Case studies on Entity Relationship Diagram (ERD)

Steps:
1. Entity
2. Attributes
3. Relationships
4. Connectivity
5. Participation
6. Foreign keys

ERD with 4 entities

- Draw an ERD for the following business rules:
  1. A department employs many employees but each employee is employed by one department.
  2. Some employees, known as "rovers," are not assigned to any department.
  3. A division operates many departments, but each department is operated by one division
  4. An employee may be assigned to only one project, and a project may have many employees assigned to it.
  5. A project must have at least one employee assigned to it.
  6. One of the employees manages each department, and each department is managed by one employee
  7. One of the employees runs each division, and each division is run by one employee.

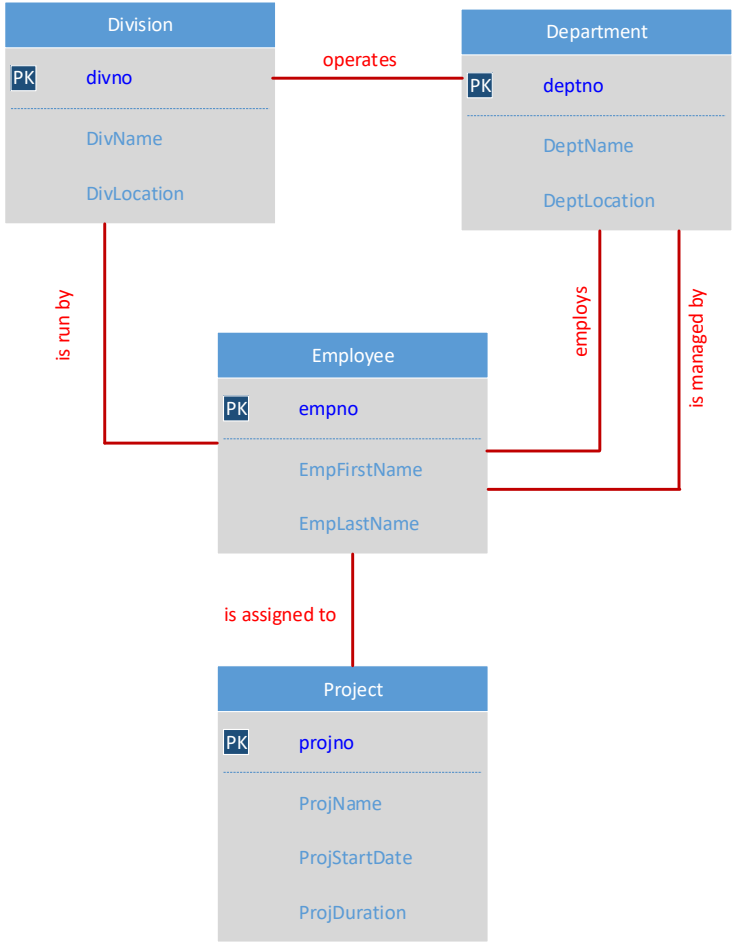
  - What about ‘rovers’? Do they form an entity?

Department-project-employee ERD

Steps 1 & 2: Entities and attributes

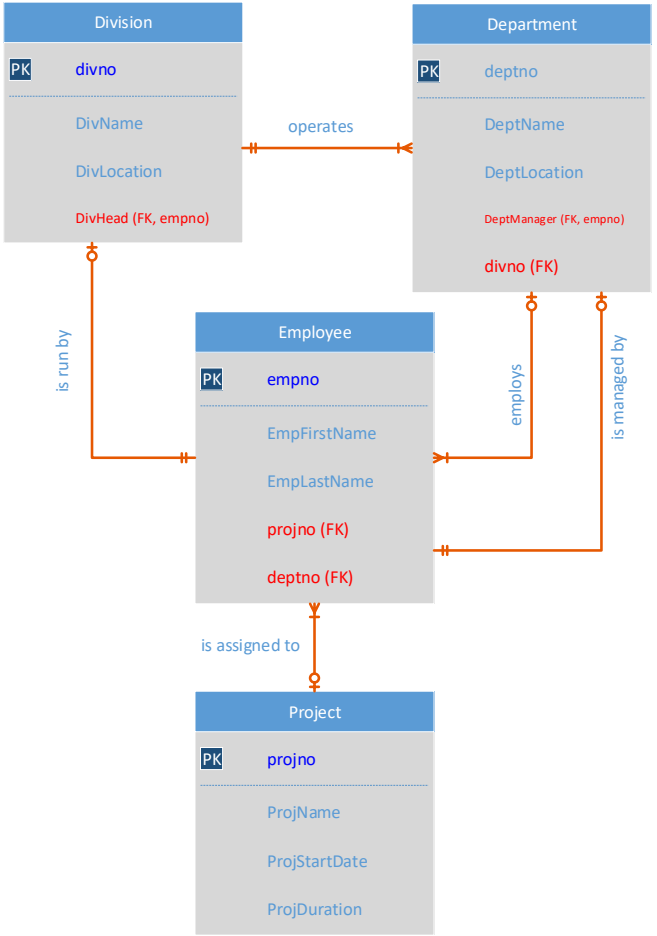
Department-project-employee ERD

Steps 3: Show relationships



Department-project-employee ERD

Steps 4-6: Show connectivity and participation



General Rules to Place Foreign Key

Connectivity *1:M*:

- Enter the primary key from the *one* side into the *many* side

Connectivity *1:1*:

- Enter the primary key from the *mandatory* side into the *optional* side
- Otherwise – your choice

Connectivity *M:N*

- Sources of redundancies
- Need to replace M:N relationships

ERD example (TWO entities): Transport

A transport company wants to computerize their ticket system. Business rules are as follows:

- Each passenger (defined by passenger id, passenger name, contact) can purchase one or many tickets.
- Each ticket can only be purchased by one passenger. Each ticket has a ticket number and expiry date on it.
- Tickets are generated before customers purchase them.

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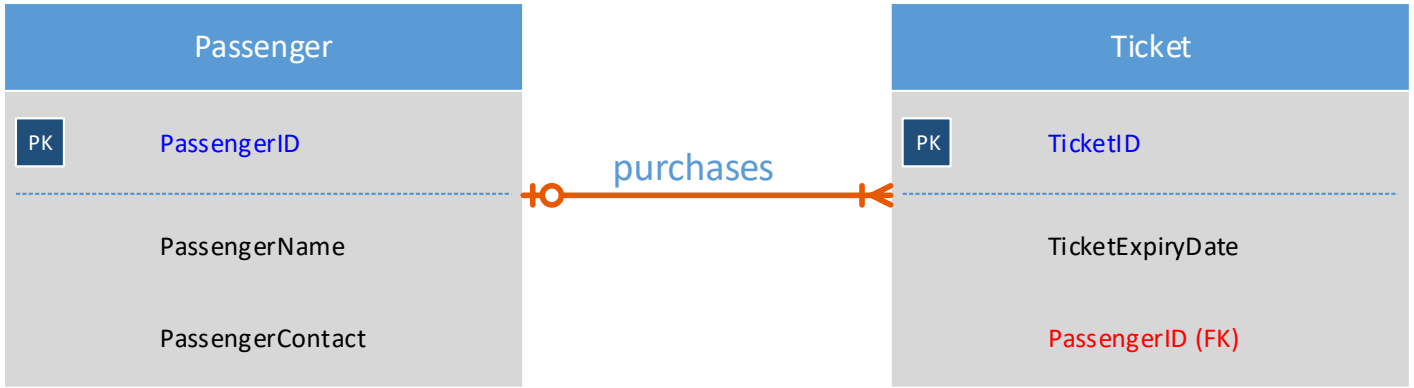
Transport ERD (TWO entities)



- Insert PassengerID as a Foreign key in Ticket table
- Why TicketID is not a FK in Passenger table?
- FK usually inserted in “Many side” to avoid data redundancy in “One side!”

ERD example (THREE entities): Real Estate

A real estate firm lists property for sale. It has several sales offices. The following business rules describe this firm:

- Each sales office employs one or more employees. An employee must be employed in one and only one sales office.
- The Sales offices list property for sale.
- Each unit of property must be listed with one (and only one) of the sales offices. A sales office may have any number of properties listed or may have no properties listed.

Note: Make up 2-3 attributes for each entity.

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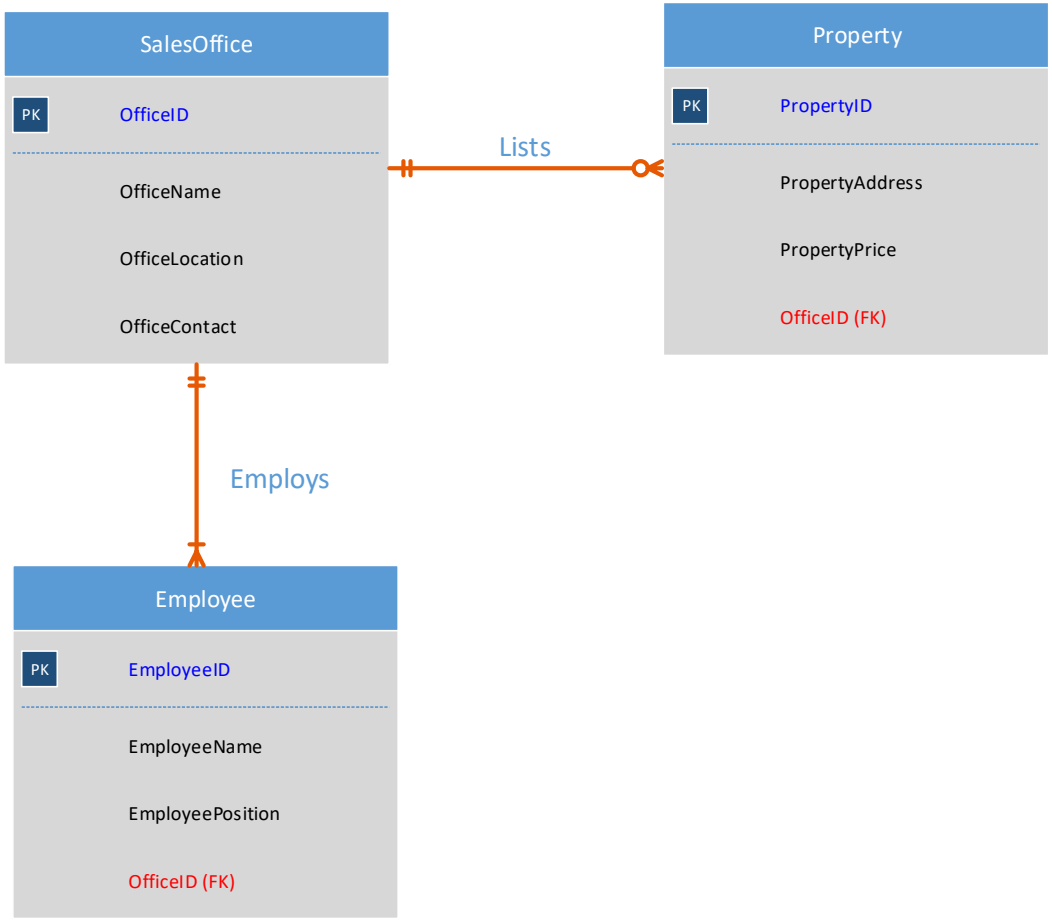
Real Estate ERD (THREE entities)

- Insert FKs
  - OfficeID in Property and Employee tables
- Why not PropertyID and/or EmployeeID inserted as FKs in SalesOffice table?
- FK usually inserted in “Many side” to avoid data redundancy in “One side!”



ERD example (FOUR entities): Supermarket

A supermarket would like to keep track of its records by having an electronic database. Business rules are as follows:

- Each customer (defined by customer id, name, contact) can make several purchases, but a specific purchase (defined by purchase no, cost, date) belongs to one and only one customer.
- Each purchase is processed by one sales staff (defined with staff id, and name), but a sales staff can process many purchases.
- Each sales staff is being supervised by a supervisor (defined with supervisor id, name, position). A supervisor can supervise many sales people.

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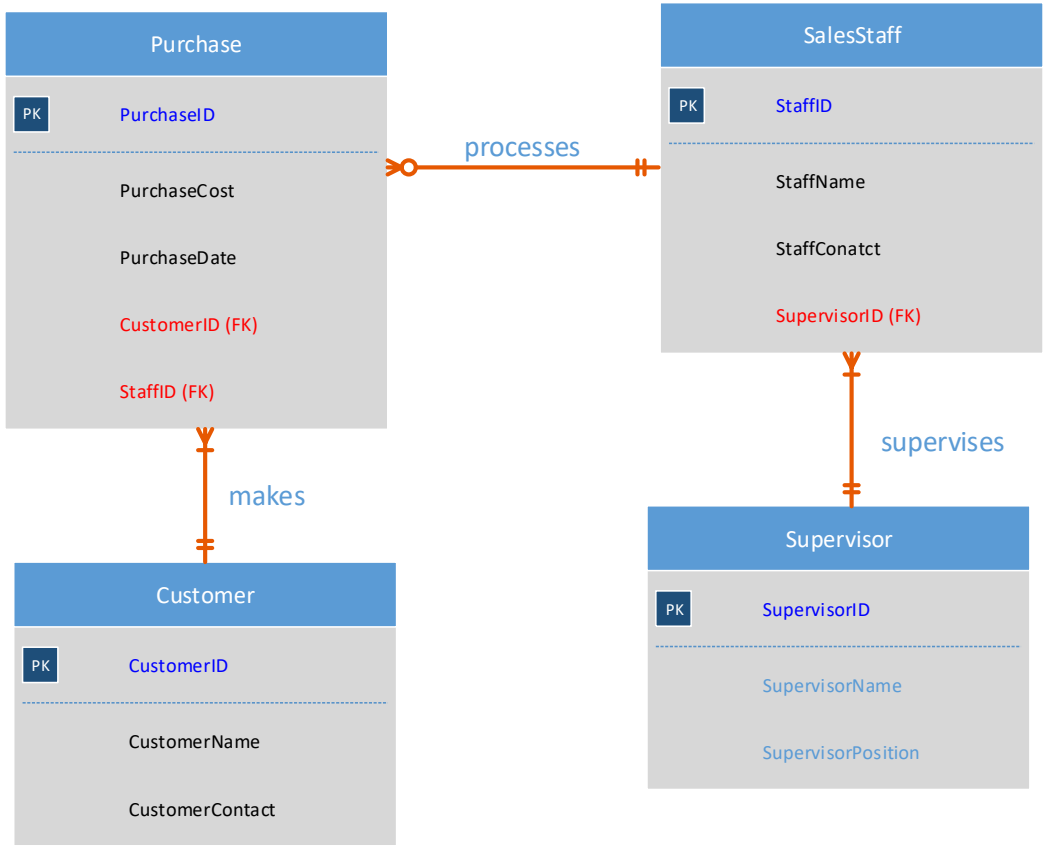
Supermarket ERD (FOUR entities)

- Insert FKs tables
  - CustomerID and StaffID in Purchase
  - SupervisorID in SalesStaff
- Again, FKs have been inserted in “Many side” to avoid data redundancy in “One side!”



Thank you