

CLiC Microscopic Data Organization Database P2 (Group 68)

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1 Modified Relations

The feedback we received is as follows:

Sub-entities in ISA hierarchies should explicitly reference the super-entity in the relational translation.

Entities

LabMember (Name, contactInformation, Status)

Researcher (Name, contactInformation, Status, Level) (Name ref LabMember(Name))

ResearchAssistant (Name, contactInformation, Status) (Name ref LabMember(Name))

CLiCDashboard (dID, Date, PATH, Focus, SNR, Contaminants, crID, Name) (crID ref CLiC Raw Data(crID), Name ref researchAssistant (Name))

nanoparticleAnalysisResults (narID, Date, PATH, AvgRadius, Name, crID) (crID ref nanoparticleData (crID), Name ref researchAssistant (Name))

bindingAnalysisResults (barID, Date, PATH, analysisType, Name, crID) (crID ref DNAUnwindingData (crID), Name ref researchAssistant (Name))

CLiCRawData (crID, Date, PATH)

nanoparticleData (crID)(crID ref CLiCRawData(crID))

DNAUnwindingData (crID)(crID ref CLiCRawData(crID))

Protocol (ProtocolID, PATH, Name) (Name ref Researcher (Name))

Microscope (MicroscopeID, Status)

Weak Entity

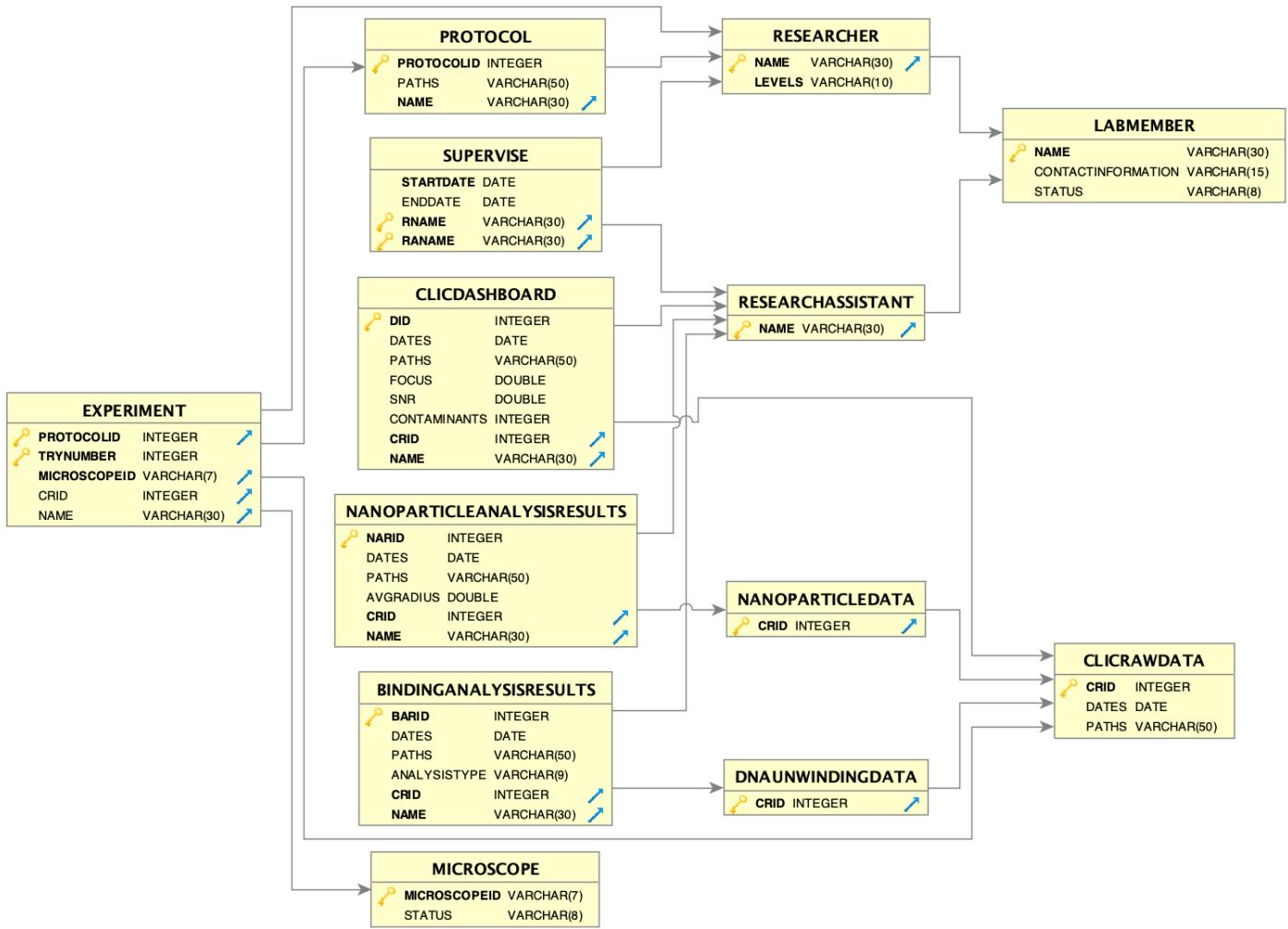
Experiment(protocolID, tryNumber, microscopeID, crdID, Name) (microscopeID ref Microscope(microscopeID), protocolID ref Protocol(protocolID), crdID ref CliCRawData(crdID), Name ref Researcher(Name))

Relationship

Supervise (rName, raName, StartDate, EndDate) (rName ref Researcher (Name), raName ref researchAssistant (Name))

2 Database Construction

Please refer to ...sql for more information. The tables created after running all the setup commands are demonstrated in Fig.1.



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Figure 1: Database framework after running all create table commands. This representation is generated with DBVisualizer. Bold Text = "Not Null"; Key sign = "Primary Key"; Blue Arrow = "Foreign Key"

3 Manual Insert

Please refer to *q3.sql* for details on the insert commands. We inserted multiple triplet data into the *labmember* relation as well as its sub-classes *researchassistant* and *researcher*. In particular, *name* and *status* contain real data, while *contactinformation* is randomly generated. The newly inserted information in each of the three tables is shown, respectively:

```
[db2 => SELECT * FROM labmember
[db2 (cont.) => ;

          NAME           CONTACTINFORMATION STATUS
-----+-----+-----+-----+
Wendy Ji      (514)-561-5587    active
Stone Chen    (514)-531-3322    active
Zhi Zhang     (514)-557-3232    active
Zach Friedenberger (514)-324-1237    active
Gracia Gu     (514)-545-5123    active
Zhi Yue Zhang  (514)-512-5567    active
Cindy Shaheen (514)-532-8521    active
Francis Stabile (514)-274-4887    active
Daniel Berard   (514)-244-9817    active
Kim Metera     (514)-274-4921    active
Radin Tahvildari (514)-284-1237    active
Romain Berti   (514)-224-9387    active
Sabrina Leslie  (514)-224-2837    active
Shane Scott     (514)-274-9287    inactive
Haoran Liao     (514)-271-1927    inactive
Yash Patel      (514)-292-1927    inactive

       16 record(s) selected.

[db2 => SELECT * FROM researcher;

          NAME           LEVELS
-----+-----+
Zhi Yue Zhang    master
Cindy Shaheen    PhD
Francis Stabile  PhD
Daniel Berard     associate
Kim Metera        associate
Radin Tahvildari associate
Romain Berti      associate
Sabrina Leslie    PI
Shane Scott        PhD

       9 record(s) selected.

[db2 => SELECT * FROM researchassistant
[db2 (cont.) => ;

          NAME
-----+
Gracia Gu
Haoran Liao
Stone Chen
Wendy Ji
Yash Patel
Zach Friedenberger
Zhi Zhang

       7 record(s) selected.
```

4 Auto Data Generation

Please refer to *autoDataGen.py* and *autoDataGen.sql* for details on the automatically generated *Insert* commands. We used python to automatically generate 200 *Insert* commands for each table. Their connections are randomly constructed but still stick to the rules specified for each relation. Some inserted information are shown below:

```
db2 => SELECT * FROM protocol FETCH FIRST 10 ROWS ONLY
PROTOCOLID PATHS
-----NAME
2 C:\Protocol\2.pdf Kim Metera
3 C:\Protocol\3.pdf Cindy Shaheen
4 C:\Protocol\4.pdf Radin Tahvildari
5 C:\Protocol\5.pdf Radin Tahvildari
6 C:\Protocol\6.pdf Francis Stabile
7 C:\Protocol\7.pdf Radin Tahvildari
8 C:\Protocol\8.pdf Daniel Berard
9 C:\Protocol\9.pdf Francis Stabile
10 C:\Protocol\10.pdf Cindy Shaheen
11 C:\Protocol\11.pdf Daniel Berard

10 record(s) selected.

db2 => SELECT * FROM experiment FETCH FIRST 10 ROWS ONLY
PROTOCOLID TRYNUMBER MICROSCOPEID CRID NAME
----- -----
2 1 Nikon01 183 Daniel Berard
2 2 Nikon01 11 Daniel Berard
2 3 Nikon01 33 Daniel Berard
2 4 Nikon01 50 Daniel Berard
3 1 Nikon01 33 Cindy Shaheen
3 2 Nikon02 175 Cindy Shaheen
4 1 Nikon02 35 Sabrina Leslie
4 2 Nikon02 93 Sabrina Leslie
4 3 Nikon02 185 Sabrina Leslie
4 4 Nikon02 174 Sabrina Leslie

10 record(s) selected.

db2 => SELECT * FROM BINDINGANALYSISRESULTS FETCH FIRST 10 ROWS ONLY
BARID DATES PATHS ANALYSISTYPE CRID NAME
----- -----
1 12/16/2018 C:\BindingAnalysisResults\1 rough 154 Stone Chen
2 12/16/2018 C:\BindingAnalysisResults\2 rough 57 Zach Friedenberger
3 11/22/2018 C:\BindingAnalysisResults\3 rough 24 Stone Chen
4 10/21/2018 C:\BindingAnalysisResults\4 rough 167 Wendy Ji
5 06/01/2018 C:\BindingAnalysisResults\5 accurate 128 Stone Chen
6 01/12/2019 C:\BindingAnalysisResults\6 rough 95 Wendy Ji
7 08/05/2018 C:\BindingAnalysisResults\7 decent 188 Stone Chen
8 08/05/2018 C:\BindingAnalysisResults\8 accurate 156 Stone Chen
9 09/23/2018 C:\BindingAnalysisResults\9 rough 124 Zhi Zhang
10 12/18/2018 C:\BindingAnalysisResults\10 accurate 178 Zhi Zhang

10 record(s) selected.

db2 => SELECT * FROM CLICDASHBOARD FETCH FIRST 10 ROWS ONLY
DID DATES PATHS FOCUS SNR CONTAMINANTS CRID NAME
----- -----
1 06/27/2018 C:\CLICDashBoard\1 +1.50000000000000E+000 -5.47000000000000E+000 2539 175 Zhi Zhang
2 03/23/2019 C:\CLICDashBoard\2 +1.76000000000000E+000 +1.21000000000000E+000 600 186 Stone Chen
3 05/07/2018 C:\CLICDashBoard\3 +4.20000000000000E+000 +9.21000000000000E+000 145 43 Stone Chen
4 10/04/2018 C:\CLICDashBoard\4 +3.00000000000000E+000 +6.63000000000000E+000 2646 127 Zach Friedenberger
5 08/22/2018 C:\CLICDashBoard\5 +2.90000000000000E+000 +4.62000000000000E+000 1957 128 Zhi Zhang
6 07/03/2018 C:\CLICDashBoard\6 +2.95000000000000E+000 +9.03000000000000E+000 636 88 Stone Chen
7 07/03/2018 C:\CLICDashBoard\7 +4.77000000000000E+000 +1.30000000000000E+000 1845 192 Stone Chen
8 10/04/2018 C:\CLICDashBoard\8 +1.12000000000000E+000 +8.79000000000000E+000 3427 153 Zach Friedenberger
9 07/24/2018 C:\CLICDashBoard\9 +4.01000000000000E+000 +1.40000000000000E+000 773 1 Wendy Ji
10 08/28/2018 C:\CLICDashBoard\10 +3.09000000000000E+000 +5.41000000000000E+000 1288 115 Stone Chen

10 record(s) selected.

db2 => SELECT * FROM CLICDASHBOARD FETCH FIRST 10 ROWS ONLY
DID DATES PATHS FOCUS SNR CONTAMINANTS CRID NAME
----- -----
1 06/27/2018 C:\CLICDashBoard\1 +1.50000000000000E+000 -5.47000000000000E+000 2539 175 Zhi Zhang
2 02/23/2019 C:\CLICDashBoard\2 +1.76000000000000E+000 +1.21000000000000E+000 600 186 Stone Chen
3 03/23/2019 C:\CLICDashBoard\3 +4.20000000000000E+000 +9.21000000000000E+000 145 43 Stone Chen
4 10/04/2018 C:\CLICDashBoard\4 +3.00000000000000E+000 +6.63000000000000E+000 2646 127 Zach Friedenberger
5 08/22/2018 C:\CLICDashBoard\5 +2.90000000000000E+000 +4.62000000000000E+000 1957 128 Zhi Zhang
6 07/03/2018 C:\CLICDashBoard\6 +2.95000000000000E+000 +9.03000000000000E+000 636 88 Stone Chen
7 09/05/2018 C:\CLICDashBoard\7 +4.71000000000000E+000 +1.85000000000000E+000 1845 192 Stone Chen
8 10/06/2018 C:\CLICDashBoard\8 +1.12000000000000E+000 +8.89000000000000E+000 3427 153 Zach Friedenberger
9 07/24/2018 C:\CLICDashBoard\9 +4.01000000000000E+000 +1.40000000000000E+000 773 1 Wendy Ji
10 08/28/2018 C:\CLICDashBoard\10 +3.09000000000000E+000 +5.41000000000000E+000 1288 115 Stone Chen

10 record(s) selected.

db2 => SELECT * FROM CLICRANCDATA FETCH FIRST 10 ROWS ONLY
CRID DATES PATHS
----- -----
1 07/29/2018 C:\CLICRawData\1.mat
2 11/15/2018 C:\CLICRawData\2.mat
3 07/17/2018 C:\CLICRawData\3.mat
4 07/11/2018 C:\CLICRawData\4.mat
5 05/07/2018 C:\CLICRawData\5.mat
6 10/20/2018 C:\CLICRawData\6.mat
7 10/20/2018 C:\CLICRawData\7.mat
8 05/14/2018 C:\CLICRawData\8.mat
9 06/11/2018 C:\CLICRawData\9.mat
10 07/13/2018 C:\CLICRawData\10.mat

10 record(s) selected.

db2 => SELECT * FROM MICROSCOPE FETCH FIRST 10 ROWS ONLY
MICROSCOPEID STATUS
----- -----
Nikon01 active
Nikon02 active
Nikon03 inactive

3 record(s) selected.

db2 => SELECT * FROM NANOPARTICLEANALYSISRESULTS FETCH FIRST 10 ROWS ONLY
NARID DATES PATHS AVERADIUS CRID NAME
----- -----
0 02/18/2019 C:\NanoparticleAnalysisResults\1 +4.88000000000000E+001 85 Stone Chen
1 12/26/2018 C:\NanoparticleAnalysisResults\2 +3.70000000000000E+001 6 Wendy Ji
2 08/08/2018 C:\NanoparticleAnalysisResults\3 +4.17500000000000E+001 102 Wendy Ji
3 08/20/2018 C:\NanoparticleAnalysisResults\4 +4.21600000000000E+001 193 Stone Chen
4 08/09/2018 C:\NanoparticleAnalysisResults\5 +3.45600000000000E+001 152 Zhi Zhang
5 08/09/2018 C:\NanoparticleAnalysisResults\6 +3.45600000000000E+001 152 Zhi Zhang
6 08/07/2018 C:\NanoparticleAnalysisResults\7 +3.64000000000000E+001 189 Zach Friedenberger
7 08/06/2018 C:\NanoparticleAnalysisResults\8 +2.87700000000000E+001 29 Stone Chen
8 05/20/2018 C:\NanoparticleAnalysisResults\9 +2.25200000000000E+001 64 Stone Chen
9 12/28/2018 C:\NanoparticleAnalysisResults\10 +4.97600000000000E+001 133 Zach Friedenberger

10 record(s) selected.
```

```

db2 => SELECT * FROM NANOPARTICLEDATA FETCH FIRST 10 ROWS ONLY
CRID
-----
1
2
3
4
5
6
7
8
9
10

10 record(s) selected.

db2 => SELECT * FROM SUPERVISE FETCH FIRST 10 ROWS ONLY
STARTDATE ENDDATE RNAME RNAME
----- -----
05/01/2018 - Radin Tahvildari Wendy Ji
05/01/2018 - Radin Tahvildari Zach Friedenberger
02/01/2017 06/01/2018 Radin Tahvildari Haoran Liao
02/01/2017 06/01/2018 Radin Tahvildari Yash Patel
05/01/2018 - Cindy Shaheen Stone Chen
05/01/2018 - Cindy Shaheen Zhi Zhang
05/01/2018 - Cindy Shaheen Gracia Gu

7 record(s) selected.

db2 => SELECT * FROM RESEARCHASSISTANT FETCH FIRST 10 ROWS ONLY
NAME
-----
Gracia Gu
Haoran Liao
Stone Chen
Wendy Ji
Yash Patel
Zach Friedenberger
Zhi Zhang

7 record(s) selected.

db2 => SELECT * FROM RESEARCHER FETCH FIRST 10 ROWS ONLY
NAME LEVELS
----- -----
Zhi Yue Zhang master
Cindy Shaheen PhD
Francis Stabile PhD
Daniel Berard associate
Kim Metera associate
Radin Tahvildari associate
Romain Berti associate
Sabrina Leslie PI
Shane Scott PhD

9 record(s) selected.

```

5 Analytical Query

5.1 Digging around!!

List the paths of all data analysis results (including binding analysis and nano-particle analysis) analyzed by an active researcher named "Wendy Ji":

The screenshot shows a database query interface with the following details:

- SQL Query:**

```

1 SELECT PATHS
2 FROM NANOPARTICLEANALYSISRESULTS
3 WHERE NAME = 'Wendy Ji'
4 UNION
5 SELECT PATHS
6 FROM BINDINGANALYSISRESULTS
7 WHERE NAME = 'Wendy Ji';
    
```
- Results:** A list of 46 paths, mostly from C:\BindingAnalysisResults\179 to C:\BindingAnalysisResults\114.
- Log:** Shows the execution log with the following entries:

Time	Status	Command	Exec	Fetch	Rows	Message	SQL/Command
22:25:53	STARTED					Executing for: 'cs421g' [DB2 LUW], Schema: CS421G68	SELECT PATHS ...
22:25:53	SUCCESS	SELECT	0.025	0.018	93	Result set fetched	
22:25:54	FINISHED		0.025	0.018	93	Success: 1	

5.2 Who has been slacking?

Rank active research assistants (name) by the number of CLiC raw data they have analyzed during January and February of 2019:

```

9
10 SELECT C.NAME, COUNT(UNIQUE(CRID)) AS NUMBEROFRDATA
11 FROM CLICDASHBOARD C, LABMEMBER L
12 WHERE C.DATES >= '2019-01-01' AND C.DATES <= '2019-02-28' AND C.NAME = L.NAME AND L.STATUS='active'
13 GROUP BY C.NAME
14 ORDER BY NUMBEROFRDATA;
15

```

7:25 [144] [INS]

NAME	NUMBEROFRDATA
Zhi Zhang	4
Zach Friedenberger	8
Stone Chen	12
Wendy Ji	12

Time Status Command Exec Fetch Rows Message SQL/Command

22:28:51 STARTED Executing for: 'cs421g' [DB2 LUW], Schema: CS421G68
SELECT C.NAME, COUNT(UNIQUE(CRID)) AS NUMBEROFRDATA...

22:28:51 SUCCESS SELECT 0.029 0.018 4 Rows set fetched

22:28:51 FINISHED Success: 4 Success: 1

5.3 Who is worst at experiments?

Rank active researchers (name) by the number of raw data they produced that is associated with a dashboard containing focus > 3 (this needs to be normalized by the total number of experiments they have done):

```

20 SELECT M.NAME, M.NUMBEROFRDATA, N.NUMBEROFRDATA, ROUND(CAST(M.NUMBEROFRDATA AS DOUBLE)/N.NUMBEROFRDATA,3)
21 FROM
22 (SELECT Y.NAME, COUNT(X.CRID) AS NUMBEROFRDATA
23 FROM
24 (SELECT UNIQUE(D.CRID) AS CRID FROM CLICDASHBOARD D, CLICRAWDATA R
25 WHERE D.CRID = R.CRID AND D.FOCUS > 3) X, LABMEMBER Y, EXPERIMENT Z
26 WHERE Y.STATUS = 'active' AND Z.CRID = X.CRID AND Y.NAME = Z.NAME
27 GROUP BY Y.NAME
28 ORDER BY NUMBEROFRDATA),
29 (SELECT Y.NAME, COUNT(X.CRID) AS NUMBEROFRDATA
30 FROM
31 (SELECT UNIQUE(D.CRID) AS CRID FROM CLICDASHBOARD D, CLICRAWDATA R
32 WHERE D.CRID = R.CRID ) X, LABMEMBER Y, EXPERIMENT Z
33 WHERE Y.STATUS = 'active' AND Z.CRID = X.CRID AND Y.NAME = Z.NAME
34 GROUP BY Y.NAME
35 ORDER BY NUMBEROFRDATA)
36 WHERE M.NAME=N.NAME
37

```

22:45 [520] [INS]

NAME	NUMBEROFRDATA	NUMBEROFRDATA	ROUND(CAST(M.NUMBEROFRDATA AS DOUBLE)/N.NUMBEROFRDATA,3)
Kim Metera	18	28	0.643
Sabrina Leslie	22	36	0.611
Francis Stabile	24	36	0.667
Radin Tahvidari	24	34	0.706
Daniel Berard	28	35	0.8
Cindy Shaheen	30	38	0.789

Time Status Command Exec Fetch Rows Message SQL/Command

13:23:35 STARTED Executing for: 'cs421g' [DB2 LUW], Schema: CS421G68
SELECT M.NAME, M.NUMBEROFRDATA, N.NUMBEROFRDATA, ROUND(CAST(M.NUMBEROFRDATA AS DOUBLE)/N.NUMBEROFRDATA,3)...

13:23:35 SUCCESS SELECT 0.019 0.002 6 Rows set fetched

13:23:35 FINISHED Success: 6 Success: 1

5.4 Get me all my good data!! Meeting with PI tomorrow!!

List the paths of all DNA unwinding data whose binding analysis results have analysis type "Decent" or "Accurate":

```

23
24
25 SELECT PATHS
26 FROM DNAUNWINDINGDATA D, BINDINGANALYSISRESULTS B
27 WHERE D.CRID=B.CRID AND (B.ANALYSISTYPE IN ('decent','accurate'));
28
29
30

```

34:1 [798] [INS]

PATHS
C:\BindingAnalysisResults\4
C:\BindingAnalysisResults\5
C:\BindingAnalysisResults\7
C:\BindingAnalysisResults\8
C:\BindingAnalysisResults\10
C:\BindingAnalysisResults\11
C:\BindingAnalysisResults\12
C:\BindingAnalysisResults\13
C:\BindingAnalysisResults\14
C:\BindingAnalysisResults\15
C:\BindingAnalysisResults\16
C:\BindingAnalysisResults\17
C:\BindingAnalysisResults\18
C:\BindingAnalysisResults\20
C:\BindingAnalysisResults\21
C:\BindingAnalysisResults\22
C:\BindingAnalysisResults\24
C:\BindingAnalysisResults\25
C:\BindingAnalysisResults\26
C:\BindingAnalysisResults\29
C:\BindingAnalysisResults\31
C:\BindingAnalysisResults\32
C:\BindingAnalysisResults\33
C:\BindingAnalysisResults\36

Time Status Command Exec Fetch Rows Message SQL/Command

22:30:51 STARTED Executing for: 'cs421g' [DB2 LUW], Schema: CS421G68
SELECT PATHS ...

22:30:51 SUCCESS SELECT 0.024 0.020 154 Result set fetched

22:30:51 FINISHED Success: 154 Success: 1

5.5 Getting ready to publish!!

List the paths of all protocols that satisfy:

- they are used in generating nano-particle data with nano-particle analysis results, which produce average radius higher than 40;
- they are used in the experiments for more than 2 times (try number in experiment is bigger than or equal to 2)

```
29
30 SELECT DISTINCT P.PATHS
31 FROM PROTOCOL_P, EXPERIMENT E, NANOPARTICLEANALYSISRESULTS N
32 WHERE N.CRID = E.CRID AND N.AVGADIUS > 40 AND E.PROTOCOLID=P.PROTOCOLID AND E.TRYNUMBER >= 2;
33
34
35
```

27:67 [791] INS |

Log 1: PROTOCOL [50] X

PATHS

1 C:\Protocol\102.pdf
2 C:\Protocol\104.pdf
3 C:\Protocol\105.pdf
4 C:\Protocol\111.pdf
5 C:\Protocol\119.pdf
6 C:\Protocol\125.pdf
7 C:\Protocol\128.pdf
8 C:\Protocol\130.pdf
9 C:\Protocol\137.pdf
10 C:\Protocol\142.pdf
11 C:\Protocol\143.pdf
12 C:\Protocol\145.pdf
13 C:\Protocol\15.pdf
14 C:\Protocol\152.pdf
15 C:\Protocol\154.pdf
16 C:\Protocol\169.pdf
17 C:\Protocol\17.pdf
18 C:\Protocol\18.pdf
19 C:\Protocol\181.pdf
20 C:\Protocol\188.pdf
21 C:\Protocol\190.pdf
22 C:\Protocol\193.pdf
23 C:\Protocol\196.pdf
24 C:\Protocol\197.pdf
25 C:\Protocol\2.pdf

Format: <Select a Cell>

Time	Status	Command	Exec	Fetch	Rows	Message	SQL/Command
22:31:44	STARTED					Executing for: 'c5421g' [DB2 LUW], Schema: CS421G68	
22:31:45	SUCCESS	SELECT	0.048	0.018	50	Result set fetched	SELECT DISTINCT P.PATHS...
22:31:45	FINISHED		0.048	0.018	50	Success: 1	

5.6 The BIG Picture!

Researchers supervising undergraduates need to keep track of the progress of their assistants. For every active assistant, supervisors would like to see the average metrics regarding data dashboard in the last year. In addition, they also want to know how many datasets assistants have finished analyzing in order to compare the performance.

```
120 SELECT RNAME, RANAME, AVGFOCUS, AVGSNR, AVGCONT, NBCRID
121 FROM
122 (SELECT *
123 FROM SUPERVISE S
124 JOIN CLICDASHBOARD D
125 ON (SELECT NAME, AVGFOCUS) AS AVGFOCUS, AVG(SNR) AS AVGSNR, AVG(CONTAMINANTS) AS AVGCONT, COUNT(DISTINCT CRID) AS NBCRID
126 WHERE YEAR(DATES)=YEAR(CURRENT_DATE) < 2
127 WHERE YEAR(DATES)-YEAR(CURRENT_DATE) < 2
128 GROUP BY NAME)
129 ON NAME=S.RNAME, LABMEMBER L
130 WHERE A.RNAME=L.NAME AND L.STATUS='active'
131 ORDER BY RNAME, RANAME;
132
```

119:1 [2917] INS |

Log 1: SUPERVISE [4] X

*	RNAME	RANAME	AVGFOCUS	AVGSNR	AVGCONT	NBCRID
1	Cindy Shaheen	Stone Chen	3.1614285714285715	5.633214285714286	2272	46
2	Cindy Shaheen	Zhi Zhang	2.5334090909090907	5.752272727272728	2468	35
3	Radin Tahvildari	Wendy Ji	3.0553061224489797	5.5916326530612235	2526	46
4	Radin Tahvildari	Zach Friedenberger	3.108653846153845	5.386923076923078	2506	46

Time Status Command Exec Fetch Rows Message SQL/Command

23:03:54 STARTED Executing for: 'c5421g' [DB2 LUW], Schema: CS421G68

23:03:54 SUCCESS SELECT 0.028 0.024 4 Result set fetched SELECT RNAME, RANAME, AVGFOCUS, AVGSNR, AVGCONT, NBCRID...

23:03:54 FINISHED 0.028 0.024 4 Success: 1

6 Data Modification

6.1 Research assistant has graduated...

Find the research assistants named 'Stone Chen' and 'Wendy Ji' and modify their status to 'inactive'. For those research assistants who just left, update their end dates of supervision to "2019-05-01":

- Table LABMEMBER:

Previous Data:

```
112 SELECT * FROM LABMEMBER;
113
114
115
108:29 [2957] INS [ ]
```

*	NAME	CONTACTINFORMATION	STATUS
1	Wendy Ji	(514)-561-5587	active
2	Stone Chen	(514)-531-3322	active
3	Zhi Zhang	(514)-557-3232	active
4	Zach Friedenberger	(514)-324-1237	active
5	Gracia Gu	(514)-545-5123	active
6	Zhi Yue Zhang	(514)-512-5567	active
7	Cindy Shaheen	(514)-532-8521	active
8	Francis Stabile	(514)-274-4887	active
9	Daniel Berard	(514)-244-9817	active
10	Kim Metera	(514)-274-4921	active
11	Radin Tahvildari	(514)-284-1237	active
12	Romain Berti	(514)-224-9387	active
13	Sabrina Leslie	(514)-224-2837	active
14	Shane Scott	(514)-274-9287	inactive
15	Haoran Liao	(514)-271-1927	inactive
16	Yash Patel	(514)-292-1927	inactive

Data after modification:

```
38 UPDATE LABMEMBER
39 SET STATUS = CASE
40 WHEN NAME IN ('Stone Chen', 'Wendy Ji') THEN 'inactive'
41 ELSE STATUS
42 END;
43
44 SELECT * FROM LABMEMBER;
45
35:1 [977] INS [ ]
```

*	NAME	CONTACTINFORMATION	STATUS
1	Wendy Ji	(514)-561-5587	inactive
2	Stone Chen	(514)-531-3322	inactive
3	Zhi Zhang	(514)-557-3232	active
4	Zach Friedenberger	(514)-324-1237	active
5	Gracia Gu	(514)-545-5123	active
6	Zhi Yue Zhang	(514)-512-5567	active
7	Cindy Shaheen	(514)-532-8521	active
8	Francis Stabile	(514)-274-4887	active
9	Daniel Berard	(514)-244-9817	active
10	Kim Metera	(514)-274-4921	active
11	Radin Tahvildari	(514)-284-1237	active
12	Romain Berti	(514)-224-9387	active
13	Sabrina Leslie	(514)-224-2837	active

- Table SUPERVISE:

Previous Data:

```
61 SELECT * FROM SUPERVISE;
62
63
54:19 [1373] INS [ ]
```

*	STARTDATE	ENDDATE	RNAME	RANAME
1	2018-05-01	(null)	Radin Tahvildari	Wendy Ji
2	2018-05-01	(null)	Radin Tahvildari	Zach Friedenberger
3	2017-02-01	2018-06-01	Radin Tahvildari	Haoran Liao
4	2017-02-01	2018-06-01	Radin Tahvildari	Yash Patel
5	2018-05-01	(null)	Cindy Shaheen	Stone Chen
6	2018-05-01	(null)	Cindy Shaheen	Zhi Zhang
7	2018-05-01	(null)	Cindy Shaheen	Gracia Gu

Data after modification:

```
46 UPDATE BINDINGANALYSISRESULTS
47 SET ANALYSISTYPE = 'decent'
48 WHERE NAME='Zhi Zhang' AND ANALYSISTYPE = 'rough';
49
50 UPDATE SUPERVISE S
51 SET ENDDATE = '2019-05-01'
52 WHERE EXISTS
53 (SELECT L.NAME
54 FROM LABMEMBER L
55 WHERE L.STATUS = 'inactive' AND L.NAME=S.RNAME AND S.ENDDATE IS NULL);
56
57 SELECT * FROM SUPERVISE;
58
42:5 [1128] INS [ ]
```

*	STARTDATE	ENDDATE	RNAME	RANAME
1	2018-05-01	2019-05-01	Radin Tahvildari	Wendy Ji
2	2018-05-01	(null)	Radin Tahvildari	Zach Friedenberger
3	2017-02-01	2018-06-01	Radin Tahvildari	Haoran Liao
4	2017-02-01	2018-06-01	Radin Tahvildari	Yash Patel
5	2018-05-01	2019-05-01	Cindy Shaheen	Stone Chen
6	2018-05-01	(null)	Cindy Shaheen	Zhi Zhang
7	2018-05-01	(null)	Cindy Shaheen	Gracia Gu

6.2 Newbie to the lab!!

Fortunately, someone is replacing those who left. Insert into research assistant and lab member "Raffle Zhu" with phone number (514)-888-8888 with 'active' status and supervision start date "2019-04-01" by "Zhi Yue Zhang":

Database Connection Sticky Database Schema

```

1 --SELECT End'Raffle' AS NEW ,NULL AS N FROM SUPERVISE WHERE RENAME='Stone Chen';
2
3 INSERT INTO LABMEMBER
4 VALUES ('Raffle Zhu','(514)-888-8888','active');
5
6 INSERT INTO RESEARCHASSISTANT
7 VALUES ('Raffle Zhu');
8
9 INSERT INTO SUPERVISE (STARTDATE, RNAME, RENAME)
10 VALUES ('2019-04-01', (SELECT RNAME FROM SUPERVISE
11 WHERE RENAME='Stone Chen'), 'Raffle Zhu');
12
13

```

1:4 [q] [INS]

Log

Time	Status	Command	Exec	Fetch	Rows	Message
12:29:58	STARTED					Executing for: 'cs421' [DB2 LUW], Schema: CS421G68
→ 12:29:58	SUCCESS	INSERT	0.040		1	OK
▲ 12:29:59	FINISHED		0.040	0	1	Success: 1

Previous Data:

Table: LABMEMBER

cs421/CS421G68/TABLE/LABMEMBER

Info Columns Data Row Count Primary Key

In DbVisualizer Pro this feature includes data editing functionality and management.

*	NAME	CONTACTINFORMATION	STATUS
1	Wendy Ji	(514)-561-5587	inactive
2	Stone Chen	(514)-531-3322	inactive
3	Zhi Zhang	(514)-557-3232	active
4	Zach Friedenberger	(514)-324-1237	active
5	Gracia Gu	(514)-545-5123	active
6	Zhi Yue Zhang	(514)-512-5567	active
7	Cindy Shaheen	(514)-532-8521	active
8	Francis Stabile	(514)-274-4887	active
9	Daniel Berard	(514)-244-9817	active
10	Kim Metera	(514)-274-4921	active
11	Radin Tahvildari	(514)-284-1237	active
12	Romain Berti	(514)-224-9387	active
13	Sabrina Leslie	(514)-224-2837	active
14	Shane Scott	(514)-274-9287	inactive
15	Haoran Liao	(514)-271-1927	inactive
16	Yash Patel	(514)-292-1927	inactive

Data after modification:

Table: LABMEMBER

cs421/CS421G68/TABLE/LABMEMBER

Info Columns Data Row Count Primary Key

In DbVisualizer Pro this feature includes data editing functionality and management.

*	NAME	CONTACTINFORMATION	STATUS
1	Wendy Ji	(514)-561-5587	inactive
2	Stone Chen	(514)-531-3322	inactive
3	Zhi Zhang	(514)-557-3232	active
4	Zach Friedenberger	(514)-324-1237	active
5	Gracia Gu	(514)-545-5123	active
6	Zhi Yue Zhang	(514)-512-5567	active
7	Cindy Shaheen	(514)-532-8521	active
8	Francis Stabile	(514)-274-4887	active
9	Daniel Berard	(514)-244-9817	active
10	Kim Metera	(514)-274-4921	active
11	Radin Tahvildari	(514)-284-1237	active
12	Romain Berti	(514)-224-9387	active
13	Sabrina Leslie	(514)-224-2837	active
14	Shane Scott	(514)-274-9287	inactive
15	Haoran Liao	(514)-271-1927	inactive
16	Yash Patel	(514)-292-1927	inactive
17	Raffle Zhu	(514)-888-8888	active

Previous Data:

Table: SUPERVISE

cs421/CS421G68/TABLE/SUPERVISE

Info Columns Data Row Count Primary Key Index

In DbVisualizer Pro this feature includes data editing functionality and management.

*	STARTDATE	ENDDATE	RNAME	RANAME
1	2018-05-01	(null)	Radin Tahvildari	Wendy Ji
2	2018-05-01	(null)	Radin Tahvildari	Zach Friedenberger
3	2017-02-01	2018-06-01	Radin Tahvildari	Haoran Liao
4	2017-02-01	2018-06-01	Radin Tahvildari	Yash Patel
5	2018-05-01	(null)	Cindy Shaheen	Stone Chen
6	2018-05-01	(null)	Cindy Shaheen	Zhi Zhang
7	2018-05-01	(null)	Cindy Shaheen	Gracia Gu

Data after modification:

Table: SUPERVISE

cs421/CS421G68/TABLE/SUPERVISE

Info Columns Data Row Count Primary Key Index

In DbVisualizer Pro this feature includes data editing functionality and management.

*	STARTDATE	ENDDATE	RNAME	RANAME
1	2018-05-01	(null)	Radin Tahvildari	Wendy Ji
2	2018-05-01	(null)	Radin Tahvildari	Zach Friedenberger
3	2017-02-01	2018-06-01	Radin Tahvildari	Haoran Liao
4	2017-02-01	2018-06-01	Radin Tahvildari	Yash Patel
5	2018-05-01	(null)	Cindy Shaheen	Stone Chen
6	2018-05-01	(null)	Cindy Shaheen	Zhi Zhang
7	2018-05-01	(null)	Cindy Shaheen	Gracia Gu
8	2019-04-01	(null)	Cindy Shaheen	Raffle Zhu

Previous Data:

Table: RESEARCHASSISTANT					
cs421/CS421G68/TABLE/RESEARCHASSISTANT					
		Info	Columns	Data	Row Count
i In DbVisualizer Pro this feature includes data modification support.					
*	NAME				
1	Gracia Gu				
2	Haoran Liao				
3	Stone Chen				
4	Wendy Ji				
5	Yash Patel				
6	Zach Friedenberger				
7	Zhi Zhang				

Data after modification:

Table: RESEARCHASSISTANT					
cs421/CS421G68/TABLE/RESEARCHASSISTANT					
		Info	Columns	Data	Row Count
i In DbVisualizer Pro this feature includes data modification support.					
*	NAME				
1	Gracia Gu				
2	Haoran Liao				
3	Raffle Zhu				
4	Stone Chen				
5	Wendy Ji				
6	Yash Patel				
7	Zach Friedenberger				
8	Zhi Zhang				

6.3 Correct a mistake!!

Find all DNA binding analysis results done by "Zhi Zhang" in 2019 with analysis type "rough". Correct the types of those analysis to "decent":

```

72 DELETE FROM CLICASHBOARD
73 WHERE FOCUS < 2 OR (YEAR(CURRENT_DATE)-YEAR(DATES)) > 1;
74
75
76 SELECT * FROM CLICASHBOARD;
66:31 [1579] [INS]
Log
Time Status Command Exec Fetch Rows Message SQL/Command
12:56:59 STARTED Executing for: `cs421g` [DB2 LUW], Schema: CS421G68
12:56:59 SUCCESS DELETE 0.012 57 OK DELETE FROM CLICASHBOARD...
12:56:59 FINISHED 0.012 0 57 Success: 1

```

Previous Data:

1: CLICASHBOARD [201] x								
*	DID	DATES	PATHS	FOCUS	SNR	CONTAMINANTS	CRID	NAME
189	189	2018-08-28	C:\CLICDashboard\189	4.64	4.09	2900	188	Zhi Zhang
190	190	2018-06-07	C:\CLICDashboard\190	4.39	2.99	459	67	Stone Chen
191	191	2019-01-29	C:\CLICDashboard\191	2.36	4.97	2307	27	Wendy Ji
192	192	2019-02-20	C:\CLICDashboard\192	2.84	7.62	2127	189	Stone Chen
193	193	2018-12-20	C:\CLICDashboard\193	3.09	5.85	4671	47	Stone Chen
194	194	2018-07-05	C:\CLICDashboard\194	1.73	6.64	4948	105	Zhi Zhang
195	195	2018-10-22	C:\CLICDashboard\195	3.84	8.71	2359	194	Wendy Ji
196	196	2018-07-14	C:\CLICDashboard\196	4.8	5.92	4848	50	Stone Chen
197	197	2018-07-06	C:\CLICDashboard\197	4.75	8.12	4942	87	Stone Chen
198	198	2019-01-16	C:\CLICDashboard\198	1.07	7.27	2758	170	Zhi Zhang
199	199	2019-01-12	C:\CLICDashboard\199	3.87	8.73	3283	114	Zhi Zhang
200	200	2018-07-21	C:\CLICDashboard\200	2.56	4.98	3778	159	Zach Friedenberger
201	202	2016-03-03	C:\CLICDashboard\202	4.0	3.14	1000	115	Stone Chen

Data after modify:

1: CLICASHBOARD [144] x								
*	DID	DATES	PATHS	FOCUS	SNR	CONTAMINANTS	CRID	NAME
132	185	2018-05-26	C:\CLICDashboard\185	2.39	8.36	2333	125	Wendy Ji
133	187	2019-01-31	C:\CLICDashboard\187	2.95	3.4	3044	157	Zach Friedenberger
134	188	2019-02-09	C:\CLICDashboard\188	3.41	8.12	4003	153	Wendy Ji
135	189	2018-08-28	C:\CLICDashboard\189	4.64	4.09	2900	188	Zhi Zhang
136	190	2018-06-07	C:\CLICDashboard\190	4.39	2.99	459	67	Stone Chen
137	191	2019-01-29	C:\CLICDashboard\191	2.36	4.97	2307	27	Wendy Ji
138	192	2019-02-26	C:\CLICDashboard\192	2.84	7.62	2127	189	Stone Chen
139	193	2018-12-20	C:\CLICDashboard\193	3.09	5.85	4671	47	Stone Chen
140	195	2018-10-22	C:\CLICDashboard\195	3.84	8.71	2359	194	Wendy Ji
141	196	2018-07-14	C:\CLICDashboard\196	4.8	5.92	4848	50	Stone Chen
142	197	2018-07-06	C:\CLICDashboard\197	4.75	8.12	4942	87	Stone Chen
143	199	2019-01-12	C:\CLICDashboard\199	3.87	8.73	3283	114	Zhi Zhang
144	200	2018-07-21	C:\CLICDashboard\200	2.56	4.98	3778	159	Zach Friedenberger

6.4 Clean up some trash data!!

We delete those useless data (satisfy both of the following conditions):

- Data with serious errors (the focus is less than 2);

- Data generated long ago (has been generated for more than 1 years)

Previous Data:

```

70
71
72
73
74 SELECT * FROM CLICDASHBOARD;
75
76
77
78
79
80
81
82
83
74:29 [1923] [INS]
Log 1: CLICDASHBOARD [202] x
Format: <Select a Cell>

```

*	DID	DATES	PATHS	FOCUS	SNR	CONTAMINANTS	CRID	NAME
183	183	2018-01-08	C:\CLICDashboard\183	3.09	9.14	1912	81	Wendy Ji
184	184	2019-02-10	C:\CLICDashboard\184	1.43	8.61	1225	63	Wendy Ji
185	185	2018-05-26	C:\CLICDashboard\185	2.39	8.36	2333	125	Wendy Ji
186	186	2018-06-03	C:\CLICDashboard\186	1.71	2.22	1105	63	Zhi Zhang
187	187	2019-01-31	C:\CLICDashboard\187	2.95	3.4	3044	197	Zach Friedenberger
188	188	2019-02-09	C:\CLICDashboard\188	3.41	8.12	4003	153	Wendy Ji
189	189	2018-08-28	C:\CLICDashboard\189	4.64	4.09	2900	188	Zhi Zhang
190	190	2018-06-07	C:\CLICDashboard\190	4.39	2.99	459	67	Stone Chen
191	191	2019-01-29	C:\CLICDashboard\191	2.36	4.97	2307	27	Wendy Ji
192	192	2019-02-26	C:\CLICDashboard\192	2.84	7.62	2127	189	Stone Chen
193	193	2018-12-20	C:\CLICDashboard\193	3.09	5.85	4671	47	Stone Chen
194	194	2018-07-05	C:\CLICDashboard\194	1.73	6.64	4948	105	Zhi Zhang
195	195	2018-10-22	C:\CLICDashboard\195	3.84	8.71	2359	194	Wendy Ji
196	196	2018-07-14	C:\CLICDashboard\196	4.8	5.92	4848	50	Stone Chen
197	197	2018-07-06	C:\CLICDashboard\197	4.75	8.12	4942	87	Stone Chen
198	198	2019-01-16	C:\CLICDashboard\198	1.07	7.27	2758	170	Zhi Zhang
199	199	2019-01-12	C:\CLICDashboard\199	3.87	8.73	3283	114	Zhi Zhang
200	200	2018-07-21	C:\CLICDashboard\200	2.56	4.98	3778	159	Zach Friedenberger
201	201	2018-03-03	C:\CLICDashboard\201	1.0	0.67	5000	115	Stone Chen
202	202	2016-03-03	C:\CLICDashboard\202	4.0	3.14	1000	115	Stone Chen

Data after modification:

```

64
65
66
67
68 DELETE FROM CLICDASHBOARD
69 WHERE CONTAMINANTS/FOCUS > 4500 AND (YEAR(CURRENT_DATE)-YEAR(DATES)) > 2;
70
71
72 SELECT * FROM CLICDASHBOARD;
73
74
75
76
73:1 [1922] [INS]
Log 1: CLICDASHBOARD [201] x
Format: <Select a Cell>

```

*	DID	DATES	PATHS	FOCUS	SNR	CONTAMINANTS	CRID	NAME
182	182	2018-12-16	C:\CLICDashboard\182	1.84	3.76	822	141	Zhi Zhang
183	183	2019-01-08	C:\CLICDashboard\183	3.09	9.14	1912	81	Wendy Ji
184	184	2019-02-10	C:\CLICDashboard\184	1.43	8.61	1225	63	Wendy Ji
185	185	2018-05-26	C:\CLICDashboard\185	2.39	8.36	2333	125	Wendy Ji
186	186	2018-06-03	C:\CLICDashboard\186	1.71	2.22	1105	63	Zhi Zhang
187	187	2019-01-31	C:\CLICDashboard\187	2.95	3.4	3044	197	Zach Friedenberger
188	188	2019-02-09	C:\CLICDashboard\188	3.41	8.12	4003	153	Wendy Ji
189	189	2018-08-28	C:\CLICDashboard\189	4.64	4.09	2900	188	Zhi Zhang
190	190	2018-06-07	C:\CLICDashboard\190	4.39	2.99	459	67	Stone Chen
191	191	2019-01-29	C:\CLICDashboard\191	2.36	4.97	2307	27	Wendy Ji
192	192	2019-02-26	C:\CLICDashboard\192	2.84	7.62	2127	189	Stone Chen
193	193	2018-12-20	C:\CLICDashboard\193	3.09	5.85	4671	47	Stone Chen
194	194	2018-07-05	C:\CLICDashboard\194	1.73	6.64	4948	105	Zhi Zhang
195	195	2018-10-22	C:\CLICDashboard\195	3.84	8.71	2359	194	Wendy Ji
196	196	2018-07-14	C:\CLICDashboard\196	4.8	5.92	4848	50	Stone Chen
197	197	2018-07-06	C:\CLICDashboard\197	4.75	8.12	4942	87	Stone Chen
198	198	2019-01-16	C:\CLICDashboard\198	1.07	7.27	2758	170	Zhi Zhang
199	199	2019-01-12	C:\CLICDashboard\199	3.87	8.73	3283	114	Zhi Zhang
200	200	2018-07-21	C:\CLICDashboard\200	2.56	4.98	3778	159	Zach Friedenberger
201	201	2018-03-03	C:\CLICDashboard\201	1.0	0.67	5000	115	Stone Chen
202	202	2016-03-03	C:\CLICDashboard\202	4.0	3.14	1000	115	Stone Chen

7 Views

7.1 You are FIRED!!

Of course this does not happen and this is just a simulation. Rank all active research assistants who started in 2018 (check this with supervision start date) by the number of data they have analyzed (including both types of data):

```

73
74 DROP VIEW SOMENAME;
75
76 CREATE VIEW SOMENAME (NAME) AS
77 SELECT B.NAME
78 FROM BINDINGANALYSISRESULTS B, SUPERVISE S, LABMEMBER L
79 WHERE B.NAME = S.RNAME AND YEAR(S.STARTDATE) >= 2018 AND B.NAME = L.NAME AND L.STATUS = 'active'
80 UNION ALL
81 SELECT N.NAME
82 FROM NANOPARTICLEANALYSISRESULTS N, SUPERVISE S, LABMEMBER L
83 WHERE N.NAME = S.RNAME AND YEAR(S.STARTDATE) >= 2018 AND N.NAME = L.NAME AND L.STATUS = 'active';
84
85 SELECT * FROM SOMENAME;
86 SELECT NAME,COUNT(*) AS NUMBERDA
87 FROM SOMENAME
88 GROUP BY NAME
89 ORDER BY NUMBERDA;
90
91
92
93
94
95
96
97
86:33 [2385] [INS]
Log 1: SOMENAME [4] x

```

*	NAME	NUMBERDA
1	Wendy Ji	93
2	Zach Friedenberger	93
3	Zhi Zhang	97
4	Stone Chen	117

Time	Status	Command	Exec	Fetch	Rows	Message	SQI/Command
▼ 22:33:19	■ STARTED	Executing for: 'c5421g' [DB2 LUW], Schema: C5421G68					
→ 22:33:20	✓ SUCCESS	DROP	0.026		0	OK. No rows were affected	DROP VIEW SOMENAME
→ 22:33:20	✓ SUCCESS	CREATE	0.026		0	OK. No rows were affected	CREATE VIEW SOMENAME (NAME) AS...
→ 22:33:20	✓ SUCCESS	SELECT	0.044	0.022	400	Result set fetched	SELECT * FROM SOMENAME
→ 22:33:20	✓ SUCCESS	SELECT	0.124	0.020	4	Result set fetched	SELECT NAME,COUNT(*) AS NUMBERDA...
▲ 22:33:20	■ FINISHED		0.220	0.042	404	Success: 4	

The View SOMENAME is not updatable since the attribute list of the view does not include the primary key, which makes the update unable to locate the entry accurately.

7.2 Time to check the equipment...

Laboratory equipment needs to be checked and maintained frequently to ensure the smooth running of the experiment and the accuracy of its result, so we will count the number of times a microscope has been used. One will check and maintain this equipment when the number of uses exceeds 1000 and reset the number of uses to 0 after maintenance.

```

91 DROP VIEW MICROSCOPECONDITIONS;
92
93 CREATE VIEW MICROSCOPECONDITIONS (MICROID,NUMBERUSED) AS
94 SELECT MICROID,COUNT(*) AS NUMBERUSED
95 FROM
96 (SELECT E.MICROSCOPEID
97 FROM EXPERIMENT E, MICROSCOPE M
98 WHERE E.MICROSCOPEID = M.MICROSCOPEID AND M.STATUS = 'active')T
99 GROUP BY MICROID
100 ;
101
102 SELECT * FROM MICROSCOPECONDITIONS;
103
104
105 UPDATE MICROSCOPE M
106 SET M.STATUS = 'inactive'
107 WHERE EXISTS
108 (SELECT *
109 FROM MICROSCOPECONDITIONS C
110 WHERE C.NUMBERUSED >= 1000);
111

```

*	MICROID	NUMBERUSED
1	Nikon01	195
2	Nikon02	187

The View MICROSCOPECONDITIONS is not updatable it contains the GROUP BY clause:

7.3

The View is updatable when it satisfies all the following conditions:

- The view is defined based on only one table and includes its PRIMARY KEY upon creation.
- The view should not have any field made out of aggregate and arithmetic functions.
- The view must not have any GROUP BY, HAVING, SUBQUERIES or DISTINCT clause in its definition.
- If the view you want to update is based upon another view, the later should be updatable.
- Any of the selected output fields (of the view) must not use constants, strings or value expressions.
- (DB2) The view is deletable and not view only.
- (DB2) UNION ALL must have matching types for each field.

8 CHECK Constraint

8.1 Date check

Add the check constraint to the table BINDINGANALYSISRESULTS, to make sure that all the data stored in the database are after Jan, 2018.

```
130 ALTER TABLE BINDINGANALYSISRESULTS
131 ADD CONSTRAINT DATE_check CHECK (YEAR(DATES) >= 2018);
132
133 ALTER TABLE BINDINGANALYSISRESULTS
134 DROP CONSTRAINT DATE_check;
135
136
```

126:35 [3410] [INS]

Time	Status	Command	Exec	Fetch	Rows	Message	SQL/Command
22:56:32	STARTED	ALTER	0.035	0	0	Executing for: 'cs421g' [DB2 LUW], Schema: CS421G68	ALTER TABLE BINDINGANALYSISRESULTS ...
22:56:32	SUCCESS	ALTER	0.054	0	0	No rows were affected	ALTER TABLE BINDINGANALYSISRESULTS ...
22:56:32	FINISHED		0.089	0	0	Success: 2	

We tried to insert a tuple whose date is earlier than 2018, leading to failure of the sql execution.

```
155 INSERT INTO BINDINGANALYSISRESULTS
156 VALUES ('201,2010-09-02','C:\BindingAnalysisResults\201','accurate',83,'Stone_Chen');
157
158 ALTER TABLE BINDINGANALYSISRESULTS
159 DROP CONSTRAINT DATE_CHECK;
160
161
162
```

143:20 [3547] [INS]

Time	Status	Command	Exec	Fetch	Rows	Message	SQL/Command
09:55:42	STARTED	INSERT	0.112	0	0	Executing for: 'cs421g' [DB2 LUW], Schema: CS421G68	INSERT INTO BINDINGANALYSISRESULTS
09:55:42	FAILED	INSERT	0.112	0	0	0 Code: -545, SQL State: 23513] The requested operation is not allowed because a row does not satisfy the check constraint 'CS421G68.BINDINGANALYSISRESULTS.DATE_CHECK'.	VALUES ('201,2010-09-02','C:\BindingAnalysisResults\201','accurate',83,'Stone_Chen')
09:55:42	FINISHED		0.112	0	0	SQLCODE=-545, SQLSTATE=23513, DRIVER=4.22.29	

8.2 Number check

Add the check constraint to the contact information (the phone number) in the table LABMEMBER to make sure the phone number is valid.

```
136 ALTER TABLE LABMEMBER
137 ADD CONSTRAINT NUMBER_check CHECK (CONTACTINFORMATION LIKE '(%)-%-%-%');
138
139 ALTER TABLE LABMEMBER
140 DROP CONSTRAINT NUMBER_check;
141
142
```

130:26 [3471] [INS]

Time	Status	Command	Exec	Fetch	Rows	Message	SQL/Command
23:01:23	STARTED	ALTER	0.036	0	0	Executing for: 'cs421g' [DB2 LUW], Schema: CS421G68	ALTER TABLE LABMEMBER ...
23:01:23	SUCCESS	ALTER	0.030	0	0	OK. No rows were affected	ALTER TABLE LABMEMBER ...
23:01:23	FINISHED		0.066	0	0	Success: 2	

We tried to insert a tuple which violated our phone number constraint, leading to an failure of the sql command.

```
165 ALTER TABLE LABMEMBER
166 ADD CONSTRAINT NUMBER_check CHECK (CONTACTINFORMATION LIKE '(%)-%-%-%');
167
168 --TEST CASE
169 INSERT INTO LABMEMBER
170 VALUES ('Mark Zhu','(514)8888888','active');
171
172 --TEST
173 ALTER TABLE LABMEMBER
174 DROP CONSTRAINT NUMBER_check;
175
```

153:23 [3550] [INS]

Time	Status	Command	Exec	Fetch	Rows	Message	SQL/Command
09:52:27	STARTED	INSERT	0.310	0	0	Executing for: 'cs421g' [DB2 LUW], Schema: CS421G68	INSERT INTO LABMEMBER
09:52:27	FAILED	INSERT	0.310	0	0	0 Code: -545, SQL State: 23513] The requested operation is not allowed because a row does not satisfy the check constraint 'CS421G68.LABMEMBER.NUMBER_CHECK'.	VALUES ('Mark Zhu','(514)8888888','active')
09:52:27	FINISHED		0.310	0	0	SQLCODE=-545, SQLSTATE=23513, DRIVER=4.22.29	

9 Creative Points

We have implemented or performed the followings to our database:

- Automatic Data Generation:** We wrote a python script to automatically construct SQL insert statements with randomly generated data. Please refer to autoDataGen.py and autoDataGen.sql.
- Some Real Data:** We incorporated some real data in our database, including lab members and their corresponding status, as well as microscope information. In terms of other automatically generated data, they also follow the format of real data.
- Complex Analytical Query:** All queries in section 5 are real life questions one may ask in the lab and some of them involve certain complexities.