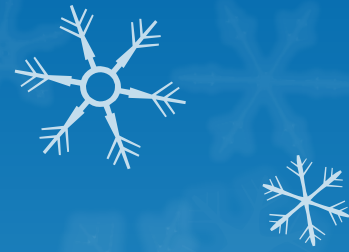


Course Name:
Database Management
Systems



Lecture 7

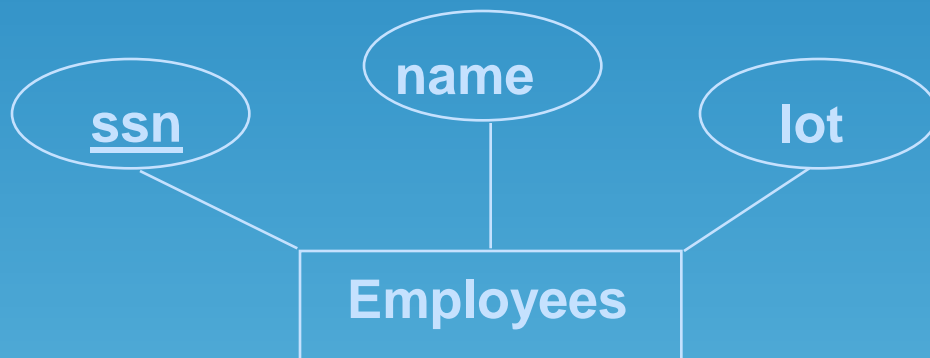
Topics to be covered

- ❑ ER to Relational



Logical DB Design: ER to Relational

- Entity sets to tables:



```
CREATE TABLE Employees  
  (ssn CHAR(11),  
   name CHAR(20),  
   lot INTEGER,  
   PRIMARY KEY (ssn))
```

Relationship Sets to Tables

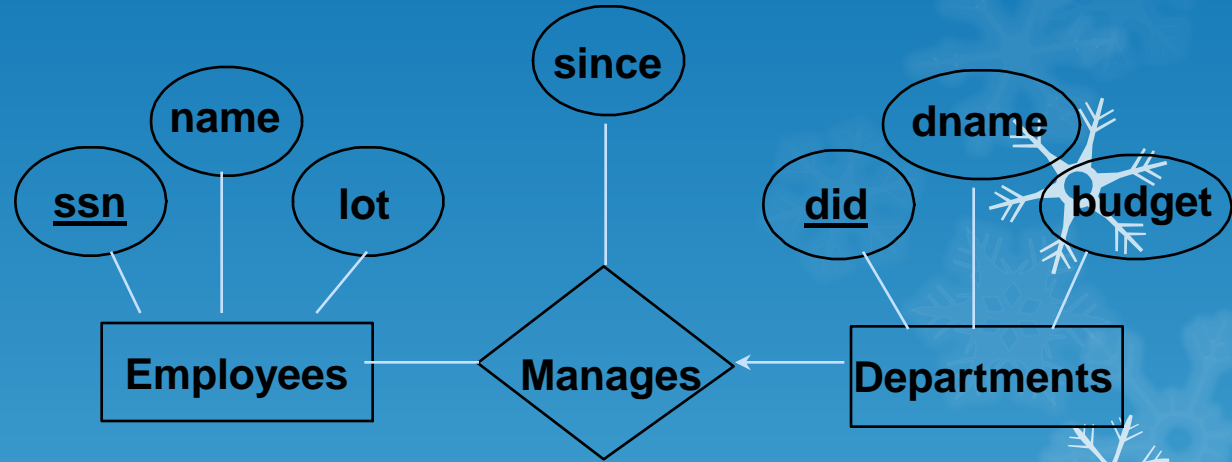


- In translating a relationship set to a relation, attributes of the relation must include:
 - Keys for each participating entity set (as foreign keys).
 - This set of attributes forms a *superkey* for the relation.
 - All descriptive attributes.

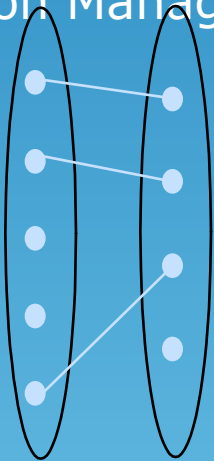
```
CREATE TABLE Works_In(  
  ssn CHAR(11),  
  did INTEGER,  
  since DATE,  
  PRIMARY KEY (ssn, did),  
  FOREIGN KEY (ssn)  
    REFERENCES Employees,  
  FOREIGN KEY (did)  
    REFERENCES Departments)
```



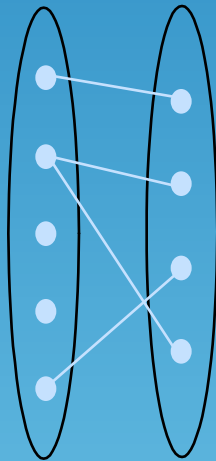
Review: Key Constraints



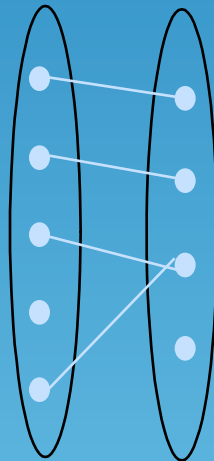
- Each dept has at most one manager, according to the key constraint on Manages.



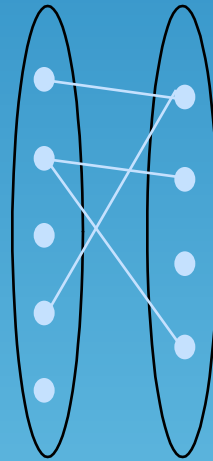
1-to-1



1-to Many



Many-to-1



Many-to-Many

Translation to relational model?

Translating ER Diagrams with Key Constraints



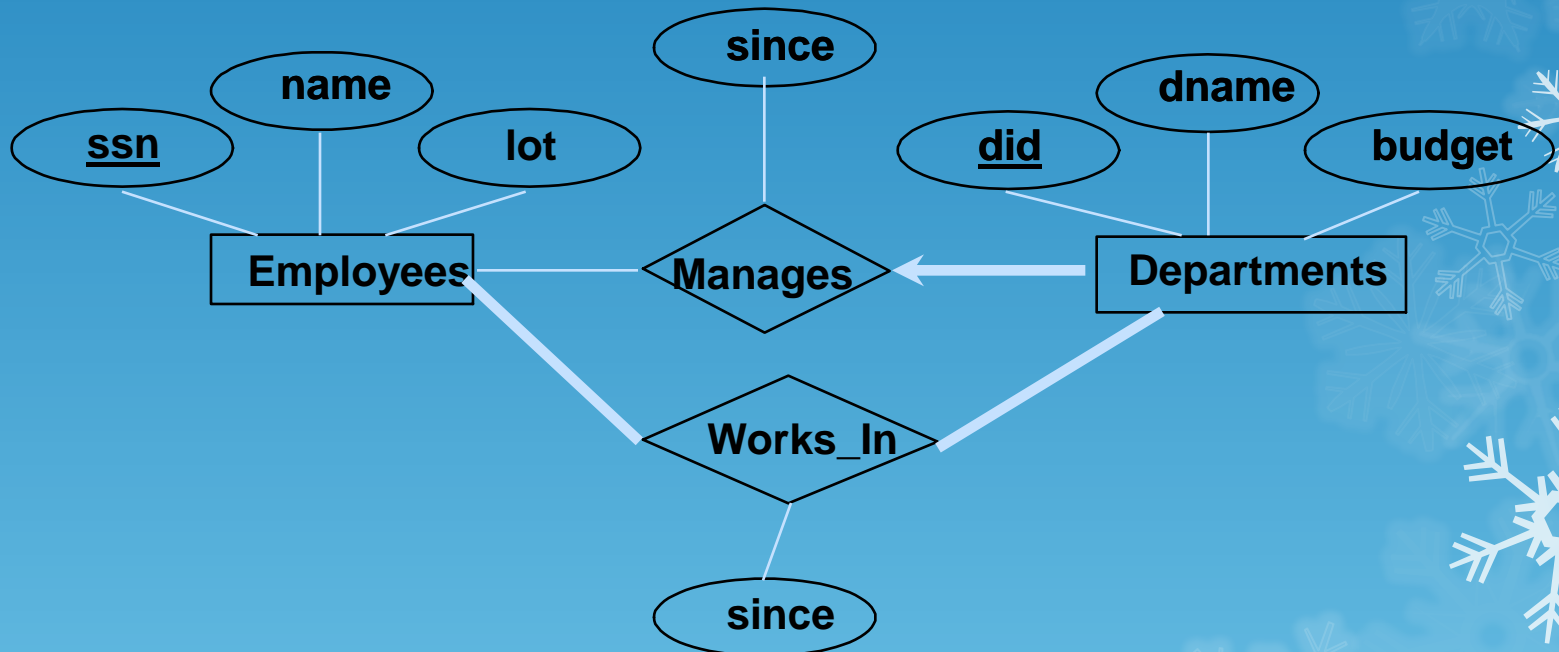
```
CREATE TABLE Manages(  
  ssn CHAR(11),  
  did INTEGER,  
  since DATE,  
  PRIMARY KEY (did),  
  FOREIGN KEY (ssn) REFERENCES Employees,  
  FOREIGN KEY (did) REFERENCES Departments)
```

```
CREATE TABLE Dept_Mgr(  
  did INTEGER,  
  dname CHAR(20),  
  budget REAL,  
  ssn CHAR(11),  
  since DATE,  
  PRIMARY KEY (did),  
  FOREIGN KEY (ssn) REFERENCES Employees)
```

- Map relationship to a table:
 - Note that **did** is the key now!
 - Separate tables for Employees and Departments.
- Since each department has a unique manager, we could instead combine Manages and Departments.

Review: Participation Constraints

- Does every department have a manager?
 - If so, this is a participation constraint: the participation of Departments in Manages is said to be *total (vs. partial)*.
 - Every *did* value in Departments table must appear in a row of the Manages table (with a non-null *ssn* value!)



Participation Constraints in SQL

```
CREATE TABLE Dept_Mgr(  
  did INTEGER,  
  dname CHAR(20),  
  budget REAL,  
  ssn CHAR(11) NOT NULL,  
  since DATE,  
  PRIMARY KEY (did),  
  FOREIGN KEY (ssn) REFERENCES Employees,  
  ON DELETE NO ACTION)
```

- We can capture participation constraints involving one entity set in a binary relationship, but little else (without resorting to CHECK constraints).