NGEE ANN SCHOOL OF INFOCOMM TECHNOLOGY

Databases	Day **2**
	2 hours
TUTORIAL 4 **Enhanced ER Modelling (Part 1)**	

Learning Objectives

(i) Learn optional and mandatory participation in relationships in ER modeling
(ii) Learn owner (identifying) and weak (dependent) entity in ER modeling
(iii) Learn to do ER modeling based on a given case scenario

ACTIVITIES

Task 1 – Identify Optional and Mandatory Participation in Relationships

In the last tutorial, we introduced the various relationships 1:1, 1:M, M:N. This week, you will be introduced to participation constraints.

Participation constraint specifies whether the existence of an entity instance depends upon it being related to another entity instance in the relationship.

Example 1
In this scenario, potential bike hirers walk into a bike rental firm to rent a bike. This event may be modelled as shown below:

A hirer may or may not hire any bike from the bike rental firm (if there is no bike that suits his needs). If a bike hirer rents a bike, he may rent more than 1 bike for himself and his family members.
A bike may not be hired by any bike hirer.

In this instance, both sides of the relationship are optional.

Example 2

In this scenario, a customer who buys a handphone set from a retail shop will want to have the handphone warranty registered.

The relationship for "Handphone Warranty" to customer is **mandatory** as represented by double lines. Why is this relationship mandatory? _____

Activities – To Do

(i) A toy shop brings in a number of different toys for their potential customers who visit the shop regularly to buy new toys. Model this relationship.

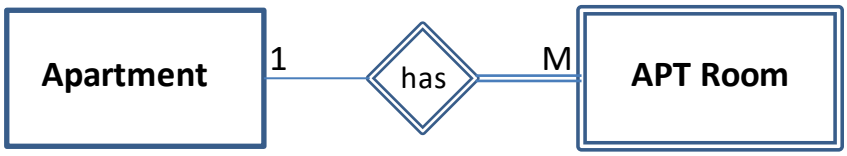
(ii) The same toy shop specially imports premium collectible toys from overseas based on customers' confirmed orders. Model this relationship of customer and imported toys.

Task 2 – Identify owner (identifying) and weak (dependent) entities

Most entities introduced so far are termed as "Regular entity" as they have their own primary key. They are also known as owner entity or identifying entity. There is a class of entities that may not have their own primary key and are termed as "weak entity" or dependent entity.

Example 1

In this scenario, we examine apartments in a private condominium.



An apartment typically has several bedrooms. The bedroom is considered a weak entity as we cannot uniquely identify the bedroom without reference to the particular apartment. At best, we can label the bedroom by number or by its use.

A weak entity is always associated by mandatory participation to its owner entity, and the relationship is shown as a diamond with double lines.

(i) Identify the primary key for the "Apartment" entity: _____

(ii) Identify possible attributes for the weak entity "APT Room" : _____

(iii) What is the partial key for the weak entity "APT Room"? _____

(iv) What is the primary key for the weak entity "APT Room"? _____

Example 2

In this scenario, we examine a typical company like Microsoft which may have a Sales Office in town and a Back Office in another location. Suppose the company adopts an open-office concept with cubicles. Each staff is assigned to a particular office cubicle.

(i) Explain why entity "Office Cubicle" may be modelled as weak entity.

_____

(ii) What attributes will your team attach to this weak entity?

_____

Task 3 – ER modelling on a given case scenario

A. Happy Valley case scenario

Happy Valley is a private luxurious condominium that has ten blocks of different number of levels and facing. Each block has a unique number and a name.

Each block has many units of different built-up area (BUA), different selling price, and a partial key, UnitNo.

The table shows the details.

BlockNo	BlockName	Facing	NoOfLevels	UnitNo	BUA (Sq m)	Price ($m)
1	Hibiscus	NE	15	05-01	125	1.8
1	Hibiscus	NE	15	02-03	130	2.1
2	Orchid	SW	12	03-01	140	2.5
2	Orchid	SW	12	02-03	145	2.7
……						

(i) Identify entities and their corresponding attributes.

(ii) Suggest how each unit may be uniquely or partially identified. Draw the ER model to show the relationship between the two entities derived from the tables.
(Hint: one of them is a weak entity)

B. Forever Young case scenario

Forever Young Boutique keeps information of its all-female staff, such as NRIC number, name, address, date of birth, age, and contact numbers. A unique identification number is assigned to the staff. She is also required to give details of her dependents, such as name, date of birth, order of birth and gender. Staff are allocated to its various branches, for which information such as branch number, branch address and branch manager is being kept. Among the staff are salesgirls who have to report to one supervisor who may oversee more than one staff. Administrative officers may not report to a supervisor but to a branch manager.

(i) Identify and draw the entities separately.
   a. underline the primary and partial keys
   b. indicate the attributes for each entity

(ii) Draw the relationship between the entities.
   a. Indicate the cardinality ratio
   b. Indicate the participation constraints
   c. Name the relationship