Exercise 3 “Advanced Data Models”

Due until 28 May, 2008 before tutorial

Exercise 3.1[OWL]:
Suppose we have defined atomic classes “Conf” for conferences and “EuroCity” for European cities, and a property “heldIn” denoting the relationship between conferences and cities. We try to define the concept of all conferences held in European cities, and arrive at a first version as follows:

```xml
<owl:Class rdf:about="EuroConf">
  <rdfs:subClassOf rdf:resource="Conf"/>
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty rdf:resource="heldIn"/>
      <owl:someValuesFrom rdf:resource="EuroCity"/>
    </owl:Restriction>
  </rdfs:subClassOf>
</owl:Class>
```

1. What are the problems with the description above?

2. Give a correct description characterizing the concept “EuroConf”.

Exercise 3.2[OLAP]:
Briefly answer the following questions:

1. What is an Online Analysis Processing (OLAP) system? What is an Online Transaction Processing (OLTP) system? What is the difference between these two?

2. What are Relational OLAP (ROLAP) and Multidimensional OLAP (MOLAP)? What is the difference between them?

3. What is a star schema? Is it typically in BCNF? Why or why not?
Exercise 3.3[Data Cube] :
We provide a star schema of a sales data warehouse and a cross-tabulation according to states and years.

<table>
<thead>
<tr>
<th></th>
<th>WI</th>
<th>CA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>63</td>
<td>81</td>
<td>144</td>
</tr>
<tr>
<td>2006</td>
<td>38</td>
<td>107</td>
<td>145</td>
</tr>
<tr>
<td>2007</td>
<td>75</td>
<td>35</td>
<td>110</td>
</tr>
<tr>
<td>Total</td>
<td>176</td>
<td>223</td>
<td>399</td>
</tr>
</tbody>
</table>

1. Show the result of roll-up on location based on the data in the cross-tabulation. (1 pt.)
2. Write a collection of SQL queries\(^1\) to obtain the same result as the previous question. (2 pt.)
3. Write a collection of SQL queries to roll-up on locid followed by drill-down on pid, while retaining time dimension on year. (2 pt.)

\(^1\)Over the star schema, not over the cross-tabulation