composed of college name, start and end dates, degree entries (degrees awarded at that college, if any), and transcript entries (courses completed at that college, if any). Each degree entry contains the degree name and the month and year the degree was awarded, and each transcript entry contains a course name, semester, year, and grade. Design an attribute to hold this information.

Question 2

Consider a CONFERENCE_REVIEW database in which researchers submit their research papers for consideration. Reviews by reviewers are recorded for use in the paper selection process. The database system caters primarily to reviewers who record answers to evaluation questions for each paper they review and make recommendations regarding whether to accept or reject the paper. The data requirements are summarized as follows:

- Authors of papers are uniquely identified by e-mail id. First and last names are also recorded.
- Each paper is assigned a unique identifier by the system and is described by a title, abstract, and the name of the electronic file containing the paper.
- A paper may have multiple authors, but one of the authors is designated as the contact author.
- Reviewers of papers are uniquely identified by e-mail address. Each reviewer's first name, last name, phone number, affiliation, and topics of interest are also recorded.
- Each paper is assigned between two and four reviewers. A reviewer rates each paper assigned to him or her on a scale of 1 to 10 in four categories: technical merit, readability, originality, and relevance to the conference. Finally, each reviewer provides an overall recommendation regarding each paper.
- Each review contains two types of written comments: one to be seen by the review committee only and the other as feedback to the author(s).

Analyze the requirements and design an ER diagram for the above scenario.

Question 3

Part a) Consider the ER diagram shown in following figure for part of a BANK database. Each bank can have multiple branches, and each branch can have multiple accounts and loans.

- List the strong entity types in the ER diagram.
- Is there a weak entity type? If so, give its name, partial key, and identifying relationship.
- What constraints do the partial key and the identifying relationship of the weak entity type specify in this diagram?
- List the names of all relationships.
- List concisely the user requirements that led to this ER schema design.

Justify your Choices.
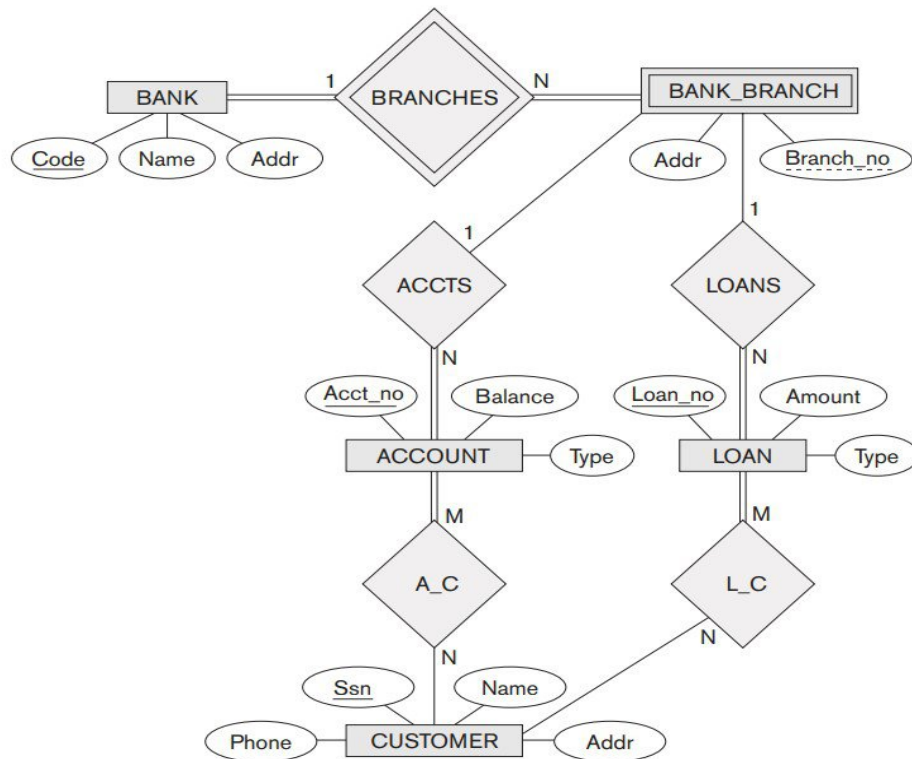
Part b)

Use mapping rules to reduce the ER diagram given in part a to a relational schema. Mention Primary and Foreign keys with proper notations.

Question 4:

Part a)

Why do we make ternary relationship? How to give cardinality ratio in this relationship? Write in your own words.

Part b)

For understanding crow foot notation read the following article. Draw an ER of your choice using crow foot notation.

(For reference: https://www.freecodecamp.org/news/crows-foot-notation-relationship-symbols-and-how-to-read-diagrams/)

Question 5:

Use mapping rules to reduce the ER diagram to a relational schema. Mention Primary and Foreign keys with proper notations.
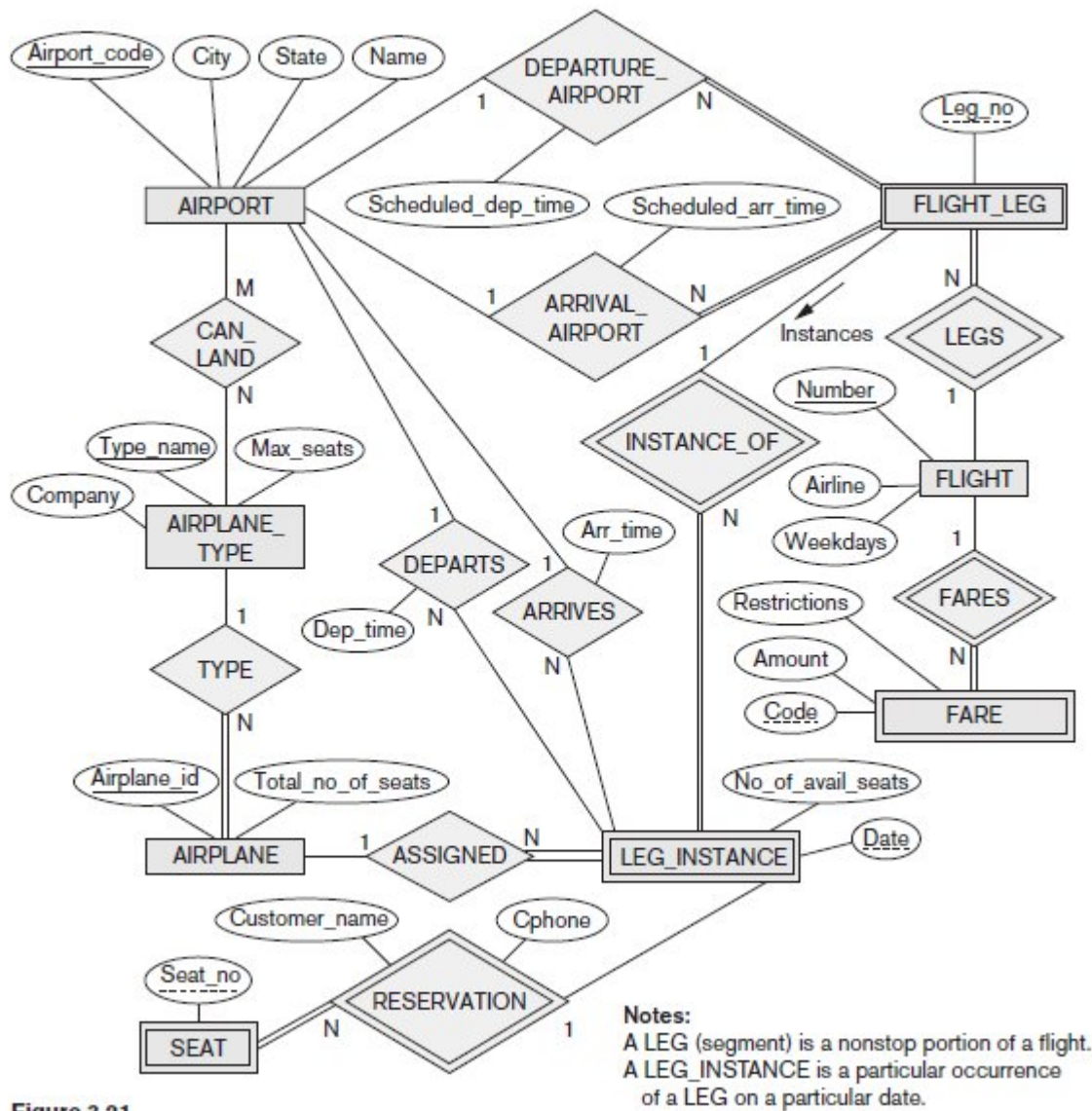

Figure 3.21

Notes:
A LEG (segment) is a nonstop portion of a flight.
A LEG_INSTANCE is a particular occurrence of a LEG on a particular date.

==============================THE END==============================