Introduction to Some Requirements Specification Tools (EEM, ELH, ECD, EAP) -Some Basic Concepts-

Dr. Ernest Cachia
SSADM Diagram Relationships
Entity Life History (ELH) Diagrams

Some basic rules

1) List any events that affect data entities
2) Having an ERD of the required system, and working bottom-up, draw a “first-draft” ELH showing the “lives” of each data entity.
3) Refine the ELH by reviewing the same ERD this time top-down paying attention to exceptions, non-standard conditions and relationships.
Finding Events

- Events affect data entities in the system
- Use an Event/Entity Matrix (EEM)
- Uses “C” for Create; “D” for Delete and “M” for Modify

<table>
<thead>
<tr>
<th>Event Entity</th>
<th>Add New Cust.</th>
<th>Delete Cust.</th>
<th>Add New DVD</th>
<th>Check out DVD</th>
<th>Update Cust. Details</th>
<th>Update DVD Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Details</td>
<td>C</td>
<td>D</td>
<td></td>
<td></td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>DVD</td>
<td></td>
<td></td>
<td>C</td>
<td></td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Customer Status</td>
<td>C</td>
<td>D</td>
<td></td>
<td></td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>DVD Status</td>
<td></td>
<td></td>
<td>C</td>
<td></td>
<td>M</td>
<td></td>
</tr>
</tbody>
</table>
Constructing the ELH

• The following is *generally* true for any entity…
ELH for “Customer” Entity

Customer

- Start
  - Add New Cust.
- Effective life
  - Update Cust. Details*
- End
  - Delete Cust.
Remember that operations (i.e. logical processing parts) can be linked to the “lowest” events of the ELH as “dangling” small square symbols.
Effect Correspondence Diagrams (ECDs)

- Similar to ELHs, but…
- Event-centred as opposed to entity-centred (as in the case of ELHs).
- Shows which entities are effected by a particular event.
- Can also show any correspondence between different effects.
Constructing ECDs (1/9)

• **Basic rules** *(adapted from Weaver)*

1. Identify all entities which are affected by a particular event (each “effect box” in a given entity’s ELH)
   - In our example we shall consider the “Add New Cust.” event.
2. Identify simultaneous effects for a given event.
   • This is the concept of one event affecting more than one occurrence of the same entity
   • There are no such situations in our example and this concept doesn’t seem to be included in the course material
Constructing ECDs  

3. Identify where an event can have a mutually exclusive affect. This will lead to “option boxes” in the ECD.
   – In our example (possibly):

   ![Diagram](image.png)
4. Identify entities interactively (i.e. repeatedly) affected by an event. This will lead to “iteration boxes”.
   – As an example, using another event (not “Add New Cust.”)
Constructing ECDs (5/9)

5. Identify effects with a 1-to-1 correspondence and link with a double-arrowed line.

   One must ask:

   - Is there another entity occurrence or set of occurrences affected by the event affecting the occurrence of this entity?

   - In our example the creation of a new customer will also result in the creation of a new (empty) customer status entity (see next slide)
Constructing ECDs (6/9)
6. This step is deemed “obsolete”. It refers to grouping of iterated affections – if rule 3 is properly enforced then this rule should never have to be used.
Constructing ECDs (8/9)

7. Add any non-updated entities
   This is usually done to:
   - either provide output control on data
   - link data entities not directly linked via their LDS
Constructing ECDs  (9/9)

8. List the event data at the entry point (arrow) of the ECD.

- CustomerID
- Cust_addr
- Cust_tel
- etc...

Diagram:
- Customer
- CustomerID
- Cust_addr
- Cust_tel
- etc...
Enquiry Access Paths (EAPs)

- EAPs are used to model the access to data by enquiry triggers (i.e. events that are non-updating).
- EAPs are a common form of validating the RS LDS – a way of testing how it can be accessed.
Constructing EAPs (1/3)

**Basic rules** *(adapted from Weaver)*

1. Specify the enquiry name (i.e. the same name as used in the function definition)
   - In our example we can use a function “Query customer”. We shall assume that function definition reads as follows:
     ‘For a given ID number of an existing customer, the query will display the customer’s full details’
Constructing EAPs (2/3)

2. Specify the enquiry trigger (i.e. the data attribute in the enquiry that will trigger the access)
   – In our example this is clearly the customer ID. However, this can include other attributes that would allow selective triggering (i.e. access-refining attributes)
3. Specify the EAP

This is the actual drawing of the EAP and is in reality split up into the following six steps:

1. Identify entities to be accessed
2. Draw the fragment of the LDM (i.e. part of an ERD) which concerns the entities in “1”
3. Redraw the fragment as an EAP
4. Include the attributes needed to enter the EAP
5. Check the accessibility of all data in question
6. Include the entry point (as an arrow) on the EAP
EAP Construction Example
(a very simple case)

The entity to access is the DVD Title

ID number

Customer

Customer Detail Line

Customer

Customer Detail Line *