Week 3

*Relations*

* Multiplicity constraints:
  + Cardinality constraints: When more than two entities in a relation, determine the multiplicity of one entity by fixing the remaining ones
    - Eg. Student 0:\* – Semester 1:\* – Course 1:\*
      * Zero or more students attend one or more courses over one or more semesters
  + Participation constraints: Mandatory if at least 1 minimum, optional otherwise
* Weak entities:
  + Entities that cannot exist without an “owner” entity
  + Cannot be solely defined with their own attributes, the “partial key” – to form a key, it needs to be combined with the primary key of the owner entity to have its own key

*EER Model*

* Defining superclass/subclass:
  + Specialisation: Top-down approach – identify superclass, then single out different attributes for subclasses
    - Identify relations between subclasses and other entities
  + Generalisation: Bottom-up approach – identify subclasses, then ascertain common attributes for superclass
  + Participation constraints: “Mandatory” (a superclass member must have a subclass) or “Optional” (subclasses are optional)
  + Disjoint constraints: Non-disjoint, or “And” (member can have multiple subclasses) or Disjoint, or “Or” (member can have only one subclass)

*Conceptual Database Design*

* 9 steps:
  1. Define entities (find nouns)
  2. Define relations (find verbs)
  3. Define attributes based on entities and relations
  4. Define attribute domains (including composite, derived and multi-value)
  5. Define keys (candidate, primary and alternate)
  6. Clarify entities using EER concepts (superclass/subclass)
  7. Remove redundancies (consider 1..1 relations)
  8. Compare model to user transactions/requirements
  9. Review, validate and iterate