Chapter 6

TSQL2

6.1. This exercise concerns the personnel database introduced in Chapter 5 (see Exercise 5.3).

a. Define the Employee relation as a bitemporal table using TSQL2’s CREATE TABLE statement.

b. Express the following in TSQL2 on this relation:
   i. What is the history of the maximum salary?
   ii. What is the history of the average salary?

Answer:

a. CREATE TABLE Employee (Name CHAR(30),
   Salary NUMERIC(8,2), Title CHAR(30),
   DateOfBirth DATE)
   AS VALID DAY AND TRANSACTION
b. i. SELECT MAX(Salary)
    FROM Employee
ii. SELECT AVG(Salary)
    FROM Employee

6.2. Show, with a concrete example relation, how a DELETE statement with a specified valid time can

a. not affect some tuples at all
b. remove some tuples entirely
c. remove a portion of some tuples

Show this relation before and after the update (see Example 6.15).

Answer:
Starting from the following Prescription table,
we execute the following deletion on December 1, 1996,

**DELETE FROM** Prescription  
**WHERE** Name = 'Melanie'  
**VALID PERIOD** '[1996-10-01 - 1997-03-30]'  

The following table is the result.

<table>
<thead>
<tr>
<th>Name</th>
<th>Drug</th>
<th>Valid Time</th>
<th>Transaction Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melanie</td>
<td>Proventil</td>
<td>[1996-09-01 - 1996-10-31]</td>
<td>[1996-09-01 - until changed]</td>
</tr>
</tbody>
</table>

Note that the first tuple of the original tuple is unaffected, the second tuple is partially affected (for the first month), and the third tuple is removed entirely, by setting its transaction stop time.

6.3. Show how the **UPDATE** statement in Example 6.17, executed on September 15, 1996, affects the following Prescription relation:

<table>
<thead>
<tr>
<th>Name</th>
<th>Drug</th>
<th>Dosage</th>
<th>Valid Time</th>
<th>Transaction Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melanie</td>
<td>Proventil</td>
<td>100</td>
<td>[1996-01-01 - 1996-08-31]</td>
<td>[1996-06-01 - until changed]</td>
</tr>
</tbody>
</table>

**Answer:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Drug</th>
<th>Dosage</th>
<th>Valid Time</th>
<th>Transaction Time</th>
</tr>
</thead>
</table>

The dosage remains at 100 for the period up to March 1, and after June 1.

6.4. Provide an example where

**CAST(VALID(A) AS ?) PRECEDES CAST(VALID(B) AS ?)**

could yield different results for different granularities replacing the "?".

**Answer:**
Let A be valid during **PERIOD** '1997-01-01 - 1997-06-01' and B be valid during **PERIOD** '1997-06-13 - 1997-07-04'. With "?" as **SECOND**, the predicate is true; with "?" as **YEAR**, the predicate is false.