Types of analysis

Functional Analysis: What do users want to do on their data?
Output: Use cases

Non-Functional Requirement Analysis: Get other requirements that are not related to what the programs will do, e.g.,

- Response time of a query
- Look & feel of the program
- Standard compliant, e.g., data security and privacy standard
- Different user privileges, who can see/edit what data

Entity analysis

1. Determine entities and attributes
2. Determine relationships and contraints

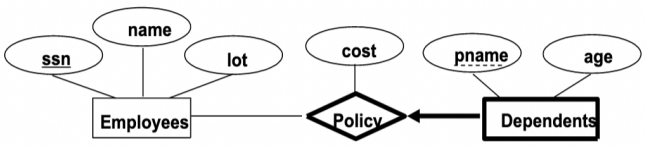
Example data models

SQL, No-Sql, XML, Property Graph Data Model

ER diagrams

- Every entity must have primary key (____)
- Single bold line (total participation) , need to use triggers to enforce
- Arrow (key constraint) , at most one
  - Can use PK of other entity as attribute , no need for separate table
  - Add not null to enforce total participation
- If double arrows (without total participation)
  - Too restrictive to only use attribute, need separate relationship set

Weak relations



- Weak entity set and identifying relationship set are translated into a single table.
- Use on delete cascade to ask DBMS to do the below
  - when the row representing the owner entity is deleted, all the rows representing the associated weak entities must also be deleted.

Policy and Dependents are modeled using one relation.

dependents (ssn CHAR(11), pname CHAR(20), DOB date, cost float,

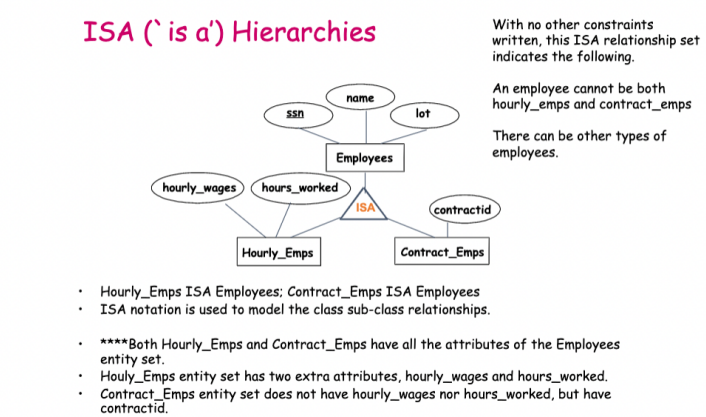
PRIMARY KEY(SSN, PNAME),
FOREIGN KEY(SSN) references Employees (ssn) ON DELETE CASCADE)

On delete of an employee tuple, delete dependents of that employee

Weak relations partial key must be included in relations that call them.

They go together with primary key of other entity sets

ISA relation



Constraints

Overlapping constraint
-Can a person be an hourly_emps and contract_emps at the same time?

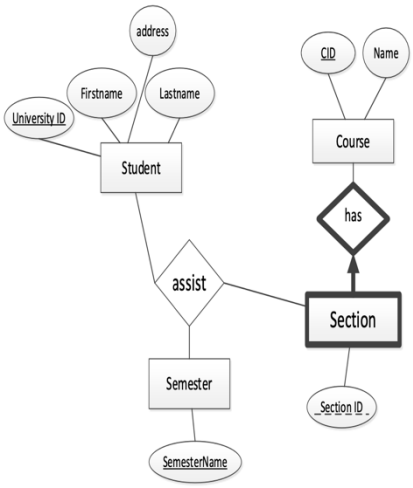
Covering constraint
-Does an employee have to be hourly or contract?

Deal with them using triggers

NOTE : Add on delete cascade when defining ISA for inherited entity sets
Example DDL statement:

```
Create table Managers(
M_EmployeeID bigint,
   MaxSupervisingCapacity int,
    Salary float,
   Primary Key (M_EmployeeID),
   Foreign Key (M_EmployeeID) references Employees(EmployeeID) on delete cascade
);
```

Example ER diagram and DDL



Student(UID, firstname, lastname, address, primary key(UID))
Course(CID, Name, primary key(CID))
Section(CID, Section_ID, primary key(CID, Section ID), FOREIGN KEY (CID) references Course(CID) ON DELETE CASCADE)
Semester(SemesterName, primary key(SemesterName))
Assist(UID, CID, sectionID, SemesterName, Primary key(UID, CID, sectionID, SemesterName), Foregin Key(UID) references Student(UID), Foreign Key(CID, sectionID) references Course(CID, sectionID) , Foreign Key(SemesterName) references Semester(SemesterName))