**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.

* Insert <‘Sophia’, ‘M’, ‘Wood’, ‘973442298’, ‘1974-05-21’, ’23 S Lamar Blvd. Rd, Austin, TX’, ‘F’, 62000, ‘222445555’, 5> into EMPLOYEE.

- No podemos insertar ya que el super\_ssn 222445555 no existe en la columna Ssn y violaria la restriccion de integridad referencial.

* Insert <‘6Sigma’, 4, ‘Austin’, 4> into PROJECT.

- Se puede insertar sin problema.

* Insert <‘Information Technology’, 2, ‘987987987’, ‘2007-10-01’> into DEPARTMENT.

- Se puede insertar sin problema. El ssn asignado a Mgr\_ssn existe en la columna Ssn de la tabla employee cumpliendo la restriccion de integridad referecial.

* Insert <‘777624972’, 15, ‘40.0’> into WORKS\_ON.

- No podemos insertar, ya que ni el valor para Essn existe como Ssn de la tabla Employee, ni el valor para Pno existe como Pnumber en la tabla Project. Por lo que no se respetan las restricciones de integridad referencial.

* Insert <‘888665555’, ‘John’, ‘M’, null, ‘Son’> into DEPENDENT.

- En el supuesto de que el valor Bdate de la tabla Dependent pudiera ser Null, no habria ningun problema al insrtar, ya que el valor Essn que hace referencia a Ssn de la table Employee existe. En caso contrario, daria error al faltar el valor de Bdate.

* Delete the DEPENDENT tuples with Essn = ‘987654321’.

- No hay problema en eliminar, ya que la tabla Dependent no apunta a ninguna otra tabla.

* Delete the DEPARTMENT tuples with Dnumber = 5.

- Dará error al no indicar el comportamiento de la eliminacion (valor por defecto, eliminacion en cascada o null) con respecto a las referencias a otras tablas ya que la tablas Dept\_locations con el atributo Dnumber, la tabla Employee con el atributo Dno y la tabla Project con el atributo Dnum, apuntan a la tabla Department.

* Delete the WORKS\_ON tuples with Pnoe = 30.

- Se realiza sin problema.

* Modify the Super\_ssn attribute of the EMPLOYEE tuple with Ssn = ‘333445555’ to null.

- Se realiza sin problema, ya que el atributo Super\_ssn ya muestra el valor NULL y por tanto no contiene restriccion de existencia.

* Modify the Pnumber attribute of the PROJECT tuple with Pnumber = 30 to 40

- Se realiza sin problema. No esiste otro proyecto con la clave primaria 40 en la tabla.

**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.

- Ssn de Book\_borrowed hace referencia a la clave primaria Ssn de user.

- Card# de Book\_borrowed hace referencia a Card# de User.

- Book\_isbn de Book hace referencia a Book\_isbn de Book\_borrowed y de Supply.

- SSsn de Supply hace referencia a SSsn de Supplier.

**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#, Apartment#, Date, Booking\_price)

AGENT(Agent\_id, Name, Phone)

- Apartment# de Apartment a Apartment# de Option y Booking.

- Agent\_id de Agent a Agent# de Booking

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.

**- INSERT <> into BOOKING**

**- INSERT <> into AGENT**

**- INSERT <'A5', 'A105', '10-02-2024', 3000> into BOOKING**

- Error, el Agent\_id A5 no existe en AGENT

**- INSERT <'A3', 'Pepito perez', '96 123 45 67 89'> into AGENT**

- Error el Agent\_id A3 ya existe en la tabla AGENT

**- INSERT <'A5', 'Pepito perez', '96 123 45 67 89'> into AGENT**

- No hay error, el Agent\_id A5 no existe en la tabla AGENT

**- INSERT <'A5', 'A105', '10-02-2024', 3000> into BOOKING**

- No hay error, el Agent\_id A5 existe en AGENT y el Apartment# A105 tambien.

**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 |