CHAPTER 14

Databases

(Solutions to Odd-Numbered Problems)

Review Questions

1. The five necessary components of DBMS are hardware, software, data, users, and procedures.

3. In the relational model, a relation is a set of data organized in a two-dimensional tables. The tables are related together.

5. Some unary operations are *insert*, *delete*, *update*, *select*, and *project*.

7. The Structured Query Language (SQL) is a language standardized by the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO) for use on relational databases. Extensive Markup Language (XML) is a markup language designed to add markup information to text document, but it also has found its application as a query language in databases. SQL is used for relational databases and XML used for objected-oriented databases.

Multiple-Choice Questions

9. c 11. b 13. c 15. b 17. c 19. c
21. b 23. d 25. b

Exercises

27. The resulting relation is shown below:

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
</tr>
</tbody>
</table>
29. The resulting relation is shown below:

<table>
<thead>
<tr>
<th>B1</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
</tr>
<tr>
<td>29</td>
</tr>
</tbody>
</table>

31. The following shows the command:

```sql
select No, Unit
from COURSES
```

33. The following shows the command:

```sql
select Name
from PROFESSORS
```

35. The following shows the command:

```sql
select Courses
from STUDENTS
where ID = 2010
```

37. The following shows the command:

```sql
select *
from COURSE
where Unit = 3
```

39. The following shows the command:

```sql
select No
from DEPARTMENTS
where Name = 'Computer Science'
```

41. There are many different solutions to this question. A simple one is shown in Figure S14.41.

43. There are many different solutions to this question. A simple one is shown in Figure S14.43.

45. Boyce-Codd normal form (BCNF) is the revised 3NF that covers a special case not covered by 3NF. For more information see the references at the end of the chapter of the text.
Figure S14.41  Exercise 41

Figure S14.43  Exercise 43