

CSI 2132 Tutorial 2

Conceptual Modeling: The Entity-Relationship Model

Database Design: Overview

Get Requirements
and Data



Conceptual Model



Logical Model



Physical Model

“Data Modeling Using ER”

Entity-Relationship Diagram

➤ Entities

- Entity Types and Entity Sets
- Strong vs. Weak

➤ Attributes

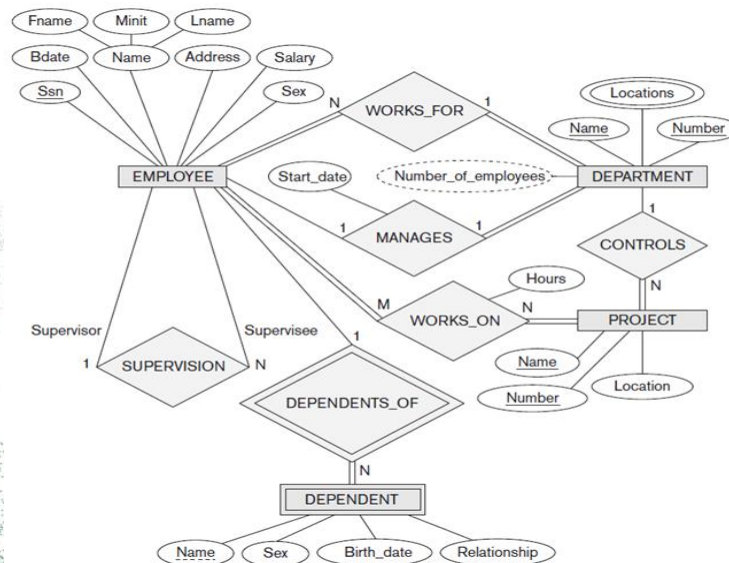
- Key Attributes
- Composite Attributes
- Multi-valued Attributes
- Derived Attributes

➤ Relationships

- Degree and cardinality
- Role names
- Partial vs. Total
- Identifying relationships

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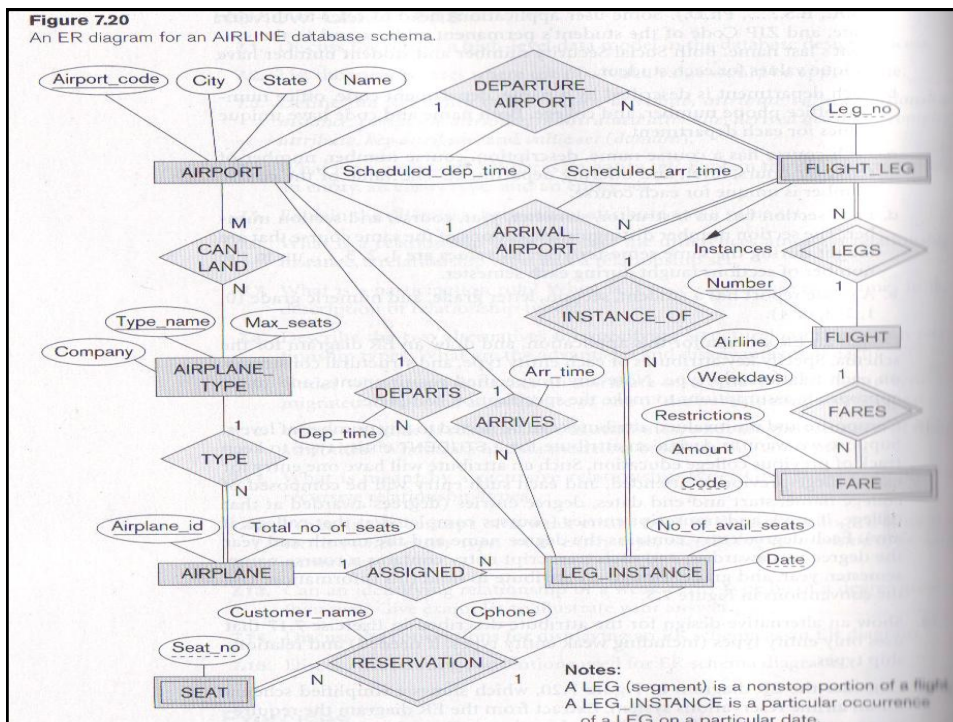


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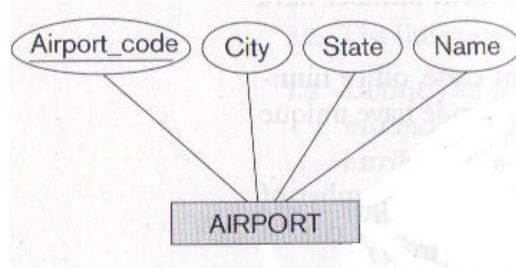
The ER diagram in the next slide shows a simplified schema for an airline reservations system.

Extract from the ER diagram the requirements and constraints that resulted in this schema. Be as precise as possible.

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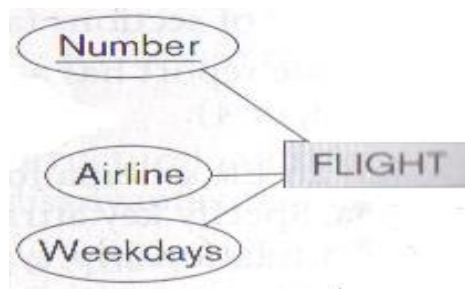
“Data Modeling Using ER”



The database represents each **AIRPORT**, keeping its unique airport code, the airport name and the city and state in which it is located.

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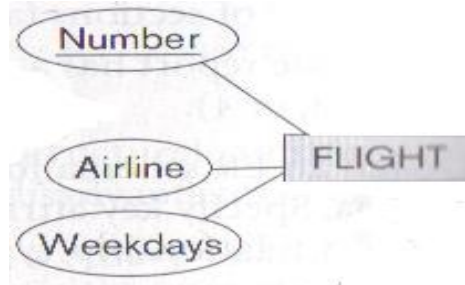
Chapter 7: “Data Modeling Using ER”



Each airline **FLIGHT** has a unique number, the airline to which it belongs and the weekdays on which it is scheduled.

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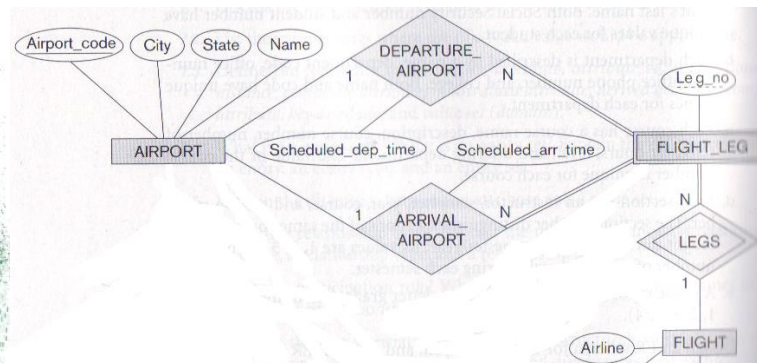
Chapter 7: "Data Modeling Using ER"



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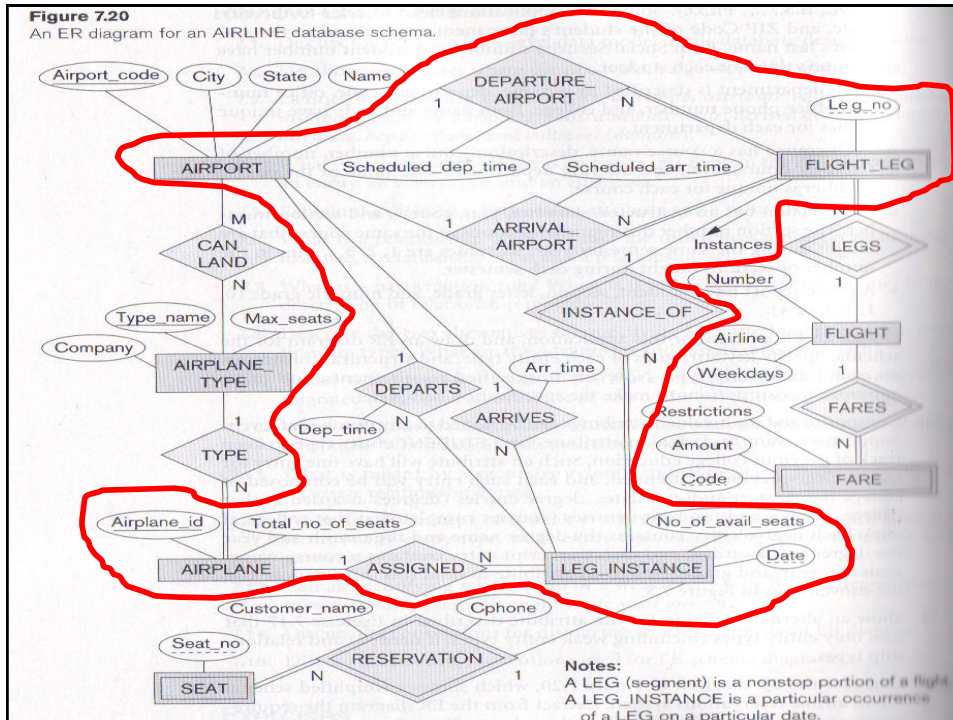
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"Data Modeling Using ER"



A flight is composed of one or more **FLIGHT LEGS**. Each **FLIGHT LEG** has a departure airport and scheduled departure time and an arrival airport and scheduled arrival time.

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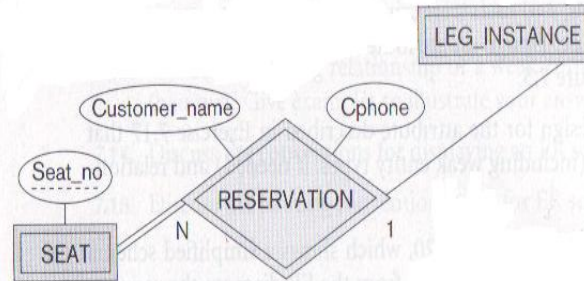


“Data Modeling Using ER”

A **LEG INSTANCE** is an instance of a FLIGHT LEG on a specific date (for example, AC1223 leg 1 on July 30, 2011).

The actual departure and arrival airports and times are recorded for each flight leg after it concludes. The number of available seats and the airplane used in the LEG INSTANCE are also kept.

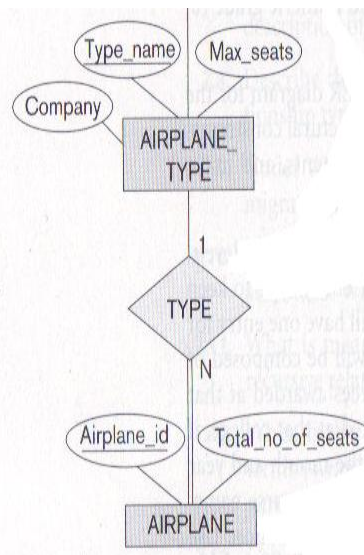
“Data Modeling Using ER”



The customer **RESERVATION** on each leg instance includes the customer name, phone and seat number(s) for each reservation.

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“Data Modeling Using ER”

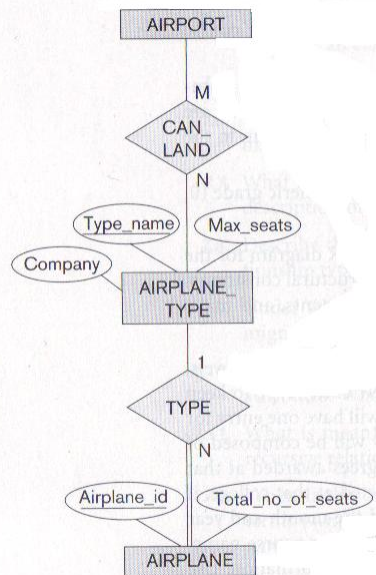


Information on **AIRPLANE**s and **AIRPLANE TYPE**s are also kept.

For each airplane type (e.g. DC-10), the type name, manufacturing company, and maximum number of seats are kept.

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“Data Modeling Using ER”



The airports in which planes of this type can land are kept in the database.

For each airplane, its ID, total number of seats and type are recorded.

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A database is needed to keep track of the teams and games of a sports league. A team has a number of players, not all of whom participate in each game.

The players participating in each game for each team are recorded, as well as the positions they played in that game, and the result of the game.

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Try to design an ER schema diagram for this application, clearly stating any assumptions you make.

Choose your favorite sport (hockey, soccer, football, **baseball** ...)

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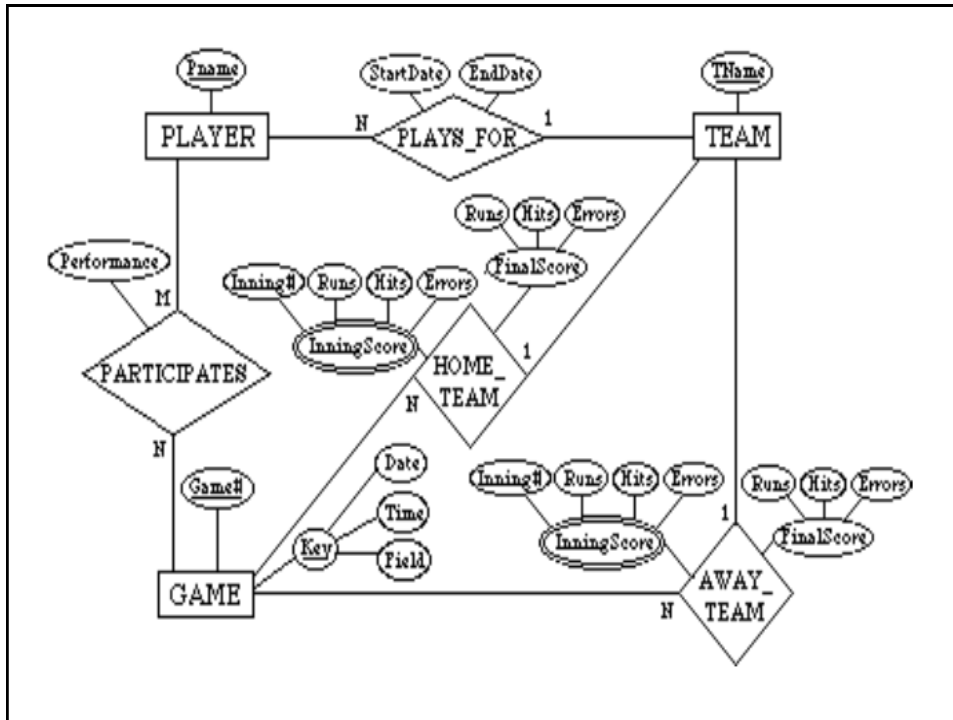


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Assumptions:

- Each game in the schedule is univocally identified by a number and the combination of date, starting time and field.
- The performance of an individual player in a game keeps the information needed for statistics and may be quite complex.

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Consider a **CONFERENCE_REVIEW** database in which researchers submit their papers for consideration. Referee reviews are recorded for use in the paper selection process.

The DB system caters primarily to reviewers who record answers to evaluation questions for each paper they review and make recommendations regarding rejection or acceptance.



“Data Modeling Using ER”

- Paper authors are uniquely identified by their email address. First and last names are also recorded.
- Each paper gets a unique ID and is described by a title, abstract and the digital file containing the paper.
- A paper may have multiple authors. One of them is designated as the contact author.

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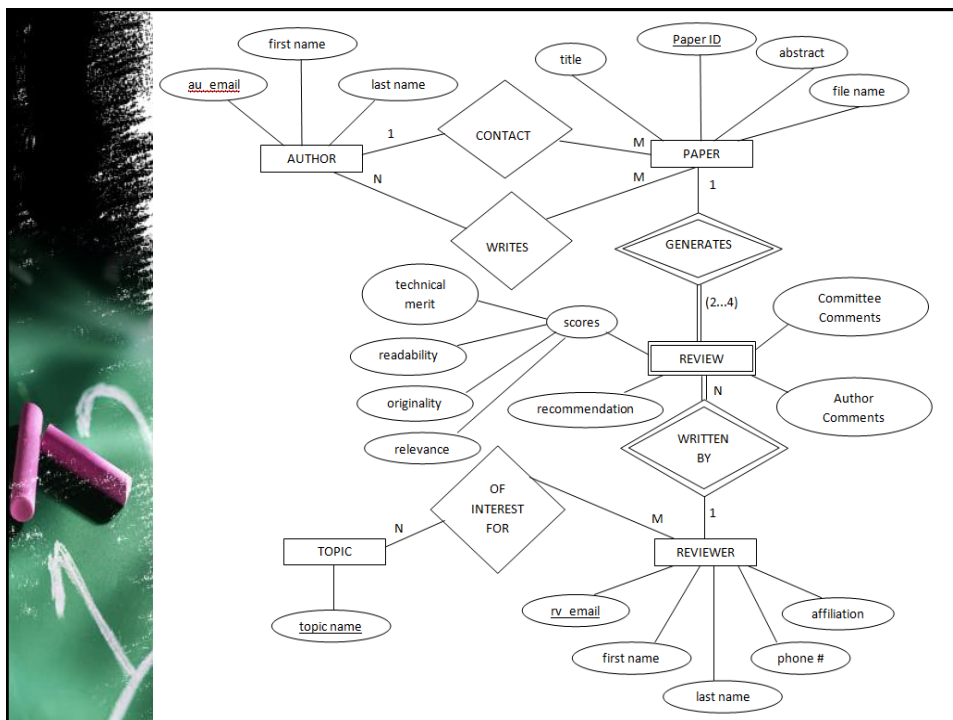
- Paper reviewers are univocally identified by their email addresses. Each reviewer’s first name, last name, phone number, affiliation and topics of interest are also recorded.
- Each paper is assigned between two and four reviewers. A reviewer rates each paper assigned on 1-10 scale in four categories: technical merit, readability, originality and relevance to the conference. An overall recommendation is finally provided.²²

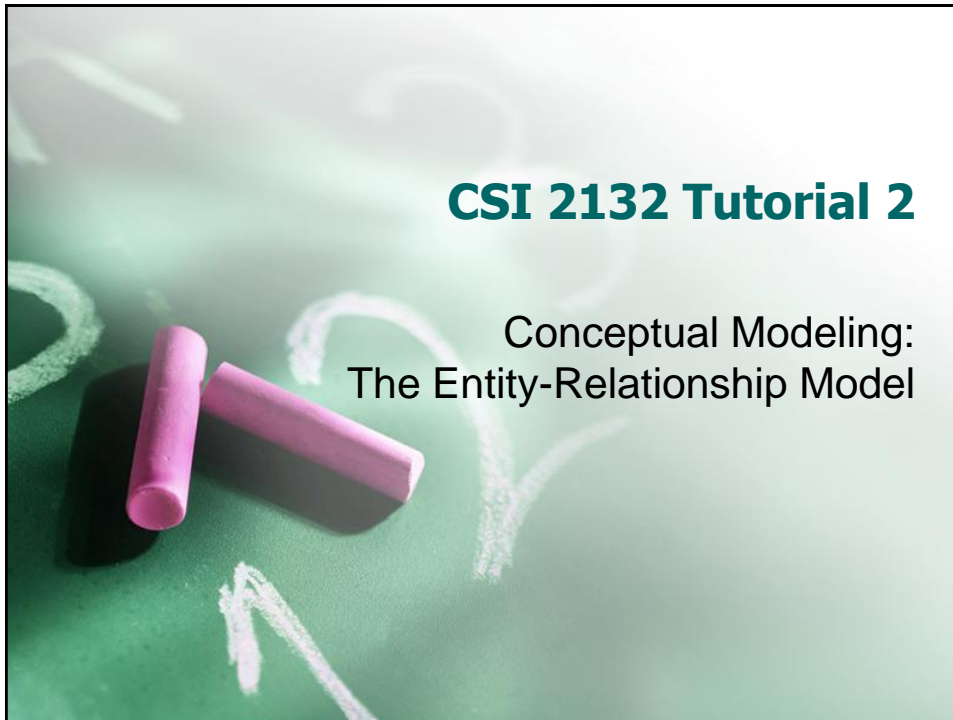
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- Each review contains two types of written comments: one to be seen by the review committee and the other as feedback to the author(s).

Design an ER diagram for the CONFERENCE REVIEW database.

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