LECTURE 2

ER-TO-RELATIONAL MAPPING ALGORITHM

Step 1: Mapping of Regular Entity Types

Step 2: Mapping of Weak Entity Types

Step 3: Mapping of Binary 1:1 Relation Types

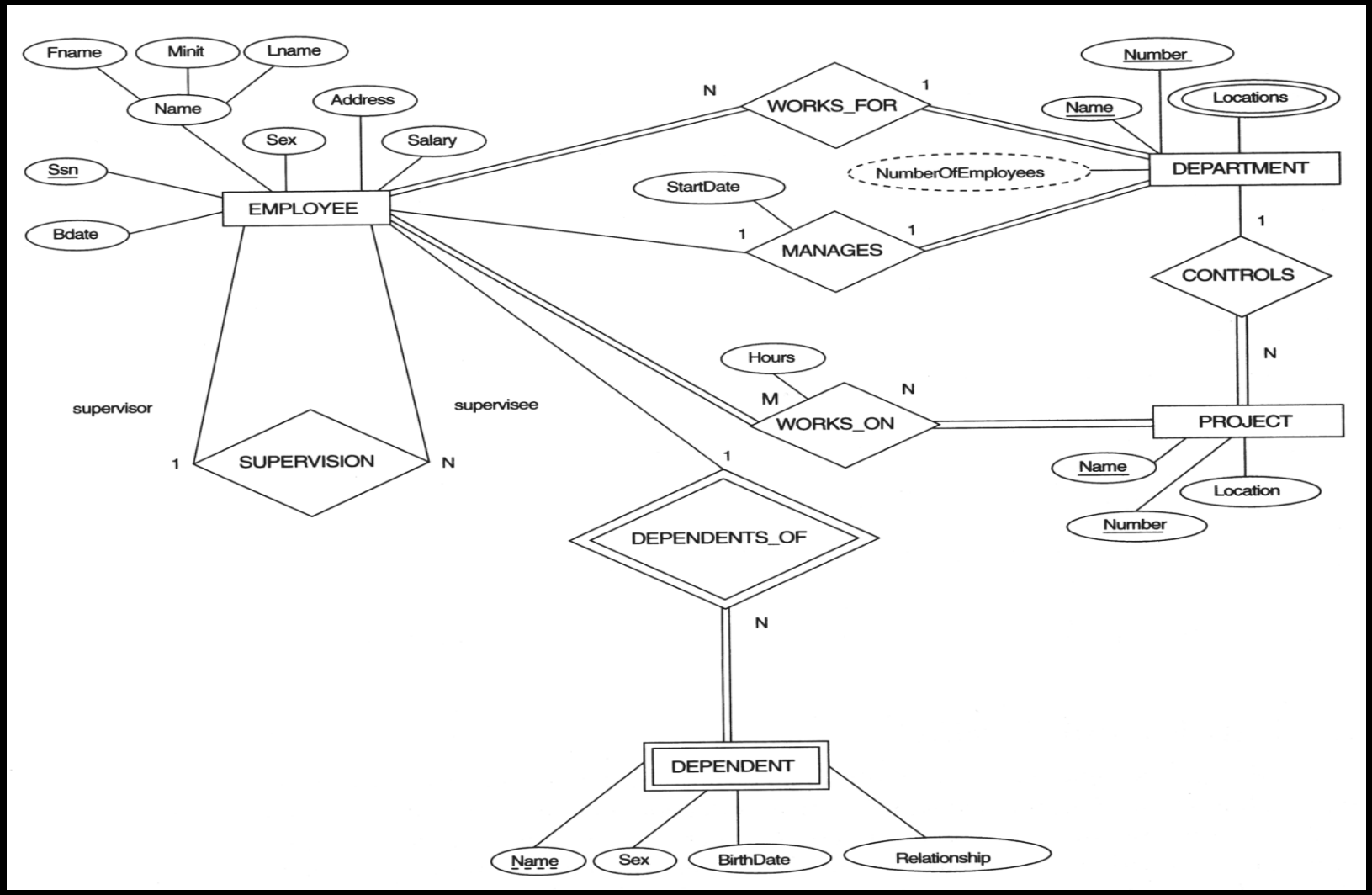
Step 4: Mapping of Binary 1:N Relationship Types.

Step 5: Mapping of Binary M:N Relationship Types.

Step 6: Mapping of Multivalued attributes.

Step 7: Mapping of N-ary Relationship Types.

ER DIAGRAM - COMPANY DATABASE



STEP 1 - MAPPING OF REGULAR ENTITY TYPES

- For **each** regular (**strong**) entity type in the ER schema
  - **Create a relation** R
  - Include all the **simple attributes** of E.
  - Choose **one of the key attributes** of E to be **primary key** for the relation.

STEP 2 - MAPPING OF WEAK ENTITY TYPES

- For **each weak entity type** W in the ER schema with owner entity type E
  - **Create a relation R**
  - Include **all attributes of the weak entity** as attributes of the new relation R.
  - Include the **primary key of the owner entity** as foreign key attributes of R.
- The **primary key of R is the *combination of* the primary key(s) of the owner(s) and the partial key of the weak entity type W**, if any.

STEP 3 - MAPPING OF 1:1 RELATIONSHIP TYPES (1/3)

- For **each 1:1 relationship type**
  - **Identify the entities participating** in the relationship
  - Choose any of the **two possible approaches**
    - **Foreign key approach**
    - **Merged relation approach**

STEP 3 - MAPPING OF 1:1 RELATIONSHIP TYPES (2/3)

Foreign Key approach:

Choose one of the **relations** and **include a foreign key in one relation (S) which is the primary key of the other relation (T).**

It is better to **choose an entity type with *total participation*** in the relationship in the **role of S.**

STEP 3 - MAPPING OF 1:1 RELATIONSHIP TYPES (3/3)

Merged relation option:

Merge the two entity types and the **relationship into a single relation**.

This may be **appropriate** when ***both participations are total.***

STEP 4 - MAPPING OF 1:N RELATIONSHIP TYPES

- For **each regular 1:N relationship type** R
  - **Identify the relation S**, which is the entity **on the N-side of the relationship**.
  - **Include as foreign key in S** the **primary key of the relation which is on the 1 side** of the relationship.
  - **Include any simple attributes** of the 1:N **relation type** as attributes of S.

STEP 5 - MAPPING OF M:N RELATIONSHIP TYPES

- For **each M:N relationship type**
  - **Create a new relation S** to represent the relationship.
  - **Include as foreign key attributes in S the primary keys of the entities on each side of the relationship.** (*The combination of the two primary keys will form the primary key of S*)
  - **Include any simple attributes of the** M:N **relationship** type as attributes of S.

STEP 6 - MAPPING OF MULTIVALUED ATTRIBUTES

- For **each multivalued attribute A**
  - **Create a new relation**.
  - **Include an attribute corresponding to the multi-valued attribute, plus the primary key attribute of the relation that has the multi-valued attribute, K**.

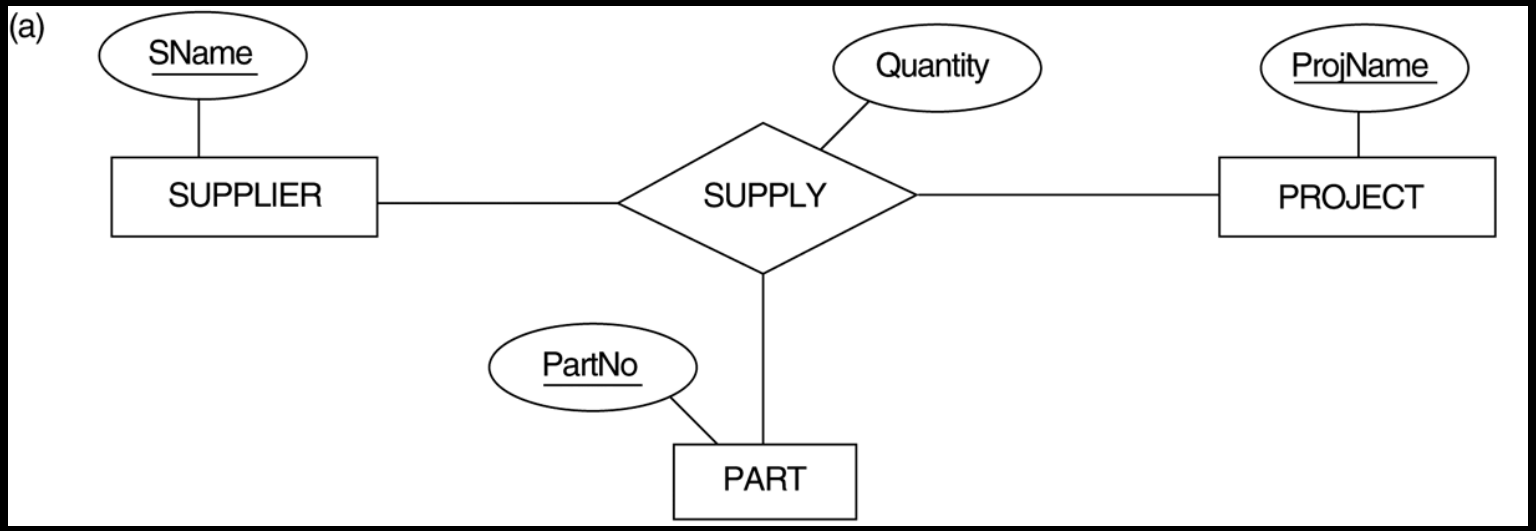
(The primary key attribute of the relation is the foreign key representing the relationship between the entity and the multi-valued relation)

The primary key of R is the combination of A and K.

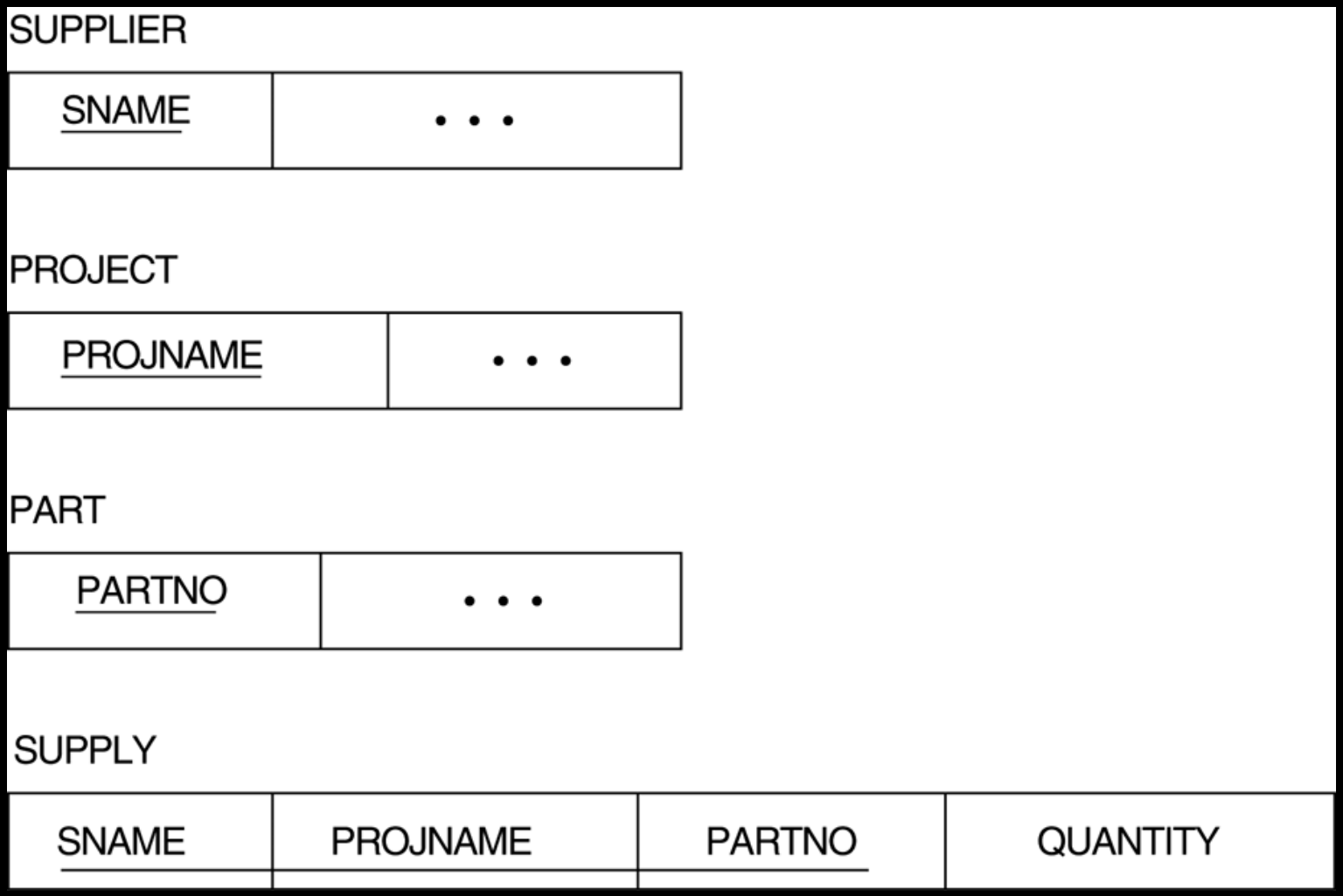
STEP 7 - MAPPING OF N-ARY RELATIONSHIP TYPES

- For **each n-ary relationship type** R (where n>2)
  - **Create a new relation S** to represent the relationship.
  - **Include** as foreign key attributes in S the **primary keys of the relations that represent the participating entities**.
  - Include **any simple attributes** of the **n-ary relationship type** as attributes of S.

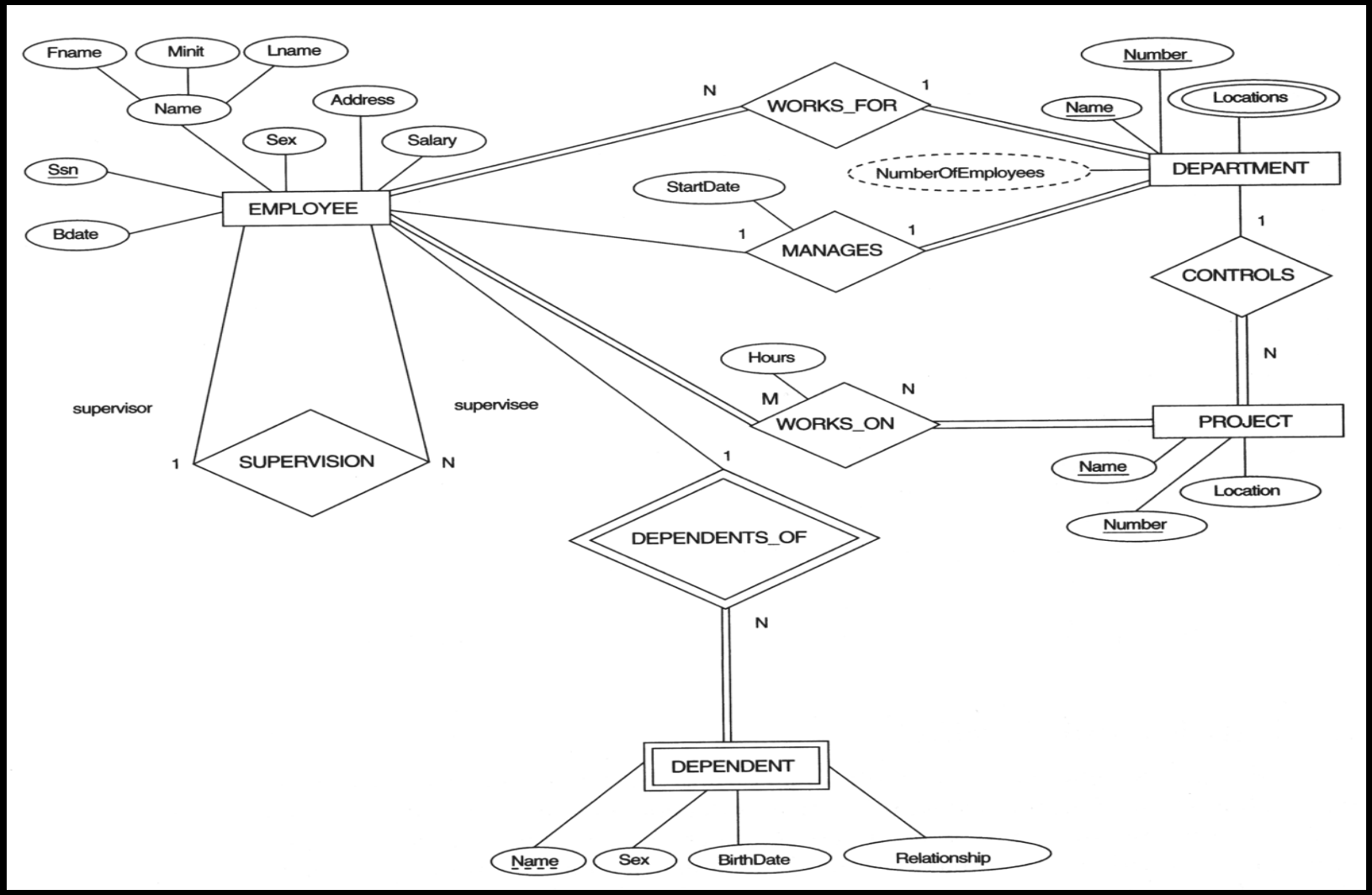
TERNARY RELATIONSHIP TYPES



MAPPING THE *N*-ARY RELATIONSHIP TYPE SUPPLY



ER DIAGRAM - COMPANY DATABASE



SCHEMA DIAGRAM