**Computer Science 204: Database Programming**

*Assignment 1*

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**Part A. Create the database, tables, and relationships needed for the foundation of the public library database, pictured in Figure 1.**

/\*First, I need to create the actual database the tables are going to go in. I'll name the library Baldwin Library\*/

CREATE DATABASE BaldwinLibrary;

**A white screen with blue text

Description automatically generated**

/\*Next I need to make sure I am using the new database I created, I'll switch over to it\*/

USE BaldwinLibrary;

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Description automatically generated**

/\*Now I will create the tables. I'll start with the Author table. The AuthorID will be the Primary Key and using that constraint will take care of requiring it to be unique and not null. All authors should have a first and last name, so I will make those not null. A authors nationally could be unknown at the time of entry, so I will default that to unknown if it's not entered.\*/

CREATE TABLE Author

(AuthorID INT PRIMARY KEY,

AuthorFirstName VARCHAR(100) NOT NULL,

AuthorLastNAme VARCHAR(100) NOT NULL,

AuthorNationality VARCHAR(200))

;

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/\* Next, I'll make the Book table. BookID will be the primary key. All books should have a visible title, so I will make that not null and also give it a larger number of characters since titles can be pretty long. AuthorID will eventually be a foreign key to the Author table, so I will make sure the data type matches, and it is not null. \*/

CREATE TABLE Book

(BookID INT PRIMARY KEY,

BookTitle VARCHAR(500) NOT NULL,

AuthorID INT NOT NULL,

Genre VARCHAR(100))

;

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/\*Next, I will make the borrower table. It looks like this table has its own intended primary key, BorrowID, so I don’t need to worry about making a primary key based on two columns. ClientID and BookID cannot be null, as there has to be someone borrowing and a book being borrowed - they will also be foreign keys so I will make sure the data types match. \*/

CREATE TABLE Borrower

(BorrowID INT PRIMARY KEY,

ClientID INT NOT NULL,

BookID INT NOT NULL,

BorrowDate DATE NOT NULL)

;

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/\*Last, I will make the Client table. ClientID will be the primary key. In the real world any piece of data could be missing from the Clients profile, but they will always be using their library card which would have their ClientID on it. Because of this I will not make these fields not null. \*/

CREATE TABLE Client

(ClientID INT PRIMARY KEY,

ClientFirstName VARCHAR(100),

ClientLastName VARCHAR(100),

ClientDOB DATE,

Occupation VARCHAR(200))

;

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Description automatically generated**

/\*Now that the tables are made, I need to create the relationships between them.

AuthorID in the Book table is a foreign key to AuthorID in the Author table. One author can write many books. \*/

ALTER TABLE BOOK

ADD CONSTRAINT author\_forkey FOREIGN KEY (AuthorID)

REFERENCES AUTHOR (AuthorID)

;

/\*Next, I will add a foreign key from the Borrower table, BookID, to the Book table, BookID\*/

ALTER TABLE Borrower

ADD CONSTRAINT book\_forkey FOREIGN KEY (BookID)

REFERENCES Book (BookID)

;

/\*Next there is another foreign key from the Borrower table, ClientID to the Client table, ClientID\*/

ALTER TABLE Borrower

ADD CONSTRAINT client\_forkey FOREIGN KEY (ClientID)

REFERENCES Client (ClientID)

;

**A screenshot of a computer

Description automatically generated**

/\*All tables have been created, have appropriate constraints, primary keys, and foreign keys. \*/

**Part B. Use the tables provided in the prompt to fill the public library database.**

**Part C. Create queries for each of the fourteen questions in the assignment.**

1. Display all contents of the Clients table
2. First names, last names, ages and occupations of all clients
3. First and last names of clients that borrowed books in March 2018
4. First and last names of the top 5 authors clients borrowed in 2017
5. Nationalities of the least 5 authors that clients borrowed during the years 2015-2017
6. The book that was most borrowed during the years 2015-2017
7. Top borrowed genres for client born in years 1970-1980
8. Top 5 occupations that borrowed the most in 2016
9. Average number of borrowed books by job title
10. Create a VIEW and display the titles that were borrowed by at least 20% of clients
11. The top month of borrows in 2017
12. Average number of borrows by age
13. The oldest and the youngest clients of the library
14. First and last names of authors that wrote books in more than one genre

**Part D. When appropriate create index’s for your database.**