The Entity-Relationship (ER) Model

1) Describes/Models
   a. Entities – real world objects
   b. Relationships – associations between entities
   c. Integrity constraints – conditions or rules that must hold
      i. Key constraint – must be unique
      ii. Participation constraint (on a relationship) – entity must have at least one relationship with the other entity

2) Features
   a. Weak Entities – entity requires another entity to be uniquely identified
   b. N-way relationships – relates more than two entities
   c. ISA Hierarchies – allows for specific sub-types of entities
   d. Aggregation – allows relationships between relationship sets (entities + relationships)

3) Diagram Crib Sheet

<table>
<thead>
<tr>
<th>Attribute Types</th>
<th>Line Types</th>
<th>Other Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Any number (partial participation)</td>
<td>ISA Hierarchy</td>
</tr>
<tr>
<td>Key</td>
<td>At most one (partial participation)</td>
<td>Relationship</td>
</tr>
<tr>
<td>Partial Key</td>
<td>At least one (total participation)</td>
<td>Joining weak entity</td>
</tr>
</tbody>
</table>

4) Example Diagram

5) Some Rules
   a. All normal entities must have a key
   b. All weak entities must have a partial key
   c. All weak entities must be connected via a relationship to a normal entity with total participation