CSE2DBF – CSE4DBF

E-R Model Examples

E-R Diagram Case (Real-Estate Agency)

Properties are rented by tenants. Each tenant is assigned a unique number by the agency. Data held about each tenant includes family name, first name, contact address, phone number and property rented. A tenant may rent more than one property at any given time.
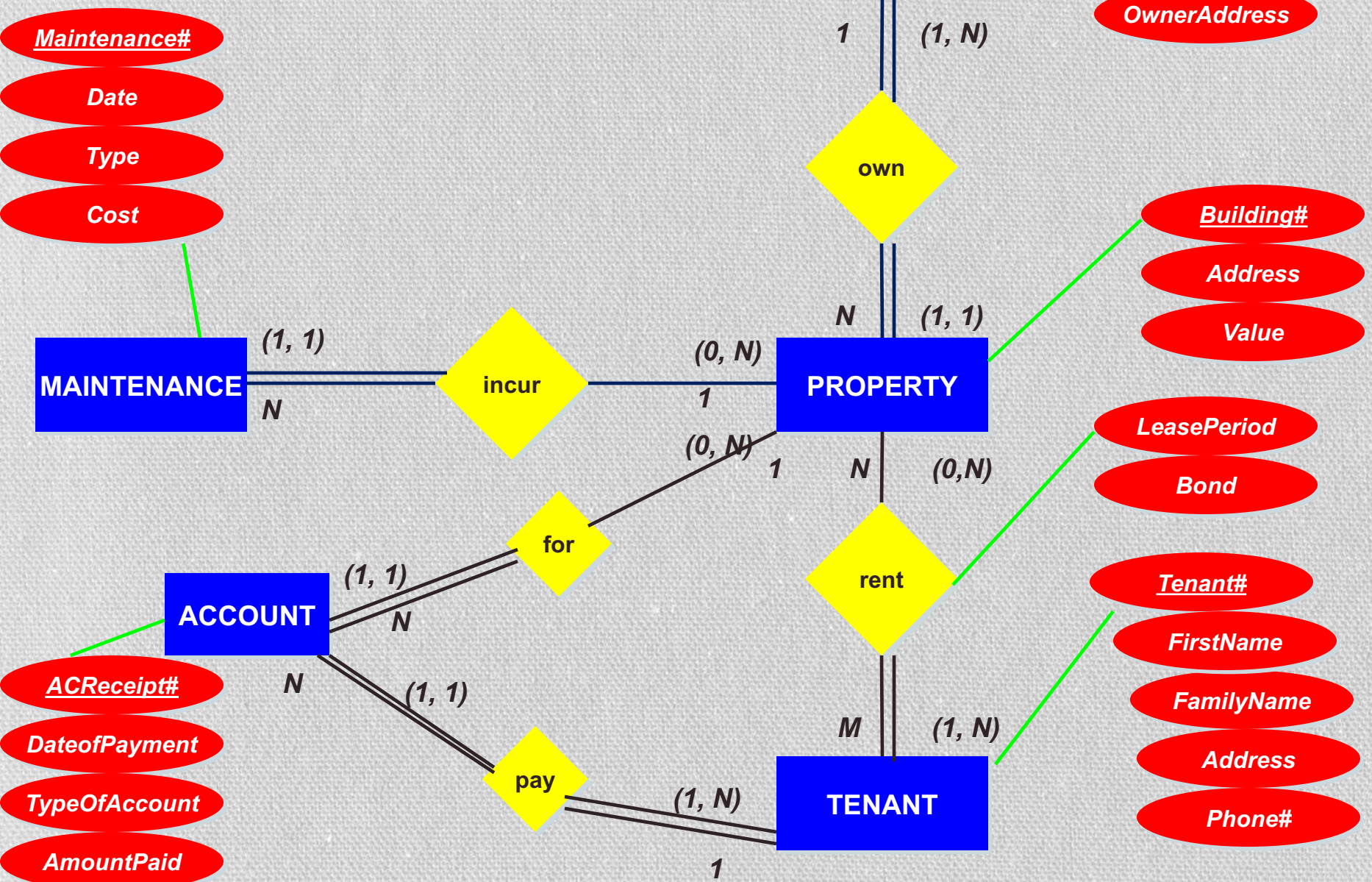
Properties are owned by owners. Each property is assigned a unique building number. The agency only encourages a single owner for any of the properties it handles. The owner, address and value are recorded for each property. In addition, the lease period and bond, are recorded for each property rented. An owner may own several properties.

Regular property maintenance is also recorded. The property, date, type of maintenance and cost are stored. Maintenance costs are charged to the property owner.

Tenants pay accounts to the agency for each property they rent. These consists of date of payment, tenant, property, type of account (rental, Bond or damage) and the amount.
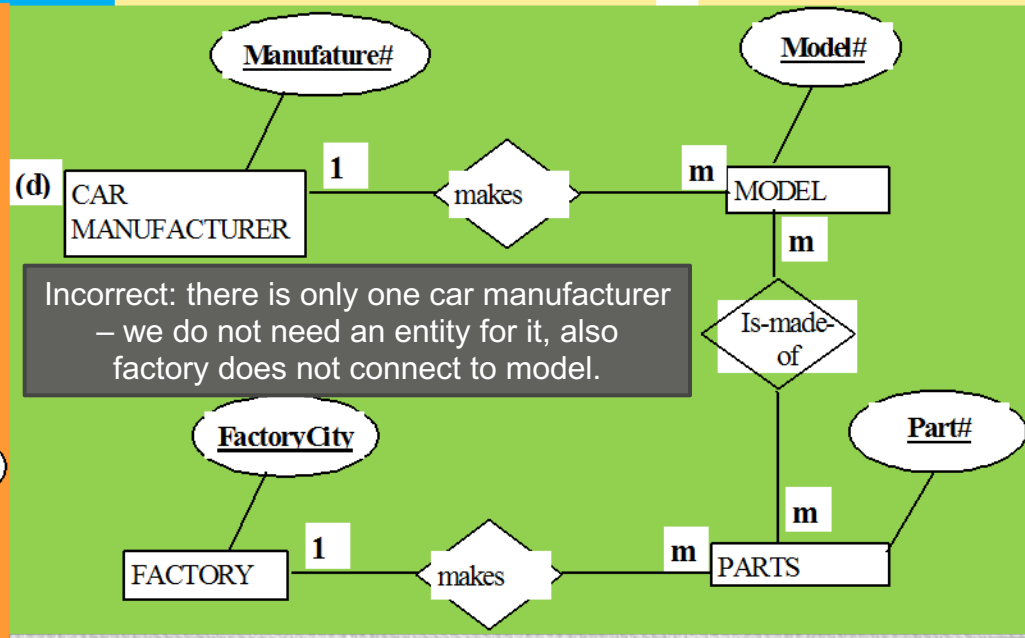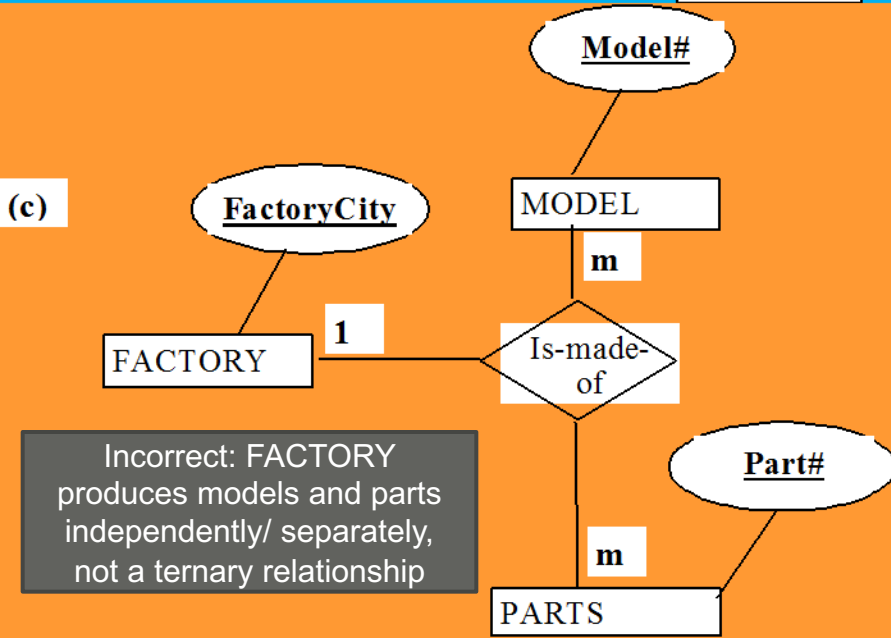
E-R Diagram Case (Real-Estate Agency)

OWNER

- *Owner#*
- *OwnerName*
- *OwnerAddress*

1   (1, N)

own

- *Maintenance#*
- *Date*
- *Type*
- *Cost*

MAINTENANCE

(1, 1)

N

incur

(0, N)

N   (1, 1)

PROPERTY

- *Building#*
- *Address*
- *Value*

1

(0, N)

1

for

(1, 1)

N

ACCOUNT

- *ACReceipt#*
- *DateofPayment*
- *TypeOfAccount*
- *AmountPaid*

N

(1, 1)

pay

(1, N)

1

- *LeasePeriod*
- *Bond*

1   N   (0,N)

rent

- *Tenant#*
- *FirstName*
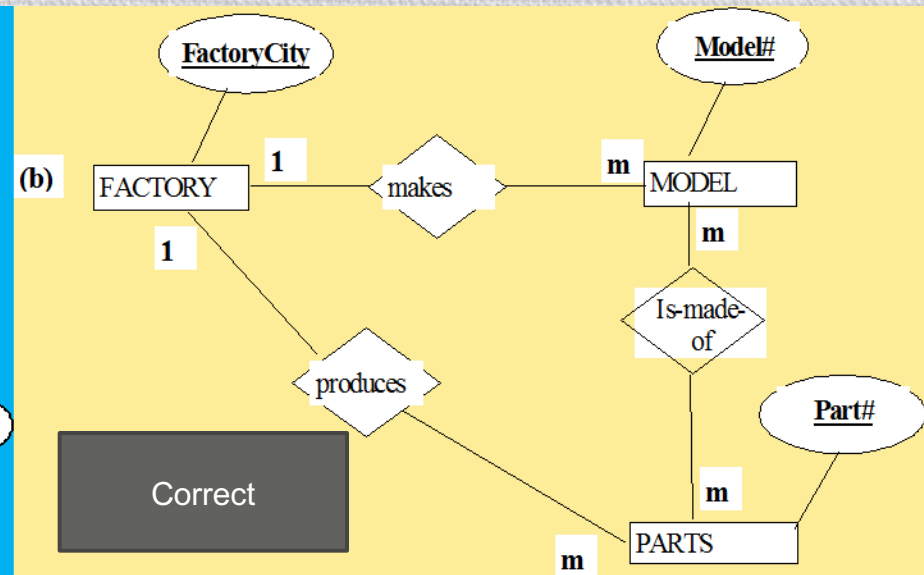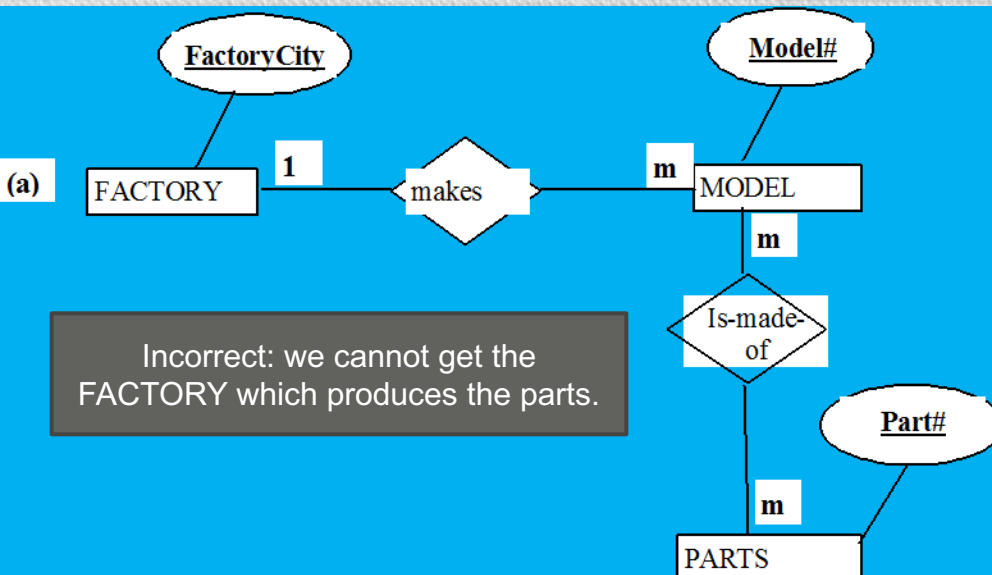- *FamilyName*
- *Address*
- *Phone#*

M   (1, N)

TENANT

E-R Diagram Case (Car Factory)

Extracted from a past test

A car manufacturer makes many models of cars. Each model is made up from many parts and each part may be used in the manufacture of more than one model. Each model of car is produced at just one of the firm's factories, which are located in London, Birmingham, Bristol, Wolverhampton and Manchester – one in each city. A factory produces many models of car and many types of part although each type of part is produced at one particular factory only.

Which of the following ER diagrams correctly represents the above problem statement? (Note that for simplicity, participations have been omitted from the diagrams).

E-R Diagram Case (Car Factory)

(a)

FactoryCity — FACTORY — 1 — makes — m — MODEL — Model#

MODEL — m — Is-made-of — m — PARTS — m — Part#

Incorrect: we cannot get the FACTORY which produces the parts.

(b)

FactoryCity — FACTORY — 1 — makes — m — MODEL — Model#

FACTORY — 1 — produces

MODEL — m — Is-made-of — m — PARTS — m — Part#

Correct

(c)

Model# — MODEL

FactoryCity — FACTORY — 1 — Is-made-of — MODEL — m

Is-made-of — m — PARTS — Part#

Incorrect: FACTORY produces models and parts independently/ separately, not a ternary relationship

(d)

Manufature# — CAR MANUFACTURER — 1 — makes — m — MODEL — Model#

MODEL — m — Is-made-of

Incorrect: there is only one car manufacturer – we do not need an entity for it, also factory does not connect to model.

FactoryCity — FACTORY — 1 — makes — m — PARTS — m — Part#

E-R Diagram Case (Food Plan Database)

Extracted from a past exam

A database on food plan is to be maintained that can store any number of plans. Each plan is given a unique *food plan id*. The *plan-designer* and *plan-creation-date* are stored for each food plan. Each plan may be made up of any number of servings, each of which is given a unique *serving-name*. A *time-of-serving* attribute is stored for each serving within a food plan. A *serving-description* is stored for each serving.

Each serving is made up of any amount of any number of food elements. For example, one particular serving may be made up of 10g of beef, 20g potatoes, 5g of tomatoes, and 3g of peas. A *food-id* is used for each element, and a field *food-description* is stored for each food element.

E-R Diagram Case (Food Plan Database)

To allow the nutritional value of each diet to be computed, nutrient values are associated with each food element, as follows:

•A set of nutrients (eg. VitA, VitB, etc.) is stored with their *unit-of measure* (eg. IU [International Unit] for VitA, mg [milligrams] for VitB, etc.). A *nutrient-id* and a *nutrient-description* are also stored.
•The *nutrient-content* for each nutrient that applies to a particular food is stored for a *standard-amount* of that food.

A patient is assigned a food plan on each day of his or her stay. Only one food plan applies to one patient on the one day, but patient may have different food plans on different days. A *patient-id* and *patient-details* are stored for each patient.

Develop an **ER model** for the above problem definition. The ER should contain necessary information such as entities, attributes, primary keys, relationships, cardinalities, and participation. Any assumptions should also be stated.

E-R Diagram Case   (Food Plan Database)
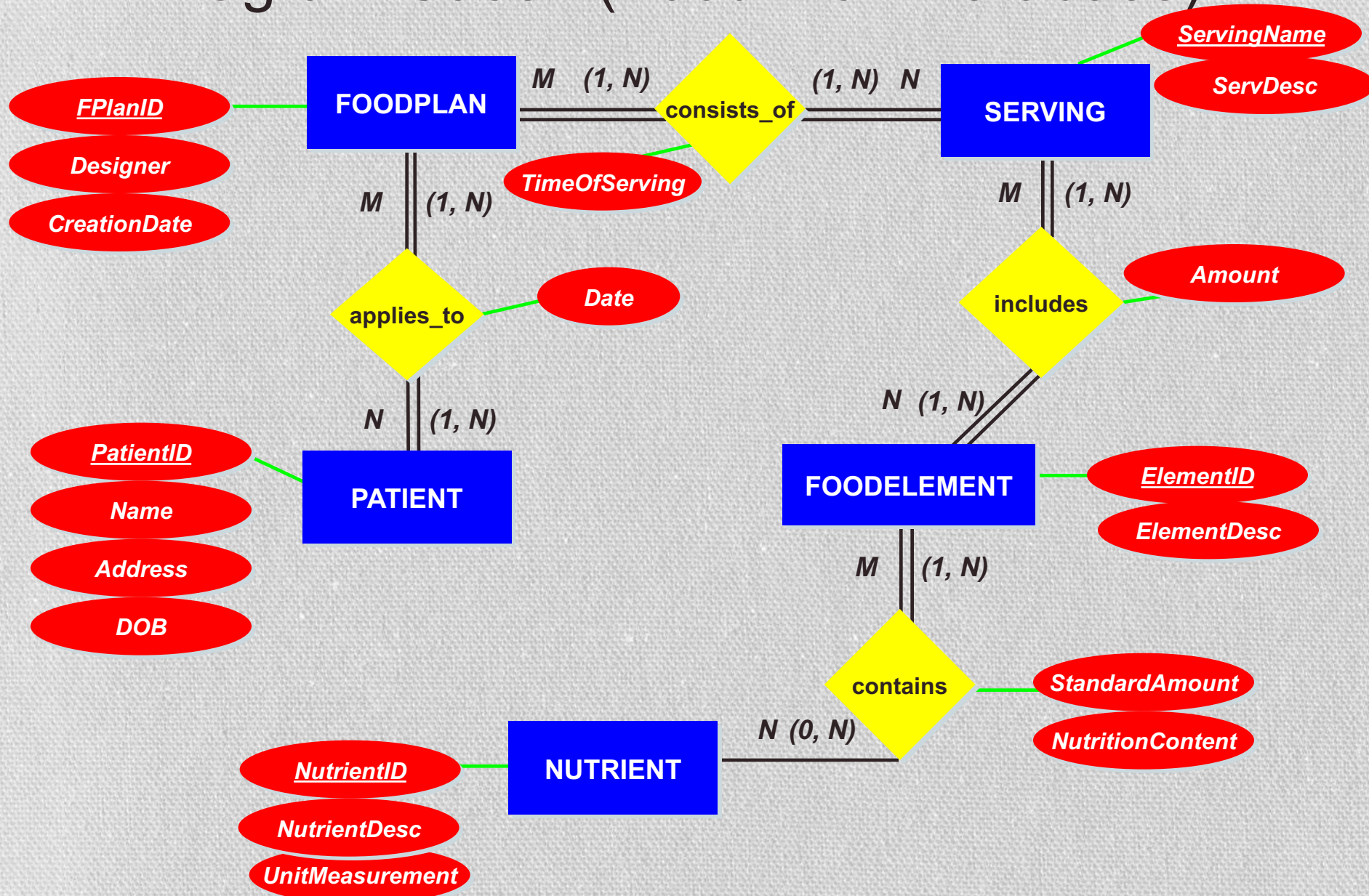
Next Lecture

Relational Database Design