

# COMP421 Project 3

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## 1 Relational Model

1. Mother(hcardid, name, email, phone, birthday, address, profession, birthframe, mbloodtype)
2. Father(fatherid, fname, femail, fphone, fhcardid, fbirthday, faddress, fprofession, fbloodtype)
3. Couple(coupleid, isInterested, hcardid, fatherid) hcardid ref Mother, fathered ref Father
4. Institute(iemail, iname, iphone, iaddress, website)
5. CommClinic(iemail) iemail ref Institute
6. BirthCenter(iemail) iemail ref Institute
7. Midwife(pracid, mname, mphone, workplace, memail, iemail) iemail foreign key referencing relation Institution
8. InfoSession(sessionid, sdate, stime, language, pracid) pracid ref Midwife
9. invited(coupleid, sessionid, attend) sessionid ref InfoSession
10. Pregnancy(coupleid, numpreg, numbabies, expdued, estdued, ishomebirth, ppracid, bpracid, iemail) coupleid ref Couple, ppracid ref Midwife, bpracid ref Midwife, iemail ref BirthCenter
11. Baby(babyid, bname, gender, bbloodtype, birthdate, birthtime, coupleid, numpreg) (coupleid, numpreg) ref Pregnancy
12. Technician(techid, tname, tphone)
13. Test(testid, ttype, presdate, sampledate, labdate, result, pracid, coupleid, numpreg, babyid, techid) pracid ref Midwife, (coupleid, numpreg) ref Pregnancy, babyid ref Baby, techid ref Technician
14. Appointment(aptmtid, adate, atime, coupleid, numpreg, pracid) (coupleid, numpreg) ref Pregnancy, pracid ref Midwife
15. Observation(noteid, odate, otime, content, aptmtid) aptmtid ref Appointment

16. DueDate(duedateid, usounddate, lmpdate, finaldate, aptmtid) aptmtid ref Appointment

## 2 Application Interaction

(a)

- (i) Query that shows that the practitioner ID  $m50501$  does not exist:

```
db2 => SELECT pracid FROM Midwife WHERE pracid = 'm50501';

PRACID
-----
0 record(s) selected.
```

- (ii) Enter this non-existent practitioner ID in application:

```
yliu335@winter2022-comp421:~/COMP421/p3$ java GoBabbyApp

Please enter your practitioner id [E] to exit: m50501
Invalid practitioner ID; No such ID exists.

Please enter your practitioner id [E] to exit:
```

(b)

- (i) Query that shows that mother  $M_1 = \text{'Victoria Gutierrez'}$  has at least 2 pregnancies:

```
db2 => WITH countPreg(name, num_of_preg) AS
(
    SELECT m.name, COUNT(p.coupleid) AS num_of_preg
    FROM Mother m, Couple c, Pregnancy p
    WHERE m.hcardid = c.hcardid AND c.coupleid = p.coupleid
    GROUP BY m.name
)
SELECT name, num_of_preg
FROM countPreg
WHERE num_of_preg >= 2 AND name = 'Victoria Gutierrez'
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.)
. ) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
NAME                      NUM_OF_PREG
Victoria Gutierrez          2

1 record(s) selected.

db2 =>
```

- (ii) Enter practitioner ID  $P_1 = \text{'m29084'}$  in application:

```
yliu335@winter2022-comp421:~/COMP421/p3$ java GoBabbyApp

Please enter your practitioner id [E] to exit: m29084

Please enter the date for appointment list [E] to exit:
```

- (iii) Enter date  $D_1 = \text{'2022-03-21'}$  in application:

```
Please enter the date for appointment list [E] to exit: 2022-03-21  
1: 10:00 B Victoria Gutierrez 87911049  
2: 11:00 B Anastasia Jerome 47078624  
  
Enter the appointment number that you would like to work on.  
[E] to exit [D] to go back to another date:
```

- (iv) Choose the appointment number associated with 'Victoria Gutierrez':

```
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 87911049  
  
1. Review notes  
2. Review tests  
3. Add a note  
4. Prescribe a test  
5. Go back to the appointments  
  
Enter your choice:
```

- (v) Enter 1:

```
Enter your choice: 1  
2022-02-15 14:17 Mother has good health.  
2022-01-14 10:52 Mother has good health.  
2021-12-15 15:31 Do blood iron test.  
2021-12-15 15:17 Mother has good health.  
  
-----  
  
For Victoria Gutierrez 87911049  
  
1. Review notes  
2. Review tests  
3. Add a note  
4. Prescribe a test  
5. Go back to the appointments  
  
Enter your choice:
```

- (vi) Enter 2:

```
Enter your choice: 2  
2022-02-15 [Preborn baby exam] 2 babies, both Male  
2022-01-14 [Blood iron] Normal  
2021-12-18 [Blood pressure] Normal  
2021-12-15 [Blood iron] Slightly higher  
  
-----  
  
For Victoria Gutierrez 87911049  
  
1. Review notes  
2. Review tests  
3. Add a note  
4. Prescribe a test  
5. Go back to the appointments  
  
Enter your choice:
```

(vii) Enter 3 (add note):

```
Enter your choice: 3
Please type your observation: Mother is in good health condition.
Done! Note added successfully.
```

```
-----  
For Victoria Gutierrez 87911049
```

1. Review notes
2. Review tests
3. Add a note
4. Prescribe a test
5. Go back to the appointments

```
Enter your choice:
```

(viii) Query that shows all notes associated with 'Victoria Gutierrez':

```
db2 => SELECT p.coupleid, p.numpreg, CAST(o.odate AS DATE) AS odate, o.otime, o.content
        FROM Mother AS m INNER JOIN Couple c ON m.hcardid = c.hcardid
        INNER JOIN Pregnancy AS p ON c.coupleid = p.coupleid
        INNER JOIN Appointment AS a ON p.coupleid = a.coupleid AND p.numpreg = a.numreg
        INNER JOIN Observation AS o ON a.apptmid = o.apptmid
        WHERE m.name = 'Victoria Gutierrez'
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
COUPLEID    NUMPREG      ODATE        OTIME      CONTENT
-----  
c3895729      1 09/24/2020 10:37    Mother has good health.  
c3895729      1 11/13/2020 10:15    Mother has good health.  
c3895729      1 11/13/2020 10:38    Do test next week.  
c3895729      1 11/24/2020 10:45    Mother has good health.  
c3895729      1 12/20/2020 15:27    Mother has good health.  
c3895729      1 01/20/2021 10:31    Mother has good health.  
c3895729      2 01/14/2022 10:52    Mother has good health.  
c3895729      2 12/15/2021 15:17    Mother has good health.  
c3895729      2 12/15/2021 15:31    Do blood iron test.  
c3895729      2 02/15/2022 14:17    Mother has good health.  
c3895729      2 03/14/2022 16:11    Mother is in good health condition.  
  
11 record(s) selected.  
db2 =>
```

(ix) Enter 1:

```
Enter your choice: 1
2022-03-14 16:11 Mother is in good health condition.
2022-02-15 14:17 Mother has good health.
2022-01-14 10:52 Mother has good health.
2021-12-15 15:31 Do blood iron test.
2021-12-15 15:17 Mother has good health.
```

```
-----  
For Victoria Gutierrez 87911049
```

1. Review notes
2. Review tests
3. Add a note
4. Prescribe a test
5. Go back to the appointments

```
Enter your choice:
```

(x) Enter 4 (add test):

```
|Enter your choice: 4  
|Please enter the type of test: trisomy 21  
|Done! Test added successfully.  
-----
```

```
For Victoria Gutierrez 87911049
```

1. Review notes
2. Review tests
3. Add a note
4. Prescribe a test
5. Go back to the appointments

```
Enter your choice: [
```

(xi) Query that shows all tests associated with 'Victoria Gutierrez':

```
db2 => SELECT p.coupleid, p.numreg, CAST(t.presdate AS DATE) AS pres_date, t.ttype, t.result  
FROM Mother AS m INNER JOIN Couple c ON m.hcardid = c.hcardid  
    INNER JOIN Pregnancy AS p ON c.coupleid = p.coupleid  
    INNER JOIN Test AS t ON p.coupleid = t.coupleid AND p.numreg = t.numreg  
WHERE m.name = 'Victoria Gutierrez'  
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>  
  


| COUPLEID | NUMREG | PRES_DATE  | TTYPE             | RESULT                |
|----------|--------|------------|-------------------|-----------------------|
| c3895729 | 1      | 09/24/2020 | Blood iron        | Normal, Blood type: A |
| c3895729 | 1      | 11/13/2020 | Preborn baby exam | 1 baby, Female        |
| c3895729 | 1      | 11/24/2020 | Blood iron        | Normal                |
| c3895729 | 2      | 12/15/2021 | Blood iron        | Slightly higher       |
| c3895729 | 2      | 01/14/2022 | Blood iron        | Normal                |
| c3895729 | 2      | 12/18/2021 | Blood pressure    | Normal                |
| c3895729 | 2      | 02/15/2022 | Preborn baby exam | 2 babies, both Male   |
| c3895729 | 2      | 03/14/2022 | trisomy 21        | -                     |


```
8 record(s) selected.
```



```
db2 =>
```


```

(xii) Enter 5 (go back to appointment):

```
|Enter your choice: 5  
|  
| 1: 10:00 B Victoria Gutierrez 87911049  
| 2: 11:00 B Anastasia Jerome 47078624  
|  
| Enter the appointment number that you would like to work on.  
|[E] to exit [D] to go back to another date:  
|
```

(c)

(i) Query that shows all tests associated with mother  $M_2 =$  'Anastasia Jerome' (as shown in (b)(iii)):

```

db2 => SELECT p.coupleid, p.numpreg, CAST(t.presdate AS DATE) AS pres_date, t.ttype, t.result
FROM Mother AS m INNER JOIN Couple c ON m.hcardid = c.hcardid
    INNER JOIN Pregnancy AS p ON c.coupleid = p.coupleid
    INNER JOIN Test AS t ON p.coupleid = t.coupleid AND p.numpreg = t.numpreg
WHERE m.name = 'Anastasia Jerome'
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>

COUPLEID  NUMPREG   PRES_DATE  TTYPE          RESULT
-----  -----  -----  -----  -----
c2893550      1 12/11/2021 Blood iron        Normal
c2893550      1 01/14/2022 Blood pressure    Normal
c2893550      1 02/14/2022 Preborn baby exam  2 babies, 1 Male 1 Female

 3 record(s) selected.

db2 =>

```

(ii) Choose the appointment associated with mother 'Anastasia Jerome':

```

1: 10:00 B Victoria Gutierrez 87911049
2: 11:00 B Anastasia Jerome 47078624

Enter the appointment number that you would like to work on.
[E] to exit [D] to go back to another date: 2

For Anastasia Jerome 47078624

1. Review notes
2. Review tests
3. Add a note
4. Prescribe a test
5. Go back to the appointments

Enter your choice:

```

(iii) Enter 1:

```

Enter your choice: 1
2022-02-14 10:28 Mother has good health.
2022-01-15 10:22 Mother has good health.
2021-12-11 11:34 Mother has good health.

-----
For Anastasia Jerome 47078624

1. Review notes
2. Review tests
3. Add a note
4. Prescribe a test
5. Go back to the appointments

Enter your choice:

```

(iv) Enter 4 (add test):

```

Enter your choice: 4
Please enter the type of test: Group B streptococcus
Done! Test added successfully.

-----
For Anastasia Jerome 47078624

1. Review notes
2. Review tests
3. Add a note
4. Prescribe a test
5. Go back to the appointments

Enter your choice:

```

- (v) Query that shows all tests associated with mother 'Anastasia Jerome':

```

db2 => SELECT p.coupleid, p.numreg, CAST(t.presdate AS DATE) AS pres_date, t.ttype, t.result
FROM Mother AS m INNER JOIN Couple c ON m.hcardid = c.hcardid
    INNER JOIN Pregnancy AS p ON c.coupleid = p.coupleid
    INNER JOIN Test AS t ON p.coupleid = t.coupleid AND p.numreg = t.numreg
WHERE m.name = 'Anastasia Jerome'
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
COUPLEID      NUMREG      PRES_DATE      TTYPE      RESULT
-----      -----
c2893550          1 12/11/2021 Blood iron           Normal
c2893550          1 01/14/2022 Blood pressure        Normal
c2893550          1 02/14/2022 Preborn baby exam     2 babies, 1 Male 1 Female
c2893550          1 03/14/2022 Group B streptococcus   -
4 record(s) selected.

db2 =>

```

(d)

- (i) Choose 5, followed by D:

```

Enter your choice: 5

1: 10:00 B Victoria Gutierrez 87911049
2: 11:00 B Anastasia Jerome 47078624

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 for appointment list [E] to exit:

```

- (ii) Enter a different date  $D_2 = '2022-04-06'$ :

```

Please enter the date for appointment list [E] to exit: 2022-04-06

1: 10:00 B Ariane Doux 23548965
2: 14:00 P Vera Wen 38753029

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

```

- (iii) In the above screenshot, then new date  $D_2$  has 2 appointments for mothers  $M_3 = 'Ariane Doux'$  and  $M_4 = 'Vera Wen'$ .

### 3 Indexing

Index creation:

```
db2 => CREATE UNIQUE INDEX ind ON Mother (phone) INCLUDE (address);
DB20000I  The SQL command completed successfully.
db2 =>
```

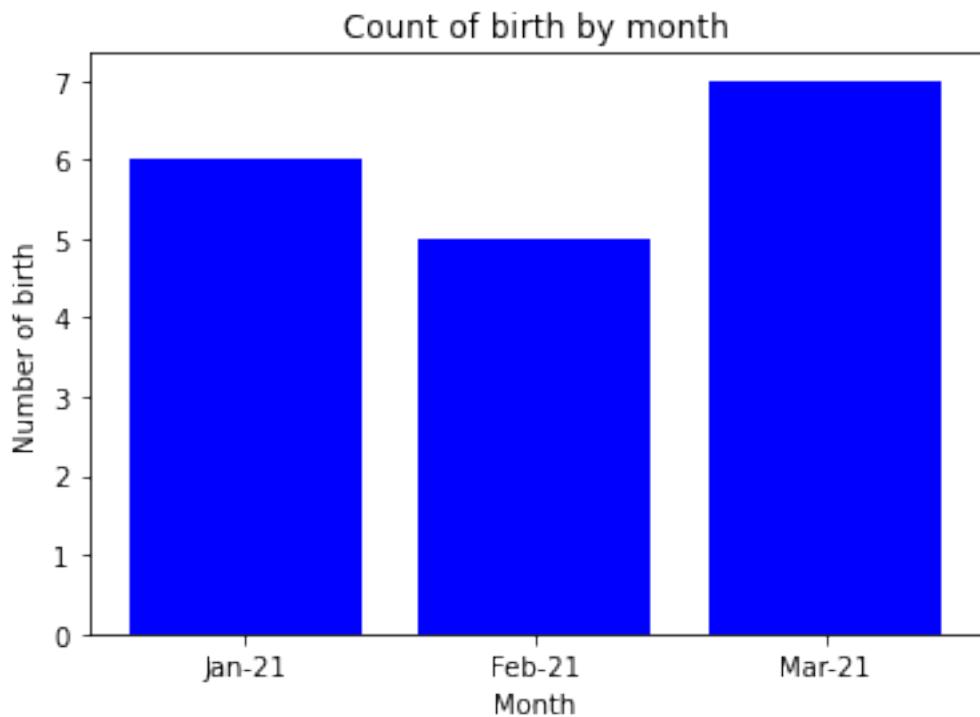
### 4 Data Analytics

Query:

```
db2 => EXPORT TO data.csv OF DEL
SELECT SUBSTR((CAST(birthday AS DATE)), 1, 7) AS birth_month, COUNT(*) AS num_of_birth
FROM Baby
WHERE SUBSTR((CAST(birthday AS DATE)), 1, 4) = '2021'
GROUP BY SUBSTR((CAST(birthday AS DATE)), 1, 7)
;db2 (cont.) => db2 (cont.) => db2 (cont.) => db2 (cont.) =>
SQL3104N  The Export utility is beginning to export data to file "data.csv".
SQL3105N  The Export utility has finished exporting "3" rows.

Number of rows exported: 3
db2 =>
```

And the bar chart generated from the exported data using python is:



The python code used to generate this chart is `script.py` which is included in my submission.