CHAPTER 14

Databases

(Solutions to Review Questions and Problems)

Review Questions

Q14-1. The five necessary components of DBMS are hardware, software, data, users, and procedures.

Q14-3. In the relational model, a relation is a set of data organized in a two-dimensional table. The relations are related together.

Q14-5. Some unary operations are *insert*, *delete*, *update*, *select*, and *project*.

Q14-7. 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.

Problems

P14-1. The resulting relation is shown below:

A1	A2	A3
2	16	102
3	16	103

P14-3. The resulting relation is shown below:

A3
100
102
103
104

P14-5. The resulting relation is shown below:

C1	C2	C3
32	401	1025
33	405	1065
37	401	1006

P14-7. The following shows the command:

```
select ID, Name
from STUDENTS
```

P14-9. The following shows the command:

```
select Name
from DEPARTMENTS
```

P14-11. The following shows the command:

```
select Courses
from PROFESSORS
where Name ='Blake'
```

P14-13. The following shows the command:

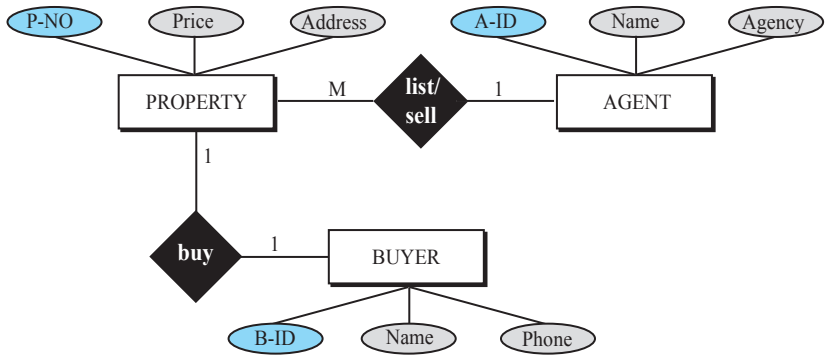
```
select Name
from STUDENTS
where Courses ='CIS015
```

P14-15. The relation is not in the 1NF form. Some intersections of rows and columns have more than one entries. The relation in 1NF is shown below.

A	*B*	*C*	*D*
1	70	65	14
2	25	24	12
2	25	24	18
2	32	24	12
2	32	24	18
2	71	24	12
2	71	24	18
3	32	6	18
3	32	11	18

P14-17. There are many different solutions to this question. A simple one is shown in Figure 14.1.

Figure 14.1 *Solution to P14-17*



PROPERTY

P-No	Price	Address
⋮	⋮	⋮

AGENT

A-ID	Name	Agency
⋮	⋮	⋮

BUYER

B-ID	Name	Phone
⋮	⋮	⋮

P14-19. A relation is in a third normal form (3NF) if it satisfies the two following conditions

a. It meets the requirements of second normal form (2NF)

b. No non-prime attribute is transitively dependent on the key. For example, consider the following simple table that shows the winners of a International Science Challenge where the key in the table is underlined.

Subject	Winner	Winner's Nationality

This table does not meet the requirements of 3NF because the non-prime attribute "Winner's Nationality" is transitively dependent on the key "Subject" via the non-prime attribute "Winner". By changing the table into the two following tables we can remove the anomaly.

Subject	Winner

Winner	Winner's Nationality