Please view output from DB2 and screenshots in the folder (PNG images)
****the copy_no and bid of borrowed_by are switched (see borrowed_by.png)**

Question 1: :

Person(pid, fname, lname, phone)

```
CREATE TABLE Person
          (pid INTEGER NOT NULL,
          fname VARCHAR(20),
          lname VARCHAR(20),
          phone CHAR(10),
          PRIMARY KEY (pid))
```

Member(pid, registration_date_membership, expire_date_membership, membership_fees, overdue_fees)

```
CREATE TABLE Member
         (pid INTEGER NOT NULL,
         registration_date_memebership DATE,
         expire_date_memebership DATE,
         membership_fees DOUBLE,
         overdue_fees DOUBLE,
         PRIMARY KEY (pid),
         FOREIGN KEY (pid), REFERENCES Person))
```

Employee(pid, sin, salary, address)

```
CREATE TABLE Employee
         (pid INTEGER NOT NULL,
         sin CHAR(9) UNIQUE,
         salary DOUBLE,
         address VARCHAR(200),
         PRIMARY KEY (pid),
         FOREIGN KEY (pid) REFERENCES Person)
```

Sections(sid, pid, name)

```
CREATE TABLE Sections
        (sid INTEGER  NOT NULL,
        pid INTEGER NOT NULL,
        name  VARCHAR (50),
        PRIMARY KEY (sid)
        FOREIGN KEY (pid) REFERENCES Employee)
```

Books(bid, sid, edition, genre, title, isbn, shelf_no)

```
CREATE TABLE Books
        (bid INTEGER NOT NULL,
        sid INTEGER NOT NULL
        edition  VARCHAR (20),
        genre  VARCHAR (15),
        title  VARCHAR (20),
        isbn CHAR(9) UNIQUE,
        shelf_no INTEGER,
        PRIMARY KEY (bid)
        FOREIGN KEY (sid) REFERENCES person))
```

Publisher(pub_id, name, phone, address)

```
CREATE TABLE Publisher
    (pub_id CHAR (9)  NOT NULL,
    name  CHAR (20),
    address CHAR (100),
    phone CHAR (15),
    PRIMARY KEY (pub_id))
```

published_by(pub_id, bid)

```
CREATE TABLE Published_by
    (pub_id CHAR (9)  NOT NULL,
    bid CHAR (9)  NOT NULL,
    PRIMARY KEY (pub_id, bid),
    FOREIGN KEY (pub_id)
            REFERENCES Publisher,
    FOREIGN KEY (bid)
            REFERENCES Books)
```

////NOTE for grader: copy_no is NOT the number of copies. It is the *i*-th copy of the book in the library///

Book_instance(copy_no, bid)

```
CREATE TABLE Book_instance
     (copy_no INTEGER  NOT NULL,
     bid INTEGER NOT NULL,
     PRIMARY KEY (copy_num, bid)
     FOREIGN KEY(bid) REFERENCES(books))
```

Borrowed_by(pid, bid, copy_no, checkout_date, return_date)

```
CREATE TABLE Borrowed_by
     (pid INTEGER NOT NULL,
     bid INTEGER NOT NULL,
     copy_no INTEGER NOT NULL,
     checkout_date DATE,
     return_date DATE,
     PRIMARY KEY (pid, copy no, checkout_date),
     FOREIGN KEY (pid) REFERENCES Member,
     FOREIGN KEY (copy_no) REFERENCES Book_Instance
```

Author(auth_id, auth_name)

```
CREATE TABLE Author
     (auth_id INTEGER NOT NULL,
     auth_name VARCHAR(30) NOT NULL,
     PRIMARY KEY(auth_id))
```

//NOTE for grader: one book can have several co-authors, so this is a many-to-many relationship

Written_by(auth_id, bid)

```
CREATE TABLE Written_by
        (auth_id INTEGER NOT NULL,
        bid INTEGER NOT NULL,
        PRIMARY KEY(auth_id, bid)
        FOREIGN KEY (auth_id) REFERENCES author,
        FOREIGN KEY (bid) REFERENCES books)
```

Question 2:

```
CREATE TABLE Person (pid INTEGER NOT NULL, fname VARCHAR(20), lname VARCHAR(20),
phone CHAR(10), PRIMARY KEY (pid))

CREATE TABLE Member (pid INTEGER NOT NULL, registration_date_memebership DATE DEFAULT
CURRENT_DATE, expire_date_memebership DATE DEFAULT CURRENT_DATE, membership_fees
DOUBLE, overdue_fees DOUBLE, PRIMARY KEY(pid),FOREIGN KEY (pid) REFERENCES Person)

CREATE TABLE Employee (pid INTEGER NOT NULL, sin CHAR(9) NOT NULL UNIQUE, salary
DOUBLE, address VARCHAR(200), PRIMARY KEY (pid), FOREIGN KEY (pid) REFERENCES Person)

CREATE TABLE Sections (sid VARCHAR(10) NOT NULL, pid INTEGER NOT NULL, name
VARCHAR(50), PRIMARY KEY (sid), FOREIGN KEY (pid) REFERENCES Employee)

CREATE TABLE Books (bid INTEGER NOT NULL, sid VARCHAR(10) NOT NULL, Edition  VARCHAR
(100), Genre  VARCHAR (100), Title VARCHAR (100), ISBN CHAR(10) UNIQUE NOT NULL,
shelf_no INTEGER, PRIMARY KEY (bid), FOREIGN KEY (sid) REFERENCES Sections)

CREATE TABLE Written_by (auth_id INTEGER NOT NULL, bid INTEGER NOT NULL, PRIMARY
KEY(auth_id, bid), FOREIGN KEY (auth_id) REFERENCES author, FOREIGN KEY (bid)
REFERENCES Books)

CREATE TABLE Book_instance (copy_no INTEGER NOT NULL, bid INTEGER NOT NULL, PRIMARY
KEY (copy_no, bid), FOREIGN KEY (bid) REFERENCES Books)

CREATE TABLE Borrowed_by (pid INTEGER NOT NULL, bid INTEGER NOT NULL, copy_no INTEGER
NOT NULL, checkout_date DATE DEFAULT CURRENT_DATE NOT NULL, return_date DATE DEFAULT
CURRENT_DATE, PRIMARY KEY (pid, copy_no, bid, checkout_date), FOREIGN KEY (bid,
copy_no) REFERENCES Book_instance, FOREIGN KEY (pid) REFERENCES Member)
```

```
CREATE TABLE Publisher(pub_id CHAR(9)  NOT NULL, name  CHAR (20), address CHAR(100),
phone INT(15), PRIMARY KEY (pub_id))
```

```
CREATE TABLE Author(auth_id INTEGER NOT NULL,auth_name VARCHAR(30) NOT NULL, PRIMARY
KEY(auth_id))

CREATE TABLE Published_by(pub_id CHAR(9) NOT NULL, bid INTEGER NOT NULL,PRIMARY KEY
(pub_id, bid),FOREIGN KEY (pub_id)REFERENCES Publisher,FOREIGN KEY (bid)REFERENCES
Books)
```

Question 3:

```
insert into Employee values (1, '958484999', 14.50, 'Brookville, 4564, Montreal
j7v9u6')
insert into Employee values (2, '958484991', 14.50, 'Laval, 45, Montreal j7v9u6')
insert into Employee values (3, '958484992', 14.50, 'Brookville, 4564, Montreal
j7v9u6')
insert into Employee values (4, '958484993', 14, 'Dorval, 4, Montreal j7v9u6')
insert into Employee values (5, '958484994', 30.50, 'Brookville, 4564, Montreal
j3v6u8')
```

Question 4:

```
insert into Person values(1, 'Tabassum', 'Anika', '5145543454')
insert into Person values(2, 'Dumitrescu', 'Alina', '5155543454')
insert into Person values(3, 'Ahmed', 'Alia', '5145588884')
insert into Person values(4, 'Taran', 'Ana', '5145543454')
insert into Person values(5, 'Alexandru', 'Talia', '5142243454')
insert into Person values(6, 'Shan', 'Chiu', '5142243454')
insert into Person values(7, 'Ping', 'Pong', '5142243454')
insert into Person values(8, 'Alexandru', 'Maria', '5142243454')
insert into Person values(20, 'Matio', 'Mara', '5142243454')

insert into Member values (1, DEFAULT, DEFAULT, 3, 3)
insert into Member values (2, DEFAULT, DEFAULT, 0, 0)
insert into Member values (3, DEFAULT, DEFAULT, 0, 0)
insert into Member values (4, DEFAULT, DEFAULT, 0, 100.45)
insert into Member values (5, DEFAULT, '02/05/2015', 0, 100.45)
insert into Member values (20, DEFAULT, '02/06/2015', 0, 100.45)

insert into Sections values ('BIO01', 1, 'Biology')
insert into Sections values ('COMP02', 2, 'Computer Science')
insert into Sections values ('HIST03', 3, 'History')
insert into Sections values ('ART09', 1, 'Arts')
insert into Sections values ('SCI16', 1, 'Science')

insert into Books values (33, 'HIST03', 'Edition 3', 'History', 'The Amazing Life and
Strange Death of Captain Cook', '0571089895', 4352)
insert into Books values (32, 'HIST03', 'Edition 1', 'Ancient History', 'Babylon:
Mesopatamia and the Birth of Civilization', '0571089032', 4352)
insert into Books values (31, 'HIST03', 'Edition 7', 'Ancient History', 'Legends of
the Ancient World: The Life and Legacy of Queen Nefertiti', '0571089638', 4352)
insert into Books values (22, 'ART09', null, 'Pop Art', 'The Philosophy of Andy
Warhol: From A to B and Back Again', '0571580239', 3111)
insert into Books values (21, 'ART09', null, 'Abstract Expressionism', 'Jackson
Pollock', '0571585434', 3111)
insert into Books values (44, 'BIO01', null, 'Natural History', 'The Mesozoic Era:
The Age of Reptiles', '0572342563', 6432)
insert into Books values (43, 'BIO01', 'Edition 6', 'Immunology', 'Essential
Immunology', '0572342535', 6431)
insert into Books values (57, 'COMP02', 'Edition 2', 'Technology', 'The C Programming
Language', '0572325344', 3452)
insert into Books values (82, 'SCI16', 'Edition 9', 'Chemistry', 'General Chemistry',
'0572344535', 3673)

insert into Written_by values (3423, 22)
insert into Written_by values (2201, 44)
insert into Written_by values (2301, 31)
insert into Written_by values (2370, 33)
insert into Written_by values (234, 32)
insert into Written_by values (2201, 43)
insert into Written_by values (2301, 43)

insert into publisher values (‘aba’, ‘PinkBooks’, ‘Montreal’, ‘5147785432’)
insert into Publisher values ('acc','BlueBirdBooks','Waterloo','5197775560')
insert into Publisher values('dba','RisenStars','Dhaka','8855447')
insert into Publisher values ('ddd','ShomoyP','Dhaka','8866759')
insert into Publisher values ('zxy','AnnonyaProk','UK','55672345')

insert into Author values ('2201','Rowling')
insert into Author values (2301, 'Tolkien')
insert into Author values(2370,'Pratchett')
insert into Author values (22, ‘Humayun’)
insert into Author values (234, ‘Tahmina’)

insert into Published_by values(‘acc’,22)

insert into Book_instance values (30, 33)
insert into Book_instance values (1, 41)
............

insert into Borrowed_by values (2, 22, 2, '02/06/2013', '02/13/2013')
insert into Borrowed_by values (2, 2, 21, '02/15/2013', '02/26/2013')
insert into Borrowed_by values (3, 1, 22, '02/09/2013', '02/16/2013')
insert into Borrowed_by values (3, 1, 32, '02/07/2013', '02/14/2013')
insert into Borrowed_by values (4, 2, 43, '02/07/2013', '02/14/2013')
insert into Borrowed_by values (20, 2, 33, '02/11/2013', '02/22/2013')
```

Question 5:

1. Not_In:SELECT Books.title FROM Books WHERE Books.genre NOT IN (‘Ancient History’)

Description of what it is supposed to do: subquery; title of books with genres that are not ‘Ancient History’

2. Aggregation: SELECT count (DISTINCT genre) FROM Books WHERE Books.edition=’3’

Description of what it is supposed to do: Aggregation; how many different numbers of editon 3 are there in books

3. Normal: SELECT DISTINCT auth_name FROM Author

Description: displaying the names of all the authors from the table Author

4. Join: SELECT Title FROM Books, Written_by WHERE books.bid=Written_by.bid

Description: We display the titles of Books where Books.bid=Written_by.bid (the number of times the results are displayed is equal to the number of items in the Written_by table; also, since there are two bids in the Written_by table with Written_by.bid=43, the corresponding title i.e. Essential Immunology is listed twice)

5. Renaming column: SELECT fname,lname AS surname FROM Person WHERE fname=’Alexandru’

Description: We rename the column lname to surname and list only the names which have surname (previously lname) Alexandru

Question 6: Please see separate file for Question 6

Question 7:

List of all the titles of the books in the HIST03 section and the names of their authors:
CREATE VIEW history_list AS SELECT title, auth_name FROM books, author, written_by

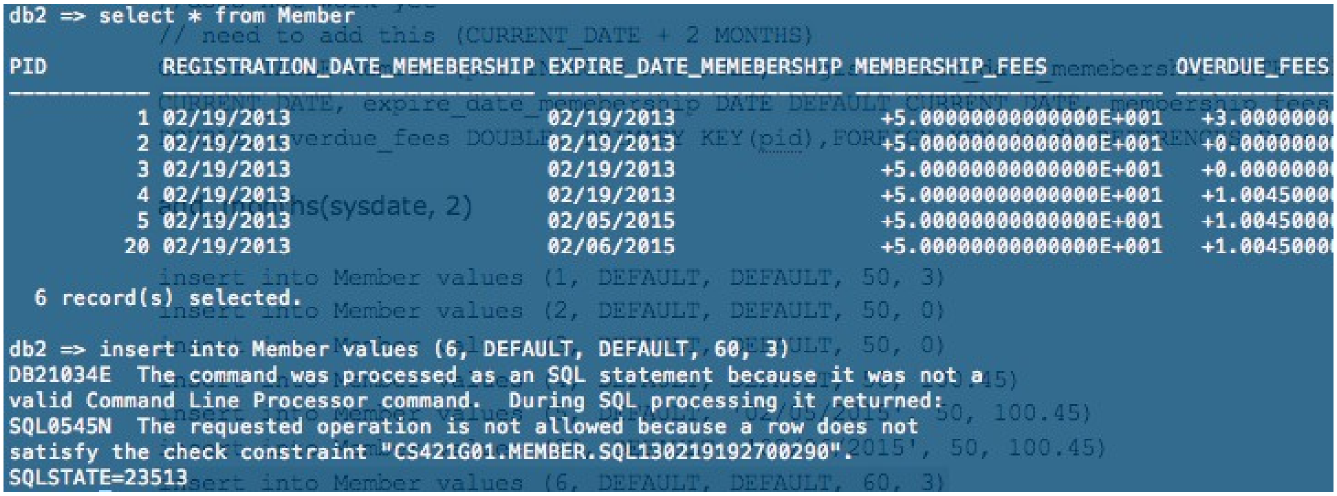
```
WHERE written_by.bid = books.bid AND author.auth_id = written_by.auth_id AND
books.sid = 'HIST03'
```

List of all the people with overdue books (fname, lname, title, copy_no):

```
CREATE VIEW overdue AS SELECT lname, fname, title, copy_no FROM person, books,
borrowed_by WHERE borrowed_by.return_date < CURRENT_DATE AND borrowed_by.pid =
person.pid AND books.bid = borrowed_by.bid
```

Question 8:

1. ALTER TABLE member ADD CHECK (membership_fees=50)



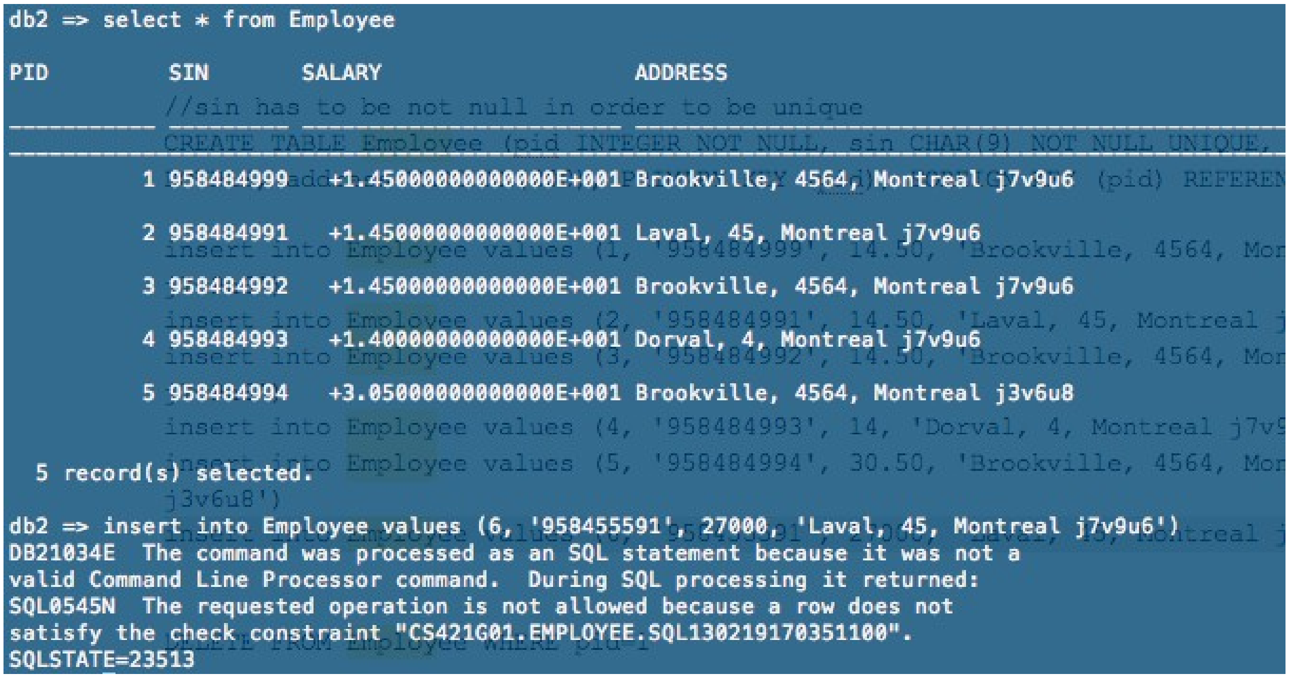
```
db2 => select * from Member

PID         REGISTRATION_DATE_MEMEBERSHIP EXPIRE_DATE_MEMEBERSHIP MEMBERSHIP_FEES          OVERDUE_FEES
----------- ----------------------------- ----------------------- ------------------------ ------------
          1 02/19/2013                    02/19/2013                +5.00000000000000E+001   +3.0000000
          2 02/19/2013                    02/19/2013                +5.00000000000000E+001   +0.0000000
          3 02/19/2013                    02/19/2013                +5.00000000000000E+001   +0.0000000
          4 02/19/2013                    02/19/2013                +5.00000000000000E+001   +1.0045000
          5 02/19/2013                    02/05/2015                +5.00000000000000E+001   +1.0045000
         20 02/19/2013                    02/06/2015                +5.00000000000000E+001   +1.0045000

  6 record(s) selected.

db2 => insert into Member values (6, DEFAULT, DEFAULT, 60, 3)
DB21034E  The command was processed as an SQL statement because it was not a
valid Command Line Processor command.  During SQL processing it returned:
SQL0545N  The requested operation is not allowed because a row does not
satisfy the check constraint "CS421G01.MEMBER.SQL130219192700290".
SQLSTATE=23513
```

2. ALTER TABLE employee ADD CHECK (salary<25000)



```
db2 => select * from Employee

PID         SIN       SALARY                   ADDRESS
----------- --------- ------------------------ --------------------------------------------------

          1 958484999 +1.45000000000000E+001 Brookville, 4564, Montreal j7v9u6

          2 958484991 +1.45000000000000E+001 Laval, 45, Montreal j7v9u6

          3 958484992 +1.45000000000000E+001 Brookville, 4564, Montreal j7v9u6

          4 958484993 +1.40000000000000E+001 Dorval, 4, Montreal j7v9u6

          5 958484994 +3.05000000000000E+001 Brookville, 4564, Montreal j3v6u8

  5 record(s) selected.

db2 => insert into Employee values (6, '958455591', 27000, 'Laval, 45, Montreal j7v9u6')
DB21034E  The command was processed as an SQL statement because it was not a
valid Command Line Processor command.  During SQL processing it returned:
SQL0545N  The requested operation is not allowed because a row does not
satisfy the check constraint "CS421G01.EMPLOYEE.SQL130219170351100".
SQLSTATE=23513
```