Relational Model:

- Mother(**hcid**, addr, profession, name, dob, bloodtype, email, phone)
- Father(**fid**, hcid, addr, profession, name, dob, bloodtype, email, phone)
- Parent(**pid**, *hcid*, fid**)
    - ❖ *hcid** foreign key references Mother;
    - ❖ *fid** foreign key references Father;
- HealthcareInstitution(**instid**, web, name, phone, email, addr)
- CommunityClinic(**instid**)
    - ❖ *instid** foreign key references HealthcareInstitution.
- BirthCenter(**instid**)
    - ❖ *instid** foreign key references HealthcareInstitution.
- Midwife(**practid**, name, email, phone, *instid**)
    - ❖ *instid** foreign key references HealthcareInstitution.
- Pregnancy(**pregnum, pid**, birthplace, expdatebirth, expdatelastperiod, expdateusound, finalestimatedate, *ppractid*, bpractid*, instid**)
    - ❖ *pid** foreign key reference Parent;
    - ❖ *ppractid** foreign key reference Midwife;
    - ❖ *bpractid** foreign key reference Midwife;
    - ❖ *instid** foreign key reference BirthCenter.
- Appointment(**appid**, appdate, apptime, *pregnum*, practid*, pid**)
    - ❖ (*pregnum*, pid**) foreign keys reference Pregnancy;
    - ❖ *practid** foreign key references Midwife;
- Observation(**obsid**, obstime, obsdate, obsnote, *appid**)
    - ❖ *appid** foreign key references Appointment.
- InfoSession(**infoid**, language, infodate, infotime, *practid*, pid**)
    - ❖ *practid** foreign key references Midwife;
    - ❖ *pid** foreign key references Parent.
- Baby(**babyid**, babyname, dob, gender, bloodtype, borntime, numofbaby, *pregnum*, pid**)
    - ❖ (*pregnum*, pid**) foreign keys reference Pregnancy.
- LabTech(**techid**, name, phone)
- MedicalTest(**testid**, presdate, sampledate, labdate, testtype, results, *practid*, pid*, pregnum*, babyid*, techid**)
    - ❖ *practid** foreign key references Midwife;
    - ❖ (*pid*, pregnum**) foreign keys references Pregnancy;
    - ❖ *babyid** foreign key references Baby;
    - ❖ *techid** foreign key references LabTech;

Pending constraints:

- All Primary Keys must be NOT NULL and UNIQUE in our database;
- Every Foreign Key should equal the Primary Key that it references;
- All attributes should have the correct data type as we defined when creating tables.
- For entity Appointment, the appdate should be earlier than the presdate, sampledate and labdate of MedicalTest for the same pregnum and pid of Pregnancy;
- The obsdate of Observation should be earlier than the appdate of Appointment for the same appid.
- For entity MedicalTest, the labdate associated with a test cannot be a date before the date the test was prescribed.

SQL Queries:

- **Q5(a):**

```
--Q5(a):
SELECT appdate, apptime, Mother.hcid, Mother.name, Mother.phone
FROM Appointment INNER JOIN Midwife ON Appointment.practid = Midwife.practid
INNER JOIN Parent ON Appointment.pid = Parent.pid INNER JOIN Mother ON Parent.hcid = Mother.hcid
WHERE Midwife.name = 'Marion Girard' AND appdate BETWEEN '2022-03-21' AND '2022-03-25';
```

```
db2 => connect to cs421;

   Database Connection Information

 Database server        = DB2/LINUXX8664 11.5.4.0
 SQL authorization ID   = CWANG131
 Local database alias   = CS421

db2 => --Q5(a):
SELECT appdate, apptime, Mother.hcid, Mother.name, Mother.phone
FROM Appointment INNER JOIN Midwife ON Appointment.practid = Midwife.practid
INNER JOIN Parent ON Appointment.pid = Parent.pid INNER JOIN Mother ON Parent.hcid = Mother.hcid
WHERE Midwife.name = 'Marion Girard' AND appdate BETWEEN '2022-03-21' AND '2022-03-25';
db2 => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
APPDATE      APPTIME  HCID                                                  NAME                                                       PHONE
---------- -------- ----------------------------------------------------- ---------------------------------------------------------- -------------------
03/21/2022 14:00:00 DORZ19970401                                          Dora Zhang                                                 +17556254187
03/22/2022 11:00:00 MIXC19850323                                          Mixian Chen                                                +1778987372
03/25/2022 12:30:00 VICG19890327                                          Victoria Gutierrez                                         +1138829381

  3 record(s) selected.
```

- **Q5(b):**

```
--Q5(b):
SELECT labdate, results FROM
MedicalTest INNER JOIN Parent ON MedicalTest.pid = Parent.pid
INNER JOIN Mother ON Parent.hcid = Mother.hcid
WHERE Mother.name = 'Victoria Gutierrez' AND pregnum = 2 AND testtype = 'blood iron';
```

```
db2 => --Q5(b):
SELECT labdate, results FROM
MedicalTest INNER JOIN Parent ON MedicalTest.pid = Parent.pid
INNER JOIN Mother ON Parent.hcid = Mother.hcid
WHERE Mother.name = 'Victoria Gutierrez' AND pregnum = 2 AND testtype = 'blood iron';
db2 => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
LABDATE      RESULTS
---------- ---------------------------------------------------
06/03/2022 result#3

  1 record(s) selected.
```

- **Q5(c):**

```
--Q5(c):
SELECT HealthcareInstitution.name, COUNT(*) NoOfPregnancies FROM
HealthcareInstitution INNER JOIN Midwife ON HealthcareInstitution.instid = Midwife.instid
INNER JOIN Pregnancy ON Midwife.practid = Pregnancy.ppractid
INNER JOIN Parent ON Pregnancy.pid = Parent.pid
WHERE YEAR(expdatebirth) = 2022 AND MONTH(expdatebirth) = 07
GROUP BY HealthcareInstitution.name;
```

```
db2 => --Q5(c):
SELECT HealthcareInstitution.name, COUNT(*) NoOfPregnancies FROM
HealthcareInstitution INNER JOIN Midwife ON HealthcareInstitution.instid = Midwife.instid
INNER JOIN Pregnancy ON Midwife.practid = Pregnancy.ppractid
INNER JOIN Parent ON Pregnancy.pid = Parent.pid
WHERE YEAR(expdatebirth) = 2022 AND MONTH(expdatebirth) = 07
GROUP BY HealthcareInstitution.name;
db2 => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
NAME                                                                                  NOOFPREGNANCIES
------------------------------------------------------------------------------------- ---------------
Lac-Saint-Louis                                                                                     3
Mississauga Hospital                                                                                1

  2 record(s) selected.
```

- **Q5(d):**

```
--Q5(d):
WITH cte AS(SELECT practid FROM HealthcareInstitution
            INNER JOIN Midwife ON HealthcareInstitution.instid = Midwife.instid
            WHERE HealthcareInstitution.name = 'Lac-Saint-Louis')
SELECT Mother.hcid, name, phone FROM Pregnancy INNER JOIN Parent ON Pregnancy.pid = Parent.pid
INNER JOIN Mother ON Parent.hcid = Mother.hcid
WHERE Pregnancy.finalestimatedate > '2022-02-24'
AND ppractid IN (SELECT practid FROM cte) OR bpractid IN (SELECT practid FROM cte);
```

```
db2 => --Q5(d):
WITH cte AS(SELECT practid FROM HealthcareInstitution
            INNER JOIN Midwife ON HealthcareInstitution.instid = Midwife.instid
            WHERE HealthcareInstitution.name = 'Lac-Saint-Louis')
SELECT Mother.hcid, name, phone FROM Pregnancy INNER JOIN Parent ON Pregnancy.pid = Parent.pid
INNER JOIN Mother ON Parent.hcid = Mother.hcid
WHERE Pregnancy.finalestimatedate > '2022-02-24'
AND ppractid IN (SELECT practid FROM cte) OR bpractid IN (SELECT practid FROM cte);
db2 => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
HCID                                             NAME                                             PHONE
------------------------------------------------ ------------------------------------------------ --------------------
VICG19890327                                     Victoria Gutierrez                               +1138829381
MIXC19850323                                     Mixian Chen                                      +1778987372
DORZ19970401                                     Dora Zhang                                       +17556254187
ABBX19900302                                     Abby Xin                                         +15166418472

  4 record(s) selected.
```

- **Q5(e):**

```
--Q5(e):
SELECT DISTINCT Mother.hcid, name FROM Mother INNER JOIN Parent ON Mother.hcid = Parent.hcid
INNER JOIN Pregnancy ON Parent.pid = Pregnancy.pid
INNER JOIN Baby ON Pregnancy.pregnum = Baby.pregnum AND Pregnancy.pid = Baby.pid
WHERE numofbaby > 1;
```

```
db2 => --Q5(e):
SELECT DISTINCT Mother.hcid, name FROM Mother INNER JOIN Parent ON Mother.hcid = Parent.hcid
INNER JOIN Pregnancy ON Parent.pid = Pregnancy.pid
INNER JOIN Baby ON Pregnancy.pregnum = Baby.pregnum AND Pregnancy.pid = Baby.pid
WHERE numofbaby > 1;
db2 => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
HCID                                             NAME
------------------------------------------------ ------------------------------------------------
VICG19890327                                     Victoria Gutierrez

  1 record(s) selected.
```

Midwife Information:

- **Q6(a):**

```
--Q6(a):
CREATE VIEW midwifeinfo(practid, name, phone, email, facility_name, facility_addr)
AS SELECT practid, Midwife.name, Midwife.phone, Midwife.email, HealthcareInstitution.name, addr
FROM Midwife INNER JOIN HealthcareInstitution ON Midwife.instid = HealthcareInstitution.instid;
```

- **Q6(b):**

```
db2 => --Q6(a):
CREATE VIEW midwifeinfo(practid, name, phone, email, facility_name, facility_addr)
AS SELECT practid, Midwife.name, Midwife.phone, Midwife.email, HealthcareInstitution.name, addr
FROM Midwife INNER JOIN HealthcareInstitution ON Midwife.instid = HealthcareInstitution.instid;
db2 => db2 (cont.) => db2 (cont.) => DB20000I  The SQL command completed successfully.
```

- **Q6(c):**

```
--Q6(c):
SELECT * FROM midwifeinfo
LIMIT 5;
```

```
db2 => --Q6(c):
SELECT * FROM midwifeinfo
LIMIT 5;
db2 => db2 (cont.) =>
PRACTID                 NAME                    PHONE           EMAIL                   FACILITY_NAME
            FACILITY_ADDR
----------------------- ----------------------- --------------- ----------------------- -----------------------------
oashley188              Olivia Ashley           +4298506933     olivia66@mail.com       Local Health Integration Network
            1360 Notre-Dame St W
eelizabeth873           Emma Elizabeth          +166482642      emma@gmail.com          Community Health Centres
            4500 WEllington St
asusan472               Ava Susan               +1758275024     avasusan@mail.com       Lac-Saint-Louis
            103 Rue Jacques-le Ber
cjane671                Charlotte Jane          +1678461942     charj52@mail.com        eHealth Ontraio
            1600 University Rd
semily123               Sophia Emily            +4649164242     sophia@qq.com           Mississauga Hospital
            1107 Lorne Park Rd

  5 record(s) selected.
```

- **Q6(d):**

```
--Q6(d)
SELECT * FROM midwifeinfo
WHERE facility_name = 'Lac-Saint-Louis'
LIMIT 5;
```

```
db2 => --Q6(d)
SELECT * FROM midwifeinfo
WHERE facility_name = 'Lac-Saint-Louis'
LIMIT 5;
db2 => db2 (cont.) => db2 (cont.) =>
PRACTID                          NAME                    PHONE               EMAIL                                           FACILITY_NAME
                 FACILITY_ADDR
------------------------------ ------------------------ ------------------- ----------------------------------------------- ------------------------
------------------------------ ------------------------
asusan472                        Ava Susan               +1758275024         avasusan@mail.com                               Lac-Saint-Louis
                 103 Rue Jacques-le Ber
mgirard121                       Marion Girard           +1425583752         marion@qq.com                                   Lac-Saint-Louis
                 103 Rue Jacques-le Ber

  2 record(s) selected.
```

- **Q6(e):**

```
--Q6(e):
INSERT INTO midwifeinfo VALUES('lmoon138', 'Lucy Moon', '+14356265746', 'lucymoon@mail.com', 'eHealth Ontraio',
'1600 University Rd');
```

```
db2 => --Q6(e):
INSERT INTO midwifeinfo VALUES('lmoon138', 'Lucy Moon', '+14356265746', 'lucymoon@mail.com', 'eHealth Ontraio',
                    '1600 University Rd');
db2 => db2 (cont.) => DB21034E  The command was processed as an SQL statement because it was not a
valid Command Line Processor command.  During SQL processing it returned:
SQL0150N  The target fullselect, view, typed table, materialized query table,
range-clustered table, or staging table in the INSERT, DELETE, UPDATE, MERGE,
or TRUNCATE statement is a target for which the requested operation is not
permitted.  SQLSTATE=42807
db2 =>
```

- When I tried to insert a record into the midwifeinfo VIEW, it showed an error since we cannot insert a row into a view since view is an unmaterialized relation that can be used to present necessary information or summary. If we want to insert new records into the database, we insert them into tables.

Check Constraints:

- **Q7:**

```
ALTER TABLE MedicalTest ADD CONSTRAINT C1 CHECK(labdate >= MedicalTest.presdate);

INSERT INTO MedicalTest VALUES(009, '2021-04-01', '2021-04-01', '2021-02-01', 'blood iron', 'result#10',
                    'semily123', 'abbykevin001', 1, 'rd001', 'jj001');
```

```
db2 => --Q7:
ALTER TABLE MedicalTest ADD CONSTRAINT C1 CHECK(labdate >= MedicalTest.presdate);
db2 => DB20000I  The SQL command completed successfully.
db2 => INSERT INTO MedicalTest VALUES(009, '2021-04-01', '2021-04-01', '2021-02-01', 'blood iron', 'result#10',
                    'semily123', 'abbykevin001', 1, 'rd001', 'jj001');
db2 (cont.) => 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 "CWANG131.MEDICALTEST.C1".  SQLSTATE=23513
db2 => quit;
DB20000I  The QUIT command completed successfully.
cwang131@winter2022-comp421:~/courses/COMP421/p2$
```