Programming: Stored Procedures and Triggers

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.

This tutorial uses the schema and data for the database created in "SQL: Creating and Populating Tables" including all the updates done during the tutorial.

Questions

Not all questions will be discussed during tutorial. You are expected to attempt them before coming to the tutorial. You may be randomly called to present your answer during tutorial. You are encouraged to discuss them on Canvas Discussion.

1. **Stored Functions and Procedures**.
   (a) Write a function/procedure `borrow_book_func` that, given the the email of a borrower (`VARCHAR(256)`), the ISBN13 of a book (`CHAR(14)`), and the borrow date (`DATE`), checks whether there is an available copy of the book, and, if that is the case, inserts

a new loan record of the copy by the borrower. Return a message indicating success or failure of insertion.

Additionally, execute the following scenario using your function.

> Adeline Wong, with email `awong007@msn.com`, tries to borrow 3 copies of `"Applied Calculus"` by Deborah Hughes-Hallett, et al. with ISBN13 value of `978-0470170526`.

2. **Triggers**.

   In our current database, Adeline Wong, with email `awong007@msn.com`, already borrowed 6 books and has not returned any of the books.

   We would like to introduce an additional constraint: A student may only borrow up to 6 books at a time. In other words, if a student has 6 books that have not been returned yet, the student cannot borrow another book.

   Let us explore two different strategies to enforce this constraint.

   (a) Create a trigger that checks if a student is trying to borrow copy of a book, the loan is only successful if that student does not already have 6 active loans.

   (b) Create a trigger to check that no student has more than 6 active loans.

References

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