Tutorial - Week 3

Objectives:

This tutorial will cover:

I. Entity-Relationship (ER) modelling review
II. Case study – Use a case study to design a conceptual model
III. Convert the conceptual model to a logical relations model
IV. Introduce the notion of physical model – **complete as homework**

Exercises:

1. ER Review – selected concepts

NOTE for students: *This is a brief summary of selected concepts taught in lectures. The lectures contain detailed content related to these and many more key concepts. These notes should be considered quick revision instead of the sole resource for the course material.*

- Entity, weak entity
- Attribute
- Business rules to relationships – key constraints and participating constraints

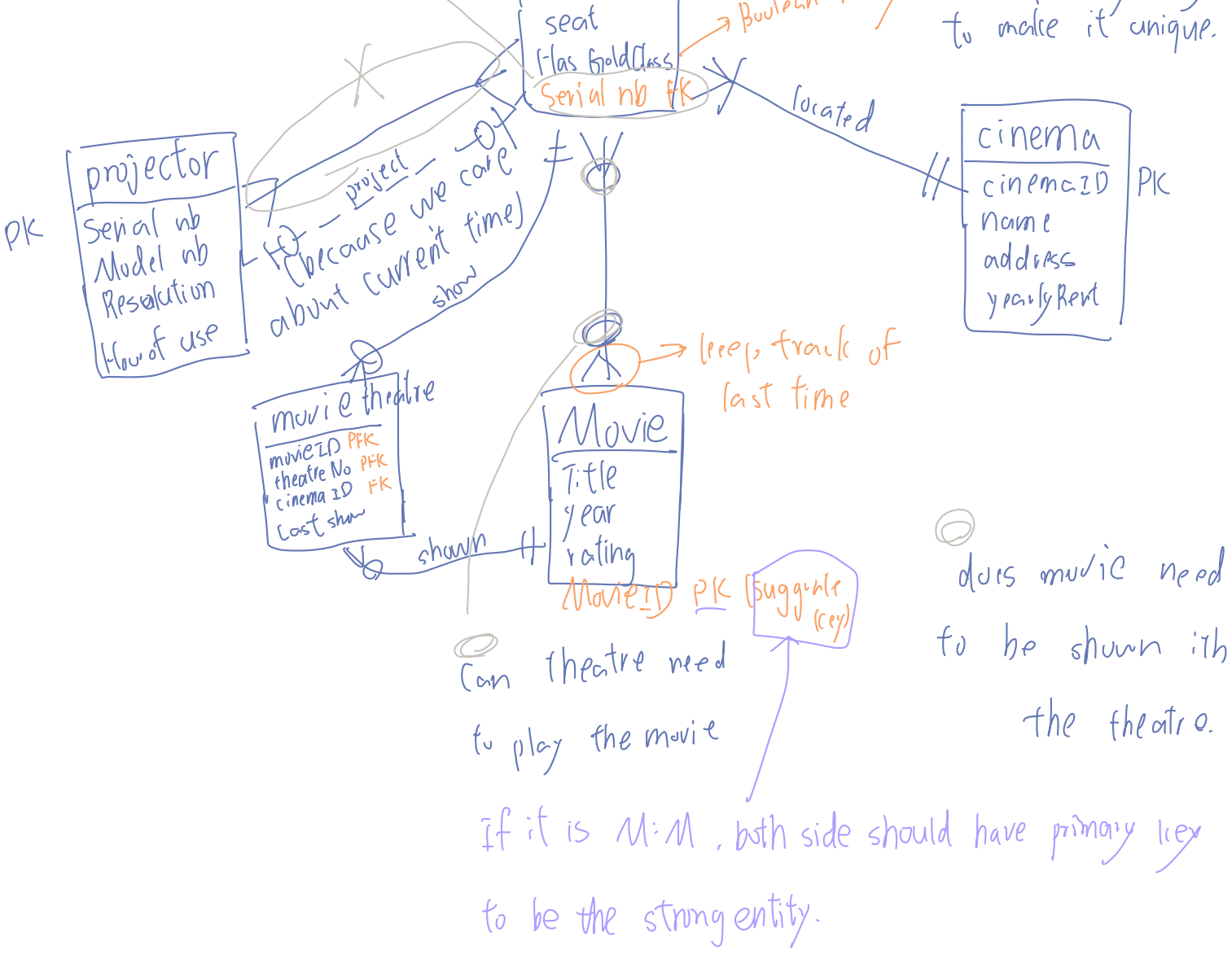
2. Consider the following case study:

A cinema chain operates a number of cinemas. Each cinema has several theatres, numbered starting from 1. The chain keeps track of the size (in meters) and seating capacity of every theatre, as well as whether the theatre offers the Gold Class experience.

The cinema chain owns hundreds of movie projectors – both film projectors (16 mm and 35 mm) and digital projectors (2D and 3D). The cinema chain stores key information about each projector, namely its serial number, model number, resolution and hours of use. Each movie theatre has space for a single projector; technicians must be able to identify which theatre each projector is currently in use.

A wide range of movies are shown at these cinemas. The system should keep track of the last time a movie was shown in a particular theatre belonging to a particular cinema. The marketing department needs to know the movie's title and year of release, along with the movie's rating (G, PG, M, MA15+ or R18+).

Each cinema has a numeric ID, name and address. For cinemas that are not owned outright, the business also keeps track of yearly rent. The system needs to be able to generate weekly activity reports for the chain's chief operating officer.


seat
Has GoldClass
Serial nb FK
Boolean
to make it unique.
projector
Serial nb
Model nb
Resolution
How of use
PK
project
FK
because we care
about current time)
show
located
cinema
cinemaID
name
address
yearlyRent
PK
movie theatre
movieID PFK
theatre No PFK
cinema ID FK
Last show
shown
Movie
Title
year
rating
MovieID PK (Suggorate key)
keep track of
last time
Can theatre need
to play the movie
does movie need
to be shown in
the theatre.
If it is M:M, both side should have primary key
to be the strong entity.

3. TASK. Follow the steps to create a conceptual model in Crow's Foot notation.

You can use draw.io or MySQL Workbench. If you use MySQL workbench, uncheck attribute data types since we do not need them for initial modelling.

Model -> Model Options -> Diagram -> Uncheck 'Show Column Types'

I. Identify the entities
II. Form relationships between entities.
III. Apply constraints (connectivity and cardinality) to the relationships.
IV. Add attributes which describe the entities and choose a unique identifier / PK. Specify FK where applicable.
V. Finalise your model by resolving M:M relationships, verify weak entities, identifying/non-identifying relationships and adding/specifying/verifying FKs and PFKs.

Logical and physical modelling

4. TASK. What needs to be changed to convert a conceptual design to logical relations?
5. TASK. Develop logical relations for the above case study.

HINT: What will you change in the logical model to generate a physical model?

HOMEWORK

6. TASK. Using MySQL Workbench create a physical E.R. model of the case study.