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COMP421
Project 3
March 15th, 2022

Notes on Submission

The application GoBabbyApp relies on the classes in package "project3" that is included in the "project 3" folder.

2. Relational Model

Patient(patid, hcardid, name, phone, address, DOB, bloodType)
birthingParent(patid, email, profession)
    Foreign Key:
        patid is foreign key referencing Patient, representing ISA hierarchy

Child (patid, gender, pregid)
    Foreign Key:
        patid is foreign key referencing Patient, representing ISA hierarchy
        pregid is foreign key referencing Pregnancy, representing bornOf relationship

nonBirthingParent(parentid, hcardid, name, phone, address, DOB, bloodType, email, profession)

Couple(cid, programInterest, patid, parid)
    Foreign Key:
    Patid references birthingParent, representing In relationship
    Parid references nonBirthingParent, representing In relationship

Lab Technician (techid, name, phone)

Midwife (mid, name, phone, email, instid)
    Foreign Keys:
        instid references MidwifeServiceClinic, representing belongs relationship

HealthCare Institution (instid, name, phone, email, address, website)

Birthing Clinic (instid)
    Foreign Keys:
        instid references HealthCareInstitution
Community Clinic (instid)
    Foreign Keys:
        instid references HealthCareInstitution

InfoSession(sessionid, date, time, language, mid)
    Foreign Keys:
        sessionid references InfoSession
        mid references Midwife, representing the MidwifeHost relation

parentsInvited(sessionid,cid, attendanceStatus)
    Foreign Keys:
        cid references Couple
        sessionid references InfoSession

Pregnancy(pregid, ithPregnancy, numberBabies, homebirth, regRoughDueDate, uSoundDueDate, lastMenstDueDate, finalEstDueDate, cid, primaryPracid, secondPracid, instid)
    Foreign keys:
        cid references Couple, representing belongs relationship

primaryPracid references Midwife(mid), representing the primarilyAssigned relationship
secondPracid references Midwife, representing the secondarilyAssigned relationship
instid references HealthCareInstitution, representing the clinicBirthLocation relationship

Appointment (aptid, date, time, mid, pregid)
Foreign Keys:
mid references Midwife, representing participantsApt
pregid references Pregnancy, representing participantsApt

AppointmentNote(noteid, notedate, notetime, observations, aptid)
Foreign Key:
Aptid references Appointment, representing notesOf relationship

Test (testid, type, sample, result, prescDate, dateSampleTaken, dateLabWorkCompleted, pregid, techid, patid, midid)
Foreign keys:
pregId references Pregnancy, representing pertainingTo relationship
techid references Lab Technician, representing processes relationship
patid references birthingParent or Child, representing prescribedFor relationship
midif references Midwife, representing prescribedBy relationship

3. Application Interaction

(a)

a)i. Run a query in the database that shows that midwife with practitioner id 80 does not exist.

The midwife's primary key is mid for "midwife id" in my model.

```
db2 => SELECT mid FROM Midwife WHERE mid = 80;

MID
-----------

  0 record(s) selected.
```

a)ii. Start the application and enter the practitioner id (of the midwife) 80.

```
anguye56@winter2022-comp421:~/code$ java GoBabbyApp
Please enter your midwife id or [E] to exit:
80
Midwife ID not valid.
Please enter your midwife id or [E] to exit:
```

(b)

b)i. Run a query in the database that shows that a mother 'Victoria Gutierrez' has had at least two pregnancies.

```
db2 => WITH CouplesMotherMatch (cid, patid, name) AS
db2 (cont.) =>     (SELECT C.cid, C.patid, P.name
db2 (cont.) =>     FROM Couple C, Patient P
    WHERE P.name = 'Victoria Gutierrez' AND C.patid = P.patid)
SELECT P.pregid, CM.patid, P.ithPregnancy, CM.name, CM.patid
FROM Pregnancy P, CouplesMotherMatch CM
WHERE P.cid IN (SELECT cid FROM CouplesMotherMatch);
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
PREGID      PATID       ITHPREGNANCY NAME                                               PATID
----------- ----------- ------------ -------------------------------------------------- -----------
    1000001        2001            2 Victoria Gutierrez                                        2001
    1100001        2001            1 Victoria Gutierrez                                        2001

  2 record(s) selected.
```

More Readable Query:

```
WITH CouplesMotherMatch (cid, patid, name) AS
  (
    SELECT C.cid, C.patid, P.name
    FROM Couple C, Patient P
    WHERE P.name = 'Victoria Gutierrez' AND C.patid = P.patid
  )
SELECT P.pregid, CM.patid, P.ithPregnancy, CM.name, CM.patid
FROM Pregnancy P, CouplesMotherMatch CM
WHERE P.cid IN (SELECT cid FROM CouplesMotherMatch);
```

b)ii. In the application, enter the practitioner id (of the midwife) 20 (must exist in the database).

```
anguye56@winter2022-comp421:~/code$ java GoBabbyApp
Please enter your midwife id or [E] to exit:
20
Please enter the date [YYYYMMDD] for appointment list [E] to exit:
```

b) iii. Enter the date 20220225. One of the appointments must be for 'Victoria Gutierrez' and another one for 'Gennie Chapman', a different expecting mother.

```
20
Please enter the date [YYYYMMDD] for appointment list [E] to exit:
20220225
1:      09:00:00        P       Victoria Gutierrez ELUA15368597
2:      11:00:00        P       Gennie Chapman YQDB87551256
Enter the appointment number that you would like to work on.
 [E] to exit [D] to go back to another date :
```

b)iv. Choose the appointment number associated with 'Victoria Gutierrez'. v. Enter 1. (Should show at least two notes).

Note both captured in below screenshot.

```
Enter the appointment number that you would like to work on.
 [E] to exit [D] to go back to another date :
1

 For [Victoria Gutierrez ELUA15368597]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
1

Review notes selected:

2022-02-25 09:25:00 couple considering home birth
2022-02-25 09:10:00 baby having occasional raised heartrate
 For [Victoria Gutierrez ELUA15368597]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

b)vi. Enter 2. (Should show at least two tests).

```
 Enter your choice:
2

Review tests selected:

2022-02-25 [routine ultrasound] heartrate slower than ideal
2022-02-25 [blood iron] healthy
2022-01-19 [blood iron] low - requires intervention
 For [Victoria Gutierrez ELUA15368597]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

b)vii. Enter 3. Add a note ”check hormone levels for heartrate”.

```
 Enter your choice:
3
Please type your observation:
check hormone levels for heartrate

 For [Victoria Gutierrez ELUA15368597]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

b)viii. Run a query in the database that shows all the notes associated with 'Victoria Gutierrez'., include couple information, pregnancy number, etc., as relevant in your model. The actual note text may be truncated to first 50 characters or so to reduce clutter.

```
db2 => WITH CouplesMotherMatch (cid, patid, name) AS
db2 (cont.) =>      (   SELECT C.cid, C.patid, P.name
        FROM Couple C, Patient P
db2 (cont.) => db2 (cont.) =>          WHERE P.name = 'Victoria Gutierrez' AND C.patid = P.patid)
, PregMatch(pregid, ithPregnancy, cid, patid) AS    (
        SELECT P.pregid, P.ithPregnancy, CM.cid, CM.patid
        FROM Pregnancy P, CouplesMotherMatch CM
        WHERE P.cid = CM.cid    )
, AptMatch(aptid, pregid, ithPregnancy, cid, patid) AS    (
        SELECT A.aptid, PM.pregid, PM.ithPregnancy, PM.cid, PM.patid
        FROM Appointment A, PregMatch PM
        WHERE A.pregid = PM.pregid    )
SELECT N.noteDate, N.noteTime, SUBSTRING(N.observations, 0 , 50) AS observations, AM.pregid, AM.ithPregnancy AS ithPreg, AM.cid
FROM AptNote N, AptMatch AM
WHERE N.aptid = AM.aptid
ORDER BY noteDate DESC, noteTime DESC;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
 db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => ;

NOTEDATE   NOTETIME OBSERVATIONS
                                                              PREGID      ITHPREG     CID
---------- -------- ------------------------------------------------------------------------------------------------------------
-------------------------------------------------------------- ----------- ----------- -----------
03/14/2022 21:10:06 check hormone levels for heartrate
                                                                 1000001           2      100001
02/25/2022 09:25:00 couple considering home birth
                                                                 1000001           2      100001
02/25/2022 09:10:00 baby having occasional raised heartrate
                                                                 1000001           2      100001

  3 record(s) selected.

db2 =>
```

More Readable query:

```
WITH CouplesMotherMatch (cid, patid, name) AS
    (
       SELECT C.cid, C.patid, P.name
       FROM Couple C, Patient P
       WHERE P.name = 'Victoria Gutierrez' AND C.patid = P.patid
    )
, PregMatch(pregid, ithPregnancy, cid, patid) AS
    (
       SELECT P.pregid, P.ithPregnancy, CM.cid, CM.patid
       FROM Pregnancy P, CouplesMotherMatch CM
       WHERE P.cid = CM.cid
    )
, AptMatch(aptid, pregid, ithPregnancy, cid, patid) AS
    (
       SELECT A.aptid, PM.pregid, PM.ithPregnancy, PM.cid, PM.patid
       FROM Appointment A, PregMatch PM
       WHERE A.pregid = PM.pregid
    )
SELECT N.noteDate, N.noteTime, SUBSTRING(N.observations, 0 , 50) AS observations, AM.pregid, AM.ithPregnancy AS ithPreg, AM.cid
FROM AptNote N, AptMatch AM
WHERE N.aptid = AM.aptid
ORDER BY noteDate DESC, noteTime DESC
```

b) ix. Enter 1.

```
 Enter your choice:
1

Review notes selected:

2022-03-14 21:10:06 check hormone levels for heartrate
2022-02-25 09:25:00 couple considering home birth
2022-02-25 09:10:00 baby having occasional raised heartrate
 For [Victoria Gutierrez ELUA15368597]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

b)x. Enter 4. Add a test for *trisomy 21*.

```
 Enter your choice:
4
Please enter type of test:
trisomy 21

 For [Victoria Gutierrez ELUA15368597]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

b) xi. Run a query in the database that shows all the tests associated with 'Victoria Gutierrez', include couple information, pregnancy number, etc., as relevant in your model. The result attribute of the test maybe truncated to the first 50 characters or so.

Note that more notes show up here because they are from Victoria's first pregnancy, as this query asked for all tests associated to the mother and not just the pregnancy. Running db2 on putty shows null values as '-', though the test result would be shown as 'PENDING' if it was displayed in the application.

```
db2 => WITH CouplesMotherMatch (cid, patid, name) AS
    (
db2 (cont.) => db2 (cont.) =>        SELECT C.cid, C.patid, P.name
        FROM Couple C, Patient P
        WHERE P.name = 'Victoria Gutierrez' AND C.patid = P.patid
db2 (cont.) => db2 (cont.) => db2 (cont.) =>     )
   , PregMatch(pregid, ithPregnancy, cid, patid) AS
    (
        SELECT P.pregid, P.ithPregnancy, CM.cid, CM.patid
        FROM Pregnancy P, CouplesMotherMatch CM
        WHERE P.cid = CM.cid
    )
SELECT T.prescDate, T.testType, T.result, PM.pregid, PM.ithPregnancy AS ithPreg, PM.cid
FROM Test T, PregMatch PM
WHERE T.pregid = PM.pregid AND T.patid = PM.patid
ORDER BY T.prescDate DESC;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db
ont.) => db2 (cont.) => ;

PRESCDATE  TESTTYPE                                           RESULT
                                                                                                                   PREGID      ITHPREG     CID
---------- -------------------------------------------------- -----------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------------------------- ----------- ----------- -----------
03/14/2022 trisomy 21                                         -
                                                                                                                       1000001           2      100001
02/25/2022 routine ultrasound                                 heartrate slower than ideal
                                                                                                                       1000001           2      100001
02/25/2022 blood iron                                         healthy
                                                                                                                       1000001           2      100001
01/19/2022 blood iron                                         low - requires intervention
                                                                                                                       1000001           2      100001
08/29/2021 blood iron                                         just right
                                                                                                                       1100001           1      100001
07/08/2021 blood iron                                         too low
                                                                                                                       1100001           1      100001
06/15/2021 blood iron                                         too high
                                                                                                                       1100001           1      100001

  7 record(s) selected.
```

More Readable query:

```
WITH CouplesMotherMatch (cid, patid, name) AS
  (
    SELECT C.cid, C.patid, P.name
    FROM Couple C, Patient P
    WHERE P.name = 'Victoria Gutierrez' AND C.patid = P.patid
  )
 , PregMatch(pregid, ithPregnancy, cid, patid) AS
  (
    SELECT P.pregid, P.ithPregnancy, CM.cid, CM.patid
    FROM Pregnancy P, CouplesMotherMatch CM
    WHERE P.cid = CM.cid
  )
SELECT T.prescDate, T.testType, T.result, PM.pregid, PM.ithPregnancy AS ithPreg, PM.cid
FROM Test T, PregMatch PM
WHERE T.pregid = PM.pregid AND T.patid = PM.patid
ORDER BY T.prescDate DESC;
```

b)xii. Enter 5.

```
 Enter your choice:
5
1:      09:00:00        P       Victoria Gutierrez ELUA15368597
2:      11:00:00        P       Gennie Chapman YQDB87551256
Enter the appointment number that you would like to work on.
 [E] to exit [D] to go back to another date :
```

(c)

c)i. Run a query in the database that shows all the tests associated with 'Gennie Chapman', include couple information, pregnancy number, etc., as relevant in your model. The result attribute of the test maybe truncated to the first 50 characters or so.

Note that more notes show up here because they are from Gennie's first pregnancy, as this query asked for all tests associated to the mother and not just the pregnancy.

```
db2 => WITH CouplesMotherMatch (cid, patid, name) AS    (
db2 (cont.) =>         SELECT C.cid, C.patid, P.name
        FROM Couple C, Patient P
        WHERE P.name = 'Gennie Chapman' AND C.patid = P.patid    )
   , PregMatch(pregid, ithPregnancy, cid, patid) AS    (
        SELECT P.pregid, P.ithPregnancy, CM.cid, CM.patid
        FROM Pregnancy P, CouplesMotherMatch CM
        WHERE P.cid = CM.cid    )
SELECT T.prescDate, T.testTydb2 (cont.) => pe, T.result, PM.pregid, PM.ithPregnancy AS ithPreg, PM.cid
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => FROM Test T, PregMatch PM
WHERE T.pregid = PM.pregid AND T.patid = PM.patid
ORDER BY T.prescDate DESC;
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
PRESCDATE  TESTTYPE                                        RESULT
                                                                                                  PREGID      ITHPREG     CID
---------- ------------------------------------------------- ------------------------------------------------------------------------------------------ ----------- ----------- -----------
02/25/2022 position ultrasound                             baby possibly breach
                                                                                                  1000002           2      100002
02/25/2022 progesterone levels                             a little high
                                                                                                  1000002           2      100002
01/19/2022 blood iron                                      a little low
                                                                                                  1000002           2      100002
06/22/2020 routine ultrasound                              good strong heartbeat
                                                                                                  1100002           1      100002

  4 record(s) selected.
```

Readable query:

```
WITH CouplesMotherMatch (cid, patid, name) AS
  (
    SELECT C.cid, C.patid, P.name
    FROM Couple C, Patient P
    WHERE P.name = 'Gennie Chapman' AND C.patid = P.patid
  )
 , PregMatch(pregid, ithPregnancy, cid, patid) AS
  (
    SELECT P.pregid, P.ithPregnancy, CM.cid, CM.patid
    FROM Pregnancy P, CouplesMotherMatch CM
    WHERE P.cid = CM.cid
  )
SELECT T.prescDate, T.testType, T.result, PM.pregid, PM.ithPregnancy AS ithPreg, PM.cid
FROM Test T, PregMatch PM
WHERE T.pregid = PM.pregid AND T.patid = PM.patid
ORDER BY T.prescDate DESC;
```

c)ii. Choose the appointment associated with mother 'Gennie Chapman'.

```
 [E] to exit [D] to go back to another date :
2

 For [Gennie Chapman YQDB87551256]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

c)iii. Enter 1 (to see the relevant notes).

```
 Enter your choice:
1

Review notes selected:

2022-02-25 11:20:00 potential signs of low iron
2022-02-25 11:15:00 prescribed thiamin
 For [Gennie Chapman YQDB87551256]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

c)iv. Enter 4. Add a test prescription for *Group B streptococcus* (test type).

```
 Enter your choice:
4
Please enter type of test:
Group B streptococcus

 For [Gennie Chapman YQDB87551256]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

c) v. Run a query in the database that shows all the tests associated with 'Gennie Chapman', include couple information, pregnancy number, etc., as relevant in your model. The result attribute of the test maybe truncated to the first 50 characters or so.

```
db2 => WITH CouplesMotherMatch (cid, patid, name) AS    (
db2 (cont.) =>         SELECT C.cid, C.patid, P.name
        FROM Couple C, Patient P
        WHERE P.name = 'Gennie Chapman' AND C.patid = P.patid    )
   , PregMatch(pregid, ithPregnancy, cid, patid) AS    (
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>         SELECT P.pregid, P.ithPregnancy, CM.cid, CM.patid
db2 (cont.) =>         FROM Pregnancy P, CouplesMotherMatch CM
        WHERE P.cid = CM.cid    )
SELECT T.prescDate, T.testType, T.result, PM.pregid, PM.ithPregnancy AS ithPreg, PM.cid
FROM Test T, PregMatch PM
WHERE T.pregid = PM.pregid AND T.patid = PM.patid
db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => ORDER BY T.prescDate DESC;

PRESCDATE  TESTTYPE                                           RESULT
                                                                                                              PREGID      ITHPREG     CID
---------- -------------------------------------------------- ----------------------------------------------------------------------
---------------------------------------------------------------------------------------------- ----------- ----------- -----------
03/14/2022 Group B streptococcus                              -
                                                                                                                  1000002           2      100002
02/25/2022 position ultrasound                                baby possibly breach
                                                                                                                  1000002           2      100002
02/25/2022 progesterone levels                                a little high
                                                                                                                  1000002           2      100002
01/19/2022 blood iron                                         a little low
                                                                                                                  1000002           2      100002
06/22/2020 routine ultrasound                                 good strong heartbeat
                                                                                                                  1100002           1      100002

  5 record(s) selected.
```

Readable query:

WITH CouplesMotherMatch (cid, patid, name) AS
  (
    SELECT C.cid, C.patid, P.name
    FROM Couple C, Patient P
    WHERE P.name = 'Gennie Chapman' AND C.patid = P.patid
)
 , PregMatch(pregid, ithPregnancy, cid, patid) AS

```
  (
    SELECT P.pregid, P.ithPregnancy, CM.cid, CM.patid
    FROM Pregnancy P, CouplesMotherMatch CM
    WHERE P.cid = CM.cid
  )
SELECT T.prescDate, T.testType, T.result, PM.pregid, PM.ithPregnancy AS ithPreg, PM.cid
FROM Test T, PregMatch PM
WHERE T.pregid = PM.pregid AND T.patid = PM.patid
ORDER BY T.prescDate DESC;
```

(d)

d)i. Choose 5, followed by [D].

```
 Enter your choice:
5
1:      09:00:00        P       Victoria Gutierrez ELUA15368597
2:      11:00:00        P       Gennie Chapman YQDB87551256
Enter the appointment number that you would like to work on.
 [E] to exit [D] to go back to another date :
D
Please enter the date [YYYYMMDD] for appointment list [E] to exit:
```

d)ii. Enter a different date 20220325.

```
Please enter the date [YYYYMMDD] for appointment list [E] to exit:
20220325
1:      12:00:00        P       Marlow McGifford BRPC98246328
2:      16:00:00        P       Lilias Burgill FFAF64947881
Enter the appointment number that you would like to work on.
 [E] to exit [D] to go back to another date :
```

d)iii. It should show at least two appointments for mothers ‘Marlow McGifford’,’Lilias Burgill’, who are not the same as previous examples.

Demonstrating different from previous examples: no notes found.

```
Enter the appointment number that you would like to work on.
 [E] to exit [D] to go back to another date :
1

 For [Marlow McGifford BRPC98246328]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
1

Review notes selected:
No notes found.

 For [Marlow McGifford BRPC98246328]
 1. Review notes
 2. Review tests
 3. Add a note
 4. Prescribe a test
 5. Go back to the appointments.

 Enter your choice:
```

4. Indexing

Create an index that will help retrieve a mother's address, assuming that we only have a phone number to start the search with.

My implementation has the 'mother' as the 'birthingParent.' 'birthingParent' is part of an ISA hierarchy, where both children and birthingParents are Patients. As the phone number and address are stored in the 'Patient' part of the hierarchy, this is where the index has been created (as per Ed post #603). A more specific index on using a multiple column search key might prove more useful, but assuming we only have the patient's phone number to search with as specified.

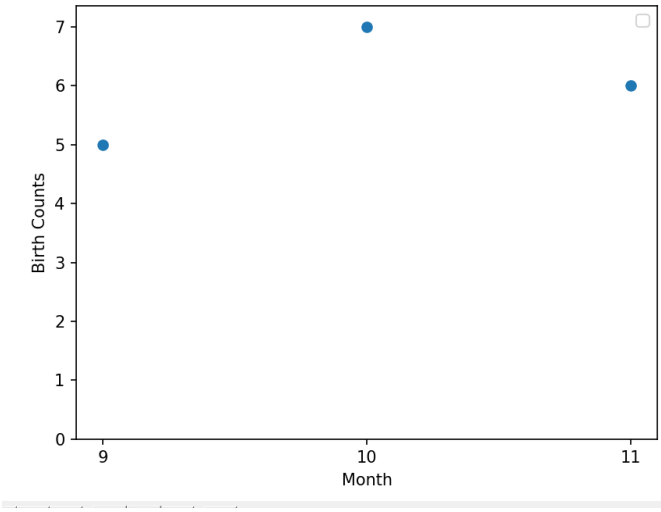
```
db2 => CREATE INDEX phoneAddrIndex ON Patient(phone);
DB20000I  The SQL command completed successfully.
db2 =>
```

5. Data Analytics

As the inverse of Project2's searching for unborn children: Only children who are born will have an updated DOB's in their Patient tables, as well as a pregid entry.

Query:

```
SELECT MONTH(P.DOB) AS DOBmonth, count(P.DOB) AS birthCounts
FROM Patient P, Child C
WHERE P.patid = C.patid
GROUP BY MONTH(P.DOB)
ORDER BY DOBmonth;
```



Query with export:

```
EXPORT TO birthcounts.csv OF DEL MODIFIED BY NOCHARDEL
SELECT MONTH(P.DOB) AS DOBmonth, count(P.DOB) AS birthCounts
FROM Patient P, Child C
WHERE P.patid = C.patid
GROUP BY MONTH(P.DOB)
ORDER BY DOBmonth;
```

```
db2 => EXPORT TO birthcounts.csv OF DEL MODIFIED BY NOCHARDEL
SELECT MONTH(P.DOB) AS DOBmonth, count(P.DOB) AS birthCounts
FROM Patient P, Child C
WHERE P.patid = C.patid
GROUP BY MONTH(P.DOB)
ORDER BY DOBmonth;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2
SQL3104N  The Export utility is beginning to export data to file
"birthcounts.csv".

SQL3105N  The Export utility has finished exporting "3" rows.


Number of rows exported: 3
```