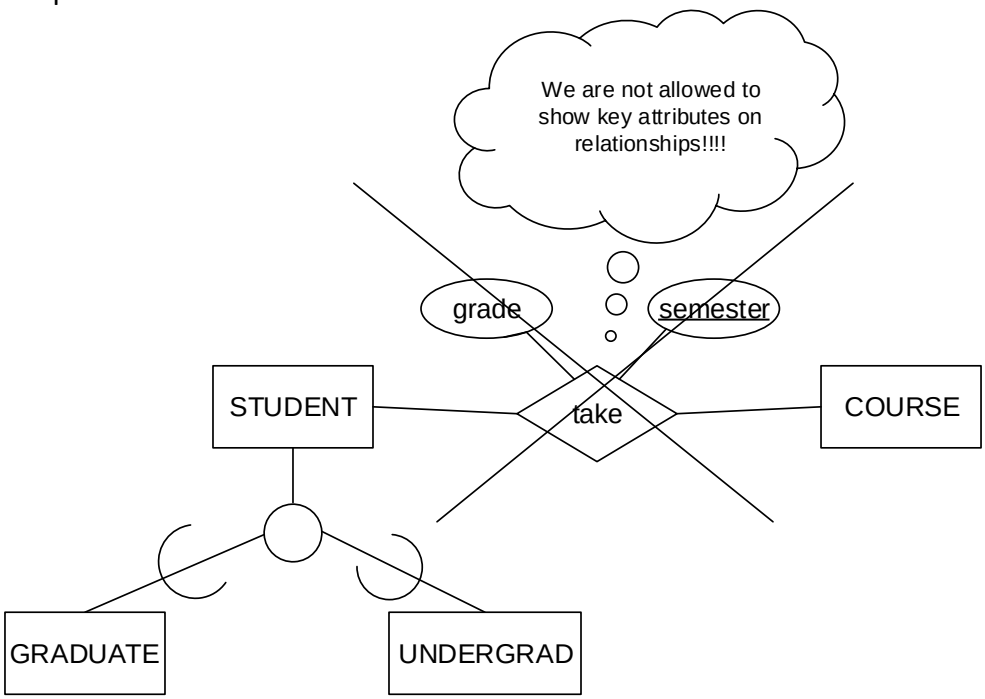
ITEC212 –Lecture Session– 16-APR-2020

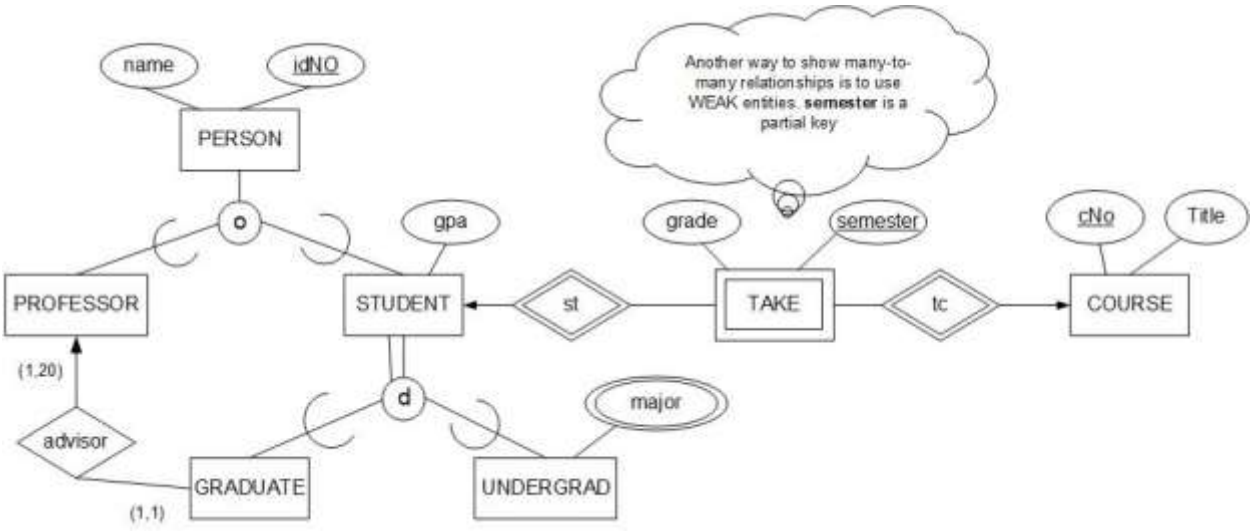
STUDENTS	
stdID	Name
101	Ali
102	Ayşe

COURSES	
ccode	Title
ITEC212	DBMS
ITEC243	OOP
ITEC315	SAD

101 takes **ITEC212** and receives B in 2019-2020 FALL Semester
101 takes **ITEC243** and receives F in 2019-2020 FALL Semester (FAILED. That is why he has to repeat the course)
.
.
.
101 takes **ITEC243** and receives **C** in **2019-2020 SPRING** Semester
Many-Many relationships become a NEW table in the Relational Model. This new table's PK will be composite PK, where we combine the PKs of both sides. In our example the combination of (stdid and ccode) must be unique. However, we have repetition for PK since the students have right to repeat the courses in different semesters!!! This means that, Composite PK (stdid+ccode) is violated!!! We need to add some other attributes that will make the PK unique…



The Solution to Practice 1 (Last slide in Lecture 3)



Relational Model

First Phase in DB Design is (Conceptual View)→ Data Modelling, Using some graphical shapes to model data. We draw Entity-Relationship Diagram (Chen Notation). We show identifiers of Entities!!!!

Second Phase (Logical View)→ Relational Model, where we convert ERD to Relational Schema (Set of TABLEs that represent an ERD or entities in a problem)

Relational → Relation =Table= two-dimensional structure consists of rows and columns.

For each relation (table), we must have a Primary Key.

Primary Key enforces entity integrity rule:

Entity integrity rule says that the PK columns must be unique (no repetition) and not null.

Foreign Key enforces referential integrity rule:

Referential integrity rule says that the foreign key column in a table is actually a PK in another table, and can have null values.

RULES:

Every entity (strong or weak or super-entity, sub-entity) becomes a table in the relational schema

The attributes and the identifier of the entities, become columns and PK of the relations (tables).

ONE-TO-ONE relationship

Instructor <-> Department

Assume we have **30** instructors and **10** departments in the University.

Solution1:

Instructors(id, name,dno) –we will know which instructor is the director of which department
dno:references Departments(dno)
Departments(dno, dname)

Solution2:

Instructors(id, name)
Departments(dno, dname,directorId) – we will know the directors of departments
directorId:references Instructors(id)

Question1: Do you think that every instructor has to be director of one department? **NO**

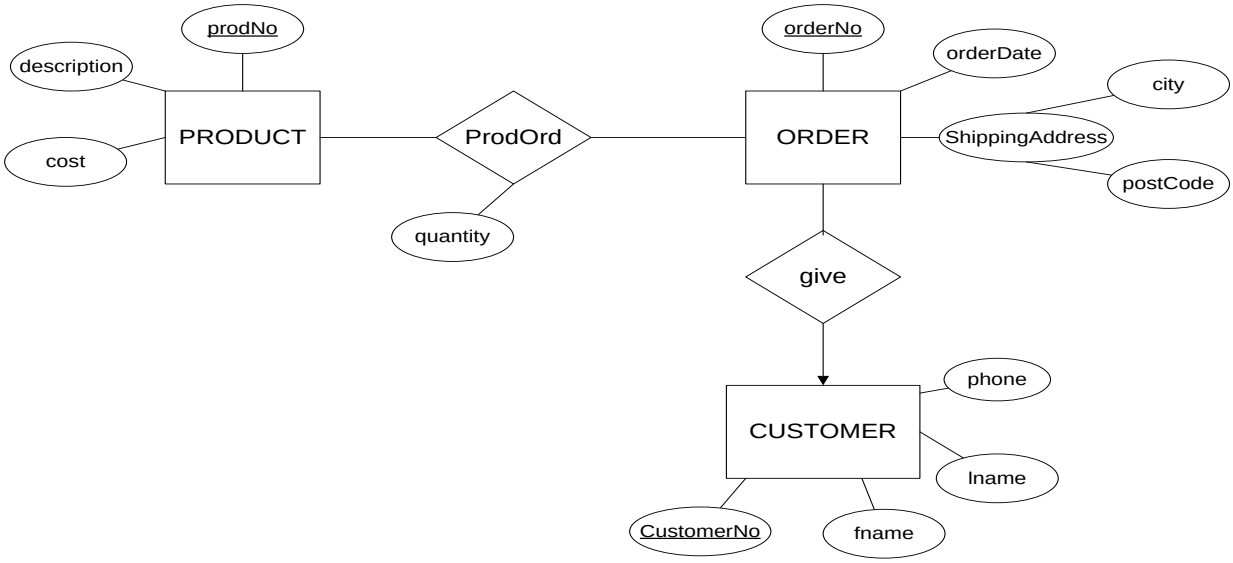
Question2: Do you think that every department must have a director who must be one of the instructors? **YES**

In solution 1: MAX 10 instructors will have value in the “dno” column. 20 NULL values

In solution 2: Since every department must have a director, and we know that there are only 10 departments, then only 10 rows will be included in this table. And all columns will have a value. DirectorId column must have a value. NO NULL VALUES!!!

Solution2 is better than Solution1.

Examples:



Relational Schema

Products(prodNo, description, cost)

Customers(customerNo, fname, lname, phone)

Orders(orderNo, orderDate, city, postcode, custNO)

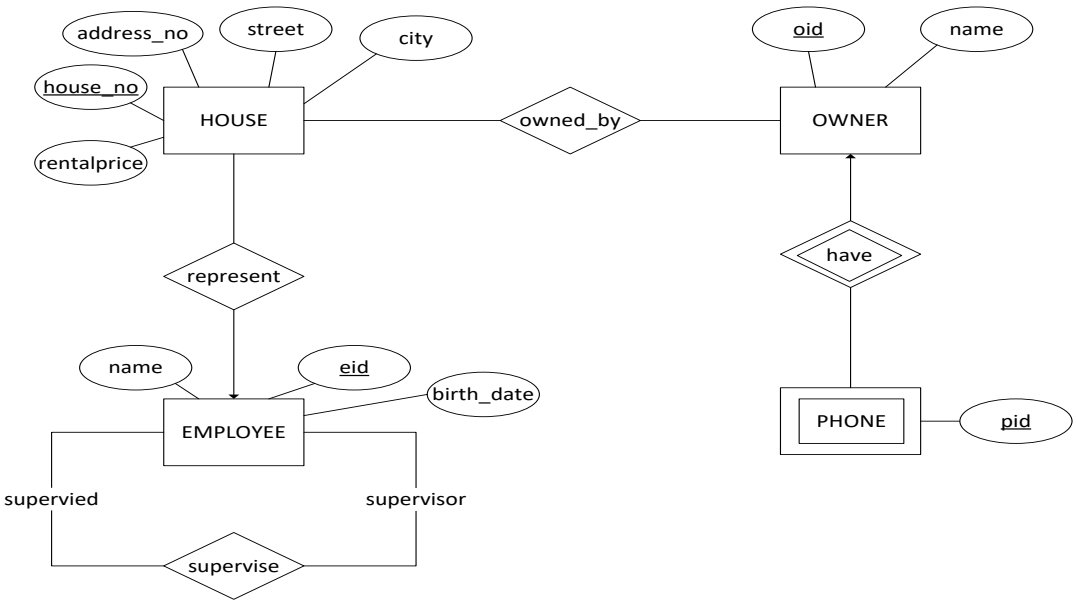
custNo: references Customers(customerNo)

Prodord(prodNo, orderNo, quantity)

prodNo: references Products (prodNo)

orderNo: references Orders(orderNo)

Prodord table has a composite Primary Key (combination of prodNo and orderNo must be unique)



Employees(eid, name, birthdate)

Supervise(supervised_eid, supervisor_eid)

Houses (houseno, address_no, street, city, rentalprice, repId)

repId: references Employees(eid)

Owners(oid, name)

Owned_by(houseno, oid)

Houseno: references Houses (houseno)

Oid: references Owners (oid)

OwnerPhone(pid, oid)

oid: references Owners (oid)