

Relational Model

Institution (instid, instname, instaddr, instphonenum, instemail, instwebsite)

Midwife (practitionerid, mwfname, mwfemail, mwfphonenum, instid,
foreign key (instid) references Institution (instid))

Mother (mcardid, expbirthframe, mname, mbirth, maddr, mphonenum, memail, mprof,
mblood)

Father (fatherid, fname, fbirth, fphonenum, fprof, fcardid, faddr, femail, fblood)

RegParent (parentid, mcardid, fatherid,
foreign key (mcardid) references Mother (mcardid),
foreign key (fatherid) references Father (fatherid))

Pregnancy (pregid, interested, pregnumtime, parentid, instid, primary_pracid, backup_pracid,
fir_duedate, sec_duedate, final_duedate, birthlocation, babynum,
foreign key (parentid) references RegParent (parentid),
foreign key (instid) references Institution (instid),
foreign key (primary_pracid) references Midwife (practitionerid),
foreign key (backup_pracid) references Midwife (practitionerid))

Appointment (apptid, apptdate, appttime, practitionerid, pregid,
foreign key (practitionerid) references Midwife (practitionerid),
foreign key (pregid) references Pregnancy (pregid))

Technician (techid, techname, techphonenum)

MedActions (testid, apptid, testtype, prescrdate, sampleddate, techid, result, labdate,
foreign key (apptid) references Appointment (apptid),
foreign key (techid) references Technician (techid))

Clinic (instid,

foreign key (instid) references Institution (instid))

BirthCenter (instid,
foreign key (instid) references Institution (instid))

Baby (babyid, pregid, babygender, babybdate, babybtime, babyname, babyblood,
foreign key (pregid) references Pregnancy (pregid))

InfoSession (practitionerid, infodate, infotime, lang,
foreign key (practitionerid) references Midwife (practitionerid))

Attend (parentid, practitionerid, infodate, infotime, attended,
foreign key (parentid) references RegParent (parentid),
foreign key (practitionerid, infodate, infotime) references InfoSession (practitionerid,
infodate, infotime))

Notes (apptid, timestmp, content,
foreign key (apptid) references Appointment (apptid))

Pending constraints

- Every "Father" is assigned an artificial key. But if the same "father" registers again in the future, he will get another different artificial id. We cannot prevent that.
- The participation constraint of "Mother" in the relationship "m_belong" is not captured;
- Does not enforce order of time.
- Does not enforce categorical input type. For example, for bloodtype, the data type we set is VARCHAR, but it is possible that users input a string which is not a bloodtype.
- It is possible that a midwife takes care of two mothers during the same period of time.
- It is possible that the same midwife be the primary and the backup for a pregnancy.

SQL Queries

5(a)

```
SELECT apptdate, appttime, Mother.mcardid, mname, mphonenum
FROM Appointment, Mother, Midwife, Pregnancy, RegParent
WHERE Appointment.practitionerid = Midwife.practitionerid
  AND Midwife.mwfname = 'Marion Girard'
  AND (Appointment.apptdate BETWEEN '2022-03-21' AND '2022-03-25')
  AND Appointment.pregid = Pregnancy.pregid
  AND Pregnancy.parentid = RegParent.parentid
  AND RegParent.mcardid = Mother.mcardid
```

;

```
db2 => SELECT apptdate, appttime, Mother.mcardid, mname, mphonenum
FROM Appointment, Mother, Midwife, Pregnancy, RegParent
WHERE Appointment.practitionerid = Midwife.practitionerid AND Midwife.mwfname = 'Marion Girard'
  AND (Appointment.apptdate BETWEEN '2022-03-21' AND '2022-03-25') AND Appointment.pregid = Pregnancy.pregid
  AND Pregnancy.parentid = RegParent.parentid AND RegParent.mcardid = Mother.mcardid
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
```

APPTDATE	APPTTIME	MCARDID	MNAME	MPHONENUM
03/21/2022	15:45:00	m3c-116798	Molly	+62 (807) 823-8721
03/25/2022	16:30:00	m3c-116798	Molly	+62 (807) 823-8721
03/22/2022	09:40:00	m4c-765800	Mary	+20 (140) 606-7020

3 record(s) selected.

5(b)

```
SELECT labdate, result
FROM MedActions, Pregnancy, Mother, Appointment, RegParent
WHERE MedActions.apptid = Appointment.apptid
  AND Appointment.pregid = Pregnancy.pregid
  AND Pregnancy.parentid = RegParent.parentid
  AND RegParent.mcardid = Mother.mcardid
  AND MedActions.testtype = 'blood iron'
  AND Mother.mname = 'Victoria Gutierrez'
  AND Pregnancy.pregnumtime = 2
  AND MedActions.result IS NOT NULL
```

;

```
db2 => SELECT labdate, result
FROM MedActions, Pregnancy, Mother, Appointment, RegParent
WHERE MedActions.apptid = Appointment.apptid
  AND Appointment.pregid = Pregnancy.pregid
  AND Pregnancy.parentid = RegParent.parentid
  AND RegParent.mcardid = Mother.mcardid
  AND MedActions.testtype = 'blood iron'
  AND Mother.mname = 'Victoria Gutierrez'
  AND Pregnancy.pregnumtime = 2
  AND MedActions.result IS NOT NULL
;
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
LABDATE      RESULT
-----
02/23/2022  20220223bloodironlevel high
03/25/2022  20220325bloodironlevel normal
04/25/2022  20220422bloodironlevel low
```

3 record(s) selected.

5(c)

WITH no_july_inst (instname) AS

```
(
  (
    SELECT instname
    FROM Institution
  )
  EXCEPT
  (
    SELECT instname
    FROM Institution, Pregnancy, Midwife, RegParent, Mother
    WHERE Pregnancy.primary_pracid = Midwife.practitionerid
    AND Midwife.institid = Institution.institid
    AND Pregnancy.parentid = RegParent.parentid
    AND RegParent.mcardid = Mother.mcardid
    AND ((Pregnancy.final_duedate IS NULL AND Mother.expbirthframe = '2022-07')
    OR (Pregnancy.final_duedate BETWEEN '2022-07-01' AND '2022-07-31'))
  )
)
SELECT instname, 0 july_due_num
FROM no_july_inst
GROUP BY instname
```

UNION

```
(
  SELECT instname, COUNT(pregid) july_due_num
  FROM Institution, Pregnancy, Midwife, RegParent, Mother
  WHERE Pregnancy.primary_pracid = Midwife.practitionerid
  AND Midwife.institid = Institution.institid
  AND Pregnancy.parentid = RegParent.parentid
  AND RegParent.mcardid = Mother.mcardid
  AND ((Pregnancy.final_duedate IS NULL AND Mother.expbirthframe = '2022-07')
    OR (Pregnancy.final_duedate BETWEEN '2022-07-01' AND '2022-07-31'))
  GROUP BY instname
)
;
```


5(e)

```
SELECT DISTINCT Mother.mcardid, mname
FROM Mother, Pregnancy, RegParent
WHERE Mother.mcardid = RegParent.mcardid
      AND RegParent.parentid = Pregnancy.parentid
      AND Pregnancy.babynum > 1
;
```

```
db2 => SELECT DISTINCT Mother.mcardid, mname
FROM Mother, Pregnancy, RegParent
WHERE Mother.mcardid = RegParent.mcardid
      AND RegParent.parentid = Pregnancy.parentid
      AND Pregnancy.babynum > 1
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
```

MCARDID	MNAME
m1c-597704	Miranda
m3c-116798	Molly
m4c-765800	Mary
m6c-682102	Victoria Gutierrez

4 record(s) selected.

Midwife Information

6(a)

```
CREATE VIEW midwifeinfo (practitionerid, mwfname, mwfonenum, mwfemail, instname,
instaddr)
AS SELECT practitionerid, mwfname, mwfonenum, mwfemail, instname, instaddr
FROM Midwife, Institution
WHERE Midwife.institid = Institution.institid
;
```

6(b)

```
db2 => CREATE VIEW midwifeinfo (practitionerid, mwfname, mwfonenum, mwfemail, instname, instaddr)
AS SELECT practitionerid, mwfname, mwfonenum, mwfemail, instname, instaddr
FROM Midwife, Institution
WHERE Midwife.institid = Institution.institid
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
DB20000I The SQL command completed successfully.
db2 => █
```

6(c)

```
db2 =>
SELECT practitionerid, mwfname, mwfonenum, mwfemail, instname, instaddr
FROM midwifeinfo
LIMIT 5
;
db2 => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
PRACTITIONERID MWFNAME MWFPHONENUM MWFEMAIL INSTNAME INSTADDR
-----
mw5a-03860 Emily +1 (336) 721-8926 emily5@amazon.co.uk popular preg-birth center 756 Kropf Avenue
mw1a-24428 Airry +52 (296) 211-2749 airry1@tiny.cc Lac-Saint-Louis 4 Lerdahl Avenue
mw4a-47220 Debby +46 (603) 307-2122 debby4@bbc.co.uk Lac-Saint-Louis 4 Lerdahl Avenue
mw3a-19614 Cindy +28 (295) 968-7360 cindy3@npr.org Lac-Saint-Louis 4 Lerdahl Avenue
mw2a-51586 Benny +86 (600) 695-1278 benny2@biglobe.ne.jp Lac-Saint-Louis 4 Lerdahl Avenue

5 record(s) selected.
```

6(d)

```
db2 => SELECT practitionerid, mwfname, mwfonenum, mwfemail, instname, instaddr
FROM midwifeinfo
WHERE instname = 'Lac-Saint-Louis'
;db2 (cont.) => db2 (cont.) => db2 (cont.) =>
PRACTITIONERID MWFNAME MWFPHONENUM MWFEMAIL INSTNAME INSTADDR
-----
mw1a-24428 Airry +52 (296) 211-2749 airry1@tiny.cc Lac-Saint-Louis 4 Lerdahl Avenue
mw2a-51586 Benny +86 (600) 695-1278 benny2@biglobe.ne.jp Lac-Saint-Louis 4 Lerdahl Avenue
mw3a-19614 Cindy +28 (295) 968-7360 cindy3@npr.org Lac-Saint-Louis 4 Lerdahl Avenue
mw4a-47220 Debby +46 (603) 307-2122 debby4@bbc.co.uk Lac-Saint-Louis 4 Lerdahl Avenue
mw6a-56690 Marion Girard +59 (900) 700-0421 mgirard6@blogs.com Lac-Saint-Louis 4 Lerdahl Avenue

5 record(s) selected.
```

6(e)

```
db2 => INSERT INTO midwifeinfo VALUES ('mw10a-1010', 'Ivy', '+86 (940) 125-0028', 'ivy@189baf.cc', 'good-comm clinn', '169 Prairieview Alley');
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 =>
```

There is an error when we try to insert value into View.

View is an intermediate relation and the records in it are from underlying Relations.

Thus, modifying View directly will cause inconsistency, which is why it is not permitted.

Check Constraints

```
db2 => ALTER TABLE MedActions
ADD CONSTRAINT lab_and_prescr_date CHECK (MedActions.labdate >= MedActions.prescrdate)
;db2 (cont.) => db2 (cont.) =>
DB20000I The SQL command completed successfully.
db2 => INSERT INTO MedActions VALUES ('tst7-95814', 'ap4-20301', 'bloodtype', '2022-03-25', '2022-03-25', 'tec3-29465', 'bloodtype A', '2022-03-24');
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 "XWU70.MEDACTIONS.LAB_AND_PRESCR_DATE".
SQLSTATE=23513
db2 =>
```

7. The requested operation is not allowed because a row does not satisfy the check constraint