**Exercises Relational Model**

**1**- Suppose that each of the following Update operations is applied directly to the database state shown in Figure 5.6. Discuss all integrity constraints violated by each operation, if any, and the different ways of enforcing these constraints.

1. Insert <‘Sophia’, ‘M’, ‘Wood’, ‘973442298’, ‘1974-05-21’, ’23 S Lamar Blvd. Rd, Austin, TX’, ‘F’, 62000, ‘222445555’, 5> into EMPLOYEE.
2. Insert <‘6Sigma’, 4, ‘Austin’, 4> into PROJECT.
3. Insert <‘Information Technology’, 2, ‘987987987’, ‘2007-10-01’> into DEPARTMENT.
4. Insert <‘777624972’, 15, ‘40.0’> into WORKS\_ON.
5. Insert <‘888665555’, ‘John’, ‘M’, null, ‘Son’> into DEPENDENT.
6. Delete the DEPENDENT tuples with Essn = ‘987654321’.
7. Delete the DEPARTMENT tuples with Dnumber = 5.
8. Delete the WORKS\_ON tuples with Pnoe = 30.
9. Modify the Super\_ssn attribute of the EMPLOYEE tuple with Ssn = ‘333445555’ to null.
10. Modify the Pnumber attribute of the PROJECT tuple with Pnumber = 30 to 40

**2** - Consider the following relations for a library database that keeps track of users, suppliers, books, user registration and supply details:

USER(Ssn, Uname, Uaddress , Card#, Rdate)

BOOK(Book\_isbn, Book\_title, Publisher, Author)

BOOK\_BORROWED(Ssn, Card#, Issue\_date, Return\_date, Book\_isbn)

SUPPLIER(SSsn, Sname, Saddress , Account#)

SUPPLY(Book\_isbn, SSsn, price, Sdate)

Specify the foreign keys for this schema, stating any assumptions you make.

**3** – Consider the following relations for a database that keeps track of booking of apartments by a constructor. (OPTION refers to some specific optional requirements/designs stated by the client to be implemented in the flat):

APARTMENT(Apartment#, Model, Address, Price\_perSquareFt)

OPTION(Apartment#, Option\_name, Extra\_price)

BOOKING(Agent\_id, Apartment#, Date, Booking\_price)

AGENT(Agent\_id, Name, Phone)

First, specify the foreign keys for this schema, stating any assumptions you make. Then give an example of an insertion in the BOOKING and AGENT relations that violates the referential integrity constraints and of another insertion that does not.

**APARTMENT**

|  |  |  |  |
| --- | --- | --- | --- |
| Apartment# | Model | Address | Price\_perSquareFt |
| A105 | 3BHK | Waltham Abbey | 100 |
| A308 | 5BHK | Charlotte Street | 120 |
| B216 | 3BHK | Old Gloucester Street | 190 |
| B201 | 3BHK | Old Gloucester Street | 190 |

**OPTION**

|  |  |  |
| --- | --- | --- |
| Apartment# | Option\_name | Extra\_price |
| A105 | Balcony East Facing | 1000 |
| A308 | Window | 500 |
| B216 | Mezzanine Floor | 900 |

**BOOKING**

|  |  |  |  |
| --- | --- | --- | --- |
| Agent# | Apartment# | Date | Booking\_price |
| A1 | A105 | 12-01-2016 | 1000 |
| A2 | B216 | 02-02-2016 | 2000 |

**AGENT**

|  |  |  |
| --- | --- | --- |
| Agent\_id | Name | Phone |
| A1 | Will Smith | 44 20 7520 1490 |
| A2 | Ashley Rawdon | 44 20 8650 2999 |
| A3 | John Stuart | 44 20 7419 5000 |