Information
Technology
Institute

ERD Mapping to Tables

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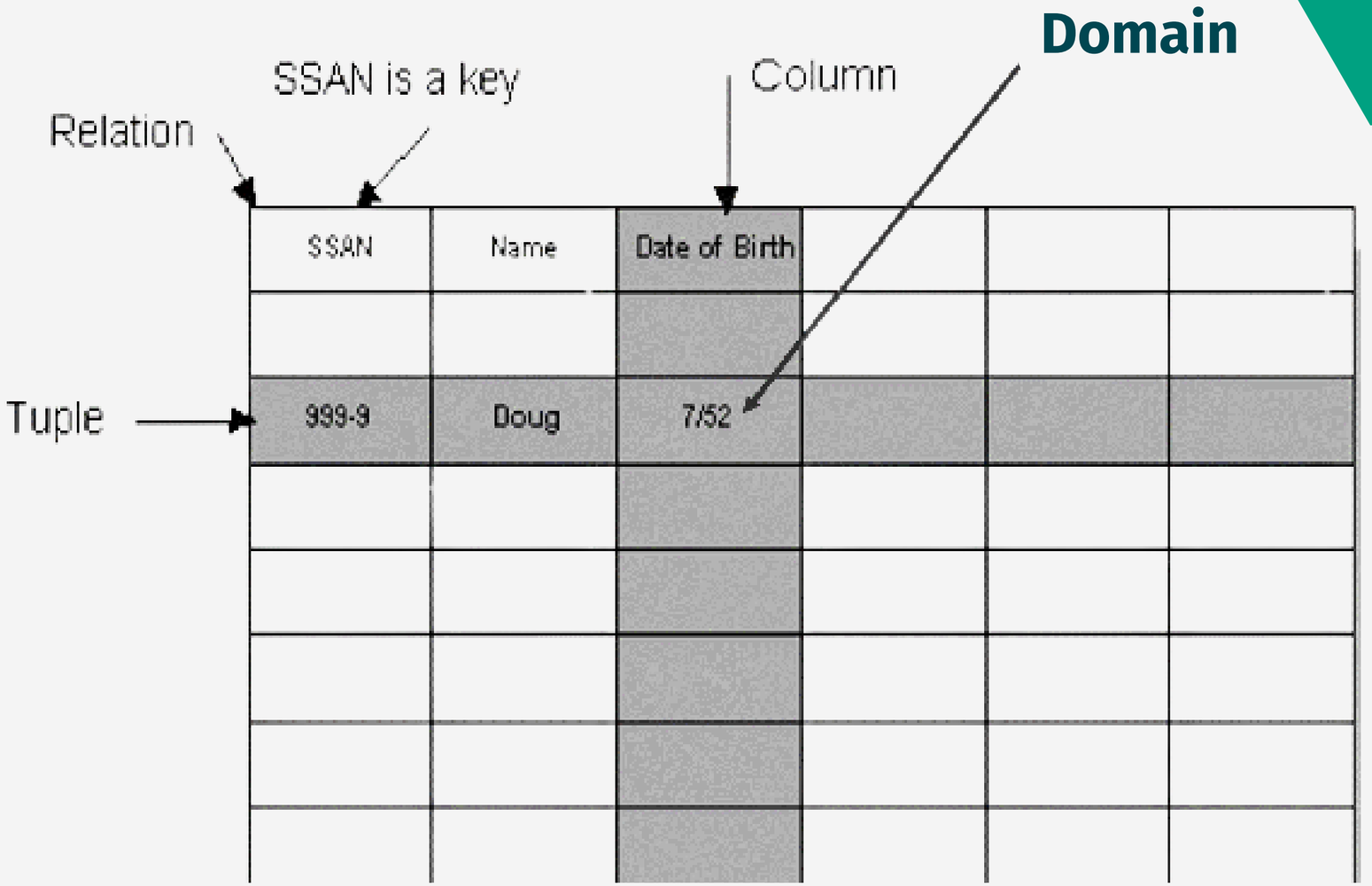
Relational database



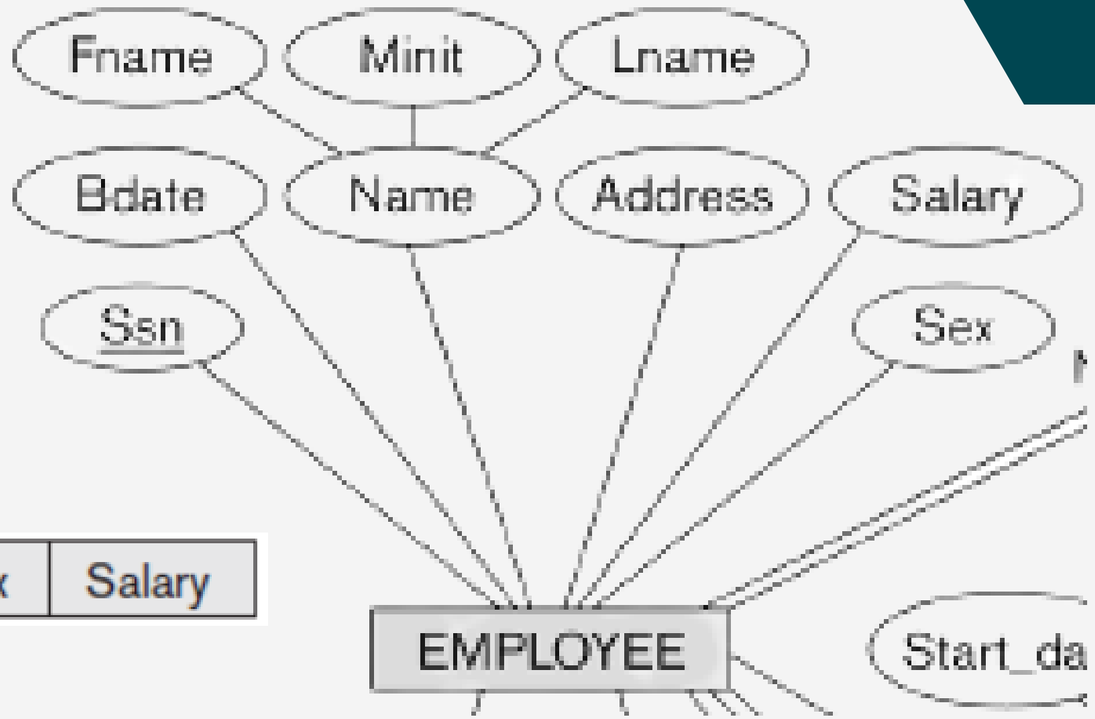
Information Technology Institute

ER to Relational Mapping:

- Mapping of Entity Types
  - Regular Entity
  - Weak Entity
- Mapping of Relationship Types
  - Binary 1:1 Relationship
  - Binary 1:M Relationship
  - Binary M:M Relationship
- Mapping of Multi-valued Attributes

Step 1: Mapping of Regular Entity Types

1. Create table for each entity type.
2. Choose one of key attributes to be the primary key.



Employee Table

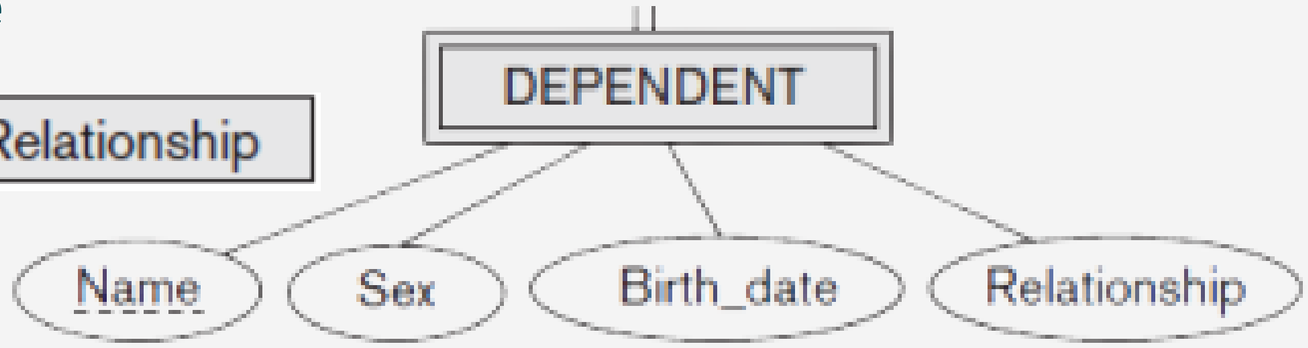
Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary

Step 2: Mapping of Weak Entity Types

1. Create table for each weak entity.
2. Add foreign key that correspond to the owner entity type.
3. Choose the primary key: (FK + weak entity partial PK if any)

Dependent Table

Essn	Dependent_name	Sex	Bdate	Relationship



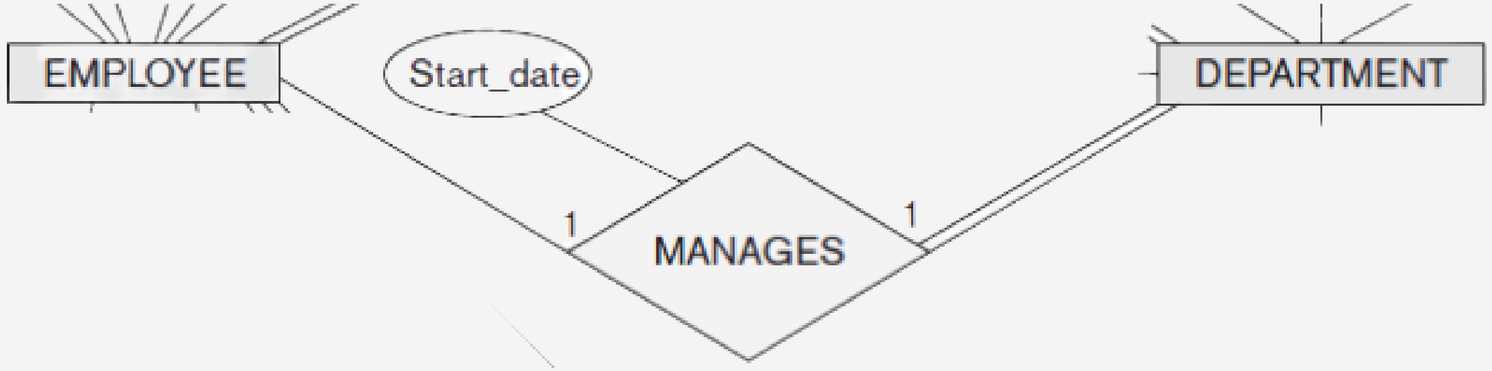
Step 3: Mapping of Binary 1:1 Relationship Types

1. Foreign key approach

- Add primary key of one participating relation as foreign key attribute of the other, which will also represent.
  - If only one side is total, choose it to represent R (why?).
- Declare foreign key attribute as unique.
- Add single-valued attributes of relationship type as attributes of R.

Step 3: Mapping of Binary 1:1 Relationship Types

1. Foreign key approach



EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date

Step 3: Mapping of Binary 1:1 Relationship Types

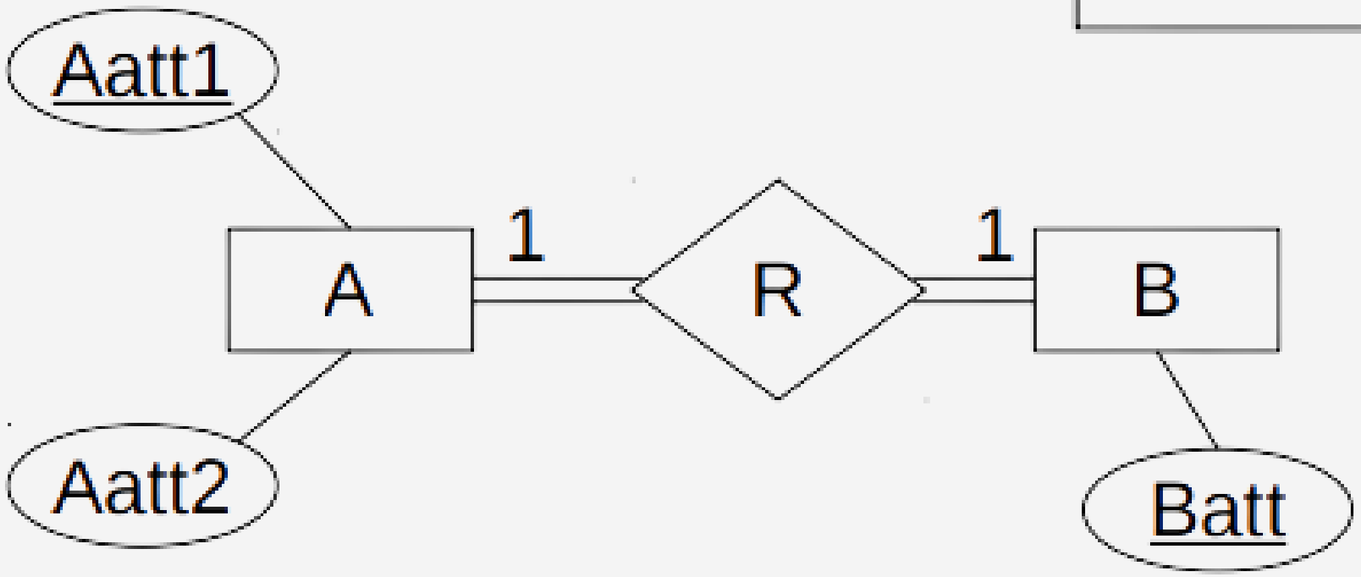
2. Merged relationship approach

- Possible only if both participations are total.
- Combine the two relation schemas into one, which will also represent R.
- Make one of the primary keys unique instead.
- Add single-valued attributes of relationship type as attributes of R.

Step 3: Mapping of Binary 1:1 Relationship Types

2. Merged relationship approach

AB	Aatt1	Aatt2	Batt



Step 3: Mapping of Binary 1:1 Relationship Types

3. Cross reference or Relationship relation approach
(May : May relation)

- Create new relation schema for R with two foreign key attributes being copies of both primary keys.
- Declare one of the attributes as primary key, the other one as unique.
- Add single-valued attributes of relationship type as attributes of R.

Step 4: Binary 1:N Relationship Types

1. Foreign key approach

- Identify relation schema S that represents participating entity type at N-side of 1:N relationship type.
- Include primary key of other entity type (1-side) as foreign key in S

Step 4: Binary 1:N Relationship Types

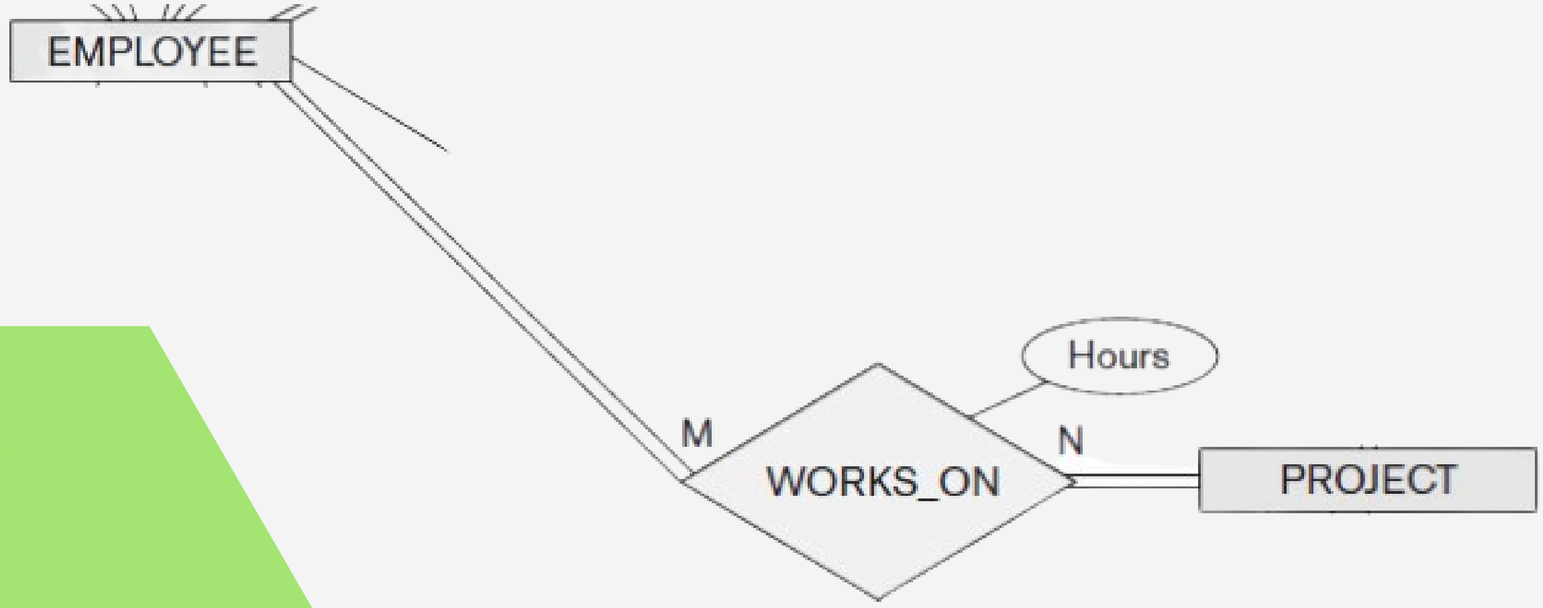
2. Relationship relation approach

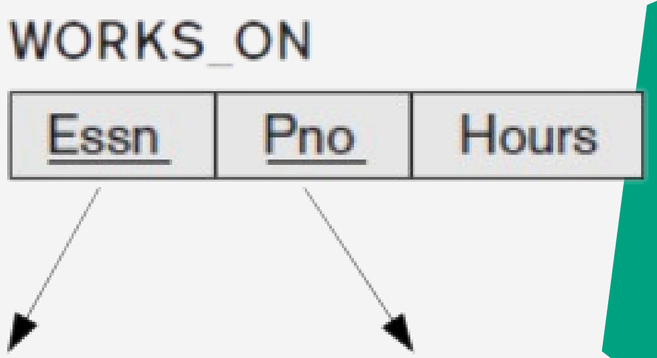
- Create new relation schema for relationship type with two foreign key attributes being copies of both primary keys.
- Declare the foreign key attribute for the relation schema corresponding to the participating entity type on the N-side as primary key

Step 5: Binary M:N and Higher Order Relationship Types

- For each binary M:N relationship type or ternary or higher order relationship type, create a new relation S.
- Include primary key of participating entity types as foreign key attributes in S.
- Make all these attributes the primary key of S.
- Include any simple attributes of relationship type in S.

Step 5: Binary M:N and Higher Order Relationship Types

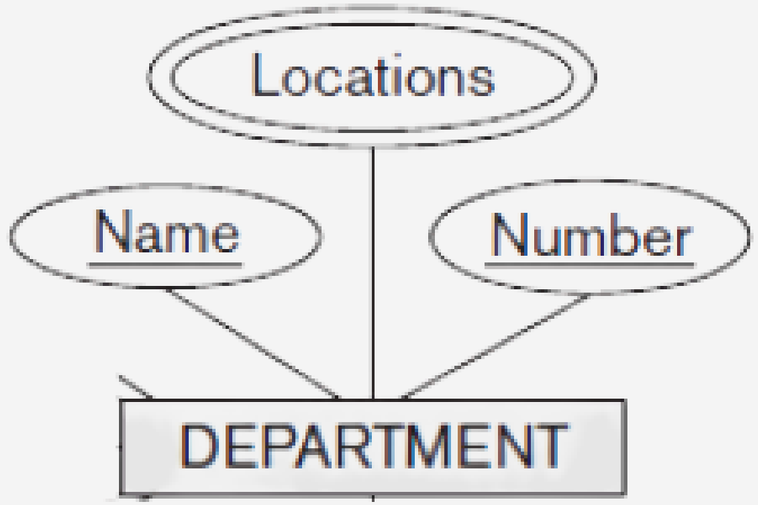


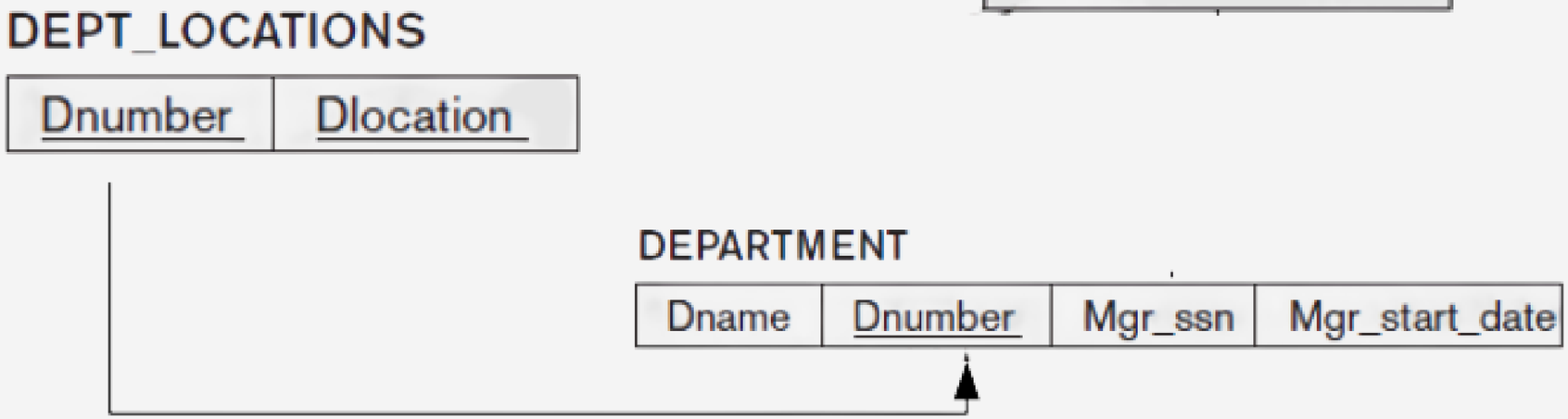


Step 6: Map Multivalued Attributes

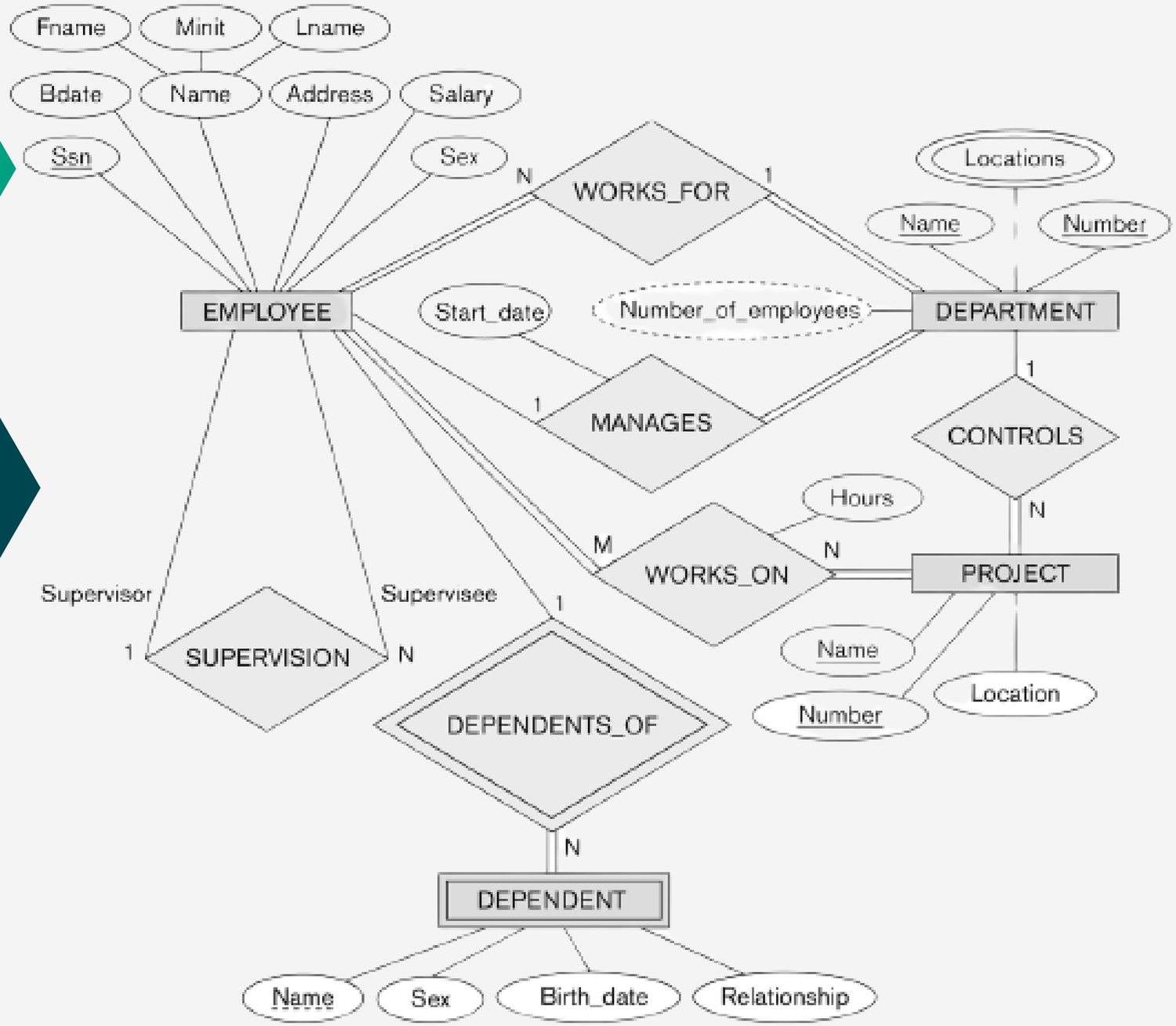
- For each multivalued attribute create new relation R.
- Add attribute to hold multivalued attribute values.
  - If multivalued attribute is composite, include its simple components.
- Add attribute(s) for primary key of relation schema for entity type or relationship type to be foreign key for R.
- Primary key of R is the combination of all its attributes

Step 6: Map Multivalued Attributes

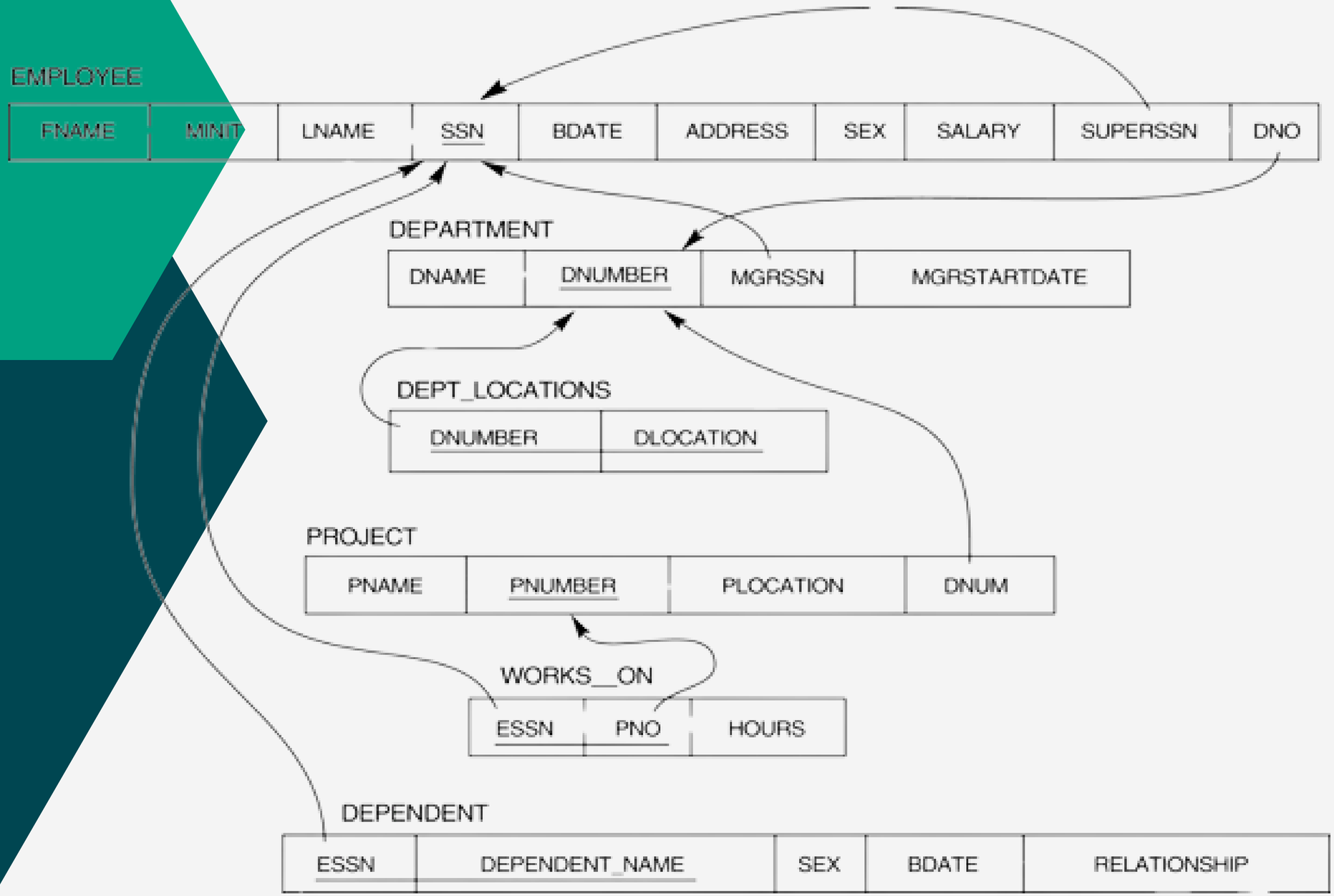




ER Diagram for Employees Schema



Mapping for the ERD



Summary

ER Model	Relational Model
Entity type	Entity relation
1:1 or 1:N relationship type	Foreign Key (or relationship relation)
M:N relationship type	Relationship relation and 2 FKs
n-ary relationship type	Relationship relation and n FKs
Simple attribute	Attribute
Composite attribute	Set of simple component attributes.
Multivalued attribute	Relation and FK
Key attribute	Primary (or Secondary) key

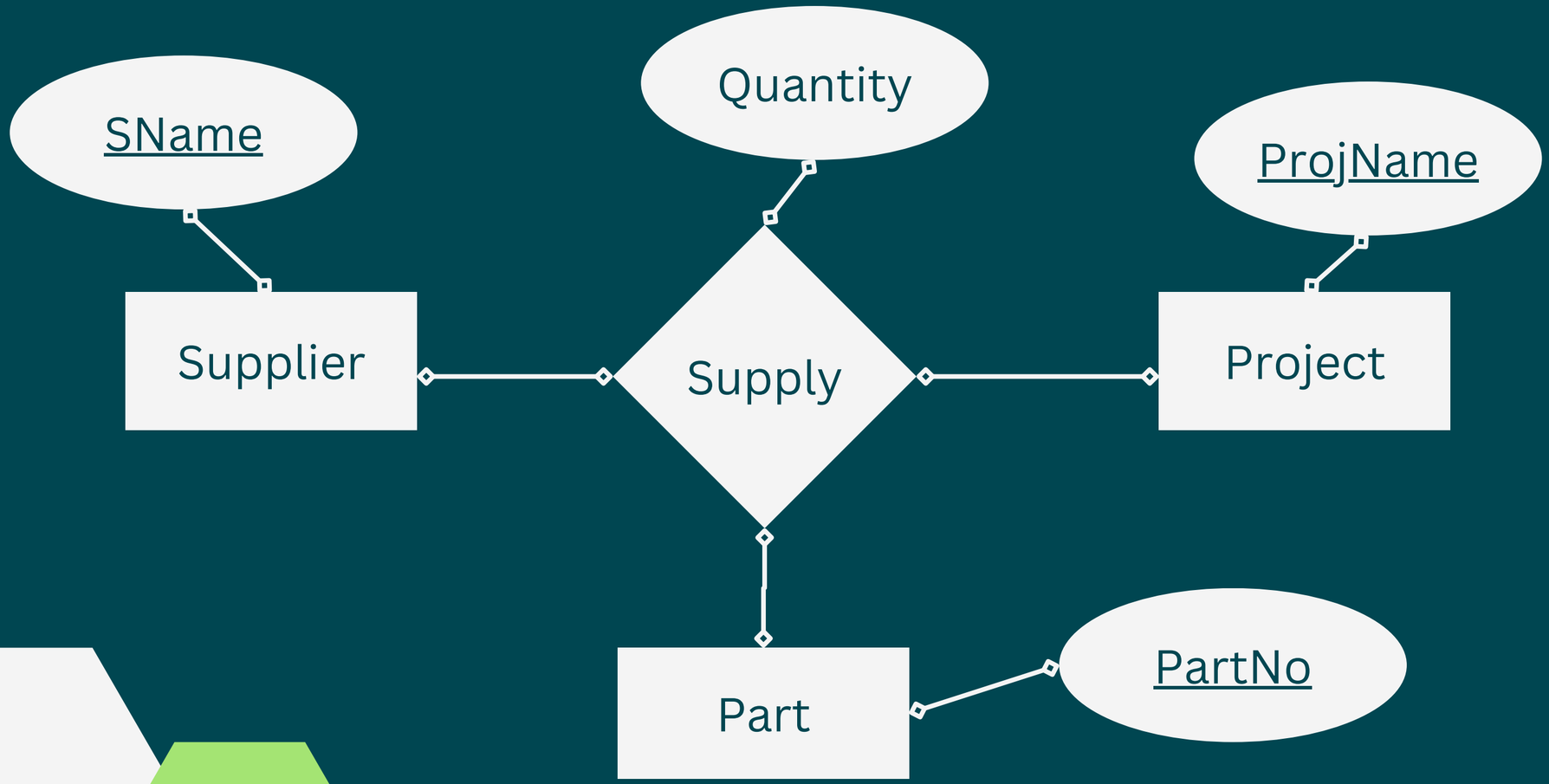
ERD Case Study

- An organization makes many models of cars, where a model is characterized by a unique name and a suffix (such as GL or XL) and an engine size.
- Each model is made up from many parts and Each part has a description , an id code, production year, and many images.
- Each part may be used in the manufacturing of more than one model

ERD Case Study

- •Each model must be produced at just one of the firm's factories, which are located in London, Birmingham, Bristol, Wolverhampton and Manchester - one in each city. Each factory has number of machines, capacity, and computer system used (OS , DBMS, Internet).
- A factory produces many models of cars and many types of parts. Although the parts and model produced in the same factory.

Ternary Relationship



ERD Case Study 2

- A country bus company owns a number of buses. A bus is characterized by number, No. of Chairs, Options (AC , Automatic, PS) , and brand-name
- Each bus is allocated to a particular route, although some routes may have several buses . Each route is described by KM, start point, end point and the duration.

ERD Case Study 2

- Each route can passes through a number of towns.
- A town may be situated along several routes. We keep track of unique name and station name in each town.
- One or more drivers are allocated to one route during a period of time. The system keep information about the driver name , mobile number , hire date, basic salary , job grade.
- The system keep information about any changes in the allocations of the drivers to the routes and the last route assigned to each driver.

ERD Narrative

- A database for a banking system is used to control withdrawal, deposit and loan transactions with customers.
- Banks which use this system have many branches; each branch has a unique name, unique address and phone.
- The system stores information about customers as unique customer ID, name, address, and phones.

ERD Narrative

- Each customer has one Account identified by unique Account number, amount, last transaction date (Day, Month and Year).
- The system records Transaction number, Transaction type, Transaction date, Transaction amount and time. The system records the branch name where the transaction occurred.
- A Customer can make any type of transactions (Withdrawal or Deposit) from any branch of the bank.

Questions?