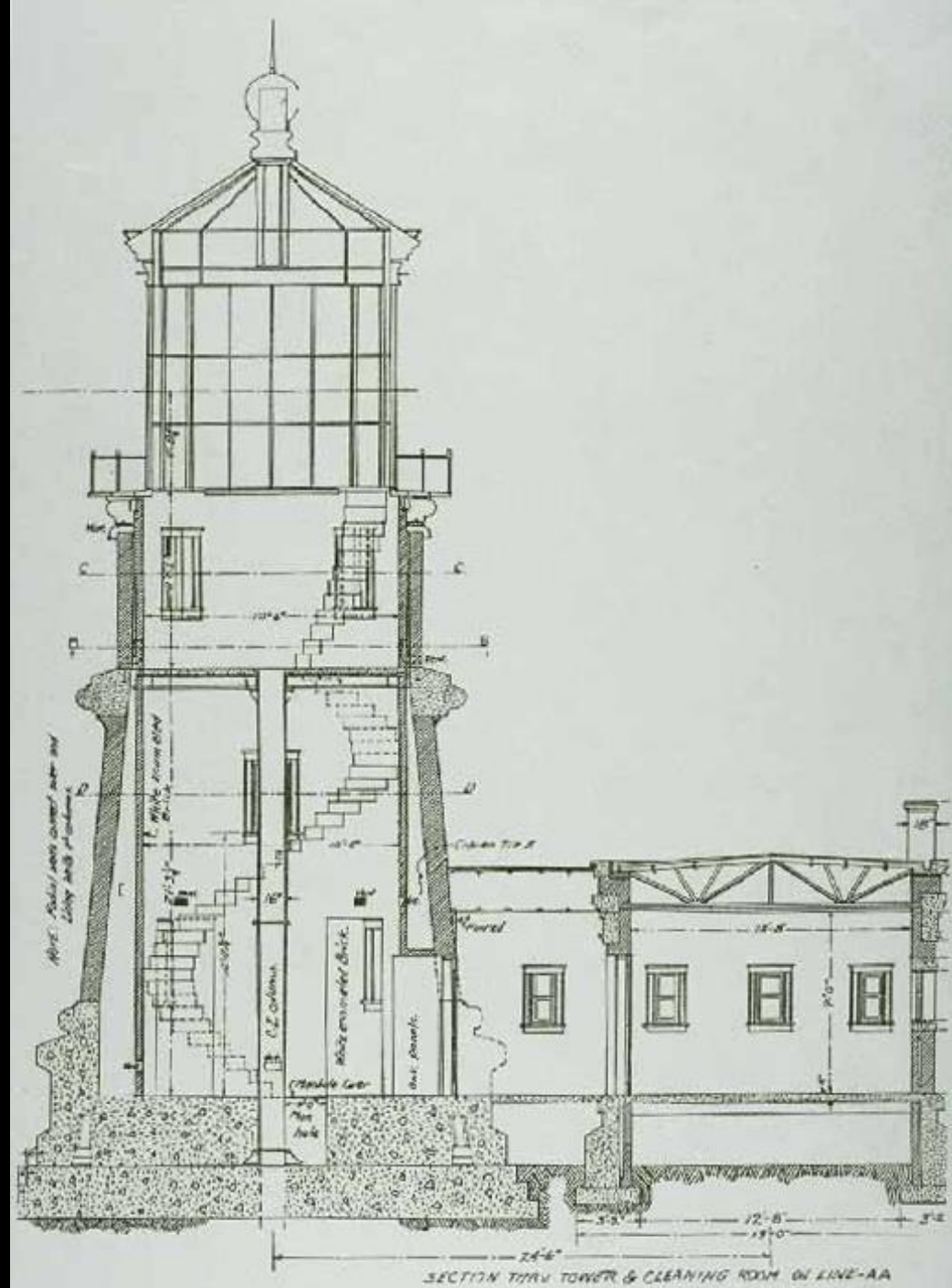


Software Architecture & Design





Database Modelling

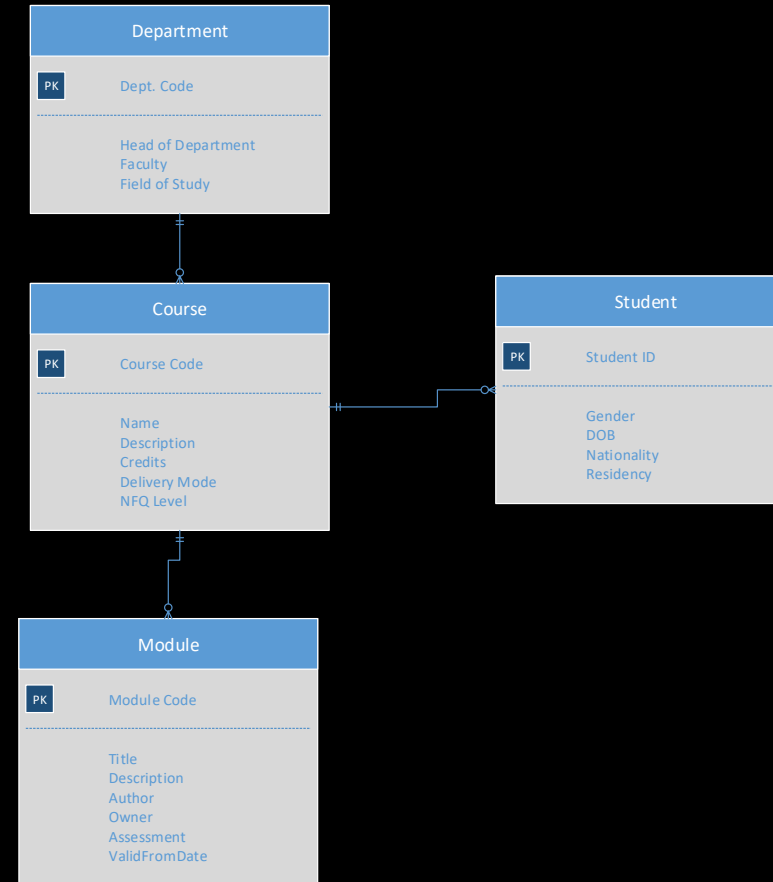
A Quick Introduction to Entity Modelling and Structured Database Design

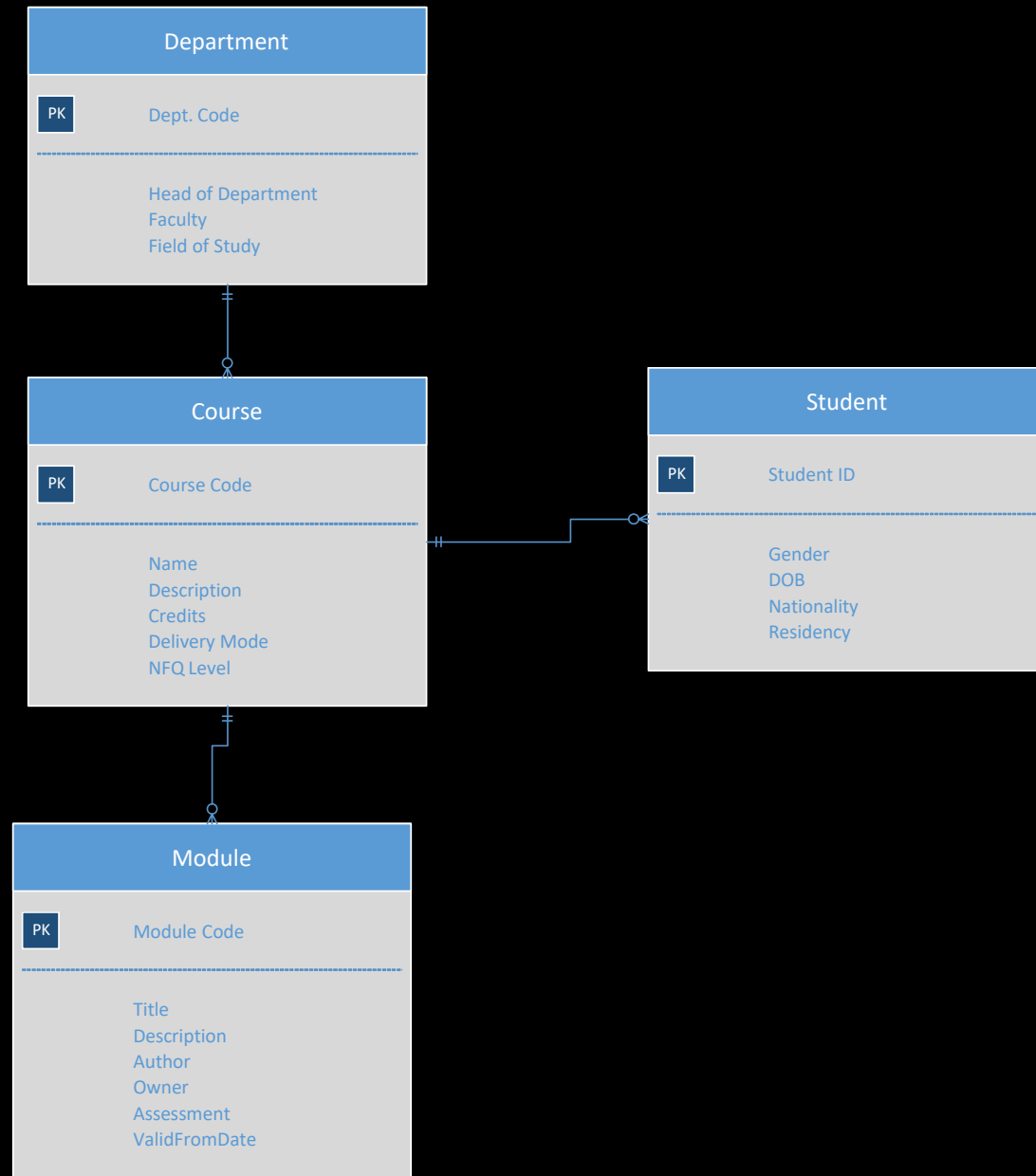
Contents

- Structured Design
- Entity Modelling
- The 'Object/Relational' Impedance Mismatch

Structured Analysis & Design

- An Emphasis on 'Data'
- Information Engineering (IE)
- Analysis
 - DFD
 - Process Decomposition
 - Entity Modelling
- Design
 - Logical Schema → Physical Schema
 - Third Normal Form (3NF)

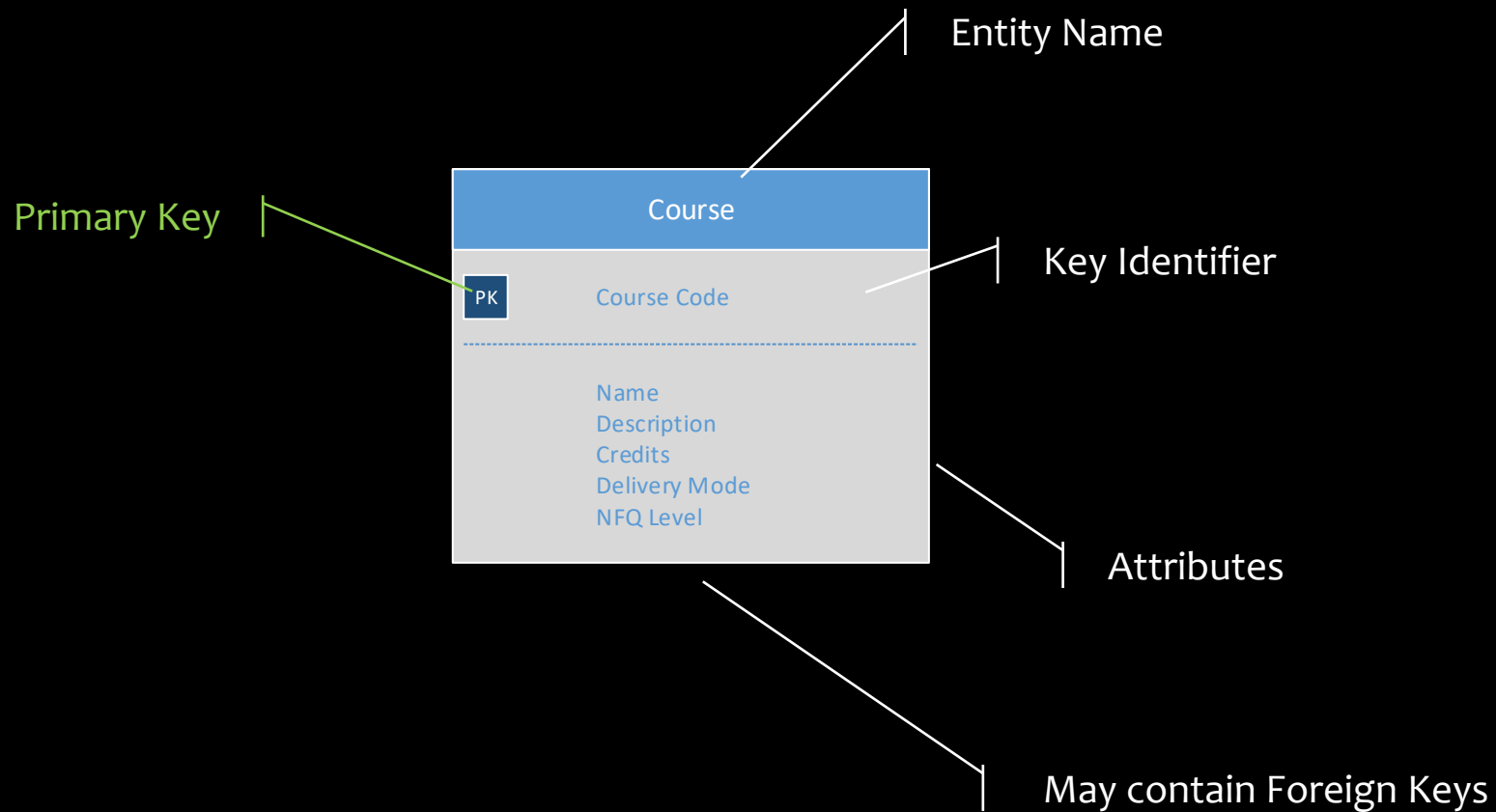




Entity Modelling

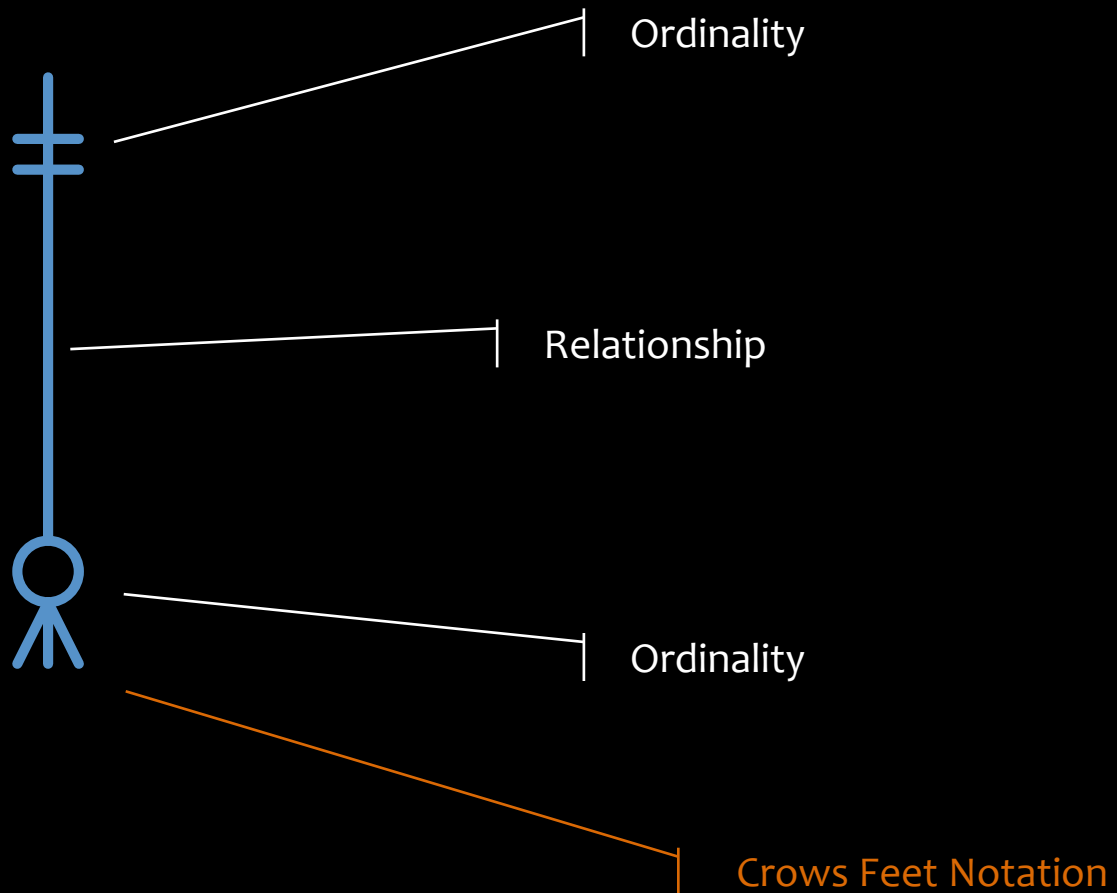
- Conceptual
- Logical
- Physical

https://en.wikipedia.org/wiki/Entity%E2%80%93relationship_model



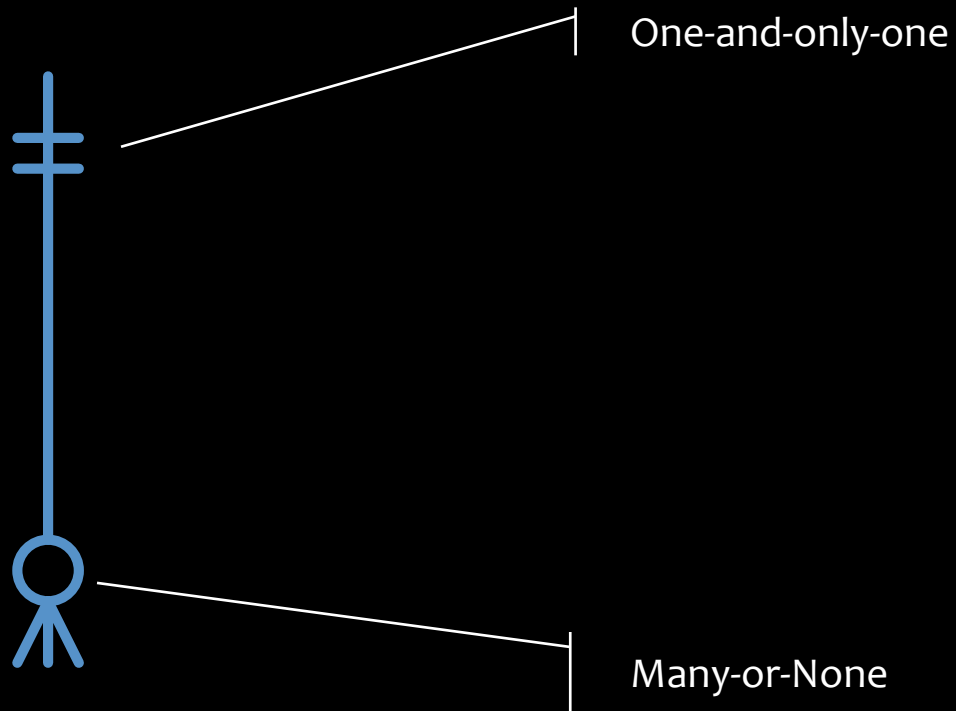
Entity

- Typically a noun – a thing
- Singular
- Independent Existence
- Uniquely Identifiable



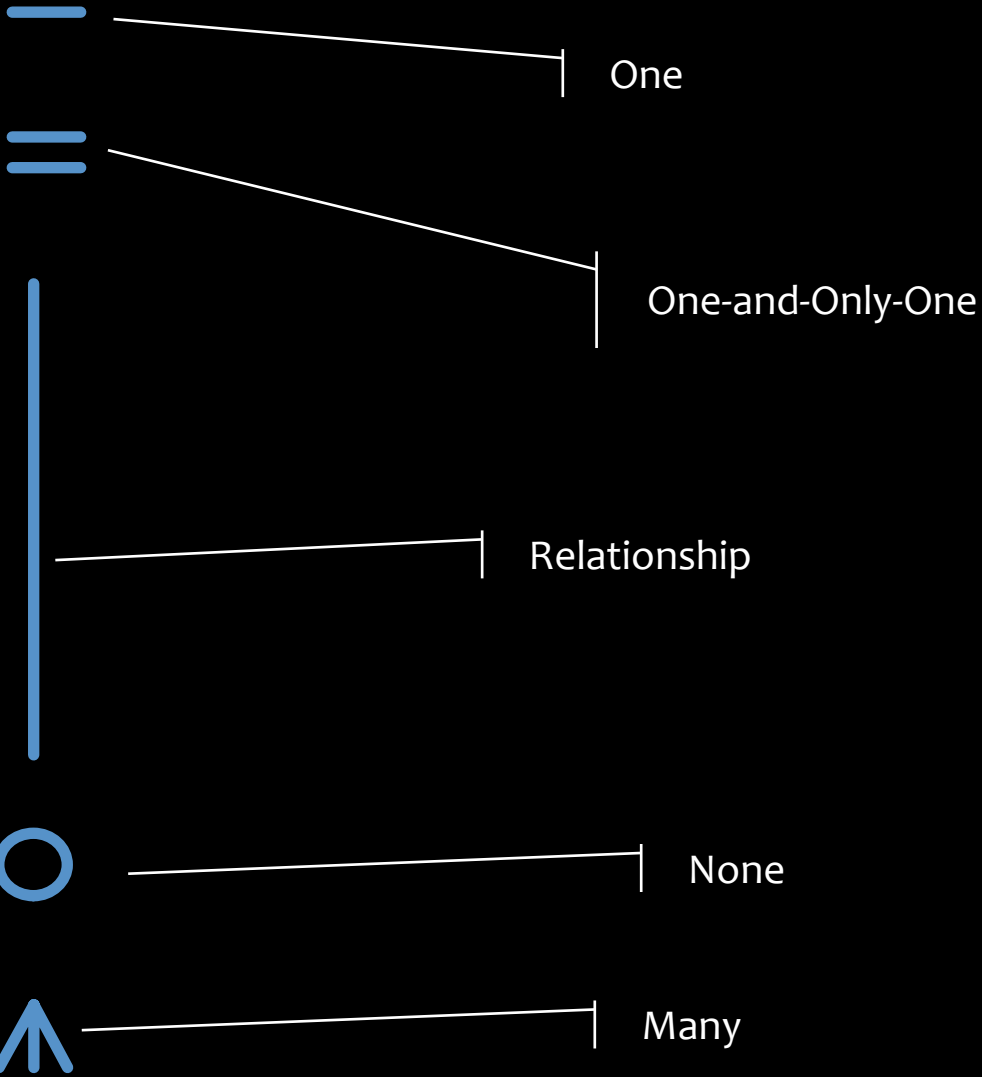
Relationship

- One-to-One or None
- One-to-Many
- Many-to-Many

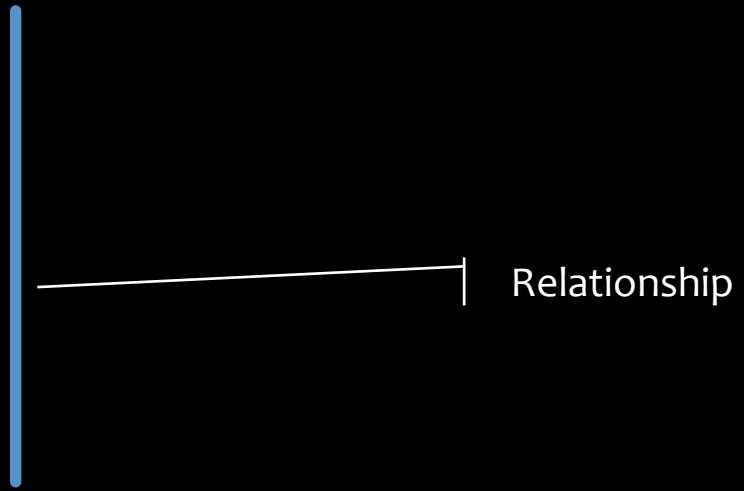


Relationship

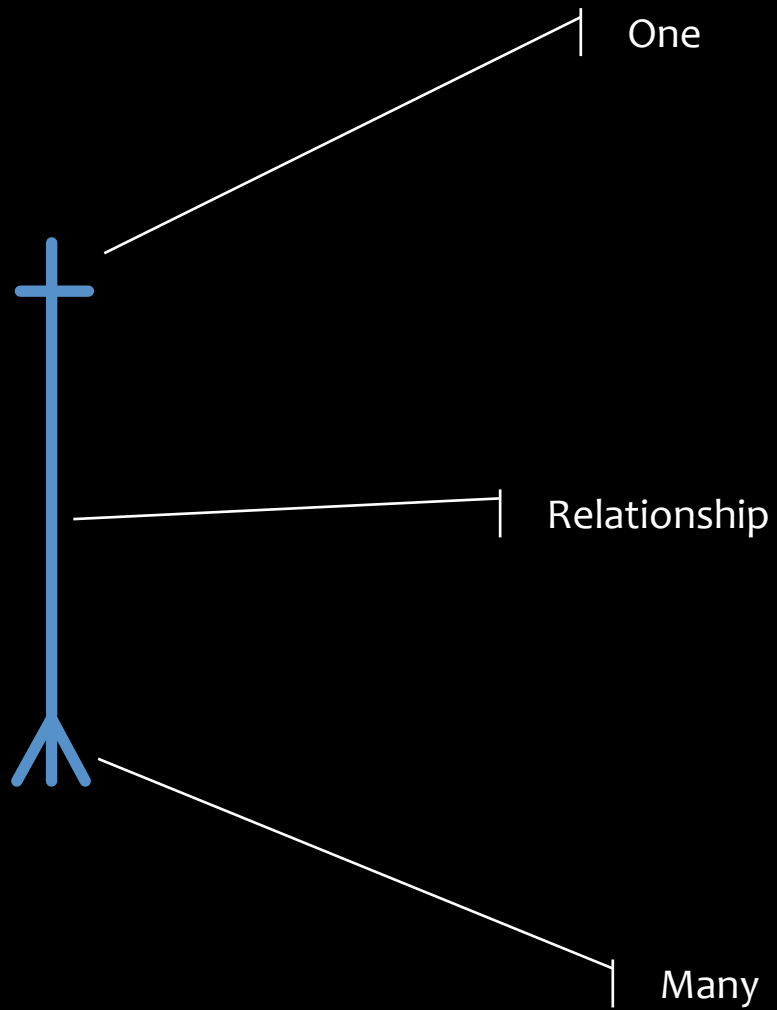
- One-to-One
- One-to-None
- One-to-Only-One
- One-to-Many
- One-to-Many-or-None
- Many-to-Many



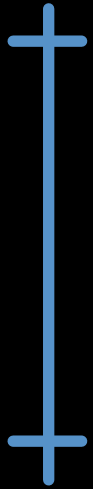
Relationship



Relationship

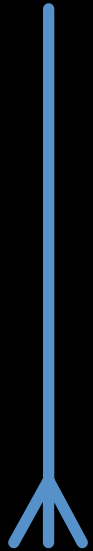


Relationship



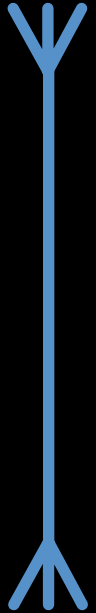
Relationship

- One-to-One



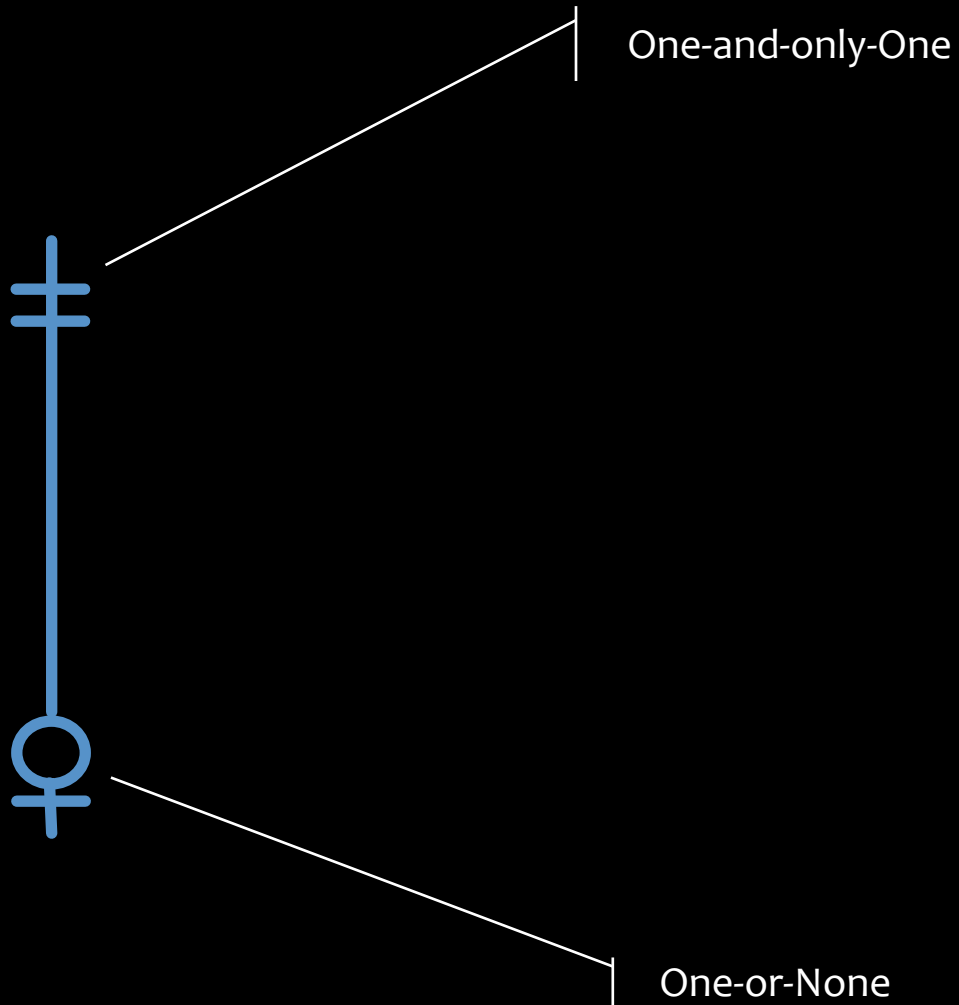
Relationship

- One-to-Many



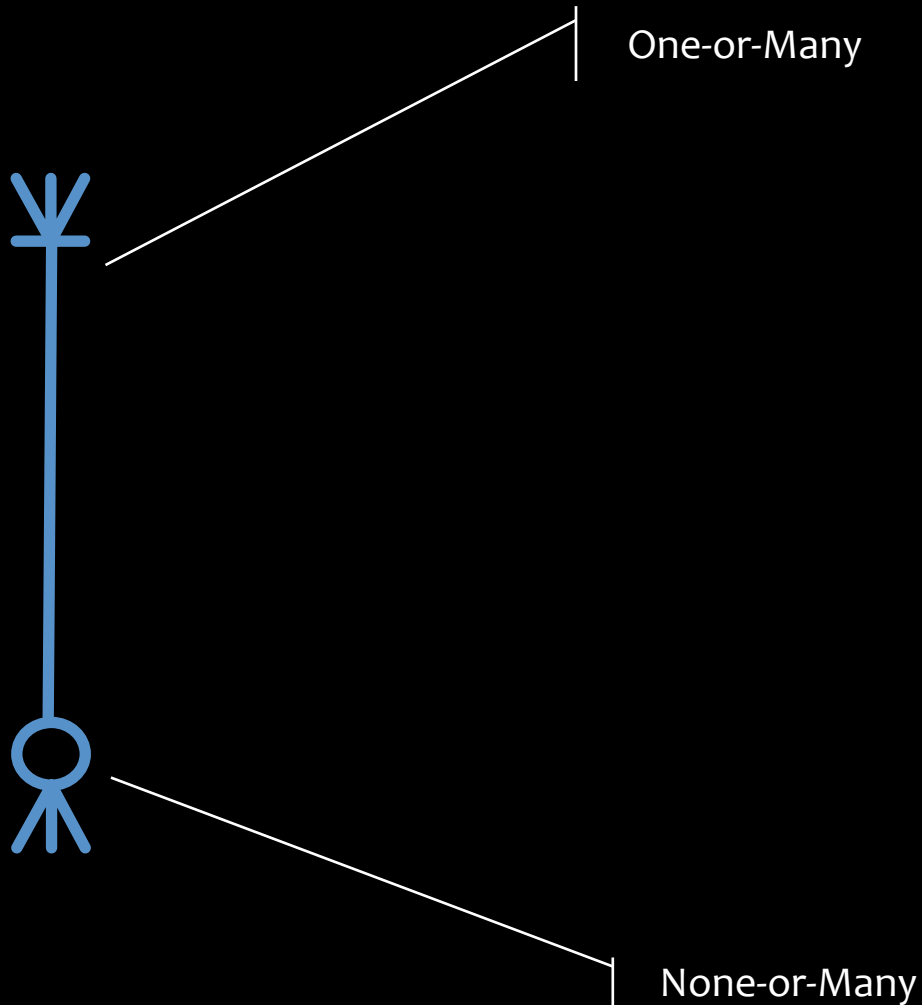
Relationship

- Many-to-Many



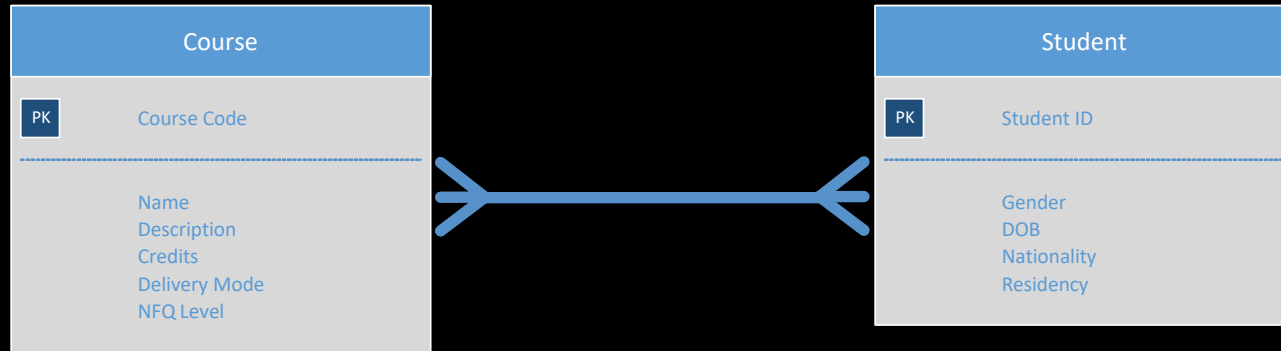
Relationship

- One-to-One



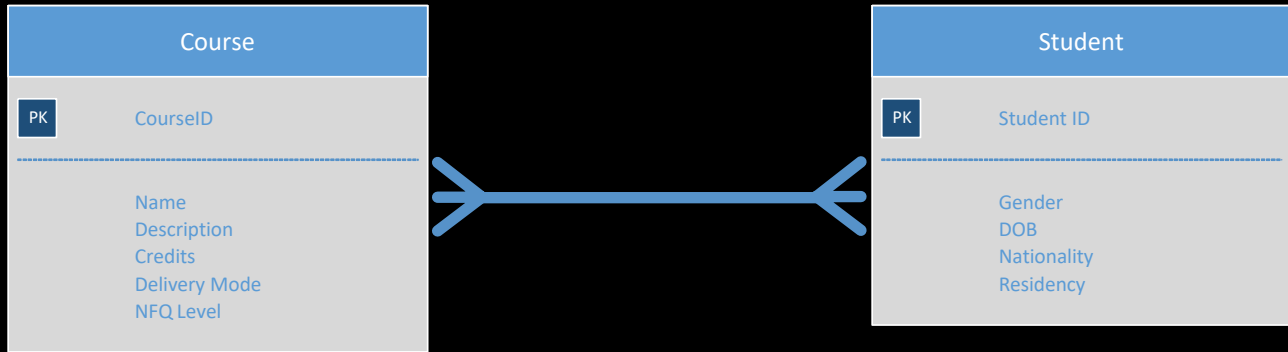
Relationship

- Many-to-Many



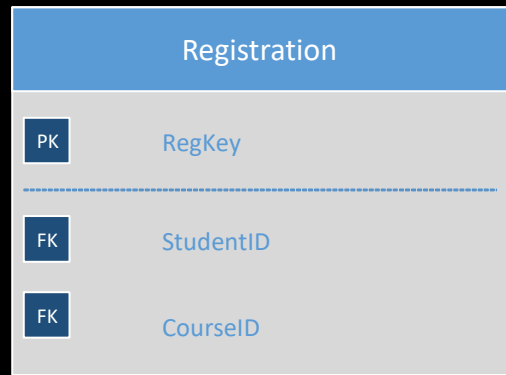
Many-to-Many

Need to resolve these



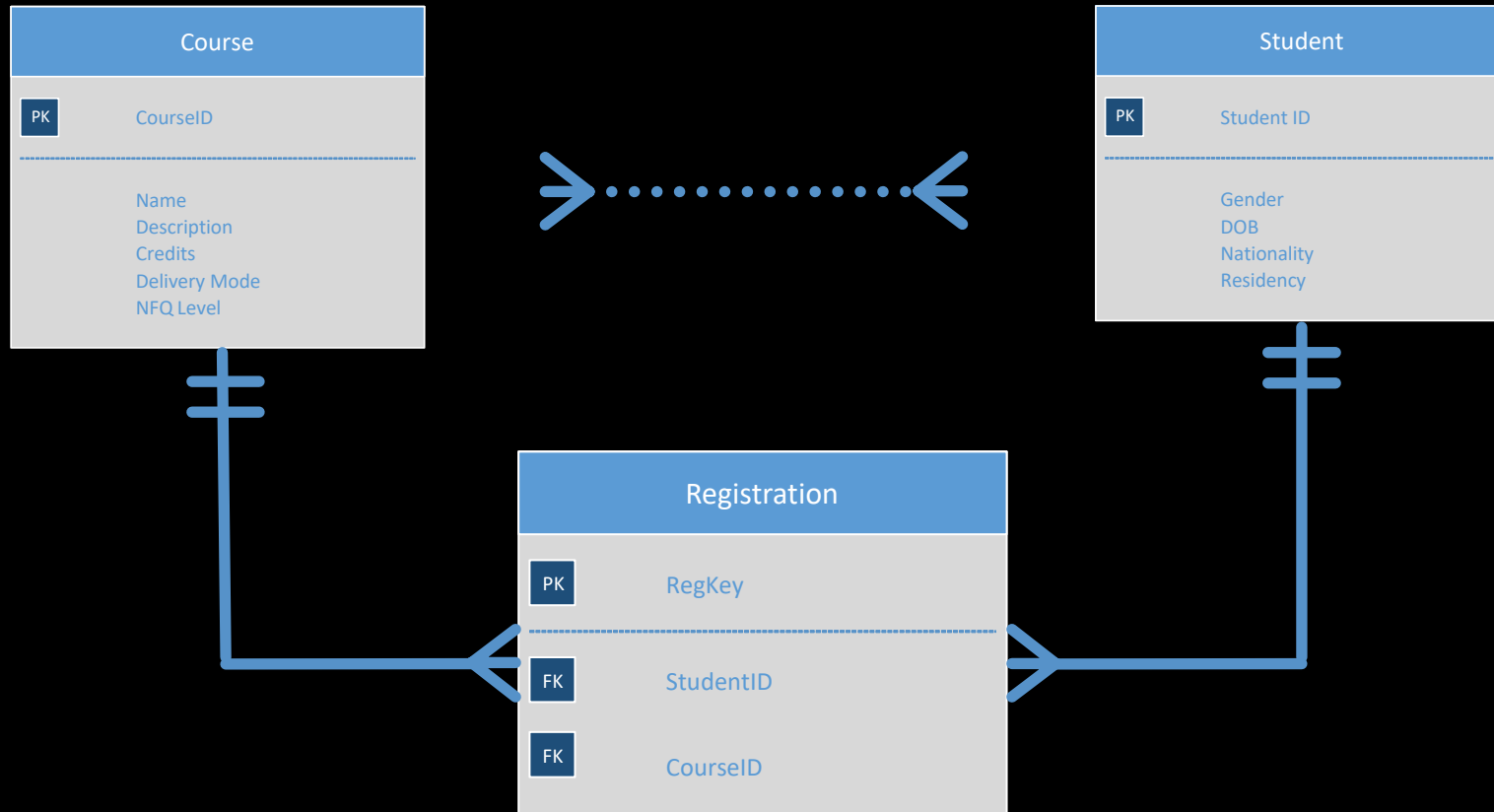
Many-to-Many

Introduce Resolver



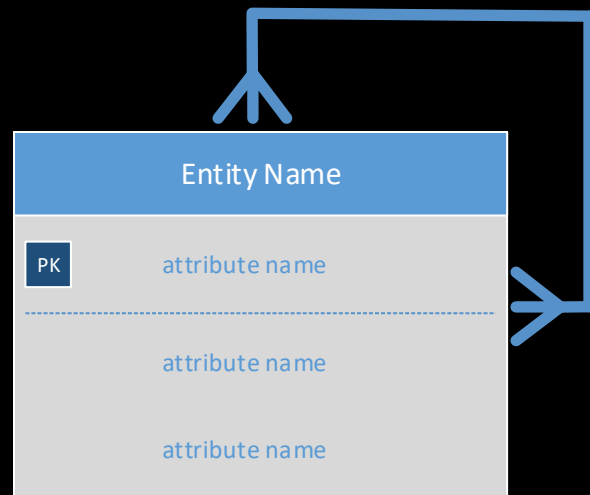
Foreign Key to Student

Foreign Key to Course



Many-to-Many

Eliminated Many-to-Many



Special Case

Pig's Ear

Object/Relational Impedance Mismatch

- Relational Model versus Object Model
- Persisting Objects in Relational Databases
 - Object → Relational Mapping to persist
 - Relational → Object Mapping to restore
- Object/Relational Mappers
 - Translation costs
- Object/Relational Mapping Frameworks
 - E.g. Spring/Hibernate, EJB Entity Beans

Q&A

Discussion Time

Recommended Reading

- Wiki: SQL, Relational DB
- MySQL Developer Zone: <https://dev.mysql.com/doc/>

Thank You

