Monash University  
School of Information Systems and Management  
IMS 5024 IS Modelling  
Tutorial 8 -- Data Modelling - Attributes

Tutorial Objective:

- to identify appropriate attributes of entities and to ensure they are in Third Normal Form.
- Evaluate data modelling in terms of Blums’ taxonomy

Tutorial Tasks.

1. The purpose of getting a collection of un-normalised entity attributes into First Normal Form is to “remove repeating groups”.
   a. What does this mean in plain English?
   b. What is the practical consequence of not storing data in First Normal Form in a database?

2. The data in the following table contains an example of data which is not fully normalised.
   - Use the data in the table to describe how “anomalies” can occur when data is maintained which is not in third normal form.
   - Explain the purpose of the normalisation process and why it is desirable to have normalised data. Express the data in the table below in third normal form.

<table>
<thead>
<tr>
<th>Book-no</th>
<th>Copy</th>
<th>Call-no</th>
<th>Borrower-no</th>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1256</td>
<td>3</td>
<td>102.64c</td>
<td>12345</td>
<td>Adams</td>
<td>Brighton</td>
</tr>
<tr>
<td>3297</td>
<td>1</td>
<td>356.66d</td>
<td>35666</td>
<td>Boyle</td>
<td>Caulfield</td>
</tr>
<tr>
<td>2672</td>
<td>1</td>
<td>785.99e</td>
<td>24287</td>
<td>Boyle</td>
<td>Frankston</td>
</tr>
<tr>
<td>1256</td>
<td>1</td>
<td>102.64c</td>
<td>35926</td>
<td>Brown</td>
<td>Caulfield</td>
</tr>
<tr>
<td>3357</td>
<td>2</td>
<td>557.22a</td>
<td>23510</td>
<td>Dent</td>
<td>Prahran</td>
</tr>
<tr>
<td>6889</td>
<td>2</td>
<td>229.89d</td>
<td>35926</td>
<td>Brown</td>
<td>Caulfield</td>
</tr>
</tbody>
</table>

3. For each of the situations below identify the appropriate entities and draw an ER model to represent the situation.
   a) A company is made up of several departments with each department employing many people. The sales staff who work for the Sales Department write many sales orders which are each placed by one customer.
   b) Jet Away Travel sells tours to customers. Tours may either be package tours or specially arranged tours which are put together to suit the specific needs of a customer. Package tours are offered by tour operators while arranged tours are constructed by Jet Away Travel staff who make the necessary airline, hotel etc. bookings. Customers must confirm their tour bookings with a deposit. They are then invoiced for their trips, and full payment must be made before their departure date. Partial payments after the initial deposit has been made are accepted.
c) Video Library Loans System

A video library lends videotapes to borrowers who must be authorised members. When videos are borrowed and returned, the library staff must place them back on the appropriate shelf for other people to borrow. Late returns are penalised with a fine. The library staff must keep track of fines due and those which have been paid. Videos which are worn or damaged and those which are no longer popular must be taken off the shelves. The library staff must search through catalogues of new releases which arrive in the mail to find videos which might be popular with the library's members. When these new videotapes arrive, they must be put on to holding shelves at the back of the store according to which one of several groups (e.g. children’s, drama, comedy) they belong to. The library staff then create an entry for each new videotape in the catalogue database. The number assigned to the videotape in the database includes the copy number of the videotape where multiple copies exist. A sticker with this number is put on the videotape and it is placed on the shelves for borrowing.

4. Evaluate data modelling in terms of Blums’ taxonomy. Do you agree with the classification Blum assigned to process modelling.