

# Database Management System 10

## Conversion of ER model to Relational Model

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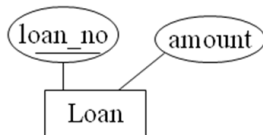
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## Conversion of ER model to Relational Model

A database that conforms to an ER diagram schema can be represented by a collection of relational schemas. Both the ER model and Relational data model are abstract, logical representations of real-world enterprises

### 1. Representation of Strong Entity sets

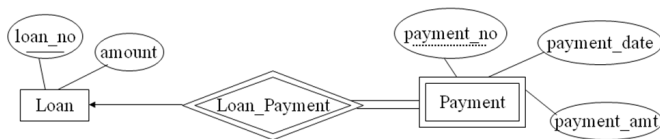
A strong entity set reduces to a schema with the same attributes. The primary key of the entity set serves as the primary key of the resulting schema



***Loan = (loan\_no, amount)***

## 2. Representation of Weak Entity sets

A weak entity set becomes a table that includes a column for the primary key of the identifying strong entity set. The primary key is constructed by the collection of foreign key and partial key



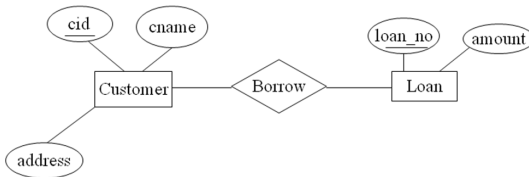
***Loan = (loan\_no, amount)***

***Payment = (loan\_no, payment\_no, payment\_date,  
payment\_amt)***

## 3. Representation of Relationship sets

### 3.a. Binary M:N

Union of the primary key attributes from the participating entity sets becomes the primary key of the relationship



***Customer = (cid, cname, address)***

***Loan = (loan\_no, amount)***

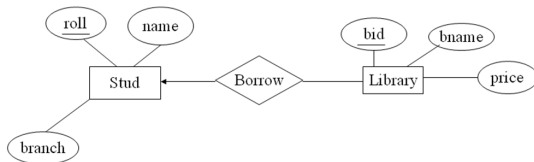
***Borrow = (cid, loan\_no)***

If borrow\_date is mentioned as descriptive attribute, then

***Borrow = (cid, loan\_no, borrow\_date)***

### 3.b. Binary M:1/1:M

Construct two tables, one for the entity set at 1 side and another for entity set at M side, add the descriptive attributes and a reference of the primary key of 1 side to the entity set at M side



***Stud = (roll, name, branch)***

***Library = (bid, bname, price, roll)***

The foreign key can be represented by specifying the name as:

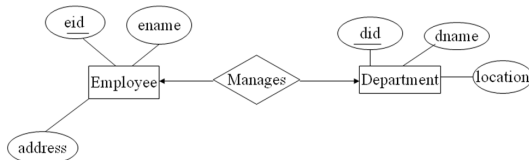
***Library = (bid, bname, price, borrowing\_roll)***

If borrow\_date is the descriptive attribute, then

***Library = (bid, bname, price, borrowing\_roll, borrow\_date)***

### 3.c. Binary 1:1

Construct two tables. In this case, either side can be chosen to act as the many side. That is, extra attributes can be added to either of the tables corresponding to the two entity sets, but not at the same time



***Employee = (eid, ename, address, did)***

***Department = (did, dname, location)***

If it is required to mention the relationship name, then

***Employee = (eid, ename, address, manager\_did)***

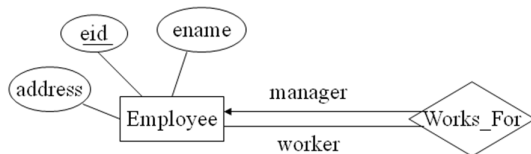
If department entity set will be considered as many side, then

***Employee = (eid, ename, address)***

***Department = (did, dname, location, manager\_eid)***

### 4. Representation of Recursive Relationship sets

Two tables will be constructed; one for entity set and one for relationship set



***Employee = (eid, ename, address)***

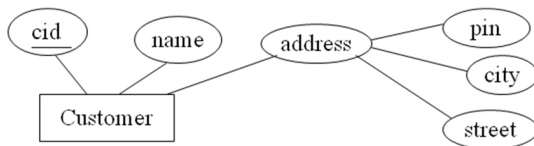
***Works\_for = (mgrid, workerid)***

This ER diagram can also be represented by using a single relation schema. In such cases, the schema contains a foreign key for each tuple in the original entity set

***Employee = (eid, ename, address, manager\_id)***

### 5. Representation of Composite attributes

The composite attributes are flattened out by creating a separate attribute for each of its parts

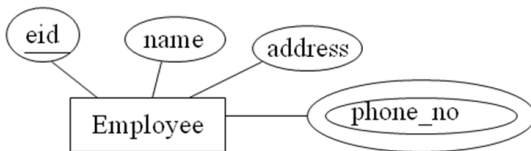


***Customer = (cid, name, address\_street, address\_city, address\_pin)***



### 6. Representation of Multi-valued attributes

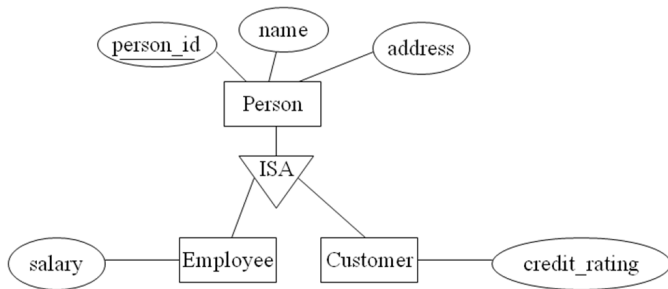
A multi-valued attribute M of an entity set E is represented by a separate schema E\_M as E\_M(primary key of E,M)



***Employee = (eid, name, address)***  
***Employee\_phone\_no = (eid, phone\_no)***

### 7. Representation of Generalization/Specialization

In case of generalization/specialization-related ER diagram, one schema will be constructed for the generalized entity set and the schemas for each of the specialized entity sets



***Person = (person\_id, name, address)***

***Employee = (person\_id, salary)***

***Customer = (person\_id, credit\_rating)***

### Representation of Generalization/Specialization...

When the generalization/specialization is a disjointness case, the schemas are constructed only for the specialized entity sets

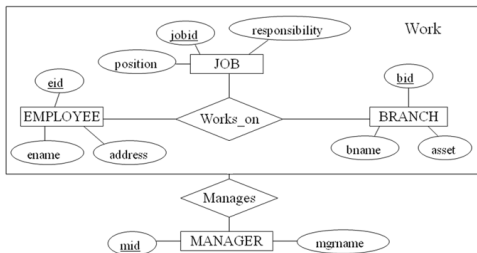
***Employee = (employee\_id, name, address, salary)***

***Customer = (customer\_id, name, address, credit\_rating)***

## Conversion of ER model to Relational Model...

### 8. Representation of Aggregation

To represent aggregation, create a schema containing the primary key of the aggregated relationship, primary key of the associated entity set and descriptive attributes (if any)



***Employee = (eid, name, address)***

***Branch = (bid, bname, asset)***

***Job = (jobid, position, responsibility)***

***Works\_on = (eid, bid, jobid)***

***Manager = (mid, mgrname)***

***Manages = (eid, bid, jobid, mid)***