
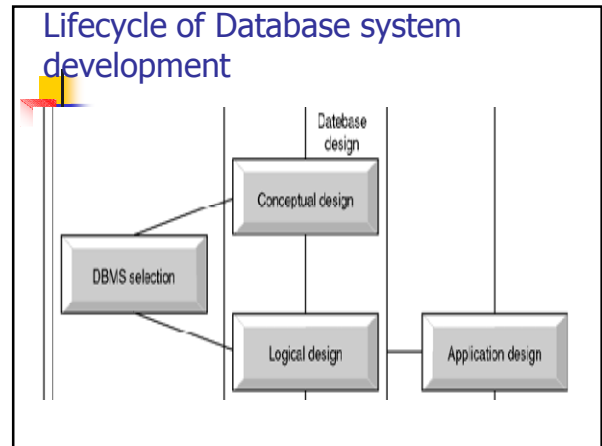


LOGICAL DESIGN

•Mapping from conceptual model (EER-M) into a relational schema



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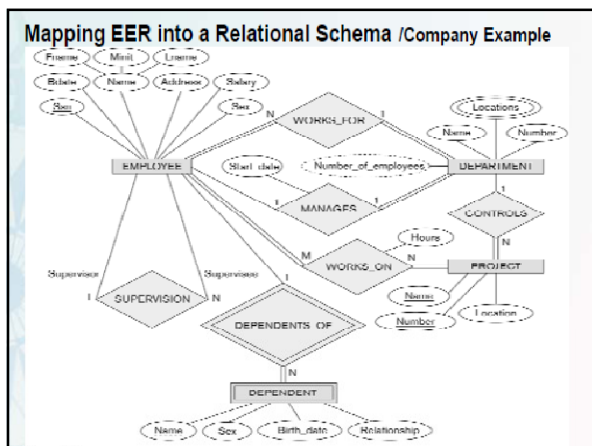
Mapping an EER-Model into a relational schema

- This approach involves applying transformation rules (or steps) to the EER model in order to achieve a relational logical schema.
- NB: the steps below should not be taken as golden rules.

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Mapping an EER-Model into a relational schema

- Application requirements vary from one domain to another and from one user to another.
- Hence, the following steps should be only taken as guidelines



Step 1

- For each regular entity type (ignore those with subclasses at this point) on your diagram
- create a table and nominate a primary key (PK) for that relation.

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Step 1 Cont:

```
EMPLOYEE (FNAME, MINT, LNAME, SSN, BDATE, ADDRESS,
DEPARTMENT (DNAME, DNUMBER)          SEX, SALARAY)
PROJECT (PNAME, PNUMBER, PLOCATION)
```

Step 2:

- For each weak entity type, create a relation.
- The PK is a combination of the identifier of the parent entity and the identifier of the weak or dependent entity (i.e. a composite PK).

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Step 2 cont

```
EMPLOYEE (FNAME, MINT, LNAME, SSN, BDATE, ADDRESS,
DEPARTMENT (DNAME, DNUMBER)          SEX, SALARAY)
PROJECT (PNAME, PNUMBER, PLOCATION)
DEPENDENT (ESSN, DEPENDENT NAME, SEX, BDATE)
```

Step 4:

- Each unary or binary type relationship with a one-to-one cardinality is mapped with a foreign key attribute in one of the relational as the linking attribute.
- If the relationship is mandatory OR optional from both sides,
- then it does not make a difference as to where to place the foreign key.

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Step 4 Cont:

- If it is mandatory (total participation) from one side and optional (partial participation) from the other side,
- then the PK of the optional side is inserted as a foreign key at the mandatory side.

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Step 4 cont:

```
PROJECT (PNAME, PNUMBER,
PLOCATION)
```

```
EMPLOYEE (FNAME, MINT,
LNAME, SSN, BDATE,
ADDRESS, SEX, SALARAY)
```

```
DEPENDENT (ESSN,
DEPENDENT NAME, SEX,
BDATE)
```

```
DEPARTMENT (DNAME, DNUMBER, MgrSSN, MgrStartDate)
```

Step 5:

- For Each unary or binary one-to-many relationship type.
- The PK from the 1-end is inserted as a FK at the N-end.

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Step 5 cont:

EMPLOYEE (FNAME, MINT, LNAME, SSN, BDATE, ADDRESS, SEX, SALARY, DNO, SUPERSSN)

DEPARTMENT (DNAME, DNUMBER, MGRSSN, MGRSTARTDATE)

PROJECT (PNAME, PNUMBER, PLOCATION, DNO)

DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE)

Step 6:

- Each N:M relationship of any degree is mapped to a new linking relation whose PK includes the keys of all participating relations (a composite PK).
- Include all relationship's attributes in the new relation.

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Step 6 cont:

EMPLOYEE (FNAME, MINT, LNAME, SSN, BDATE, ADDRESS, SEX, SALARY, DNO, SUPERSSN)

DEPARTMENT (DNAME, DNUMBER, MGRSSN, MGRSTARTDATE)

PROJECT (PNAME, PNUMBER, PLOCATION, DNO)

DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE)

WORKS_ON (ESSN, PNO, HOURS)

Step 7:

- Each multi-value attribute mapped to a new relation.
- The new relation should include an attribute pertaining to the main relation as a foreign key.

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Step 7 cont:

EMPLOYEE (FNAME, MINT, LNAME, SSN, BDATE, ADDRESS, SEX, SALARY, DNO, SUPERSSN)

DEPARTMENT (DNAME, DNUMBER, MGRSSN, MGRSTARTDATE)

PROJECT (PNAME, PNUMBER, PLOCATION, DNO)

DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE)

WORKS_ON (ESSN, PNO, HOURS)

DEPT_LOCATION (DNUMBER, DLOCATION)

