Relational Model

- Facility(facemail,facname,facaddr,facphonenum,web)
- Midwife(parcid,wname,wemail,wphonenum,facemail)
    - facemail foreign key referencing relation Facility
- CommunityClinic(comemail)
    - comemail foreign key referencing relation Facility
- BirthingCenter(bcemail)
    - bcemail foreign key referencing relation Facility
- Mother(mhealthid,mprofession,mphonenum,maddr,memail,mdob,mname,mbloodtype)
- Father(fatherid,fhealthid,fprofession,fphonenum,faddr,femail,fdob,fname,fbloodtype)
- Couple(coupleid,mheathid,fatherid)
    - mhealthid foreign key referencing relation Mother
    - fatherid foreign key referencing relation Father
- Pregnancy(coupleid,numofpreg, exptfym, mensduedate, ultraduedate, finalduedate,bcbirthaddr,homebirthaddr ,primarymwid,backupmwid,bcemail)
    - coupleid foreign key referencing relation Couple
    - primarymwid foreign key referencing relation Midwife
    - backupmwid foreign key referencing relation Midwife
    - bcemail foreign key referencing relation BirthingCenter
- Baby(babyid,babyname,babydobtime,babybt,gender,coupleid,numofpreg)
    - (coupleid,numofpreg) foreign key referencing relation Pregnancy
- InfoSession(sessionid,sessiondate,sessiontime,infolanguage,parcid)
    - parcid foreign key referencing relation Midwife
- Invite(sessionid,coupleid,numofpreg,attended)
    - sessionid foreign key referencing relation InfoSession
    - (coupleid,numofpreg) foreign key referencing relation Pregnancy
- Appointment(appointid,appointtime,appointdate,parcid,coupleid,numofpreg)
    - (coupleid,numofpreg) foreign key referencing relation Pregnancy
    - parcid foreign key referencing relation Midwife
- Note(noteid,notetimestamp,appointid,content)
    - appointid foreign key referencing relation Appointment
- LabTechnician(techid,techname,techphonenum)
- MedicalTest(testid,prescdate,sampledate,donedate,testresult,testtype,parcid,coupleid, numofpreg,babyid,techid)
    - parcid foreign key referencing relation Midwife
    - (coupleid,numofpreg) foreign key referencing relation Pregnancy
    - babyid foreign key referencing relation Baby
    - techid foreign key referencing relation LabTechnician

Pending Constraints

- Attributes name, date of birth, phone number and profession of Father are not NULL even they are not primary key. Other attributes of father can be NULL besides primary key
- Attributes name, date of birth, phone number, profession, address and email should not be NULL for Mother even they are not primary key
- A midwife can not be both the primary and the backup midwife of one pregnancy
- A midwife might be shcheduled to hold several info-sessions at the same time period in a specific date, but one can only hold one of these sessions.
- A couple can be invited to several info-sessions and they must have at least one of these sessions marked as “attended” to be assigned to a midwife.
- A couple can register several appointments with the midwife at the same time of one day (with different appointid). but they can only attend one of them with the midwife.
- Timestamp of Note is not null
- A couple must have at least one pregnancy associated to be recorded in the system
- Emails and health id number of Father are unique but they can be NULL as well since father emails and health id number are optional to be filled in
- Midwifes have unique, not null emails
- A facility must be either a community clinic or a birthing center, there is no third option
- A unborn baby will have birth date and time as NULL

SQL Queries

- **Question 5**
  - **a)**

    SELECT APPOINTDATE,APPOINTTIME,MOTHER.MHEALTHID,MNAME,MPHONENUM

    FROM APPOINTMENT,MIDWIFE,PREGNANCY,COUPLE,MOTHER

    WHERE MIDWIFE.PARCID = APPOINTMENT.PARCID

    AND PREGNANCY.COUPLEID = APPOINTMENT.COUPLEID

    AND PREGNANCY.NUMOFPREG = APPOINTMENT.NUMOFPREG

    AND PREGNANCY.COUPLEID = COUPLE.COUPLEID

    AND COUPLE.MHEALTHID = MOTHER.MHEALTHID

    AND APPOINTDATE >= ‘2022-03-21’

    AND APPOINTDATE <= ‘2022-03-25’;

```
db2 => SELECT APPOINTDATE,APPOINTTIME,MOTHER.MHEALTHID,MNAME,MPHONENUM
db2 (cont.) => FROM APPOINTMENT,MIDWIFE,PREGNANCY,COUPLE,MOTHER
db2 (cont.) => WHERE MIDWIFE.PARCID = APPOINTMENT.PARCID
db2 (cont.) => AND PREGNANCY.COUPLEID = APPOINTMENT.COUPLEID
db2 (cont.) => AND PREGNANCY.NUMOFPREG = APPOINTMENT.NUMOFPREG
db2 (cont.) => AND PREGNANCY.COUPLEID = COUPLE.COUPLEID
db2 (cont.) => AND COUPLE.MHEALTHID = MOTHER.MHEALTHID
db2 (cont.) => AND APPOINTDATE >= '2022-03-21'
db2 (cont.) => AND APPOINTDATE <= '2022-03-25';

APPOINTDATE APPOINTTIME MHEALTHID   MNAME                                              MPHONENUM
----------- ----------- ----------- -------------------------------------------------- ---------------
03/22/2022  11:30:00           1001 Luzzy                                              514-109-1234
03/25/2022  11:30:00           1002 Lilly                                              514-141-6131

  2 record(s) selected.
```

  - **b)**

    SELECT DONEDATE LABDATE, TESTRESULT

    FROM MEDICALTEST,PREGNANCY,MOTHER,COUPLE

    WHERE TESTTYPE = ‘blood iron test’

AND MEDICALTEST.NUMOFPREG = PREGNANCY.NUMOFPREG

AND MEDICALTEST.COUPLEID = PREGNANCY.COUPLEID

AND MEDICALTEST.BABYID IS NULL

AND PREGNANCY.COUPLEID = COUPLE.COUPLEID

AND COUPLE.MHEALTHID = MOTHER.MHEALTHID

AND MOTHER.MNAME = ‘Victoria Gutierrez’

AND MEDICALTEST.NUMOFPREG = 2;

```
db2 => SELECT DONEDATE LABDATE, TESTRESULT
db2 (cont.) => FROM MEDICALTEST,PREGNANCY,MOTHER,COUPLE
db2 (cont.) => WHERE TESTTYPE = 'blood iron test'
db2 (cont.) => AND MEDICALTEST.NUMOFPREG = PREGNANCY.NUMOFPREG
db2 (cont.) => AND MEDICALTEST.COUPLEID = PREGNANCY.COUPLEID
db2 (cont.) => AND MEDICALTEST.BABYID IS NULL
db2 (cont.) => AND PREGNANCY.COUPLEID = COUPLE.COUPLEID
db2 (cont.) => AND COUPLE.MHEALTHID = MOTHER.MHEALTHID
db2 (cont.) => AND MOTHER.MNAME = 'Victoria Gutierrez'
db2 (cont.) => AND MEDICALTEST.NUMOFPREG = 2;

LABDATE    TESTRESULT
---------- --------------------
05/18/2012 good

  1 record(s) selected.
```

- **c)**

SELECT FACNAME,COUNT(PRIMARYMWID) PREGCOUNT

FROM PREGNANCY,MIDWIFE,FACILITY

WHERE PRIMARYMWID IS NOT NULL

AND MIDWIFE.PARCID = PRIMARYMWID

AND MIDWIFE.FACEMAIL = FACILITY.FACEMAIL

AND PREGNANCY.FINALDUEDATE >= ‘2022-07-01’

AND PREGNANCY.FINALDUEDATE <= ‘2022-07-31’

GROUP BY FACNAME

UNION

SELECT FACNAME,COUNT(PRIMARYMWID) PREGCOUNT

FROM PREGNANCY,MIDWIFE,FACILITY

WHERE PRIMARYMWID IS NOT NULL

AND FINALDUEDATE IS NULL

AND MIDWIFE.PARCID = PRIMARYMWID

AND MIDWIFE.FACEMAIL = FACILITY.FACEMAIL

AND PREGNANCY.EXPTFYM >= ‘2022-07-01’

AND PREGNANCY.EXPTFYM <= ‘2022-07-31’

GROUP BY FACNAME;

```
db2 => SELECT FACNAME,COUNT(PRIMARYMWID) PREGCOUNT
db2 (cont.) => FROM PREGNANCY,MIDWIFE,FACILITY
db2 (cont.) => WHERE PRIMARYMWID IS NOT NULL
db2 (cont.) => AND MIDWIFE.PARCID = PRIMARYMWID
db2 (cont.) => AND MIDWIFE.FACEMAIL = FACILITY.FACEMAIL
db2 (cont.) => AND PREGNANCY.FINALDUEDATE >= '2022-07-01'
db2 (cont.) => AND PREGNANCY.FINALDUEDATE <= '2022-07-31'
db2 (cont.) => GROUP BY FACNAME
db2 (cont.) => UNION
db2 (cont.) => SELECT FACNAME,COUNT(PRIMARYMWID) PREGCOUNT
db2 (cont.) => FROM PREGNANCY,MIDWIFE,FACILITY
db2 (cont.) => WHERE PRIMARYMWID IS NOT NULL
db2 (cont.) => AND FINALDUEDATE IS NULL
db2 (cont.) => AND MIDWIFE.PARCID = PRIMARYMWID
db2 (cont.) => AND MIDWIFE.FACEMAIL = FACILITY.FACEMAIL
db2 (cont.) => AND PREGNANCY.EXPTFYM >= '2022-07-01'
db2 (cont.) => AND PREGNANCY.EXPTFYM <= '2022-07-31'
db2 (cont.) => GROUP BY FACNAME;

FACNAME                         PREGCOUNT
------------------------------- -----------
fac2                                      1
fac5                                      1

  2 record(s) selected.
```

- **d)**

```
SELECT MOTHER.MHEALTHID,MNAME,MPHONENUM
FROM MOTHER
WHERE EXISTS
(
   SELECT BABYID
   FROM MIDWIFE,PREGNANCY,BABY,COUPLE,FACILITY
   WHERE MIDWIFE.FACEMAIL = FACILITY.FACEMAIL
    AND FACILITY.FACNAME = 'Lac-Saint-Louis'
    AND MIDWIFE.PARCID = PREGNANCY.PRIMARYMWID
    AND BABY.COUPLEID = PREGNANCY.COUPLEID
    AND BABY.NUMOFPREG = PREGNANCY.NUMOFPREG
    AND BABY.BABYDOBTIME IS NULL
    AND PREGNANCY.COUPLEID = COUPLE.COUPLEID
    AND COUPLE.MHEALTHID = MOTHER.MHEALTHID
);
```

```
db2 => SELECT MOTHER.MHEALTHID,MNAME,MPHONENUM
db2 (cont.) => FROM MOTHER
db2 (cont.) => WHERE EXISTS(
db2 (cont.) => SELECT BABYID
db2 (cont.) => FROM MIDWIFE,PREGNANCY,BABY,COUPLE,FACILITY
db2 (cont.) => WHERE MIDWIFE.FACEMAIL = FACILITY.FACEMAIL
db2 (cont.) => AND FACILITY.FACNAME = 'Lac-Saint-Louis'
db2 (cont.) => AND MIDWIFE.PARCID = PREGNANCY.PRIMARYMWID
db2 (cont.) => AND BABY.COUPLEID = PREGNANCY.COUPLEID
db2 (cont.) => AND BABY.NUMOFPREG = PREGNANCY.NUMOFPREG
db2 (cont.) => AND BABY.BABYDOBTIME IS NULL
db2 (cont.) => AND PREGNANCY.COUPLEID = COUPLE.COUPLEID
db2 (cont.) => AND COUPLE.MHEALTHID = MOTHER.MHEALTHID);

MHEALTHID   MNAME                                              MPHONENUM
----------- ---------------------------------------------------- ---------------
       1002 Lilly                                                514-141-6131

  1 record(s) selected.

db2 =>
```

- **e)**

```
WITH PREGBABY(BABYCOUNT,COUPLEID,NUMOFPREG) AS
(
 SELECT COUNT(BABYID) BABYCOUNT,BABY.COUPLEID,BABY.NUMOFPREG
 FROM MOTHER,PREGNANCY,BABY,COUPLE
 WHERE MOTHER.MHEALTHID = COUPLE.MHEALTHID
 AND COUPLE.COUPLEID = PREGNANCY.COUPLEID
 AND BABY.COUPLEID = PREGNANCY.COUPLEID
 AND BABY.NUMOFPREG = PREGNANCY.NUMOFPREG
 GROUP BY (BABY.COUPLEID,BABY.NUMOFPREG)
)
SELECT DISTINCT MOTHER.MHEALTHID,MNAME
FROM PREGBABY,MOTHER,COUPLE
WHERE MOTHER.MHEALTHID = COUPLE.MHEALTHID
AND COUPLE.COUPLEID = PREGBABY.COUPLEID
AND BABYCOUNT > 1;
```

```
db2 => WITH PREGBABY(BABYCOUNT,COUPLEID,NUMOFPREG) AS
db2 (cont.) => (SELECT COUNT(BABYID) BABYCOUNT,BABY.COUPLEID,BABY.NUMOFPREG
db2 (cont.) => FROM MOTHER,PREGNANCY,BABY,COUPLE
db2 (cont.) => WHERE MOTHER.MHEALTHID = COUPLE.MHEALTHID
db2 (cont.) => AND COUPLE.COUPLEID = PREGNANCY.COUPLEID
db2 (cont.) => AND BABY.COUPLEID = PREGNANCY.COUPLEID
db2 (cont.) => AND BABY.NUMOFPREG = PREGNANCY.NUMOFPREG
db2 (cont.) => GROUP BY (BABY.COUPLEID,BABY.NUMOFPREG))
db2 (cont.) => SELECT DISTINCT MOTHER.MHEALTHID,MNAME
db2 (cont.) => FROM PREGBABY,MOTHER,COUPLE
db2 (cont.) => WHERE MOTHER.MHEALTHID = COUPLE.MHEALTHID
db2 (cont.) => AND COUPLE.COUPLEID = PREGBABY.COUPLEID
db2 (cont.) => AND BABYCOUNT > 1;

MHEALTHID   MNAME
----------- --------------------------------------------------
       1002 Lilly

  1 record(s) selected.
```

Midwife Information

- a) SQL:

  CREATE VIEW midwifeinfo(parcid,name,phone,email,facname,facaddress) AS

  SELECT PARCID,WNAME NAME,WPHONENUM PHONE,WEMAIL EMAIL,FACNAME,FACADDR

  FROM MIDWIFE,FACILITY WHERE MIDWIFE.FACEMAIL = FACILITY.FACEMAIL;

- b) Success screenshot:

```
db2 => CREATE VIEW midwifeinfo(parcid,name,phone,email,facname,facaddress) AS
db2 (cont.) => SELECT PARCID,WNAME NAME,WPHONENUM PHONE,WEMAIL EMAIL,FACNAME,FACADDR
db2 (cont.) => FROM MIDWIFE,FACILITY WHERE MIDWIFE.FACEMAIL = FACILITY.FACEMAIL;
DB20000I  The SQL command completed successfully.
db2 =>
```

- c) Success select all:

```
db2 => SELECT parcid,name,phone,email,facname,facaddress FROM midwifeinfo;

PARCID          NAME                                               PHONE          EMAIL                          FACNAME                        FACADDRESS
--------------- -------------------------------------------------- -------------- ------------------------------ ------------------------------ -------------
mw1             Marion Girard                                      514-001-2123   mw1@gmail.com                  Lac-Saint-Louis                fac addr 1
mw5             Bobby                                              514-412-2231   mw5@gmail.com                  Lac-Saint-Louis                fac addr 1
mw3             Kimmy                                              514-321-2515   mw3@gmail.com                  fac2                           fac addr 2
mw2             Mary                                               514-123-6161   mw2@gmail.com                  fac4                           fac addr 4
mw4             Kellen                                             514-111-6151   mw4@gmail.com                  fac5                           fac addr 5

  5 record(s) selected.
```

- d) Select specific facility:

```
db2 => SELECT parcid,name,phone,email,facname,facaddress FROM midwifeinfo
db2 (cont.) => WHERE facname = 'Lac-Saint-Louis';

PARCID          NAME                                               PHONE          EMAIL                          FACNAME                        FACADDRESS
--------------- -------------------------------------------------- -------------- ------------------------------ ------------------------------ -------------
mw1             Marion Girard                                      514-001-2123   mw1@gmail.com                  Lac-Saint-Louis                fac addr 1
mw5             Bobby                                              514-412-2231   mw5@gmail.com                  Lac-Saint-Louis                fac addr 1

  2 record(s) selected.
```

- e)

```
db2 => INSERT INTO midwifeinfo(parcid,name,phone,email,facname,facaddress)VALUES
db2 (cont.) => ('mw6','Lux','514-999-9999','mw6@gmail.com','Lac-Saint-Louis','fac addr 1');
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 =>
```

  We can not perfom such insertion becuase midwifeinfo is a VIEW, not an acutal relation table stored in the database system. It is a definition of executing some query commands instead of a set of tuples, thus we can not insert any tuple into midwifeinfo.

Check Constraints

- Add Constraint

```
db2 => ALTER TABLE MEDICALTEST ADD CONSTRAINT check_labdate_after_prescdate
db2 (cont.) => CHECK (prescdate <= donedate);
DB20000I  The SQL command completed successfully.
```

- Insert invalid tuple

```
db2 => INSERT INTO MEDICALTEST
db2 (cont.) => (testid,prescdate,sampledate,donedate,testresult,testtype,parcid,coupleid,numofpreg,babyid,techid) VALUES
db2 (cont.) => (6010,DATE'2022-04-03',NULL,DATE'2020-04-01',NULL,'medical test3','mw3','couple2',1,'baby3','tech4');
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
"RDENG4.MEDICALTEST.CHECK_LABDATE_AFTER_PRESCDATE".  SQLSTATE=23513
```