Please note that I used PostgreSQL to build the table and the project might contain specific functions that might only be available with PostgreSQL.

If you have questions, please email me at vermillionvincent@gmail.com.

A. Write the SQL statements in order to create the tables for the database. Use the Entity Relationship Diagram (ERD) of the database shown in Figure 1. For simplicity, we are assuming in this project that a book cannot be written by more than one author. You need to create the tables as well as the required constraints, including the keys (primary and foreign), and the relationships between tables.

CREATE TABLE Author (
AuthorID INTEGER PRIMARY KEY,
AuthorFirstName VARCHAR (30) NOT NULL,
AuthorLastName VARCHAR (30) NOT NULL,
AuthorNationality VARCHAR (30) NOT NULL
);

CREATE TABLE Book (
BookID INTEGER PRIMARY KEY,
BookTitle VARCHAR (50) NOT NULL,
AuthorID INTEGER NOT NULL,
Genre VARCHAR (30) NOT NULL,
FOREIGN KEY (AuthorID) REFERENCES Author(AuthorID)
);

CREATE TABLE Client (
ClientID INTEGER PRIMARY KEY,
ClientFirstName VARCHAR (30) NOT NULL,
ClientLastName VARCHAR (30) NOT NULL,
ClientDOB INTEGER NOT NULL,
Occupation VARCHAR(30) NOT NULL
);

CREATE TABLE Borrower (
BorrowID INTEGER PRIMARY KEY,
ClientID INTEGER NOT NULL,
BookID INTEGER NOT NULL,
BorrowDate DATE NOT NULL,
FOREIGN KEY (ClientID) REFERENCES Client(ClientID),
FOREIGN KEY (BookID) REFERENCES Book(BookID)
);

1

B. Populate your database with the sample set of data given to you in the tables below the assignment prompts.

INSERT INTO Author (AuthorID, AuthorFirstName, AuthorLastName, AuthorNationality)
VALUES (1, 'Sofia', 'Smith', 'Canada'),
(2, 'Maria', 'Brown', 'Brazil'),
(3, 'Elena', 'Martin', 'Mexico'),
(4, 'Zoe', 'Roy', 'France'),
(5, 'Sebastian', 'Lavoie', 'Canada'),
(6, 'Dylan', 'Garcia', 'Spain'),
(7, 'Ian', 'Cruz', 'Mexico'),
(8, 'Lucas', 'Smith', 'USA'),
(9, 'Fabian', 'Wilson', 'USA'),
(10, 'Liam', 'Taylor', 'Canada'),
(11, 'William', 'Thomas', 'Great Britain'),
(12, 'Logan', 'Moore', 'Canada'),
(13, 'Oliver', 'Martin', 'France'),
(14, 'Alysha', 'Thompson', 'Canada'),
(15, 'Isabelle', 'Lee', 'Canada'),
(16, 'Emily', 'Clark', 'USA'),
(17, 'John', 'Young', 'China'),
(18, 'David', 'Wright', 'Canada'),
(19, 'Thomas', 'Scott', 'Canada'),
(20, 'Helena', 'Adams', 'Canada'),
(21, 'Sofia', 'Carter', 'USA'),
(22, 'Liam', 'Parker', 'Canada'),
(23, 'Emily', 'Murphy', 'USA');

INSERT INTO Book (BookID, BookTitle, AuthorID, Genre)
VALUES (1, 'Build your database system', 1, 'Science'),
(2, 'The red wall', 2, 'Fiction'),
(3, 'The perfect match', 3, 'Fiction'),
(4, 'Digital Logic', 4, 'Science'),
(5, 'How to be aGreat lawyer', 5, 'Law'),
(6, 'Manage successful negotiations', 6, 'Society'),
(7, 'Pollution today', 7, 'Science'),
(8, 'A gray park', 2, 'Fiction'),
(9, 'How to be rich in one year', 8, 'Humor'),
(10, 'Their bright fate', 9, 'Fiction'),
(11, 'Black lines', 10, 'Fiction'),
(12, 'History of theater', 11, 'Literature'),
(13, 'Electrical transformers', 12, 'Science'),

(14, 'Build your big data system', 1, 'Science'),
(15, 'Right and left', 13, 'Children'),
(16, 'Programming using Python', 1, 'Science'),
(17, 'Computer networks', 14, 'Science'),
(18, 'Performance evaluation', 15, 'Science'),
(19, 'Daily exercise', 16, 'Well being'),
(20, 'The silver uniform', 17, 'Fiction'),
(21, 'Industrial revolution', 18, 'History'),
(22, 'Green nature', 19, 'Well being'),
(23, 'Perfect football', 20, 'Well being'),
(24, 'The chocolate love', 21, 'Humor'),
(25, 'Director and leader', 22, 'Society'),
(26, 'Play football every week', 20, 'well being'),
(27, 'Maya the bee', 13, 'Children'),
(28, 'Perfect rugby', 20, 'Well being'),
(29, 'The end', 23, 'Fiction'),
(30, 'Computer security', 1, 'Science'),
(31, 'Participate', 22, 'Society'),
(32, 'Positive figures', 3, 'Fiction');

INSERT INTO Client (ClientID, ClientFirstName, ClientLastName, ClientDOB, Occupation)
VALUES (1, 'Kaiden', 'Hill', '2006', 'Student'),
(2, 'Alina', 'Morton', '2010', 'Student'),
(3, 'Fania', 'Brooks', '1983', 'Food Scientist'),
(4, 'Courtney', 'Jensen', '2006', 'Student'),
(5, 'Brittany', 'Hill', '1983', 'Firefighter'),
(6, 'Max', 'Rogers', '2005', 'Student'),
(7, 'Margaret', 'McCarthy', '1981', 'School Psychologist'),
(8, 'Julie', 'McCarthy', '1973', 'Professor'),
(9, 'Ken', 'McCarthy', '1974', 'Securities Clerk'),
(10, 'Britany', 'O''Quinn', '1984', 'Violinist'),
(11, 'Conner', 'Gardner', '1998', 'Licensed Massage Therapist'),
(12, 'Mya', 'Austin', '1960', 'Parquet Floor Layer'),
(13, 'Thierry', 'Rogers', '2004', 'Student'),
(14, 'Eloise', 'Rogers', '1984', 'Computer Security Manager'),
(15, 'Gerard', 'Jackson', '1979', 'Oil Exploration Engineer'),
(16, 'Randy', 'Day', '1986', 'Aircraft Electrician'),
(17, 'Jodie', 'Page', '1990', 'Manufacturing Director'),
(18, 'Coral', 'Rice', '1996', 'Window Washer'),
(19, 'Ayman', 'Austin', '2002', 'Student'),
(20, 'Jaxson', 'Austin', '1999', 'Repair Worker'),
(21, 'Joel', 'Austin', '1973', 'Police Officer'),
(22, 'Alina', 'Austin', '2010', 'Student'),
(23, 'Elin', 'Austin', '1962', 'Payroll Clerk'),

3

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(24, 'Ophelia', 'Wolf', '2004', 'Student'),
(25, 'Eliot', 'McGuire', '1967', 'Dentist'),
(26, 'Peter', 'McKinney', '1968', 'Professor'),
(27, 'Annabella', 'Henry', '1974', 'Nurse'),
(28, 'Anastasia', 'Baker', '2001', 'Student'),
(29, 'Tyler', 'Baker', '1984', 'Police Officer'),
(30, 'Lilian', 'Ross', '1983', 'Insurance Agent'),
(31, 'Thierry', 'Arnold', '1975', 'Bus Driver'),
(32, 'Angelina', 'Rowe', '1979', 'Firefighter'),
(33, 'Marcia', 'Rowe', '1974', 'Health Educator'),
(34, 'Martin', 'Rowe', '1976', 'Ship Engineer'),
(35, 'Adeline', 'Rowe', '2005', 'Student'),
(36, 'Colette', 'Rowe', '1963', 'Professor'),
(37, 'Diane', 'Clark', '1975', 'Payroll Clerk'),
(38, 'Caroline', 'Clark', '1960', 'Dentist'),
(39, 'Dalton', 'Clayton', '1982', 'Police Officer'),
(40, 'Steve', 'Clayton', '1990', 'Bus Driver'),
(41, 'Melanie', 'Clayton', '1987', 'Computer Engineer'),
(42, 'Alana', 'Wilson', '2007', 'Student'),
(43, 'Carson', 'Byrne', '1995', 'Food Scientist'),
(44, 'Conrad', 'Byrne', '2007', 'Student'),
(45, 'Ryan', 'Porter', '2008', 'Student'),
(46, 'Elin', 'Porter', '1978', 'Computer Programmer'),
(47, 'Tyler', 'Harvey', '2007', 'Student'),
(48, 'Arya', 'Harvey', '2008', 'Student'),
(49, 'Serena', 'Harvey', '1978', 'School Teacher'),
(50, 'Lilly', 'Franklin', '1976', 'Doctor'),
(51, 'Mai', 'Franklin', '1994', 'Dentist'),
(52, 'John', 'Franklin', '1999', 'Firefighter'),
(53, 'Judy', 'Franklin', '1995', 'Firefighter'),
(54, 'Katy', 'Lloyd', '1992', 'School Teacher'),
(55, 'Tamara', 'Allen', '1963', 'Ship Engineer'),
(56, 'Maxim', 'Lyons', '1985', 'Police Officer'),
(57, 'Allan', 'Lyons', '1983', 'Computer Engineer'),
(58, 'Marc', 'Harris', '1980', 'School Teacher'),
(59, 'Elin', 'Young', '2009', 'Student'),
(60, 'Diana', 'Young', '2008', 'Student'),
(61, 'Diane', 'Young', '2006', 'Student'),
(62, 'Alana', 'Bird', '2003', 'Student'),
(63, 'Anna', 'Becker', '1979', 'Security Agent'),
(64, 'Katie', 'Grant', '1977', 'Manager'),
(65, 'Joan', 'Grant', '2010', 'Student'),
(66, 'Bryan', 'Bell', '2001', 'Student'),
(67, 'Belle', 'Miller', '1970', 'Professor'),
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(68, 'Peggy', 'Stevens', '1990', 'Bus Driver'),
(69, 'Steve', 'Williamson', '1975', 'HR Clerk'),
(70, 'Tyler', 'Williamson', '1999', 'Doctor'),
(71, 'Izabelle', 'Williamson', '1990', 'Systems Analyst'),
(72, 'Annabel', 'Williamson', '1960', 'Cashier'),
(73, 'Mohamed', 'Waters', '1966', 'Insurance Agent'),
(74, 'Marion', 'Newman', '1970', 'Computer Programmer'),
(75, 'Ada', 'Williams', '1986', 'Computer Programmer'),
(76, 'Sean', 'Scott', '1983', 'Bus Driver'),
(77, 'Farrah', 'Scott', '1974', 'Ship Engineer'),
(78, 'Christine', 'Lambert', '1973', 'School Teacher'),
(79, 'Alysha', 'Lambert', '2007', 'Student'),
(80, 'Maia', 'Grant', '1984', 'School Teacher');

INSERT INTO Borrower (BorrowID, ClientID, BookID, BorrowDate)
VALUES (1,35,17,'2016-07-20'),
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(3,42,8,'2016-10-03'),
(4,62,16,'2016-04-05'),
(5,53,13,'2017-01-17'),
(6,33,15,'2015-11-26'),
(7,40,14,'2015-01-21'),
(8,64,2,'2017-09-10'),
(9,56,30,'2017-08-02'),
(10,23,2,'2018-06-28'),
(11,46,19,'2015-11-18'),
(12,61,20,'2015-11-24'),
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(15,80,21,'2018-03-18'),
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(72,2,5,'2015-01-08'),
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(293,74,25,'2015-09-25'),
(294,47,14,'2018-02-01'),
(295,10,2,'2017-04-18'),
(296,16,21,'2016-10-03'),
(297,48,5,'2016-09-17'),
(298,72,3,'2017-02-10'),
(299,26,23,'2016-03-01'),
(300,49,23,'2016-10-25');

C. Write the following queries to retrieve the information detailed below.

Display all contents of the Clients table:
- SELECT * FROM Client;

First names, last names, ages and occupations of all clients:
- SELECT ClientFirstName, ClientLastName,extract(year from age(date_trunc('year', make_date(clientdob, 1, 1)))) AS age, Occupation
  FROM Client;

First and last names of clients that borrowed books in March 2018:
- SELECT ClientFirstName, ClientLastName
  FROM Client
  WHERE ClientID IN (SELECT ClientID FROM Borrower WHERE BorrowDate
  BETWEEN '2018-03-01' AND '2018-03-31');

First and last names of the top 5 authors clients borrowed in 2017:
- SELECT AuthorFirstName, AuthorLastName
  FROM Author
  WHERE AuthorID IN (SELECT AuthorID FROM Book WHERE BookID IN (SELECT
  BookID FROM Borrower WHERE BorrowDate BETWEEN '2017-01-01' AND
  '2017-12-31')
  GROUP BY AuthorID
  ORDER BY COUNT(*) DESC
  LIMIT 5);

Nationalities of the least 5 authors that clients borrowed during the years 2015-2017:
- SELECT AuthorNationality
  FROM Author
  WHERE AuthorID IN (SELECT AuthorID FROM Book WHERE BookID IN (SELECT
  BookID FROM Borrower WHERE BorrowDate BETWEEN '2015-01-01' AND
  '2017-12-31')
  GROUP BY AuthorID
  ORDER BY COUNT(*) ASC
  LIMIT 5);

The book that was most borrowed during the years 2015-2017:
- SELECT BookTitle
  FROM Book
  WHERE BookID IN (SELECT BookID FROM Borrower WHERE BorrowDate BETWEEN '2015-01-01' AND '2017-12-31'
  GROUP BY BookID
  ORDER BY COUNT(*) DESC
  LIMIT 1);

Top borrowed genres for client born in years 1970-1980:
- SELECT Genre
  FROM Book
  WHERE BookID IN (SELECT BookID FROM Borrower WHERE ClientID IN (SELECT ClientID FROM Client WHERE ClientDOB BETWEEN '1970' AND '1980'))
  GROUP BY Genre
  ORDER BY COUNT(*) DESC
  LIMIT 5;

Top 5 occupations that borrowed the most in 2016:
- SELECT Occupation, COUNT(*) as NumBorrows
  FROM Client
  WHERE ClientID IN (SELECT ClientID FROM Borrower WHERE BorrowDate BETWEEN '2016-01-01' AND '2016-12-31')
  GROUP BY Occupation
  ORDER BY NumBorrows DESC
  LIMIT 5;

Average number of borrowed books by job title:
- SELECT Occupation, AVG(NumBorrows) as AvgNumBorrows
  FROM (SELECT Occupation, COUNT(*) as NumBorrows
  FROM Client
  WHERE ClientID IN (SELECT ClientID FROM Borrower)
  GROUP BY Occupation) as AveNumBorrows
  GROUP BY Occupation;

Create a VIEW and display the titles that were borrowed by at least 20% of clients:
- CREATE VIEW PopularBooks AS
  SELECT BookTitle
  FROM Book
  WHERE BookID IN (SELECT BookID FROM Borrower GROUP BY BookID HAVING COUNT(*) >= 0.2 * (SELECT COUNT(*) FROM Client));
  SELECT * FROM PopularBooks;

13

The top month of borrows in 2017:
- SELECT DATE_PART('month', BorrowDate) as Month, COUNT(*) as NumBorrows
  FROM Borrower
  WHERE BorrowDate BETWEEN '2017-01-01' AND '2017-12-31'
  GROUP BY Month
  ORDER BY NumBorrows DESC
  LIMIT 1;

The oldest and the youngest clients of the library:
- SELECT ClientFirstName, ClientLastName, ClientDOB
  FROM Client
  WHERE ClientDOB = (SELECT MIN(ClientDOB) FROM Client) OR ClientDOB =
  (SELECT MAX(ClientDOB) FROM Client);

First and last names of authors that wrote books in more than one genre:
- SELECT DISTINCT AuthorFirstName, AuthorLastName
  FROM Author
  WHERE AuthorID IN (SELECT AuthorID FROM Book GROUP BY AuthorID HAVING
  COUNT(DISTINCT Genre) > 1);