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| King Saud University  College of Computer and Information Sciences  Computer Science Department | |
| CSC380  Fundamentals Of Database Systems | First Semester  1440-1441 |

***CSC 380 Project***

**Library Management System**

Phase3

**Team#1**

1. **Overview**

We designed a Library Database Management System which is suitable for public libraries, it allows the library to keep track of information about borrowers. It also helps employees to arrange and retrieve information about variety of books in purpose of helping borrowers, intended to providing information such as number of available copies, list of books belong to practical category, maintaining the details of all item that were available in library.

1. **Requirement Specification**

* The library Database keeps track of the BOOKs information. Each BOOK has a title, a unique ISBN, a number of copies, and a publish date. Every book can be categorized in different genres. A BOOK can be written by many AUTHORS.
* Each AUTHOR has a name (first name, last name) and a unique ID. An AUTHOR can write many BOOKS.
* The library Database keeps track of BORROWERS information, such as their name, a unique ID and their phone number. Many BORROWERS can borrow many BOOKS, and the system will keep the date of borrowing day and the borrowing expiration date.
* Each EMPLOYEE has a unique ID, a name, a gender, a date of birth, a nationality, a salary and phone number.

1. **Entity Relationship Diagram**

A close up of a map

Description automatically generated

1. **Relational Schema**



1. **System users**

The group of users and Operations that can be performed and their views:

* + - 1. Employee:

**Description:**

An employee will mainly deal with the book and borrowing operations.

**Operations:**

* **Insert**:

Inserta new book to the library.

Insert a new borrower.

* **Delete**:

Delete an existing book by ISBN.

Delete an existing borrower by borrowerID.

* **Update:**

Update the NumberOfCopies for a book by ISBN.

* **Retrieve:**

Retrieve all books Titles for specific author by **join by** AuthorID.

Retrieve all books for a specific category by category.

**Views:**

* + - **From BOOK:** ISBN, Title, PublishDate, NumberOfCopies.
    - **From BOOK\_CATEGORY:** BISBN and Category.

2- Borrower:

**Description:**

The Borrower of the library is the person who is willing to borrow or have borrowed a book from the library.

**Operations:**

* **Retrieve:**

Retrieve books titles for a specific author by Fname and Lname.

Retrieve all books that he has borrowed by borrowerID.

**Views:**

* + - **From BOOK:** ISBN, Title, PublishDate, NumberOfCopies.
    - **From BORROWER:** borrowerID,Name,PhoneNo.
    - **From BORROW:** BookISBN, borrowerID, DateOfBorrowing, DateOfExpiration.

The Implementation for the DB using a DBMS :

CREATE SCHEMA LIBRARY ;

CREATE TABLE LIBRARY.EMPLOYEE

( EmployeeID CHAR(4) NOT NULL,

Salary FLOAT ,

EName VARCHAR(25) ,

Gender CHAR(1) ,

DateOfBirth DATE ,

Nationality VARCHAR(20) ,

PhoneNo CHAR(10) ,

PRIMARY KEY (EmployeeID) );

CREATE TABLE LIBRARY.BOOK (

ISBN CHAR(6) NOT NULL ,

Title VARCHAR(45) NOT NULL ,

PublishDate DATE ,

NumberOfCopies INT CHECK (NumberOfCopies >= 0 ) ,

PRIMARY KEY ( ISBN) );

CREATE TABLE LIBRARY.BORROWER (

borrowerID CHAR(4) NOT NULL,

Name VARCHAR(25) ,

PhoneNo CHAR(10) ,

PRIMARY KEY (borrowerID) );

CREATE TABLE LIBRARY.AUTHOR (

AuthorID CHAR(4) NOT NULL,

Fname VARCHAR(25) ,

Lname VARCHAR(25) ,

PRIMARY KEY (AuthorID) );

CREATE TABLE LIBRARY.BOOK\_CATEGORY (

BISBN CHAR(6) NOT NULL,

Category VARCHAR(25) NOT NULL,

PRIMARY KEY ( BISBN , Category ) ,

CONSTRAINT BISBNFK

FOREIGN KEY (BISBN) REFERENCES LIBRARY.BOOK(ISBN)

ON DELETE CASCADE ON UPDATE CASCADE );

CREATE TABLE LIBRARY.WRITEE (

AuthorID CHAR(4) NOT NULL ,

BookISBN CHAR(6) NOT NULL ,

PRIMARY KEY ( AuthorID , BookISBN ) ,

CONSTRAINT BookISBNFK1

FOREIGN KEY (BookISBN) REFERENCES LIBRARY.BOOK(ISBN)

ON DELETE CASCADE ON UPDATE CASCADE ,

CONSTRAINT AuthorIDFK

FOREIGN KEY (AuthorID) REFERENCES LIBRARY.AUTHOR(AuthorID)

ON DELETE CASCADE ON UPDATE CASCADE

);

CREATE TABLE LIBRARY.ARRANGE\_BY (

BookISBN CHAR(6) NOT NULL ,

Employee\_ID CHAR(4) NOT NULL ,

PRIMARY KEY ( BookISBN , Employee\_ID ) ,

CONSTRAINT BookISBNFK

FOREIGN KEY (BookISBN) REFERENCES LIBRARY.BOOK(ISBN)

ON DELETE CASCADE ON UPDATE CASCADE ,

CONSTRAINT EmployeeIDFK

FOREIGN KEY (Employee\_ID ) REFERENCES LIBRARY.EMPLOYEE(EmployeeID) ON DELETE CASCADE ON UPDATE CASCADE

);

CREATE TABLE LIBRARY.BORROW(

BookISBN CHAR(6) NOT NULL,

borrowerID CHAR(4) NOT NULL,

DateOfBorrowing DATE,

DateOfExpiration DATE,

PRIMARY KEY(BookISBN,borrowerID),

CONSTRAINT BookBFK

FOREIGN KEY (BookISBN) REFERENCES LIBRARY.BOOK(ISBN)

ON DELETE CASCADE ON UPDATE CASCADE,

CONSTRAINT borrowerIDFK

FOREIGN KEY (borrowerID) REFERENCES LIBRARY.BORROWER(borrowerID)

ON DELETE CASCADE ON UPDATE CASCADE);