

For the purpose of this assignment I am using Postgres as database mangement system.
Create Database for the library system

```
CREATE DATABASE
postgres=# \c library
You are now connected to database "library" as user "postgres".
```

Now we create the relations needed for our system with the specified constrains specified in the previews assignment.

Create Book relation with its constrains.

```
library=# CREATE TABLE BOOK (
library(# Title      CHAR(60) NOT NULL,
library(# Author     CHAR(40),
library(# ISBN_number INT PRIMARY KEY NOT NULL UNIQUE,
library(# Cost       DECIMAL(10,2) CHECK(Cost > 0))
library-# ;
CREATE TABLE
library=# \d BOOK
          Table "public.book"
   Column   |      Type      | Modifiers
-----+-----+-----
 title      | character(60)   | not null
 author     | character(40)   |
 isbn_number | integer         | not null
 cost       | numeric(10,2)   |
Indexes:
    "book_pkey" PRIMARY KEY, btree (isbn_number)
Check constraints:
    "book_cost_check" CHECK (cost > 0::numeric)
```

Create borrower relation and its constrains.

```
library=# CREATE TABLE BORROWER (
LibraryCard  INT PRIMARY KEY NOT NULL UNIQUE,
Name         CHAR(40) NOT NULL,
Address      CHAR(40),
PostalCode   CHAR(20),
PhoneNumber   CHAR(20),
MembershipDate DATE NOT NULL);
CREATE TABLE
library=# \d BORROWER
          Table "public.borrower"
   Column   |      Type      | Modifiers
-----+-----+-----
 librarycard | integer         | not null
 name        | character(40)   | not null
 address     | character(40)   |
 postalcode  | character(20)   |
 phonenumber | character(20)   |
 membershipdate | date           | not null
Indexes:
    "borrower_pkey" PRIMARY KEY, btree (librarycard)
```

Create BookCopy relation with its constrains.

```
library=# CREATE TABLE BOOKCOPY (  
ISBN_number INT NOT NULL UNIQUE references BOOK(ISBN_NUMBER),  
PublicationDate DATE,  
Sequence INT UNIQUE NOT NULL);  
CREATE TABLE  
library=# \d BOOKCOPY  
Table "public.bookcopy"  
Column | Type | Modifiers  
-----+-----+-----  
isbn_number | integer | not null  
publicationdate | date |  
sequence | integer | not null  
Indexes:  
"bookcopy_isbn_number_key" UNIQUE CONSTRAINT, btree (isbn_number)  
"bookcopy_sequence_key" UNIQUE CONSTRAINT, btree (sequence)  
Foreign-key constraints:  
"bookcopy_isbn_number_fkey" FOREIGN KEY (isbn_number) REFERENCES book(isbn_number)
```

Create Librarian relation with the required constrains.

```
library=# CREATE TABLE LIBRARIAN (  
LibrarianID INT PRIMARY KEY NOT NULL UNIQUE,  
Name CHAR(40) NOT NULL,  
PhoneNumber CHAR(20),  
Supervisor INT references LIBRARIAN(LibrarianID)  
);  
CREATE TABLE  
library=# \d LIBRARIAN  
Table "public.librarian"  
Column | Type | Modifiers  
-----+-----+-----  
librarianid | integer | not null  
name | character(40) | not null  
phonenumber | character(20) |  
supervisor | integer |  
Indexes:  
"librarian_pkey" PRIMARY KEY, btree (librarianid)  
Foreign-key constraints:  
"librarian_supervisor_fkey" FOREIGN KEY (supervisor) REFERENCES librarian(librarianid)  
Referred by:  
TABLE "librarian" CONSTRAINT "librarian_supervisor_fkey" FOREIGN KEY (supervisor) REFERENCES librarian(librarianid)
```

Create BookLended relation with all constrains.

```
library=# CREATE TABLE BOOKLENDED (  
library(# LibraryCard INT NOT NULL UNIQUE references BORROWER(LibraryCard),  
library(# CheckoutDate DATE UNIQUE NOT NULL,  
library(# ReturnDate DATE CHECK(ReturnDate > CheckoutDate),  
library(# ISBN_number INT references BOOK(ISBN_number),  
library(# Sequence INT references BOOKCOPY(sequence),  
library(# LibrarianID INT references LIBRARIAN(LibrarianID));  
CREATE TABLE  
library=# \d BOOKLENDED  
Table "public.booklended"  
Column | Type | Modifiers  
-----+-----+-----  
librarycard | integer | not null  
checkoutdate | date | not null  
returndate | date |  
isbn_number | integer |  
sequence | integer |  
librarianid | integer |  
Indexes:  
"booklended_checkoutdate_key" UNIQUE CONSTRAINT, btree (checkoutdate)  
"booklended_librarycard_key" UNIQUE CONSTRAINT, btree (librarycard)  
Check constraints:  
"booklended_check" CHECK (returndate > checkoutdate)  
Foreign-key constraints:  
"booklended_isbn_number_fkey" FOREIGN KEY (isbn_number) REFERENCES book(isbn_number)  
"booklended_librarianid_fkey" FOREIGN KEY (librarianid) REFERENCES librarian(librarianid)  
"booklended_librarycard_fkey" FOREIGN KEY (librarycard) REFERENCES borrower(librarycard)  
"booklended_sequence_fkey" FOREIGN KEY (sequence) REFERENCES bookcopy(sequence)
```

The resulting schema for our library system is completed.

```
library=# \d  
List of relations  
Schema | Name | Type | Owner  
-----+-----+-----+-----  
public | book | table | postgres  
public | bookcopy | table | postgres  
public | booklended | table | postgres  
public | borrower | table | postgres  
public | librarian | table | postgres  
(5 rows)
```