

Relational DataBase Design

أجب اتباع Relational Design (Schema) \rightarrow ER لغز *
اخطوات التالية :-

1- Mapping of Regular (Strong) Entity Types :-

Simple Attr.s خاصية منفردة متعلقة بـ Relation \leftarrow Strong Entity Type \rightarrow 1
• Composite Attr. \rightarrow Simple Attr. \rightarrow 1
• if one + more Relation \sqcup Pk تكرار

- EMPLOYEE

Fname	Minit	Lname	<u>SSN</u>	BDate	Address	Sex	Salary
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- DEPARTMENT

Dname	<u>DNumber</u>
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- PROJECT

Pname	<u>PNumber</u>	PLocation
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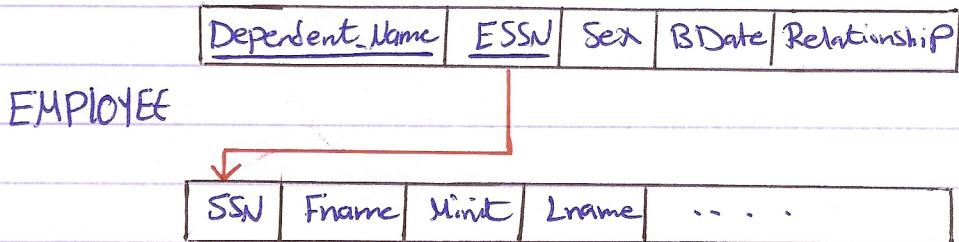
2- Mapping of Weak Entity Types :-

owner \rightarrow Strong Ent. \rightarrow owner \rightarrow weak Entity \rightarrow 1
لديه \rightarrow Weak Entity Type \rightarrow Relation \rightarrow 1 \rightarrow weak
• Composite Attr. \rightarrow Simple Attr. \rightarrow 1 \rightarrow Simple Attr.s \rightarrow 1

mapping like this \rightarrow weak Entity \rightarrow Fk \rightarrow owner \rightarrow Pk \rightarrow 1
• owner \rightarrow weak \rightarrow identifying Relat. \rightarrow 1

• Partial key + Fk \rightarrow Relation \rightarrow Pk \rightarrow 1

- Dependent



ملاحظة :-

الاسم يكون من Pk \rightarrow Fk

3- Mapping of Binary Relationship.

- أحد نوع العلاقة - وبناءً على نوعه نوع

* 1:1 Relationship

نوع 1:1 relationship \leftarrow تكون المكان التي Entity Type is Fk -
نوع 1:1 relationship \leftarrow تكون المكان التي Entity Type is Fk في أي مكان

* 1:N Relationship.

نوع 1:N relationship \leftarrow تكون المكان التي Entity Type is Fk من تأثيرها .

* نصيحة \leftarrow تكون المكان التي Entity Types \rightarrow Relationship \rightarrow Atts.

. Fk

* M:N Relationship

نوع M:N relationship \leftarrow تكون المكان التي Entity Types \rightarrow Pks من تأثيرها .

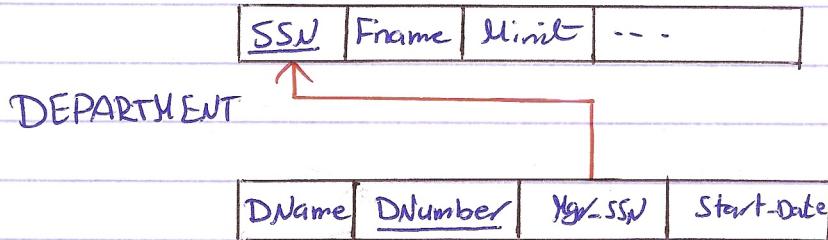
. Fks في العلاقة

. Fks في العلاقة هي عبارة عن Relation \rightarrow Pk - ١

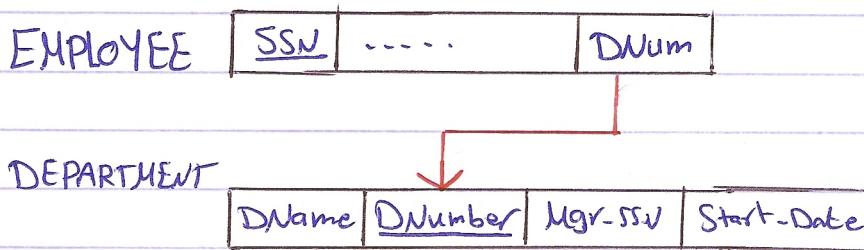
. Relation هي Relationship \rightarrow Atts. نصيحة - ٢

Mapping of COMPANY Relationships :-

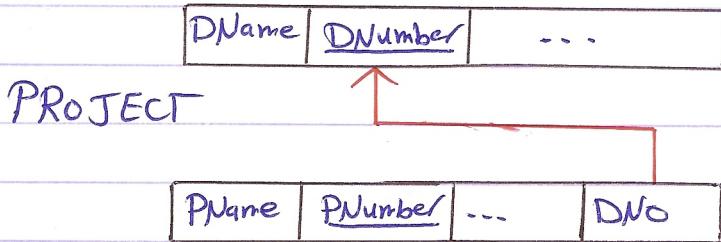
- Manages :
EMPLOYEE



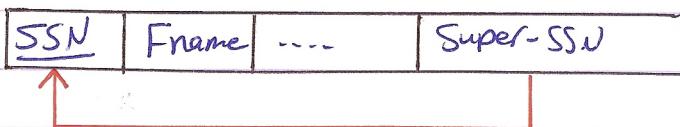
- Belongs -To (Works -For).



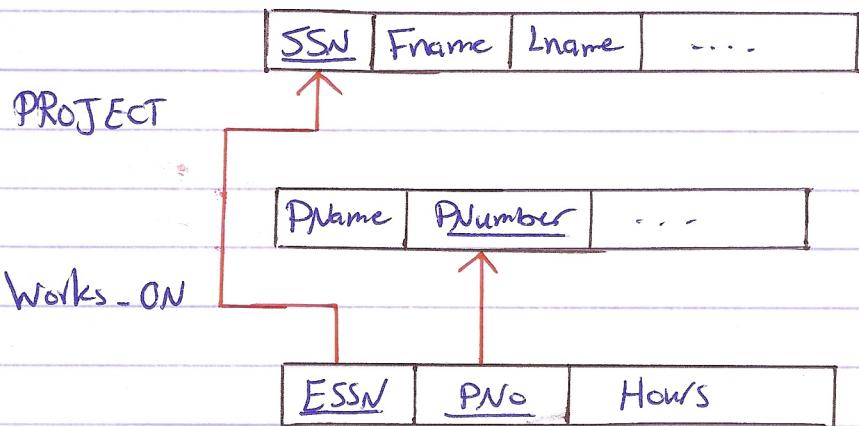
- Controls
DEPARTMENT



- Supervision
EMPLOYEE



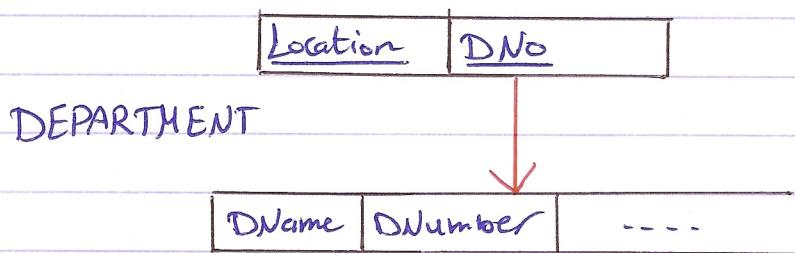
- Works-ON
EMPLOYEE



4- Mapping of Multi-valued Attributes.

Attr. \rightarrow like cities, Multi-valued Attr. \rightarrow exists Relation if -
Relation \in Fk \sqsubseteq Attr. and exists Entity Type w/ Pk cities \in .
Attr. + Fk \rightarrow exists Relation w/ Pk \rightarrow

DEPT-location

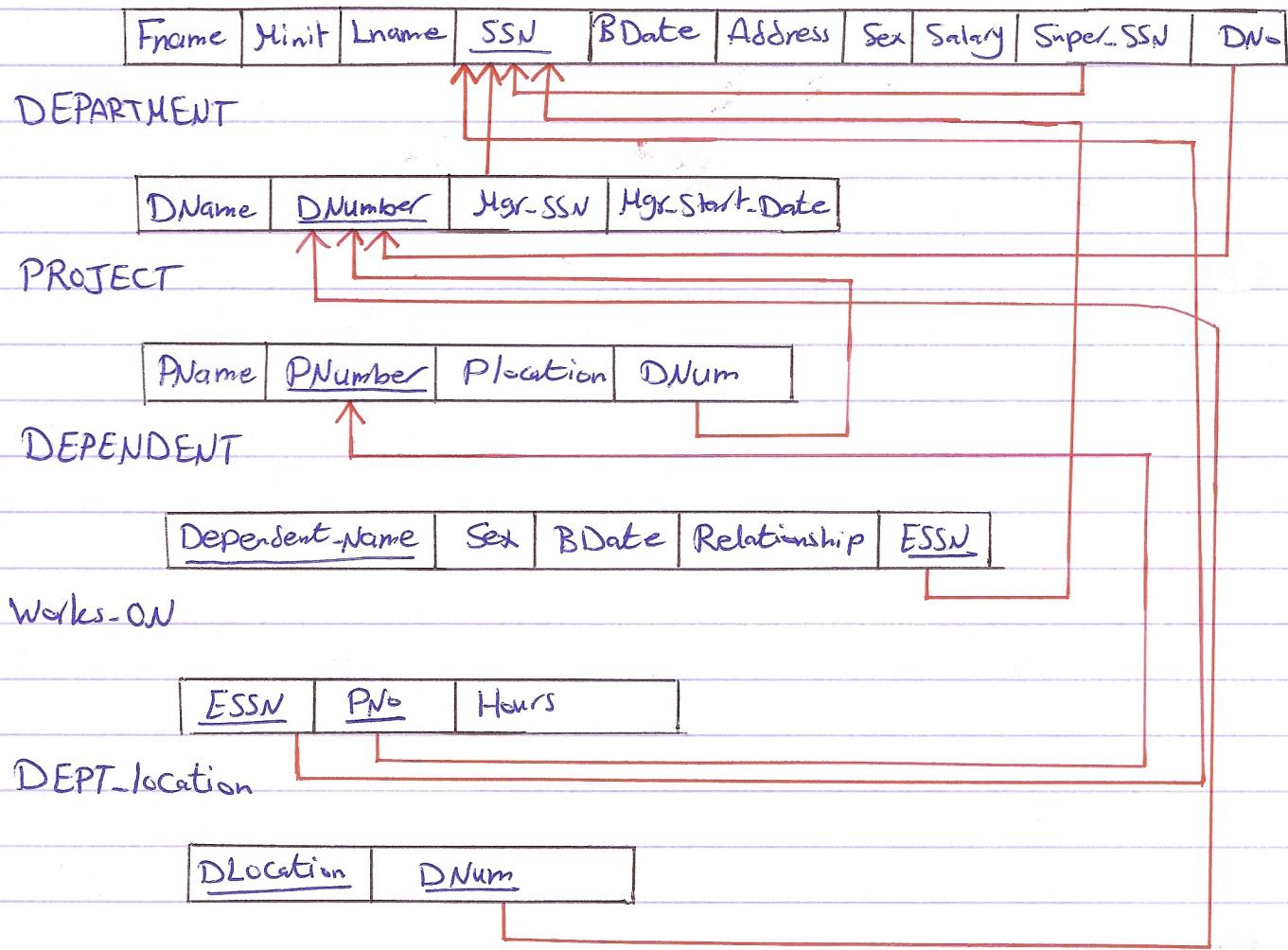


5- Mapping of N-ary Relationships

Relationship Attr. like cities Relationship \rightarrow exists Relation if -
Relation \in Fks \sqsubseteq the relation \in \sqcup Entity Types w/ Pks cities \in .
Fks \rightarrow exists Relation w/ Pk \rightarrow
(4)

COMPANY Relational Design

EMPLOYEE



(5)



Exercises

Exercise 1:

The data requirements for a Human Resources (HR) schema are summarized as follows:

- Each employee has an identification number, name, phone number, e-mail address, salary, and manager. Some employees earn commissions in addition to their salary.
- Each employee has a job, such that each job has an identification code, job title, and a minimum and maximum salary range for the job.
- The company keeps track of the date when the employee hired the job.
- Some employees have been with the company for a long time and have held different positions within the company.
- Each employee is assigned to a department, and each department is identified either by a unique department number or a short name, and has a manager.
- Each department is associated with one location, and each location has a unique id and a full address that includes the street name, postal code, city, state or province, and the country.
- The company is regionally diverse, so it tracks the regions of its warehouses and departments, such that each region has a unique id, a unique name.
- The company records a country id, name and the region where the country is located geographically for each country.
- When an employee resigns, the duration the employee was working (start date and end date), the job identification number, and the department are recorded.

- 1- Draw an ER diagram for the schema. Specify structural constraints on each relationship type.
- 2- Design the relational schema for this application.



Exercise 2:

Design the relational schema for University and Mail-Order Databases in the previous lab.