COMP3311 Notes

1 Week 1

1.1 Intro to Database Systems

What technologies are used?
- PostgreSQL (v13)
- SQLite (v3.x)
- Python (v3.9+)
- psycopg2 (v2.8+)

Aims of data modelling:
- Describe what *information* is contained in the database
- Describe *relationships* between data items
- Describe *constraints* on data

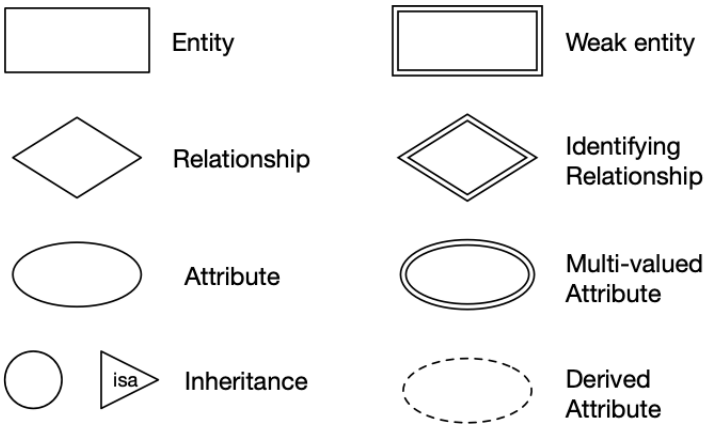
1.2 Entity-Relationship Data Modelling

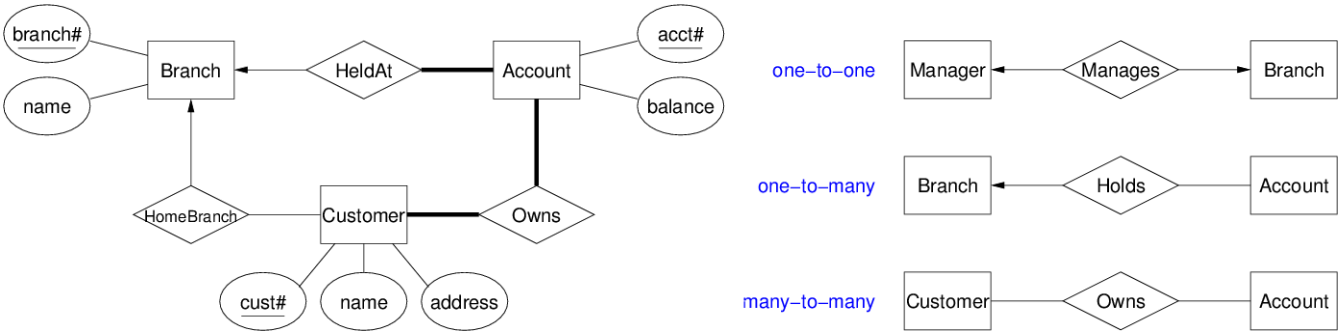
Intro to ER
ER has three major modelling constructs:

- **attribute:** *data item* describing a property of interest
- **entity:** collection of attributes describing *object of interest*
- **relationship:** *association* between entities (objects)

ER Diagrams
ER diagrams are a graphical tool for data modelling consisting of:

- a collection of *entity set* definitions
- a collection of *relationship set* definitions
- *attributes* associated with entity and relationship sets
- connections between entity and relationship sets





ER Class Hierarchies
ER implements *super* and sub class hierarchies.

- Superclasses have common properties with all entities in the hierarchy
- Subclasses are derived from the superclass and can be thought of as a child within the hierarchy

1.3 Relational Modelling

Intro to RM
World is modelled via tuples, relations and constraints.

Tuples are collections of values
- e.g (123456, John Smith, 75.2)

Relations are sets of tuples
- e.g (1,2,3), (3,2,1)

Constraints are logical statements on valid data
- e.g. zID is unique and $0 \leq \text{WAM} \leq 100$

Types of Constraints:
- *unique* = value of attribute is unique in relation
- *key* = chosen unique attribute to distinguish tuples
- *domain* = type of attribute, restrictions within type
- *referential integrity* = foreign key