WBS-FOR CREATING AN ER-MODEL

- Let $A(E_i) =$ the set of attributes of entity-set an $E_i$.
- Let $A(R_j) =$ the set of attributes (if any) of a relationship-set $R_j$.
  - For an $R_j$, if a collection of entities, one from each $E_i$ participating in $R_j$, can interact multiple times, then we need a primary key among the attributes $A(R_j)$ to distinguish those interactions. (See below; entity-attributes are not shown.)
  - In that case, each link’s cardinality-upper-bound $> 1$ or $= \infty$.

```
PAWS-    VISITS       SELECTED-
USERS   StartTimeDate, Duration  WEB-SITES
```

A sample table for VISITS

<table>
<thead>
<tr>
<th>PawsId</th>
<th>Web-URL</th>
<th>StartTimeDate</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>124-12-1234</td>
<td><a href="http://www.xyz.com">www.xyz.com</a></td>
<td>10:30:00+2011-Jan-01</td>
<td>2:30:10</td>
</tr>
<tr>
<td>124-12-1234</td>
<td><a href="http://www.xyz.com">www.xyz.com</a></td>
<td>12:50:00+2011-Jan-01</td>
<td>1:30:30</td>
</tr>
<tr>
<td>234-55-2222</td>
<td><a href="http://www.xyz.com">www.xyz.com</a></td>
<td>12:50:00+2011-Jan-01</td>
<td>2:00:10</td>
</tr>
<tr>
<td>234-55-2222</td>
<td><a href="http://www.uvw.com">www.uvw.com</a></td>
<td>12:50:00+2011-Jan-01</td>
<td>0:30:20</td>
</tr>
<tr>
<td>234-55-2222</td>
<td><a href="http://www.abc.com">www.abc.com</a></td>
<td>10:30:00+2011-Feb-02</td>
<td>0:10:30</td>
</tr>
</tbody>
</table>

- The value of "Duration" in the VISITS-table is determined by the values of other three attributes; this kind of data-dependencies are called functional dependencies and are written as
  
  PawsId, Web-URL, StartTimeDate → Duration

Question:

• What do the rows 1 and 2 in the sample table illustrate (why did I include them)? How about the 2nd and 3rd rows?
• What problems would arise for VISIT-table if we did not know the keys of SELECTED-WEB-SITES and PAWS-USERS?
A WBS FOR CREATING ER-MODELS

Create an ER-model

- Identify Entities $E_i$
  - Identify name and $A(E_i)$ for each $E_i$
- Identify Relation-ships $R_j$
  - Identify name & connecting $E_i$’s for each $R_j$
  - Identify $A(R_j)$ of each $R_j$
- Identify cardinalities of each $E_i$-$R_j$ link
  - Identify a primary key (if any) for $A(R_j)$.

Question:

•? State clearly how this WBS satisfies the property below (take the project to be "create an ER-model for an application").

"each work-unit in a WBS for a project must relate to one or more data items relevant to the project and vice-versa."

•? What is a good reason for no further decomposition of the work-unit "Identify name and $A(E_i)$ for each $E_i"$?

•? Suppose someone applied the above WBS to create an ER-model for data related to the web-site-visits and came up with the ER-model shown on the previous page. Which work-unit in the WBS would have produced which part(s) of the ER-model?

•? In what way the above WBS is right or wrong?

•? Is there another WBS which is as good as or better than the one above for creating an ER-model? (Explain your answers.)