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)
Referenced by:
    TABLE "librarian" CONSTRAINT "librarian_supervisor_fkey" FOREIGN KEY (supervisor) REFERENCES librarian(librarianid)
```

```
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)
```

Create BookLended relation with all constrains.

```
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)
```

The resulting schema for our library system is completed.