



Tutorial: Creating and Populating Tables

Students at the National University of Ngendipura (NUN) buy books for their studies. They also lend and borrow books to and from other students. Your company, Apasaja Private Limited, is commissioned by NUN Students Association (NUNStA) to implement an online book exchange system that records information about students, books that they own and books that they lend and borrow.

The database records the name, faculty, and department of each student. Each student is identified in the system by her email. The database also records the date at which the student joined the university (year attribute).

The database records the title, authors, publisher, year and edition and the ISBN-10 and ISBN-13 for each book. The International Standard Book Number, ISBN-10 or -13, is an industry standard for the unique identification of books. It is possible that the database records books that are not owned by any students (because the owners of a copy graduated or because the book was advised by a lecturer for a course but not yet purchased by any student.)

The database records the date at which a book copy is borrowed and the date at which it is returned. We refer to this information as a loan record.

For auditing purposes the database records information about the books, the copies and the owners of the copies as long as the owners are students or as there are loan records concerning the copies. For auditing purposes the database records information about graduated students as long as there are loan records concerning books that they owned.

1. You are provided with the relational schema and with a sample instance of the database as of December 31, 2010. You are given the SQL data definition language code to create the schema and the SQL data manipulation language code to create a instance of the database.

- (a) Download the following files from Canvas “Files > Cases > Book Exchange”.

```
NUNStASchema.sql,  
NUNStASudent.sql,  
NUNStABook.sql,  
NUNStACopy.sql,  
NUNStALoan.sql,  
and NUNStAClean.sql.
```

- (b) Read the SQL files. What are they doing?

- (c) Use the files to create and populate a database (they may need some bug fixing).

2. Insertion, deletion, and update.

- (a) Insert the following new book.

```
1 INSERT INTO book VALUES (  
2 'An Introduction to Database Systems',
```

```

3 'paperback' ,
4 640 ,
5 'English' ,
6 'C. J. Date' ,
7 'Pearson' ,
8 '2003-01-01' ,
9 '0321197844' ,
10 '978-0321197849');

```

- (b) Insert the same book with a different ISBN13, for instance '978-0201385908'.
- (c) Insert the same book with the original ISBN13 but with a different ISBN10, for instance '0201385902'.
- (d) Insert the following new student.

```

1 INSERT INTO student VALUES (
2 'TIKKI TAVI' ,
3 'tikki@gmail.com' ,
4 '2010-01-01',
5 'School of Computing',
6 'CS',
7 NULL);

```

- (e) Insert the following new student.

```

1 INSERT INTO student (email, name, year, faculty, department)
2 VALUES (
3 'rikki@gmail.com',
4 'RIKKI TAVI',
5 '2010-01-01',
6 'School of Computing',
7 'CS');

```

- (f) Change the name of the department 'CS' to 'Computer Science'.

```

1 UPDATE student
2 SET department = 'Computer Science'
3 WHERE department = 'CS';

```

- (g) Delete the students from the 'chemistry' department.
- (h) Delete the students from the 'Chemistry' department.

3. Integrity constraints.

- (a) Some constraints in PostgreSQL are DEFERRABLE. What does it mean?
- (b) Insert the following copy of 'An Introduction to Database Systems' owned by Tikki.

```

1 INSERT INTO copy
2 VALUES (
3 'tikki@gmail.com',
4 '978-0321197849',
5 1,
6 'TRUE') ;

```

What is the difference between the following two SQL programs?

```

1 BEGIN TRANSACTION;
2 SET CONSTRAINTS ALL IMMEDIATE;
3 DELETE FROM book
4 WHERE ISBN13 = '978-0321197849' ;
5 DELETE FROM copy
6 WHERE book = '978-0321197849' ;
7 END TRANSACTION;

```

```
1 BEGIN TRANSACTION;
2 SET CONSTRAINTS ALL DEFERRED;
3 DELETE FROM book WHERE ISBN13 = '978-0321197849' ;
4 DELETE FROM copy WHERE book = '978-0321197849' ;
5 END TRANSACTION;
```

4. Modifying the Schema.

- (a) Argue that there is no need for the **available** field of the table **copy**. Make the necessary changes.
- (b) Argue that the table **student** should not contain both the fields **department** and **faculty**. Make the necessary changes.

References

- [1] W3schools online web tutorials. www.w3schools.com. Visited on 26 July 2021.
- [2] S. Bressan and B. Catania. *Introduction to Database Systems*. McGraw-Hill Education, 2006.
- [3] H. Garcia-Molina, J.D. Ullman, and J. Widom. *Database Systems: The Complete Book*. Pearson international edition. Pearson Prentice Hall, 2009.
- [4] R. Ramakrishnan and J. Gehrke. *Database Management Systems*. McGraw-Hill, 2002.