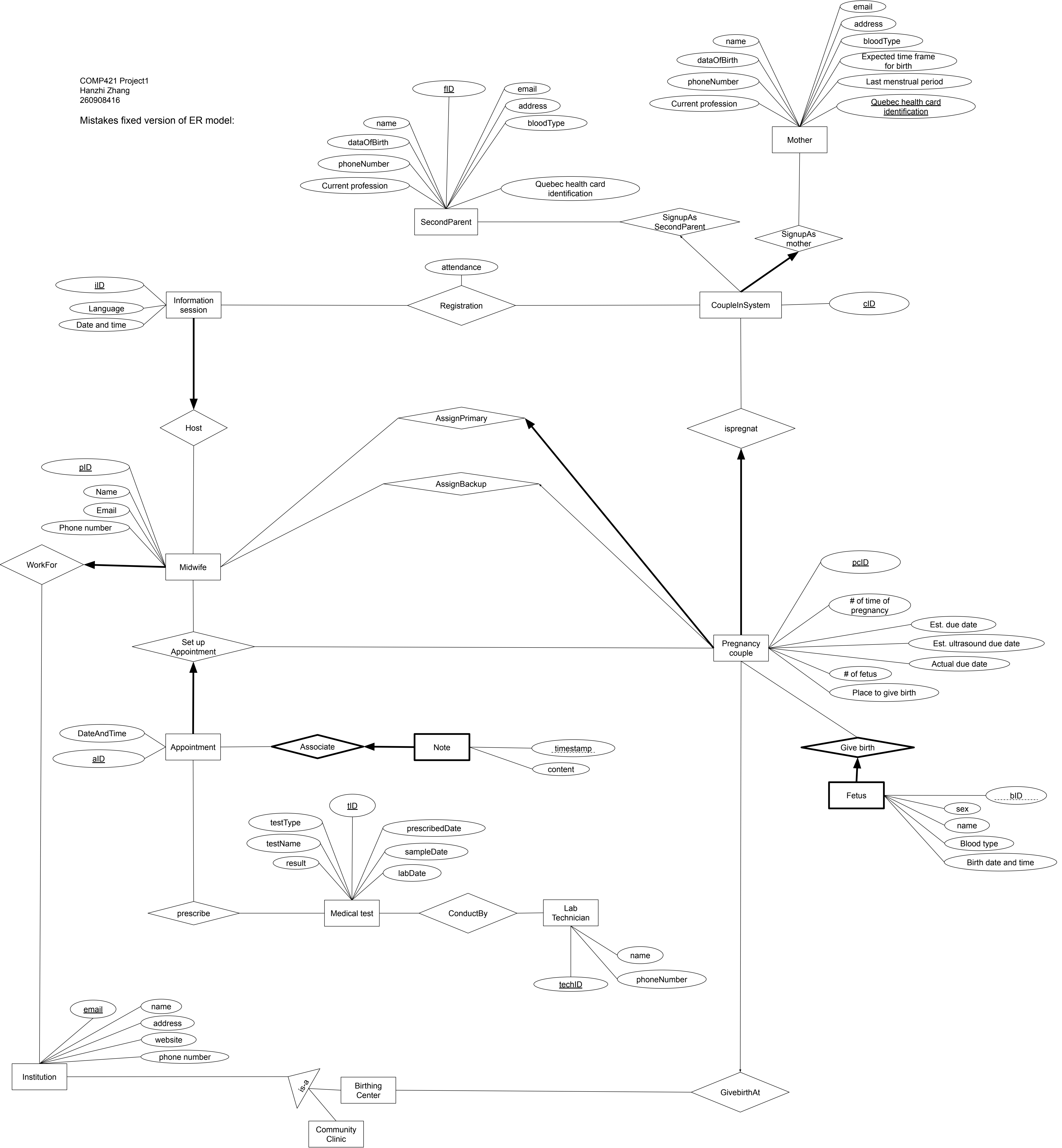COMP421 Project1
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Mistakes fixed version of ER model:

Fix to model:

Two points were deducted:
1. Overly complicated relationship between different type of couples.
    - Fix: merge 'SelectedCouple' and 'PregnancyCouple' into one entity
2. Relationship between birthing center and pregnancy should be modelled
    - Fix: add the relation between birthing center and the pregnancy couple

One suggestion was given:
1. Mother and father be of separate entity sets
    - Fix: make mother and father be separate entity sets

Problem found:
1. Using is-a relationship to represent a couple and pregnancy is not appropriate, since it will be impossible to represent the same couple to have multi pregnancies.
    - Fix: make it participation constraints

Relation model

1. AsMother (<u>cID</u>, qhcID)
    - cID foreign key ref CoupleInSystem
    - qhcID foreign key ref Mother

2. AsSecondParent (<u>cID</u>, fID)
    - cID foreign key ref CoupleInSystem
    - pfID foreign key ref SecondParent

3. Institution (<u>email</u>, name, address, website, phoneNumber)
    a. Inst_CommunityClinic(<u>email</u>)
        - email foreign key ref Institution
    b. Inst_BirthingCenter(<u>email</u>)
        - email foreign key ref Institution

4. WorkFor (<u>pID</u>, email)
    - pID foreign key ref Midwife
    - email foreign key ref Institution
    - The system needs to make sure that every midwife is work for one institution.

5. isPregnant(<u>pcID</u>, cID)
    - pcID foreign key ref PregnancyCouple
    - cID foreign key ref CoupleInSystem

6. PregnancyCouple(<u>pcID</u>, …, placeGiveBirth)
    – Fetus (<u>bID</u>, <u>pcID</u>, sex, name, bloodType, BirthDateandTime)
    - pcID foreign key ref PregnancyCouple

7. Registration (<u>iID</u>, <u>cID</u>, attendance)
    - iID foreign key ref InformationSession
    - cID foreign key ref CoupleInSystem

8. Host (<u>iID</u>, pID)
    - iID foreign key ref InformationSession
    - pID foreign key ref Midwife

9. AssignPrimary (<u>pcID</u>, pID)
    - pcID foreign key ref PregnancyCouple
    - pID foreign key ref Midwife
    - The system needs to make sure that every selected couple is assigned with a midwife.

10. AssignBackup (<u>pcID</u>, pID)
    - pcID foreign key ref PregnancyCouple
    - pID foreign key ref Midwife
    - Since the backup midwife is assigned during the pregnancy process, it is possible that a pregnant couple does not have a backup midwife, but a backup midwife will be assigned before the couple gives birth.

11. SetupAppointment (<u>aID</u>, pcID, pID)

- aID foreign key ref Appointment
- pcID foreign key ref CoupleInSyste
- pID foreign key ref Midwife

12. Appointement (aID, DateAndTime)
    – Note (aID, nTime, content)
- atID foreign key ref Appointment

13. Prescribtion (aID, tID)
- aID foreign key ref Appointment
- tID foreign key ref MedicalTest

14. ConductBy (tID, techID)
- tID foreign key ref MedicalTest
- techID foreign key ref LabTechnician

15. GiveBirthAtCenter(pcID, email)
- pcID foreign key ref PregnancyCouple
- email foreign key ref Inst_BirthingCenter

Pending constraints

1. Cannot eliminate the overlap of multi pregnancies from the same mother
2. Cannot represent the backup midwife is assigned after the primary midwife is assigned.
3. Cannot ensure the primary midwife and the backup midwife are from the same facility.
4. The order of time logic is not tracked (a midwife hosting more than one info session at the same time, etc)
5. Primary and backup midwives may be the same person.
6. Need assume primary and backup midwives assigned to a couple should be from the same facility.
7. A couple who choose to give birth at home still can have a relationship with giving birth at the birthing center (and vice versa)
8. Can exist a medical test that is not prescribed during an appointment, since it is possible that some other medical staff are able to give a prescription that is in the system but not a midwife.
9. Exists medical test that is not conducted by a lab technician since other medical staff (exp. A midwife) is also able to conduct some tests.

SQL Queries

Question 5a)

```sql
CONNECT TO cs421;

SELECT DISTINCT Appointment.DateAndTime, Mother.qhcID, Mother.name, Mother.phoneNum
FROM SetupAppointment,Appointment, Midwife, isPregnant, AsMother, Mother
WHERE SetupAppointment.pID = Midwife.pID AND Midwife.name = 'Marion Girard'
    AND SetupAppointment.pcID = isPregnant.pcID AND isPregnant.cID = AsMother.cID
    AND AsMother.qhcID = Mother.qhcID
    AND SetupAppointment.aID = Appointment.aID
    AND Appointment.DateAndTime>='2022-03-21-00.00.00.000000' AND
Appointment.DateAndTime<'2022-03-26-00.00.00.000000'
ORDER BY Appointment.DateAndTime, Mother.qhcID, Mother.name, Mother.phoneNum;
```

```
[hzhang203@winter2022-comp421[05:19:58]:~/COMP421/p2$ db2 -t -f q5a.sql

    Database Connection Information

 Database server        = DB2/LINUXX8664 11.5.4.0
 SQL authorization ID    = HZHANG20...
 Local database alias    = CS421


DATEANDTIME                     QHCID                    NAME                              PHONENUM
--------------------------      ------------------       -------------------------------   ----------
2022-03-21-08.00.00.000000 GUTV 0000 1980 0101 Victoria Gutierrez                4389210101
2022-03-21-09.00.00.000000 GUTV 0000 1980 0101 Victoria Gutierrez                4389210101
2022-03-22-10.00.00.000000 POSC 0000 1986 1212 Cassy Postma                      4389231212
2022-03-25-11.00.00.000000 HOUX 0000 1988 1124 Xiaopei Hou                       7347940298

    4 record(s) selected.
```

b)

```sql
CONNECT TO cs421;

SELECT MedicalTest.prescribedDate, MedicalTest.result, Mother.name
FROM SetupAppointment, Prescribtion, MedicalTest, PregnancyCouple, isPregnant, AsMother, Mother
WHERE SetupAppointment.aID = Prescribtion.aID AND Prescribtion.tID = MedicalTest.tID AND MedicalTest.testName =
'blood iron'
    AND SetupAppointment.pcID = isPregnant.pcID AND isPregnant.cID = AsMother.cID
    AND AsMother.qhcID = Mother.qhcID AND Mother.name = 'Victoria Gutierrez'
    AND isPregnant.pcID = PregnancyCouple.pcID AND numofPregnancy = 2
ORDER BY MedicalTest.prescribedDate, MedicalTest.result;
```

```
[hzhang203@winter2022-comp421[16:41:39]:~/COMP421/p2$ db2 -t -f q5b.sql

    Database Connection Information

 Database server        = DB2/LINUXX8664 11.5.4.0
 SQL authorization ID    = HZHANG20...
 Local database alias    = CS421



 PRESCRIBEDDATE RESULT              NAME
 -------------- ---------------     ------------------------------
 03/21/2022     iron +              Victoria Gutierrez
 03/21/2022     iron -              Victoria Gutierrez

    2 record(s) selected.
```

c)
```
CONNECT TO cs421;

WITH cTbl(name, cnt) as (
SELECT ip.name, count(ip.dueDate) as cnt
FROM (
    SELECT Institution.name, PregnancyCouple.pcID, COALESCE(PregnancyCouple.estDueDate,
PregnancyCouple.expDueDate) AS dueDate
    FROM AssignPrimary, WorkFor, Institution, PregnancyCouple
    WHERE AssignPrimary.pID = WorkFor.pID AND WorkFor.email = Institution.email
        AND AssignPrimary.pcID = PregnancyCouple.pcID
) as ip
WHERE ip.dueDate>='2022-07-01' AND ip.dueDate<='2022-07-31'
GROUP BY ip.name
)
SELECT Institution.name, (CASE when Institution.name = cTbl.name then cTbl.cnt else 0 end) as CNT
FROM cTbl, Institution;
```

```
[hzhang203@winter2022-comp421[05:23:56]:~/COMP421/p2$ db2 -t -f q5c.sql

    Database Connection Information

 Database server        = DB2/LINUXX8664 11.5.4.0
 SQL authorization ID   = HZHANG20...
 Local database alias   = CS421


NAME                             CNT
----------------------------- -----------
Lac-Saint-Louis                          1
YYF                                      0
ABC                                      0
DEF                                      0
GHI                                      0
JKL                                      0
MNO                                      0
PQR                                      0
STU                                      0
VWX                                      0

  10 record(s) selected.
```

d)
```
CONNECT TO cs421;

WITH endpreg (pcID, date) as (
    SELECT Fetus.pcID, Fetus.birthDateAndTime
      FROM Fetus
      WHERE birthDateAndTime is not NULL
      AND birthDateAndTime <= (SELECT * FROM (values current date))
)
SELECT DISTINCT Mother.qhcID, Mother.name, Mother.phoneNum
FROM AssignPrimary, isPregnant, endpreg, AsMother, Mother , WorkFor, Institution
WHERE AssignPrimary.pcID = isPregnant.pcID
   AND isPregnant.pcID not in (Select endpreg.pcID from endpreg)
   AND AsMother.cID = isPregnant.cID AND AsMother.qhcID = Mother.qhcID
   AND AssignPrimary.pID = WorkFor.pID AND WorkFor.email = Institution.email AND Institution.name =
'Lac-Saint-Louis';
```

e)
CONNECT TO cs421;

WITH babyTbl(pcID, cnt) as (
    SELECT Fetus.pcID, count(*)
    FROM Fetus
    GROUP BY (Fetus.pcID)
)
SELECT DISTINCT Mother.qhcID, Mother.name
FROM babyTbl, isPregnant, AsMother, Mother
WHERE babyTbl.pcID = isPregnant.pcID AND isPregnant.cID = AsMother.cID AND AsMother.qhcID = Mother.qhcID
    AND babyTbl.cnt>=2;

Midwife Information

a)

CREATE VIEW midwifeinfo (pID, name, email, fname, faddress) AS
    SELECT Midwife.pID, Midwife.name, Midwife.memail, Institution.name, Institution.address
    FROM Midwife, Institution, WorkFor
    WHERE Midwife.pID = WorkFor.pID AND Institution.email = WorkFor.email;

```
[db2 => connect to cs421

    Database Connection Information

 Database server        = DB2/LINUXX8664 11.5.4.0
 SQL authorization ID   = HZHANG20...
 Local database alias   = CS421

db2 => CREATE VIEW midwifeinfo (pID, name, email, fname, faddress) AS SELECT Midwife.pID, Midwife.name, Midwife.memail, Institution.name, Institution.address FROM Midwi
fe, Institution, WorkFor WHERE Midwife.pID = WorkFor.pID AND Institution.email = WorkFor.email;
DB20000I  The SQL command completed successfully.
db2 => SELECT * FROM midwifeinfo LIMIT 5;

PID             NAME                    EMAIL                       FNAME                   FADDRESS
--------------  ----------------------  -------------------------   ----------------------  --------------------
MW GIRM 0101_1 Marion Girard            mariong@midwife.com         Lac-Saint-Louis         addrLSL
MW WANL 0712_2 Laofeng Wang             laofengw@widwife.com        YYF                     addrYYF
MW CARD 0926_3 Dianna Carter            diannac@widwife.com         ABC                     addrABC
MW WEBB 0617_4 Bridgett Webb            bridgettw@widwife.com       DEF                     addrDEF
WM SANE 0810_5 Ester Santimario         esters@widwife.com          Lac-Saint-Louis         addrLSL

   5 record(s) selected.

db2 => SELECT * FROM midwifeinfo WHERE midwifeinfo.fname = 'Lac-Saint-Louis' LIMIT 5;

PID             NAME                    EMAIL                       FNAME                   FADDRESS
--------------  ----------------------  -------------------------   ----------------------  --------------------
MW GIRM 0101_1 Marion Girard            mariong@midwife.com         Lac-Saint-Louis         addrLSL
WM SANE 0810_5 Ester Santimario         esters@widwife.com          Lac-Saint-Louis         addrLSL

   2 record(s) selected.

db2 => INSERT INTO midwifeinfo (pID, name, email, fname, faddress) VALUES ('MW DRKR 0816_9', 'Doctor K. Robert', 'robertk@widwife.com', 'CPC', 'addrCPC');
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 =>
```

b)

db2 => CREATE VIEW midwifeinfo (pID, name, email, fname, faddress) AS SELECT Midwife.pID, Midwife.name, Midwife.memail, Institution.name, Institution.address FROM Midwife, Institution, WorkFor WHERE Midwife.pID = WorkFor.pID AND Institution.email = WorkFor.email;
DB20000I The SQL command completed successfully.

c)

db2 => SELECT * FROM midwifeinfo LIMIT 5;

PID	NAME	EMAIL	FNAME	FADDRESS
MW GIRM 0101_1	Marion Girard	mariong@midwife.com	Lac-Saint-Louis	addrLSL
MW WANL 0712_2	Laofeng Wang	laofengw@widwife.com	YYF	addrYYF
MW CARD 0926_3	Dianna Carter	diannac@widwife.com	ABC	addrABC
MW WEBB 0617_4	Bridgett Webb	bridgettw@widwife.com	DEF	addrDEF
WM SANE 0810_5	Ester Santimario	esters@widwife.com	Lac-Saint-Louis	addrLSL

  5 record(s) selected.

d)

db2 => SELECT * FROM midwifeinfo WHERE midwifeinfo.fname = 'Lac-Saint-Louis' LIMIT 5;

PID	NAME	EMAIL	FNAME	FADDRESS
MW GIRM 0101_1	Marion Girard	mariong@midwife.com	Lac-Saint-Louis	addrLSL
WM SANE 0810_5	Ester Santimario	esters@widwife.com	Lac-Saint-Louis	addrLSL

2 record(s) selected.

e)
db2 => INSERT INTO midwifeinfo (pID, name, email, fname, faddress) VALUES ('MW DRKR 0816_9', 'Doctor K. Robert', 'robertk@widwife.com', 'CPC', 'addrCPC');
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

Check Constraints

```
[db2 => select * from MedicalTest

TID         TESTTYPE        TESTNAME          PRESCRIBEDDATE LABDATE     SAMPLEDATE RESULT
----------  --------------  ----------------  -------------- ----------  ---------- ----------------
T-X W 001   X-ray           whole body x-ray  03/21/2020     03/22/2020  -          -
T-B C 001   Blood test      common            02/22/2022     02/28/2022  -          ok
T-B I 001   Blood test      blood iron        03/21/2020     03/23/2020  -          iron --
T-B I 002   Blood test      blood iron        03/21/2022     03/23/2022  -          iron -
T-B I 003   Blood test      blood iron        03/21/2022     -           -          iron +
T-U C 001   Urine           common            03/25/2022     03/26/2022  -          -

  6 record(s) selected.

db2 => ALTER TABLE MedicalTest ADD CONSTRAINT executionDATE CHECK((labDate is null) or (prescribedDate <= labDate));
DB20000I  The SQL command completed successfully.
db2 => INSERT INTO MedicalTest VALUES ('T-B C 002', 'Blood test', 'common', DATE'2022-03-21', DATE'2020-03-21', NULL, 'iron +');
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 "HZHANG203.MEDICALTEST.EXECUTIONDATE".
SQLSTATE=23513
db2 => INSERT INTO MedicalTest VALUES ('T-B C 002', 'Blood test', 'common', DATE'2022-03-21', NULL, NULL, 'iron +');
DB20000I  The SQL command completed successfully.
db2 =>
```

Add constraint:

db2 => ALTER TABLE MedicalTest ADD CONSTRAINT executionDATE CHECK((labDate is null) or (prescribedDate <= labDate));
DB20000I The SQL command completed successfully.

Insert an invalid command:

db2 => INSERT INTO MedicalTest VALUES ('T-B C 002', 'Blood test', 'common', DATE'2022-03-21', DATE'2020-03-21', NULL, 'iron +');
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 "HZHANG203.MEDICALTEST.EXECUTIONDATE".
SQLSTATE=23513

Inser a valid command:

db2 => INSERT INTO MedicalTest VALUES ('T-B C 002', 'Blood test', 'common', DATE'2022-03-21', NULL, NULL, 'iron +');
DB20000I The SQL command completed successfully.