Princess Sumaya University for Technology
The King Hussein School for Information Technology
Computer Science Department
Database Systems (11323)
Project

Purpose of Project

In this project, you (as a team) need to build a database information system application. You will use the methodology as learned from this class for database development. The system must be implemented on Oracle.

Groups

Groups of 2 or 3 students are required. Each group will present its work during the last week of classes.

Grading

The project carries 15% of the class grade. Different phases of the project carry different weights.

Project Description

University Bookstore Database

You have been hired by the general manager of the University Bookstore to develop a working database system to handle book inventory, course adoptions, and other pertinent transactions of a typical college bookstore. The manager wants to be able to access each employee's first and last name, date hired, salary, and which department of the bookstore they work in. Some employees may have the same name. Thus, an employee ID is also required.

The bookstore sells merchandise such as textbooks, clothing, office supplies, snack food, and other miscellaneous items. Each item of merchandise has a unique stock code that identifies it. Each item of merchandise is classified according to a category, such as books (B), supplies (S), clothing (C), etc. Each item of merchandise must belong to one category, but a category may contain several items. A category consists of the one-letter abbreviation (B, S, C, etc.) and a description of the category (books, supplies, clothing, etc.). In addition, include the following data in the Merchandise table: a description of the item, the author, the quantity on hand, the unit cost, whether it is a taxable item or not, and the selling price.

In addition to the merchandise, the manager also wants to store information about vendors, particularly the vendor's name and phone number. An item of merchandise is supplied by exactly one vendor, and a vendor may supply many different items. No two vendors have the same name.

The bookstore database must also store data about course offerings (sections) that are offered each term: the department code (FIN, MIS, CIS, etc.), course number (300, 320, etc.), section number (001, 002, etc.), professor name, and course title. The department code, course number, and section number are required to identify each course offering uniquely, e.g., FIN 300 001, MIS 300 002. The course title is the same for all sections of the same course, e.g., FIN 300 is "Financial Management" for all sections of FIN 300.

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The database must also store information concerning textbook adoptions. A section may adopt one or more textbooks, but a book may be adopted by none, one, or more than one section. Different sections of the same course may adopt different books. For each adoption, the bookstore also wants to know if the book is required or not.

Project Steps

You have to follow the steps for designing a database.

Part 1: Database Design

In this portion of the competition, you will create the ER diagram for the application and then convert that diagram to a relational model.

Draw the Entity Relationship (ER) diagram for the application. Specify the entities, their attributes, the relationships between the entities, as well as the cardinality and participation of the relationships. You may use software, such as ERDPlus, to draw and print the ER diagram. Upon completion of the ER diagram, convert it to an equivalent relational schema that would implement this database. Indicate the tables, columns, primary and foreign keys. Turn in a printout of the entire schema along with your ER diagram.   **(50 Pts)**

Part 2: Database Implementation using SQL

In this portion of the competition, you will perform various tasks to implement the University Bookstore database fully. Create all database tables using Oracle based on that relational schema. Name the database and its tables appropriately. Make sure to specify primary keys for all tables. Make sure all referential integrity constraints are enforced. Populate the tables with initial data (no less than five rows per table). Write a set of SQL statements to manipulate and query the database. You will create several queries.   **(50 Pts)**

Submitted Material

Going through database design steps, you have to document everything and submit documentation that includes all of the following:

1. An introduction describing your application, team members (maximum of 4), and how work was distributed among team members.

2. A section that illustrates and discusses the requirements of your application (requirements gathered from the user of this application).
3. Draw an ER/EER diagram that represents your application's requirements.
4. Show the database relational schema of your database after mapping from your ER diagram.
5. Show a sample of a database relational instance for all the relations in your database (an example of 5 records in each table)
6. Write SQL statements for the following (Show snapshots from implementing your sentences)
   a. Creating relations in your database, specifying all constraints and data types.
   b. Inserting records into each relation. (5 records in each table)
   c. Modifying a record based on a condition (based on your application needs)
   d. Deleting a record based on a condition. (based on your application needs)
   e. Complete each of the following queries. Name the queries as specified

   1. Write a query to perform an outer join on the two tables Category and Merchandise. List the fields Category description and Merchandise description. Include all categories, even those that do not have a matching item in the Merchandise table. Save as *Q1 OuterJoin*.

   2. Create a query that assigns the name of each department and the number of employees in that department. Order the records by Department name. Change the heading of the count column to read *Number of Employees*. Save as *Q2 Department Employees*.

   3. Prepare a list of taxable items from *Irving Publishers, Thatcher's Supplies*, or *West Publishing*. Order this list by vendor name. Include the vendor's name, the stock code, the description, and the selling price in the result. Save as *Q3 Taxable*.

   4. Create a query on the Adoptions table that asks the user to enter the Department (FIN, MIS, or SDS). The query will then return the Department Code, Course Number, Section Number, Stock Number, and title of every book adopted by that Department. Only include books—not every merchandise item. Save as *Q4 Parameter Query*.

   5. Create a query that returns the total inventory amount for all merchandise grouped by vendors. Sort ascending by vendors. Name the columns "Vendor" and "Total Inventory". Save as *Q5 Inventory*.

   6. Create a query that lists all employees (employee ID, last and first name) who earn more than the average salary for all employees. Order by Last name. Save as *Q6 Big Earners*.

   7. Create a query that lists all employees (employee ID, last name, first name, and salary) who earn more than the average salary for their ***department***. Save as *Q8 Average*.

Good Luck ☺