

CPSC 304 Project Cover Page

Milestone #: 4

Date: Mar 27

Group Number: 34

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

2. A single SQL script has been committed to Github and can be found [here](#). Alternatively, you may navigate to our Github repo to `/backend/db.sql`.

3.

- a. A short description of the final project, and what it accomplished.

An admin dashboard for managing a bike club built with PHP, Oracle, and Bootstrap. Users can create, read, update, or delete entities such as members, as well as run more complex queries such as finding the number of bikes in each city. There is a table view for members that show all member attributes.

- b. A description of how your final schema differed from the schema you turned in.

- i. If the final schema differed, explain why. Note that turning in a final schema that's different from what you planned is fine, we just want to know what changed and why.

The following schema changes have been made:

- Both Volunteer and Member tables have DateRegistered and Name removed as the foreign key as it was not needed
- Shift was merged with Assigned and referenced Volunteer's StudentID as the foreign key due to cardinality constraint
- UNIQUE constraint removed from StudentPhoneNo in Student table as it is possible for multiple members to share the same phone number

- c. A copy of the schema and screenshots that show what data is present in each relation after the SQL script from item #2 is run.

```
Table created.
```

```
Table created.
```

```
Table created.
```

```
SQL> @db.sql
```

Running db.sql should populate the tables so that if you run select all commands in SQL, you should get the following results.

Student table:

```
SQL> select * from student;
```

STUDENTI	STUDENTNAME	DATAREGIS	STUDENTPHONE
00000000	Bella	04-MAY-21	+16041234567
00000001	Johnny	04-JAN-23	+16047654321
00000002	Maple	04-MAY-21	+16041111111
00000003	Jennie	13-JUN-20	+16042222222
00000004	Han	21-NOV-15	+16043333333
00000005	Joelle	01-DEC-19	+16044444444
00000006	Amy	03-NOV-20	+16055555555
00000007	Pippa	22-OCT-21	+16066666666

8 rows selected.

Member table:

```
SQL> select * from Member;
```

STUDENTI	STUDENTNAME	DATAREGIS	STUDENTPHONE	MEMBERSHIPST
BANKINGINFO				
00000000	Bella	04-MAY-21	+16041234567	Gold
1234567890	123456789			
00000001	Johnny	04-JAN-23	+16047654321	Gold
1234567890	123456781			
00000002	Maple	04-MAY-21	+16041111111	Silver
1234567890	123456782			
STUDENTI STUDENTNAME DATAREGIS STUDENTPHONE MEMBERSHIPST				
BANKINGINFO				
00000003	Jennie	13-JUN-20	+16042222222	Bronze
1234567890	123456783			
00000004	Han	04-MAY-21	+16043333333	Gold
1234567890	123456784			

Facility table:

UNITNUMBER	POSTAL	CITY	STREETNAME	CAPACITYOFPEOPLE
NUMBEROFBIKES				
0	V2W4T5	Burnaby	Hastings Ave	100
13				
1	V6Y7K4	Burnaby	Renford St	80
47				
2	V4K7N3	Richmond	Bern St	40
8				
UNITNUMBER	POSTAL	CITY	STREETNAME	CAPACITYOFPEOPLE
NUMBEROFBIKES				
3	V8J3N5	Richmond	Honeysuckle Avenue	28
50				
4	V9N2L2	Vancouver	Henria St	55
12				
5	V7N3K6	Vancouver	Camelia Ave	21
8				
UNITNUMBER	POSTAL	CITY	STREETNAME	CAPACITYOFPEOPLE
NUMBEROFBIKES				
6	V2W4T5	Vancouver	Bumblebee St	8
0				

7 rows selected.

LockersIn table:

```
SQL> select * from LockersIn;
```

B	LOCKERNUMBER	POSTAL	UNITNUMBER
Y	0	V2W4T5	0
Y	1	V6Y7K4	1
N	2	V4K7N3	2
Y	3	V8J3N5	3
N	4	V9N2L2	4
N	5	V7N3K6	5

6 rows selected.

BikeHas table:

```
SQL> select * from BikeHas;
```

BIKESERIALNUMBER	MODEL	B	CONDITIO	POSTAL	UNITNUMBER
11111111	Basso	Y	Good	V2W4T5	0
11111112	Electra	N	Superb	V9N2L2	4
11111113	Giordano	Y	Good	V6Y7K4	1
11111114	Kuota	N	Bad	V4K7N3	2
11111115	Nicolai	Y	Repair	V2W4T5	6

Duration table:

```
SQL> select * from Duration;
```

```
STARTTIME
```

```
ENDTIME
```

```
DURATION
```

```
01-MAR-23 12.30.00.000000 PM
```

```
01-MAR-23 01.30.00.000000 PM
```

```
60
```

```
01-APR-23 12.30.00.000000 PM
```

```
01-APR-23 01.30.00.000000 PM
```

```
30
```

```
STARTTIME
```

```
ENDTIME
```

```
DURATION
```

```
01-MAY-23 07.30.00.000000 PM
```

```
01-MAY-23 09.30.00.000000 PM
```

```
90
```

```
01-JUN-22 04.30.00.000000 PM
```

```
01-JUN-23 05.30.00.000000 PM
```

```
STARTTIME
```

```
ENDTIME
```

```
DURATION
```

```
60
```

```
11-MAY-23 11.30.00.000000 AM
```

```
11-MAY-23 01.30.00.000000 PM
```

```
120
```

Booking Table:

```
SQL> select * from Booking;
```

```
STUDENTI BIKESERIALNUMBER
```

```
STARTTIME
```

```
ENDTIME
```

```
DATEBOOKE
```

```
00000000      11111111
01-MAR-23 12.30.00.000000 PM
01-MAR-23 01.30.00.000000 PM
01-MAR-23
```

```
STUDENTI BIKESERIALNUMBER
```

```
STARTTIME
```

```
ENDTIME
```

```
DATEBOOKE
```

```
00000000      11111112
01-APR-23 12.30.00.000000 PM
01-APR-23 01.30.00.000000 PM
01-APR-23
```

```
STUDENTI BIKESERIALNUMBER
```

```
STARTTIME
```

```
ENDTIME
```

```
DATEBOOKE
```

```
00000001      11111113
01-MAY-23 07.30.00.000000 PM
01-MAY-23 09.30.00.000000 PM
01-MAY-23
```

```
STUDENTI BIKESERIALNUMBER
```

```
STARTTIME
```

```
ENDTIME
```

```
DATEBOOKE
```

```
00000000      11111114
01-JUN-22 04.30.00.000000 PM
01-JUN-23 05.30.00.000000 PM
01-JUN-23
```

```
STUDENTI BIKESERIALNUMBER
```

```
STARTTIME
```

```
ENDTIME
```

```
DATEBOOKE
```

```
00000003      11111115
11-MAY-23 11.30.00.000000 AM
11-MAY-23 01.30.00.000000 PM
11-MAY-23
```

MerchandisedPurchased table:

```
SQL> select * from MerchandisePurchased;
```

COST	TYPE	UPC	DATEPURCH	STUDENTI
10.3	Helmet	123456789012	28-FEB-23	00000000
112.45	Bike	123456789011	28-FEB-23	00000000
10.35	Helmet	123456789013	28-JAN-23	00000001
400.4	Bike	123456789014	20-APR-22	00000002
20.45	Helmet	123456789015	06-JUN-20	00000002

Lesson table:

```
SQL> select * from Lesson ;
```

```
LESSONID LESSONDAT
```

```
LESSONSTARTTIME
```

```
LESSONENDTIME
```

```
NUMBEROFREGISTRANTS LOCATION
```

```
44444444 03-MAY-20  
03-MAY-20 12.30.00.000000 PM  
03-MAY-20 01.30.00.000000 PM  
12 Dance St
```

```
LESSONID LESSONDAT
```

```
LESSONSTARTTIME
```

```
LESSONENDTIME
```

```
NUMBEROFREGISTRANTS LOCATION
```

```
44444441 22-APR-20  
22-APR-20 01.40.00.000000 PM  
22-APR-20 03.40.00.000000 PM  
30 Bella St
```

```
LESSONID LESSONDAT
```

```
LESSONSTARTTIME
```

```
LESSONENDTIME
```

```
NUMBEROFREGISTRANTS LOCATION
```

```
44444442 03-JUN-20  
03-JUN-20 09.30.00.000000 AM  
03-JUN-20 10.30.00.000000 AM  
11 Bumble Rd
```

```
LESSONID LESSONDAT
```

```
LESSONSTARTTIME
```

```
LESSONENDTIME
```

```
NUMBEROFREGISTRANTS LOCATION
```

```
44444443 30-MAY-20  
30-MAY-20 03.00.00.000000 PM  
30-MAY-20 04.00.00.000000 PM  
45 Chocolate St
```

```
LESSONID LESSONDAT
```

```
LESSONSTARTTIME
```

```
LESSONENDTIME
```

```
NUMBEROFREGISTRANTS LOCATION
```

```
44444445 13-OCT-20  
13-OCT-20 12.15.00.000000 PM  
13-OCT-20 01.15.00.000000 PM  
32 Renfrew Ave
```

Instructor table:

```
SQL> select * from Instructor;
```

INSTRUCT	AGE	NAME	DATEHIRED	INCOME	INSTRUCTORPH
55555555	24	Laila	03-MAY-20	45000	+17781111111
55555551	25	Sheila	06-MAY-22	55000	+17782222222
55555552	21	Joe	12-MAY-22	65000	+17783333333
55555553	34	Bob	07-JUN-20	30000	+17784444444
55555554	32	Carson	12-AUG-21	60000	+17785555555

Teaches table:

```
SQL> select * from teaches;
```

INSTRUCT	LESSONID	LESSONDAT	STARTTIME	ENDTIME	LOCATION	NUMBEROFREGISTRANTS
55555555	44444444	03-MAY-20	03-MAY-20 12.30.00.000000 PM		Dance St	12

INSTRUCT	LESSONID	LESSONDAT	STARTTIME	ENDTIME	LOCATION	NUMBEROFREGISTRANTS
55555551	44444441	22-APR-20	22-APR-20 01.40.00.000000 PM		Cron St	30

INSTRUCT	LESSONID	LESSONDAT	STARTTIME	ENDTIME	LOCATION	NUMBEROFREGISTRANTS
55555552	44444442	03-JUN-20	03-JUN-20 09.30.00.000000 AM		Bumble Rd	11

INSTRUCT	LESSONID	LESSONDAT	STARTTIME	ENDTIME	LOCATION	NUMBEROFREGISTRANTS
55555553	44444443	30-MAY-20	30-MAY-20 03.00.00.000000 PM		Chocolate St	45

INSTRUCT	LESSONID	LESSONDAT	STARTTIME	ENDTIME	LOCATION	NUMBEROFREGISTRANTS
55555554	44444444	13-OCT-20	13-OCT-20 12.15.00.000000 PM		Renfrew Ave	32

Enrolled table:


```
SQL> select * from Enrolled;
```

STUDENTI	LESSONID	LESSONDAT
----------	----------	-----------

STARTTIME

ENDTIME

LOCATION	NUMBEROFREGISTRANTS
----------	---------------------

00000000	44444444	03-MAY-20		
03-MAY-20	12.30.00.000000	PM		
03-MAY-20	01.30.00.000000	PM		
Dance St			12	

STUDENTI	LESSONID	LESSONDAT
----------	----------	-----------

STARTTIME

ENDTIME

LOCATION	NUMBEROFREGISTRANTS
----------	---------------------

00000001	44444444	03-MAY-20		
03-MAY-20	12.30.00.000000	PM		
03-MAY-20	01.30.00.000000	PM		
Dance St			12	

STUDENTI	LESSONID	LESSONDAT
----------	----------	-----------

STARTTIME

ENDTIME

LOCATION	NUMBEROFREGISTRANTS
----------	---------------------

00000002	44444444	03-MAY-20		
03-MAY-20	12.30.00.000000	PM		
03-MAY-20	01.30.00.000000	PM		
Dance St			12	

STUDENTI	LESSONID	LESSONDAT
----------	----------	-----------

STARTTIME

ENDTIME

LOCATION	NUMBEROFREGISTRANTS
----------	---------------------

00000003	44444444	03-MAY-20		
03-MAY-20	12.30.00.000000	PM		
03-MAY-20	01.30.00.000000	PM		
Dance St			12	

STUDENTI	LESSONID	LESSONDAT
----------	----------	-----------

STARTTIME

ENDTIME

LOCATION	NUMBEROFREGISTRANTS
----------	---------------------

00000004	44444444	03-MAY-20		
03-MAY-20	12.30.00.000000	PM		
03-MAY-20	01.30.00.000000	PM		
Dance St			12	

SocialEvents Table:

```

SQL> select * from SocialEvents;

SOCIALEVENTNAME      EVENTDATE
-----
STARTTIME
-----
CAPACITY  NUMBEROFREGISTRANTS  LOCATION
-----
HappyLand Day      05-APR-23
05-APR-23 12.30.00.000000 PM
15                      5 Hastings Ave

Bike Day          15-APR-23
15-APR-23 01.30.00.000000 PM
25                      4 Hastings Ave

SOCIALEVENTNAME      EVENTDATE
-----
STARTTIME
-----
CAPACITY  NUMBEROFREGISTRANTS  LOCATION
-----

Wonderworld        25-APR-23
25-APR-23 12.30.00.000000 PM
35                      20 Bern St

Practicing biking   05-MAY-23
05-MAY-23 12.30.00.000000 PM

SOCIALEVENTNAME      EVENTDATE
-----
STARTTIME
-----
CAPACITY  NUMBEROFREGISTRANTS  LOCATION
-----

20                      9 Hastings Ave

Watch and learn     15-MAY-23
15-MAY-23 11.30.00.000000 AM
30                      12 Bern St

```

Registered Table:

```

SQL> select * from Registered;

SOCIALEVENTNAME      EVENTDATE  STUDENTI  STUDENTNAME      DATEREGIS
-----
STUDENTPHONE  MEMBERSHIPST  BANKINGINFO
-----
HappyLand Day      05-APR-23  00000000 Bella      04-MAY-21
+16041234567 Gold      1234567890123456789

HappyLand Day      05-APR-23  00000001 Johnny     04-JAN-23
+16047654321 Gold      1234567890123456781

HappyLand Day      05-APR-23  00000002 Maple     04-MAY-21
+16041111111 Silver    1234567890123456782

SOCIALEVENTNAME      EVENTDATE  STUDENTI  STUDENTNAME      DATEREGIS
-----
STUDENTPHONE  MEMBERSHIPST  BANKINGINFO
-----
HappyLand Day      05-APR-23  00000003 Jennie     13-JUN-20
+16042222222 Bronze    1234567890123456783

HappyLand Day      05-APR-23  00000004 Han        04-MAY-21
+16043333333 Gold      1234567890123456784

```

Volunteer table:

```
SQL> select * from Volunteer;
```

STUDENTI	STUDENTN	DATEREGIS	STUDENTPHONE	TOTALVOLUNTEERHOURS
00000000	Bella	04-MAY-21	+16041234567	120
00000002	Maple	04-MAY-21	+16041111111	100
00000003	Jennie	13-JUN-20	+16042222222	320
00000005	Joelle	01-DEC-19	+16044444444	400
00000001	Johnny	04-JAN-23	+16047654321	120
00000007	Pippa	22-OCT-21	+16066666666	20

6 rows selected.

Shift table:

```
SQL> select * from Shift;
```

STUDENTI	SHIFTID	DURATION
STARTTIME		

LOCATION		
SHIFTDATE		

00000000	33333333	60
04-MAR-23 12.30.00.000000 PM		
Hastings Ave		04-MAR-23
00000001	33333331	60
05-MAR-23 11.30.00.000000 AM		
Henria St		05-MAR-23
STUDENTI	SHIFTID	DURATION
STARTTIME		

LOCATION		
SHIFTDATE		

00000002	33333332	120
06-MAR-23 10.30.00.000000 AM		
Honeysuckle Ave		06-MAR-23
00000003	33333334	360
07-MAR-23 04.00.00.000000 PM		
STUDENTI	SHIFTID	DURATION
STARTTIME		

LOCATION		
SHIFTDATE		

Hastings Ave		
07-MAR-23		
00000005	33333335	60
08-MAR-23 03.00.00.000000 PM		
Bern St		08-MAR-23

- d. A list of all SQL queries used and where it can be found in the code (i.e., file name and line number(s)). For SQL query requirements, check the rubric listed on Canvas for Milestone 4.

SQL Query	File Name	Code Line
Insert	members.php	262
Delete	members.php	369

Update	members.php	296
Selection	members.php	317
Projection	bike.php	264 - 287
Join	volunteer.php	179
Aggregation with GROUP BY	aggregation.php	69
Aggregation with HAVING	aggregation.php	75
Nested Aggregation with GROUP BY	aggregation.php	81
Division	division.php	65, 71

- e. Screenshots demonstrating the functionality of each query using the GUI. We want to see a before/during/after progression of events. For example, the before screenshot would be what data is in the table before you run the query, the during screenshot(s) is how the query is triggered using the GUI, and the after screenshot is what data is in your table afterwards. Please label each set of screenshots with the name of the query it is meant to address (e.g., "Insert Operation").

INSERT Operation (Before)



Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000000	Bella	04-MAY-21	+16041234567	Gold	1234567890123456789
00000001	Johnny	04-JAN-23	+16047654321	Gold	1234567890123456781
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782
00000003	Jennie	13-JUN-20	+16042222222	Bronze	1234567890123456783
00000004	Han	04-MAY-21	+16043333333	Gold	1234567890123456784

INSERT Operation (During)

Members Dashboard

Manage members in UBC Bike Club

Create a new member

Student ID:	Member Name:	Date Registered:
<input type="text" value="88888888"/>	<input type="text" value="Sally"/>	<input type="text" value="2023-03-30"/> 
Phone Number:	Banking Number:	Membership Type:
<input type="text" value="+16043526539"/>	<input type="text" value="1234123412341234123"/>	<input type="text" value="Silver"/> 

INSERT Operation (After)

Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000000	Bella	04-MAY-21	+16041234567	Gold	1234567890123456789
00000001	Johnny	04-JAN-23	+16047654321	Gold	1234567890123456781
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782
00000003	Jennie	13-JUN-20	+16042222222	Bronze	1234567890123456783
00000004	Han	04-MAY-21	+16043333333	Gold	1234567890123456784
88888888	Sally	30-MAR-23	16043526539	Silver	1234123412341234123

UPDATE Operation (Before)

Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000000	Bella	04-MAY-21	+16041234567	Gold	1234567890123456789
00000001	Johnny	04-JAN-23	+16047654321	Gold	1234567890123456781
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782
00000003	Jennie	13-JUN-20	+16042222222	Bronze	1234567890123456783
00000004	Han	04-MAY-21	+16043333333	Gold	1234567890123456784
88888888	Sally	30-MAR-23	16043526539	Silver	1234123412341234123

UPDATE Operation (During)

Update an existing member

Student ID:

88888888

Member Name:

Sally Johnson

Date Registered:

2023-03-30

Phone Number:

6043526539

Banking Number:

1234123412341234123

Membership Type:

Gold

Update

UPDATE Operation (After)

Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000000	Bella	04-MAY-21	+16041234567	Gold	1234567890123456789
00000001	Johnny	04-JAN-23	+16047654321	Gold	1234567890123456781
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782
00000003	Jennie	13-JUN-20	+16042222222	Bronze	1234567890123456783
00000004	Han	04-MAY-21	+16043333333	Gold	1234567890123456784
88888888	Sally Johnson	30-MAR-23	6043526539	Gold	1234123412341234123

DELETE Operation (Before)

Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000000	Bella	04-MAY-21	+16041234567	Gold	1234567890123456789
00000001	Johnny	04-JAN-23	+16047654321	Gold	1234567890123456781
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782
00000003	Jennie	13-JUN-20	+16042222222	Bronze	1234567890123456783
00000004	Han	04-MAY-21	+16043333333	Gold	1234567890123456784
88888888	Sally Johnson	30-MAR-23	6043526539	Gold	1234123412341234123

DELETE Operation (During)

Delete an existing member

Student ID:

88888888

Delete

DELETE Operation (After)

Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000000	Bella	04-MAY-21	+16041234567	Gold	1234567890123456789
00000001	Johnny	04-JAN-23	+16047654321	Gold	1234567890123456781
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782
00000003	Jennie	13-JUN-20	+16042222222	Bronze	1234567890123456783
00000004	Han	04-MAY-21	+16043333333	Gold	1234567890123456784

SELECT Operation (Before)

Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000000	Bella	04-MAY-21	+16041234567	Gold	1234567890123456789
00000001	Johnny	04-JAN-23	+16047654321	Gold	1234567890123456781
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782
00000003	Jennie	13-JUN-20	+16042222222	Bronze	1234567890123456783
00000004	Han	04-MAY-21	+16043333333	Gold	1234567890123456784

SELECT Operation (During)

View Members by Membership Type

Membership Type:

Silver

View

SELECT Operation (After)

Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782

Table has been populated to show only members with the status Silver.

PROJECTION (Before)

Bike Serial Number	Model	Booked Status	Condition	Postal Code	Unit Number
11111111	Basso	Y	Good	V2W4T5	0
11111112	Electra	N	Superb	V9N2L2	4
11111113	Giordano	Y	Good	V6Y7K4	1
11111114	Kuota	N	Bad	V4K7N3	2
11111115	Nicolai	N	Repair	V2W4T5	6

PROJECTION (During)

Projection

Check out all the bikes that we have and at what locations you can find them!

☐ Bike Serial Number ☒ Model ☒ Booked Status ☒ Condition ☐ Postal Code ☐ Unit Number

Submit

PROJECTION (After)

Model	Booked Status	Condition
Basso	Y	Good
Electra	N	Superb
Giordano	Y	Good
Kuota	N	Bad
Nicolai	N	Repair

JOIN (Before)
Volunteer Table

StudentID	StudentName	DateRegistered	StudentPhoneNo	TotalVolunteerHours
00000000	Bella	04-MAY-21	+16041234567	120
00000002	Maple	04-MAY-21	+16041111111	100
00000003	Jennie	13-JUN-20	+16042222222	320
00000005	Joelle	01-DEC-19	+16044444444	400
00000001	Johnny	04-JAN-23	+16047654321	120
00000007	Pippa	22-OCT-21	+16066666666	20

Shift Table

StudentID	ShiftID	Duration	Start Time	Location	Shift Date
00000000	33333333	60	04-MAR-23 12.30.00.000000 PM	Hastings Ave	04-MAR-23
00000001	33333331	60	05-MAR-23 11.30.00.000000 AM	Henria St	05-MAR-23
00000002	33333332	120	06-MAR-23 10.30.00.000000 AM	Honeysuckle Ave	06-MAR-23
00000003	33333334	360	07-MAR-23 04.00.00.000000 PM	Hastings Ave	07-MAR-23
00000005	33333335	60	08-MAR-23 03.00.00.000000 PM	Bern St	08-MAR-23

JOIN (During)
Join

Find the phone number of volunteers who have volunteered for a shift at a location

Hastings Ave

Submit

JOIN (After)

StudentName	StudentPhoneNo
Jennie	+16042222222
Bella	+16041234567

Table has been populated to show only the volunteers who have worked at 'Hastings Ave' and their phone nos.

Aggregation with GROUP BY, HAVING and Nested Aggregation Operation (Before)
Note: For Aggregation with GROUP BY, Aggregation with HAVING and Nested Aggregation with GROUP

BY operation, all 3 queries make use of the same Facility data.

Unit Number	Postal Code	City	Street Name	Capacity Of People	Number of Bikes
0	V2W4T5	Burnaby	Hastings Ave	100	13
1	V6Y7K4	Burnaby	Renford St	80	47
2	V4K7N3	Richmond	Bern St	40	8
3	V8J3N5	Richmond	Honeysuckle Avenue	28	50
4	V9N2L2	Vancouver	Henria St	55	12
5	V7N3K6	Vancouver	Camelia Ave	21	8
6	V2W4T5	Vancouver	Bumblebee St	8	0

Aggregation with GROUP BY, HAVING and Nested Aggregation Operation (During)

Note: All 3 aggregation functions can be found in `facility.php` under 'Aggregation'. Each query is called by clicking on the individual button. The queries are ordered in the order of 1) Aggregation with GROUP BY, 2) Aggregation with GROUP BY + HAVING, 3) Nested Aggregation.

Aggregation

Find the total number of bikes in each city

Find the cities with facilities that have an average number of bikes greater than 25

Find the cities where the average number of people in each city is greater than the average number of people in facilities across all cities

Aggregation with GROUP BY Operation (After)

Facility Statistics - Aggregation Query

Number of people and bikes in facilities under UBC Bike Club

Aggregation Query: Total number of bikes in each city

```
SELECT City, SUM(NumberOfBikes) AS total_bikes FROM Facility GROUP BY City
```

City	Total Number of Bikes
Vancouver	20
Richmond	58
Burnaby	60

Aggregation with GROUP BY + HAVING Operation (After)

Facility Statistics - Aggregation Query

Number of people and bikes in facilities under UBC Bike Club

Aggregation Query with HAVING: Cities with facilities that have average number of bikes > 25

```
SELECT City, AVG(NumberOfBikes) as avg_bikes FROM Facility GROUP BY City HAVING AVG(NumberOfBikes) > 25
```

City	Average Number of Bikes
Richmond	29
Burnaby	30

Nested Aggregation with GROUP BY Operation (After)

Facility Statistics - Aggregation Query

Number of people and bikes in facilities under UBC Bike Club

Nested Aggregation Query: Cities where the average number of people in each city is greater than the average number of people in facilities across all cities
SELECT City, AVG(CapacityOfPeople) AS avg_capacity FROM Facility GROUP BY City HAVING COUNT(*) > (SELECT AVG(num_facilities) FROM (SELECT COUNT(*) AS num_facilities FROM Facility GROUP BY City))

City	Average Number of People
Vancouver	28

Division Operation (Before)

Student Table:

Student ID	Member Name	Date Registered	Phone Number
00000000	Bella	04-MAY-21	+16041234567
00000001	Johnny	04-JAN-23	+16047654321
00000002	Maple	04-MAY-21	+16041111111
00000003	Jennie	13-JUN-20	+16042222222
00000004	Han	21-NOV-15	+16043333333
00000005	Joelle	01-DEC-19	+16044444444
00000006	Amy	03-NOV-20	+16055555555
00000007	Pippa	22-OCT-21	+16066666666

Member Table:

Student ID	Member Name	Date Registered	Phone Number	Membership Status	Banking Number
00000000	Bella	04-MAY-21	+16041234567	Gold	1234567890123456789
00000001	Johnny	04-JAN-23	+16047654321	Gold	1234567890123456781
00000002	Maple	04-MAY-21	+16041111111	Silver	1234567890123456782
00000003	Jennie	13-JUN-20	+16042222222	Bronze	1234567890123456783
00000004	Han	04-MAY-21	+16043333333	Gold	1234567890123456784

Division Operation (During)

Division

Find the number of non-members

Find the number of non-volunteers

Division Operation (After)

Student Statistics - Division Query

Number of students under UBC Bike Club

Division Query: Number of non-members

```
SELECT COUNT(*) AS num_non_members FROM Student WHERE StudentID NOT IN (SELECT StudentID FROM Member)
```

Number of Non-Members

3