Relational Model

1. Midwives (midwife name, midwife email, midwife phone number, midwife practitioner id, HI id)

    HI id is a foreign key referring to Health Institutions

2. Health Institutions (HI name, HI email, HI phone number, HI website, HI address, HI id)

3. Clinics (HI id)

    HI id is a foreign key referring to Health Institutions

4. Birthing Centers (HI id)

    HI id is a foreign key referring to Health Institutions

5. Parents (parent id, m hcardid, father id)

    m hcardid is a foreign key referring to Mothers

    father id is a foreign key referring to Fathers

6. Technicians (t id, t name, t phone number)

7. Mothers (m name, m hcardid, m date of birth, m address, m phone number, m email, m profession, blood type)

8. Fathers (father id, f name, f hcardid, f date of birth, f address, f phone number, f email, f profession, blood type)

9. Appointment (appointment id, aDate, aTime, pregnancy number, parent id, midwife practitioner id, HI id)

    pregnancy number, parent id are foreign keys referring to Pregnancies

    midwife practitioner id is a foreign key referring to Midwives

    HI id is a foreign key referring to Health Institutions

10. Medical Tests (test id, type, test prescribed date, sample taken date, lab work done date, result, pregnancy number, parent id, midwife practitioner id, baby id, technician id)

    pregnancy number, parent id are foreign keys referring to Pregnancies

    midwife practitioner id is a foreign key referring to Midwives

    baby id is a foreign key referring to Babies

    technician id is a foreign key referring to Technicians

11. Information Sessions (IS id, ISDate, ISTime, language, midwife practitioner id)

    midwife practitioner id is a foreign key referring to Midwives

12. Info Session Registration (IS id, parent id, attendance)

13. Notes (appointment id, time, content)

appointment id is a foreign key referring to Appointments

14. Pregnancies (parent id, pregnancy times, expected time frame for birth (year-month), due date based on last menstrual period, due date based on ultrasound test, final estimated due date, interested, homebirth, primary midwife practitioner id, backup midwife practitioner id, HI id)

parent id is a foreign key referring to Parents

primary midwife practitioner id is a foreign key referring to Primary Midwives

backup midwife practitioner id is a foreign key referring to Backup Midwives

HI id is a foreign key referring to Birthing Centers

15. Babies (baby id, date of birth, time of birth, gender, blood type, bname, pregnancy number, parent id)

pregnancy number, parent id are foreign keys referring to Pregnancies

Pending Constraints

1. The phone number is stored in type VARCHAR(15), and it can contain extension code or some characters.
2. The expected time frame for birth (year-month) is stored as DATE (yyyy-mm-01).
3. The contents of notes are supposed to be not null, otherwise, the notes should not be created.
4. The mothers who is currently pregnant and have not yet given birth are decided by unborn babies since the estimated due date may be unpunctual.
5. The primary midwife and the backup midwife should be different person, and they can be employed by distinct facilities.
6. Some attributes (e.g., the due date based on dating ultrasound test) are missing before the results of medical tests come out, but they should eventually be available.
7. We currently cannot disallow a pair of parents cannot form twice.

8. There might be some person who do not know their blood type before taking blood iron test, hence the blood type attribute can be null when we create tables.

9. We cannot enforce a test should belong to at least one or only one of mothers or babies.

10. If a pair of parents is not interested in this system, then they would not attend any appointments or take any medical tests.

SQL Queries

(a)

```
WITH Temp(date, time, hcardid) AS
(
    SELECT date, time, hcardid from appointments A, parents P
    WHERE A.parent_id = P.parent_id
    AND practitioner_id = (SELECT practitioner_id FROM midwives
                           WHERE name = 'Marion Girard')
    AND date >= '2022-03-21' AND date <= '2022-03-25'
)
SELECT date, time, Temp.hcardid, mname, phone FROM Temp, mothers
WHERE Temp.hcardid = mothers.hcardid
;
```

```
db2 => WITH Temp(date, time, hcardid) AS
(
    SELECT date, time, hcardid from appointments A, parents P
    WHERE A.parent_id = P.parent_id
    AND practitioner_id = (SELECT practitioner_id FROM midwives
                           WHERE name = 'Marion Girard')
    AND date >= '2022-03-21' AND date <= '2022-03-25'
)
SELECT date, time, Temp.hcardid, mname, phone FROM Temp, mothers
WHERE Temp.hcardid = mothers.hcardid
;
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (
cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
DATE       TIME     HCARDID     MNAME                          PHONE
---------- -------- ----------- ------------------------------ --------------
03/23/2022 14:00:00        4643 Victoria Gutierrez             613-464-9370

  1 record(s) selected.
```

(b)

```
SELECT lab_date, result FROM tests
WHERE type = 'blood iron' AND pregnancy_num = 2
AND parent_id IN ( SELECT parent_id FROM parents P, mothers M
                   WHERE P.hcardid = M.hcardid AND mname = 'Victoria
Gutierrez')
;
```

```
db2 => SELECT lab_date, result FROM tests
WHERE type = 'blood iron' AND pregnancy_num = 2
AND parent_id IN ( SELECT parent_id FROM parents P, mothers M
                   WHERE P.hcardid = M.hcardid AND mname = 'Victoria Gutierrez')
;
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
LAB_DATE   RESULT

---------- --------------------------------------------------------------------
--------------------------------------------------------------------------------
--------------------------------------------------
10/28/2021 mother blood test: A

  1 record(s) selected.
```

(c)

```
WITH Temp(practitioner_id, hi_id, estdued) AS
(
    SELECT practitioner_id, M.hi_id, (CASE WHEN estdued IS NULL THEN expdueym
                                           ELSE estdued END) AS estdued
    FROM pregnancies P, midwives M
    WHERE primary_practitioner_id = practitioner_id
)
SELECT hname, COUNT(*) as total_pregnum FROM Temp, health_institutions H
WHERE Temp.hi_id = H.hi_id AND estdued BETWEEN '2022-07-01' AND '2022-07-31'
GROUP BY Temp.hi_id, hname
;
```

```
db2 => WITH Temp(practitioner_id, hi_id, estdued) AS
(
    SELECT practitioner_id, M.hi_id, (CASE WHEN estdued IS NULL THEN expdueym
                                           ELSE estdued END) AS estdued
    FROM pregnancies P, midwives M
    WHERE primary_practitioner_id = practitioner_id
)
SELECT hname, COUNT(*) as total_pregnum FROM Temp, health_institutions H
WHERE Temp.hi_id = H.hi_id AND estdued BETWEEN '2022-07-01' AND '2022-07-31'
GROUP BY Temp.hi_id, hname
;
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (
cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
HNAME                            TOTAL_PREGNUM
-------------------------------- -------------
Credit Birth center                          1
Blossom Valley Clinic                        2
Goddess Birth center                         1

  3 record(s) selected.
```

(d)

```
WITH A(practitioner_id, parent_id) AS   -- parents who unborn baby
(
    SELECT primary_practitioner_id, parent_id FROM pregnancies
```

```
    WHERE pregnancy_num IN ( SELECT pregnancy_num FROM babies
                             WHERE dateofbirth IS NULL AND timeofbirth IS
NULL )
    AND parent_id IN ( SELECT parent_id FROM babies
                       WHERE dateofbirth IS NULL AND timeofbirth IS NULL )
), B(practitioner_id) AS    -- midwives employed by Lac-Saint-Louis
(
    SELECT practitioner_id FROM midwives M, health_institutions H
    WHERE M.hi_id = H.hi_id AND H.hname = 'Lac-Saint-Louis'
)
SELECT hcardid, mname, phone FROM mothers
WHERE hcardid IN (
    SELECT hcardid FROM parents
    WHERE parent_id IN (
        SELECT parent_id FROM A
        WHERE practitioner_id = (SELECT practitioner_id FROM B)
    )
)
;
```

```
db2 => WITH A(practitioner_id, parent_id) AS   -- parents who unborn baby
(
    SELECT primary_practitioner_id, parent_id FROM pregnancies
    WHERE pregnancy_num IN ( SELECT pregnancy_num FROM babies
                             WHERE dateofbirth IS NULL AND timeofbirth IS NULL )
    AND parent_id IN ( SELECT parent_id FROM babies
                       WHERE dateofbirth IS NULL AND timeofbirth IS NULL )
), B(practitioner_id) AS    -- midwives employed by Lac-Saint-Louis
(
    SELECT practitioner_id FROM midwives M, health_institutions db2 (cont.) => H
    WHERE M.hi_id = H.hi_id AND H.hname = 'Lac-Saint-Louis'
)
SELECT hcardid, mname, phone FROM mothers
WHERE hcardid IN (
    SELECT hcardid FROM parents
    WHERE parent_id IN (
        SELECT parent_id FROM A
        WHERE practitioner_id = (SELECT practitioner_id FROM B)
db2 (cont.) =>     )
)
;
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.
) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (
cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
db2 (cont.) =>

HCARDID     MNAME                          PHONE
----------- ------------------------------ --------------
       7530 Tracy Herrera                  250-266-7937

  1 record(s) selected.
```

(e)

```
WITH Temp(hcardid) AS
(
    SELECT hcardid FROM parents
    WHERE parent_id in ( SELECT parent_id FROM babies
                         GROUP BY pregnancy_num, parent_id
                         HAVING COUNT(*) >= 2 )
)
```

```
SELECT M.hcardid, mname FROM Temp, mothers M
WHERE Temp.hcardid = M.hcardid
;
```

```
db2 => WITH Temp(hcardid) AS
(
    SELECT hcardid FROM parents
    WHERE parent_id in ( SELECT parent_id FROM babies
                         GROUP BY pregnancy_num, parent_id
                         HAVING COUNT(*) >= 2 )
)
SELECT M.hcardid, mname FROM Temp, mothers M
WHERE Temp.hcardid = M.hcardid
;
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.
) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
HCARDID     MNAME
----------- ----------------------------
       8128 Candice Head

  1 record(s) selected.
```

Midwife Information

(a)

```
CREATE VIEW midwifeinfo(practitioner_id, name, phone, email, hname, address)
AS
    SELECT practitioner_id, M.name, M.phone, M.email, hname, address
    FROM midwives M, health_institutions H
    WHERE M.hi_id = H.hi_id
;
```

(b)

```
db2 => CREATE VIEW midwifeinfo(practitioner_id, name, phone, email, hname, address) A
S
    SELECT practitioner_id, M.name, M.phone, M.email, hname, address
    FROM midwives M, health_institutions H
    WHERE M.hi_id = H.hi_id
;
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => DB20000I  The SQL command
 completed successfully.
```

(c)

```
SELECT * FROM midwifeinfo
LIMIT 5
;
```

```
db2 => SELECT * FROM midwifeinfo
LIMIT 5
;
db2 (cont.) => db2 (cont.) =>
PRACTITIONER_ID NAME                     PHONE          EMAIL
                                         HNAME          ADDRESS
-------------- ------------------------- -------------- ------------------------------
---------------------------------------- ---------------------------- -------------------------
------------------------------------------------------------------------
          1001 Dominga Thomas                 204-975-3312    DomingaJThomas@armyspy.com
                                              Lac-Saint-Louis                4845 Bayfield St, Stouffvi
lle, ON L4A 1T2
          1002 Kate Weiner                    250-674-1510    KateGWeiner@dayrep.com
                                              Credit Birth center            4029 Silver Springs Blvd,
Calgary, AB T3E 0K6
          1003 Pat Cola                       613-478-3242    PatPCola@teleworm.us
                                              Blossom Valley Clinic          1750 Royal Avenue, New Wes
tminster, BC V3L 5H1
          1004 Shemika Urbanski               819-622-7549    ShemikaSUrbanski@dayrep.com
                                              Blossom Valley Clinic          1750 Royal Avenue, New Wes
tminster, BC V3L 5H1
          1005 Betty Rea                      519-990-0990    BettyLRea@armyspy.com
                                              Publishing Birth center        2665 Goyeau Ave, Windsor,
ON N9A 1H9

  5 record(s) selected.
```

(d)

```
SELECT * FROM midwifeinfo
WHERE hname = 'Lac-Saint-Louis'
LIMIT 5
;
```

```
db2 => SELECT * FROM midwifeinfo
WHERE hname = 'Lac-Saint-Louis'
LIMIT 5
;
db2 (cont.) => db2 (cont.) => db2 (cont.) =>
PRACTITIONER_ID NAME                     PHONE          EMAIL
                                         HNAME                  ADDRESS

-------------- ------------------------- -------------- ------------------------------
---------------------------------------- ---------------------------- -------------------------
------------------------------------------------------------------------
          1001 Dominga Thomas                 204-975-3312    DomingaJThomas@armyspy.com
                                              Lac-Saint-Louis                4845 Bayfield St, Stouffvi
lle, ON L4A 1T2
          1007 Lisa Neal                      514-757-5465    LisaJNeal@jourrapide.com
                                              Lac-Saint-Louis                4845 Bayfield St, Stouffvi
lle, ON L4A 1T2

  2 record(s) selected.
```

(e)

```
INSERT INTO midwifeinfo(practitioner_id, name, phone, email, hname, address)
VALUES
(1008, 'Ilene Higgins', '416-223-5492', 'IleneJHiggins@rhyta.com', 'Credit
Birth center', '4029 Silver Springs Blvd, Calgary, AB T3E 0K6')
;
```

```
db2 => INSERT INTO midwifeinfo(practitioner_id, name, phone, email, hname, address) VALUES
(1008, 'Ilene Higgins', '416-223-5492', 'IleneJHiggins@rhyta.com', 'Credit Birth center', '4029 Si
lver Springs Blvd, Calgary, AB T3E 0K6')
;
db2 (cont.) => db2 (cont.) => DB21034E  The command was processed as an SQL statement because it w
as 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
```

Explanation: We create this view based on other tables with their own logics. If this view can be used for inserting other records, those records might violate some logics in the original tables.

Check Constraints

```
ALTER TABLE tests
ADD CHECK (prescribed_date <= lab_date)
;
```

```
db2 => ALTER TABLE tests
ADD CHECK (prescribed_date <= lab_date)
;
db2 (cont.) => db2 (cont.) => DB20000I  The SQL command completed successfully.
```

```
INSERT INTO tests(test_id, type, prescribed_date, sample_date, lab_date,
                  result, pregnancy_num, parent_id, practitioner_id, baby_id,
tech_id) VALUES
(9006, 'blood iron', DATE '2021-01-01', DATE '2021-01-02', DATE '2011-01-03',
'N/A', 1, 4001, 1001, 7003, 8001)
;
```

```
db2 => INSERT INTO tests(test_id, type, prescribed_date, sample_date, lab_date,
                  result, pregnancy_num, parent_id, practitioner_id, baby_id, tech_id) VALUES
(9006, 'blood iron', DATE '2021-01-01', DATE '2021-01-02', DATE '2011-01-03', 'N/A', 1, 4001, 1001
, 7003, 8001)
;
db2 (cont.) => db2 (cont.) => db2 (cont.) => DB21034E  The command was processed as an SQL stateme
nt 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 "JZHOU70.TESTS.SQL220223195810680".
SQLSTATE=23513
```