Assignment 2&3

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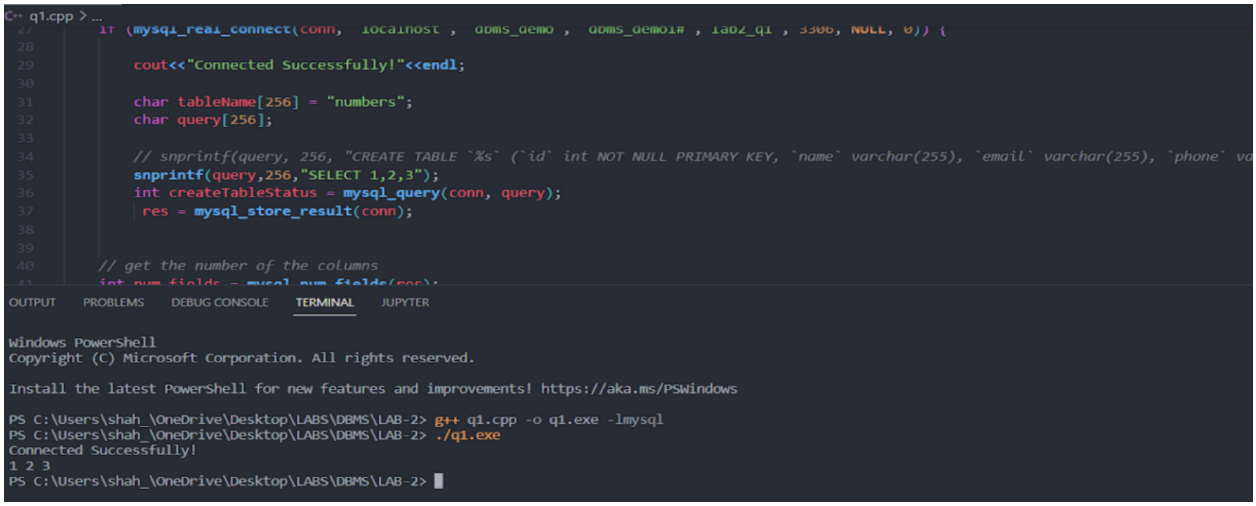
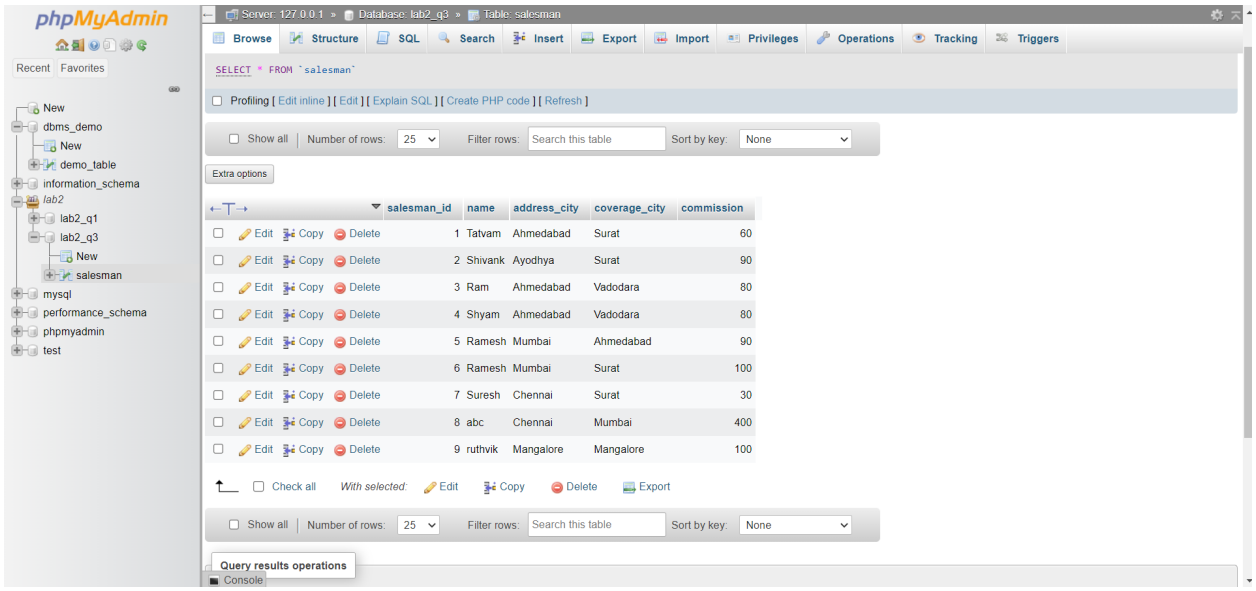
Q.1) SQL query to display 3 numbers in 3 columns will be (SELECT 1,2,3)



Q.2) SQL query to display the result of arithmetic expression

Q.3)



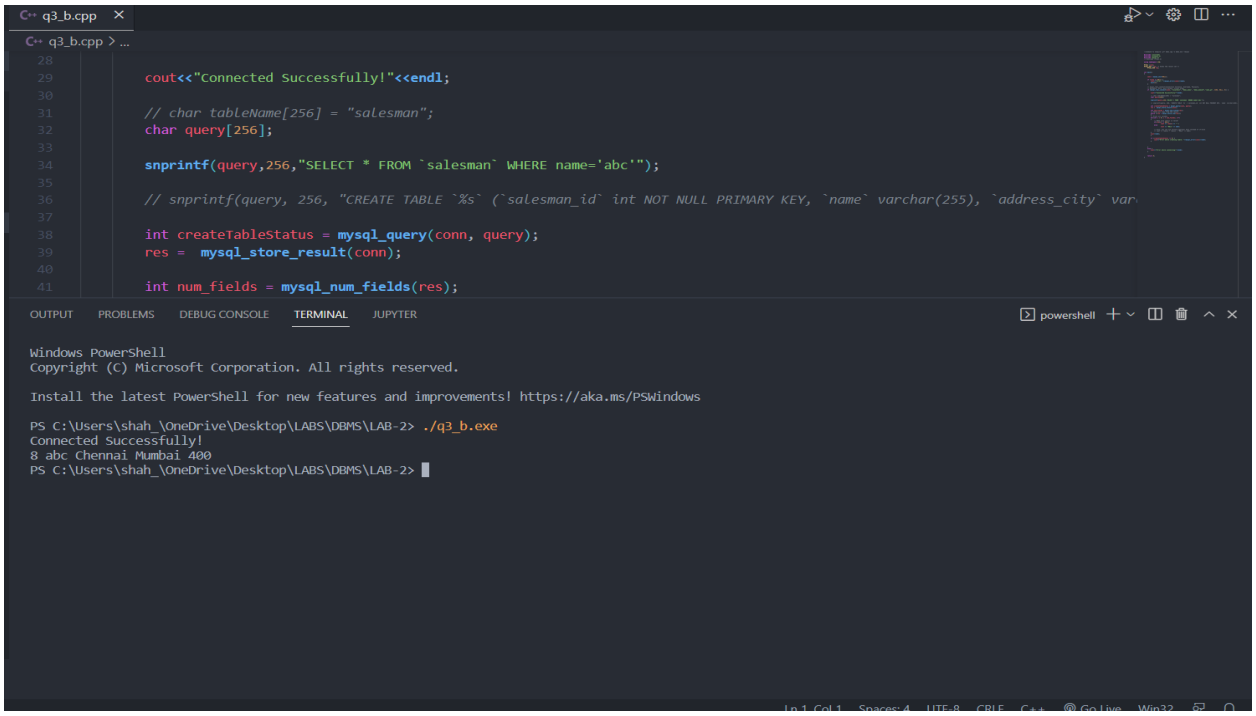
A.

a.

```
LABS > DBMS > LAB-2 > C++ q3_a.cpp > main()
    // mysql_real_connect(Connection Instance, Username, Password,
    // Database, Port, Unix Socket, Client Flag)
    if (mysql_real_connect(conn, "localhost", "dbms_demo", "dbms_demo1#","lab2_q3", 3306, NULL, 0)) {

        cout<<"Connected Successfully!"<<endl;

        // char tableName[256] = "salesman";
        char query[256];

        snprintf(query,256,"SELECT * FROM `salesman`");

        // snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` varchar(255), `coverage_city_commis

        int createTableStatus = mysql_query(conn, query);
```

```
OUTPUT PROBLEMS 1K+ DEBUG CONSOLE TERMINAL JUPYTER

Connected Successfully!
1 Tatvam Ahmedabad Surat 60
2 Shivank Ayodhya Surat 90
3 Ram Ahmedabad Vadodara 80
4 Shyam Ahmedabad Vadodara 80
5 Ramesh Mumbai Ahmedabad 90
6 Ramesh Mumbai Surat 100
7 Suresh Chennai Surat 30
8 abc Chennai Mumbai 400
9 ruthvik Mangalore Mangalore 100
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2>
```

b.


q3_b.cpp
cout<<"Connected Successfully!"<<endl;
// char tableName[256] = "salesman";
char query[256];
snprintf(query,256,"SELECT * FROM `salesman` WHERE name='abc'");
// snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` var
int createTableStatus = mysql_query(conn, query);
res = mysql_store_result(conn);
int num_fields = mysql_num_fields(res);
OUTPUT
PROBLEMS
DEBUG CONSOLE
TERMINAL
JUPYTER
powershell
Windows PowerShell
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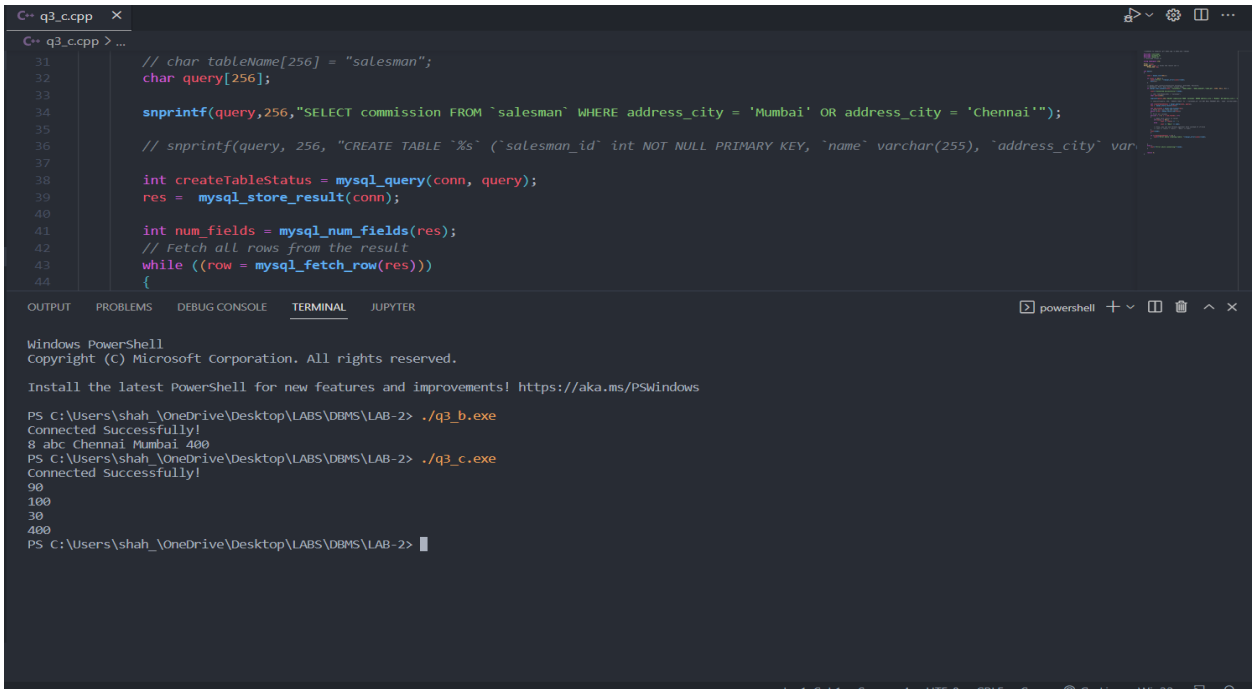
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2> ./q3_b.exe
Connected Successfully!
8 abc Chennai Mumbai 400
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2>

c.


q3_c.cpp
// char tableName[256] = "salesman";
char query[256];
snprintf(query,256,"SELECT commission FROM `salesman` WHERE address_city = 'Mumbai' OR address_city = 'Chennai'");
// snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` var
int createTableStatus = mysql_query(conn, query);
res = mysql_store_result(conn);
int num_fields = mysql_num_fields(res);
// Fetch all rows from the result
while ((row = mysql_fetch_row(res)))
{
OUTPUT
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JUPYTER
powershell
Windows PowerShell
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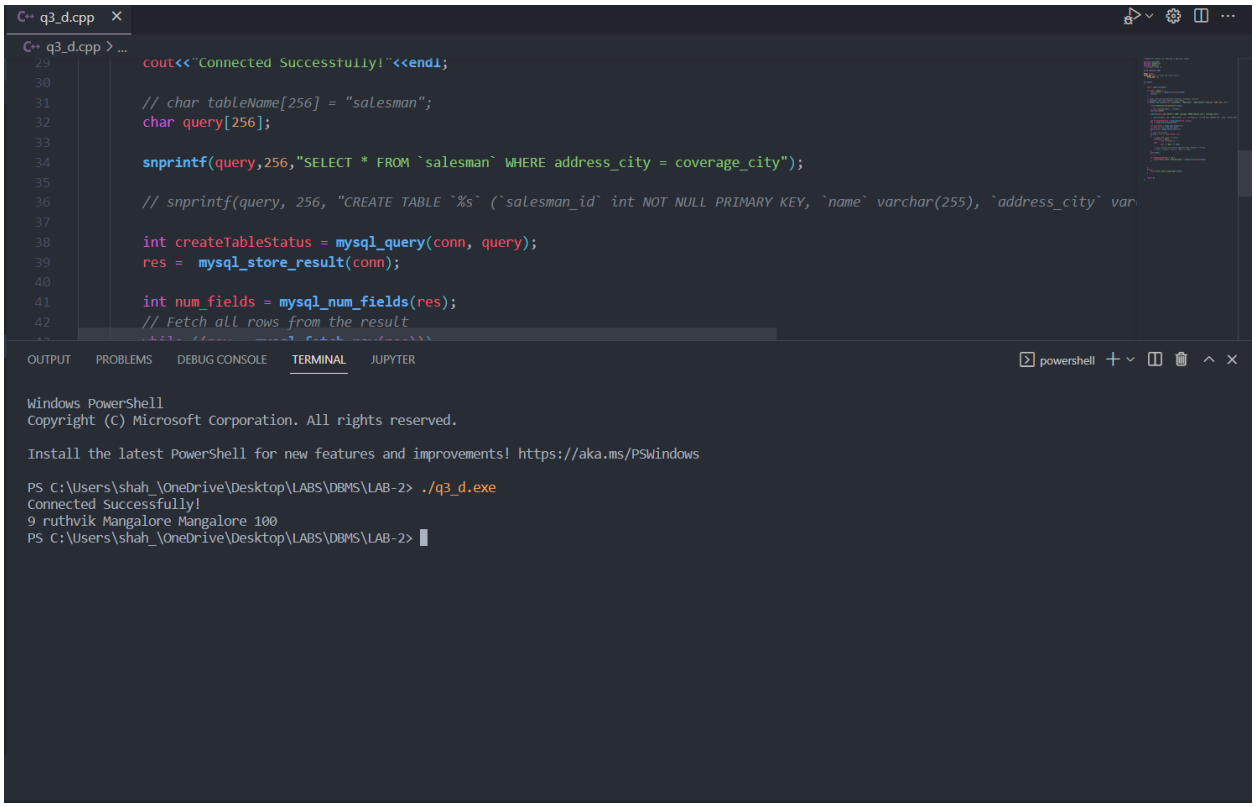
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2> ./q3_b.exe
Connected Successfully!
8 abc Chennai Mumbai 400
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2> ./q3_c.exe
Connected Successfully!
90
100
30
400
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2>

d.


q3_d.cpp
cout<<"Connected Successfully!"<<endl;
// char tableName[256] = "salesman";
char query[256];
snprintf(query,256,"SELECT * FROM `salesman` WHERE address_city = coverage_city");
// snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` var
int createTableStatus = mysql_query(conn, query);
res = mysql_store_result(conn);
int num_fields = mysql_num_fields(res);
// Fetch all rows from the result
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Windows PowerShell
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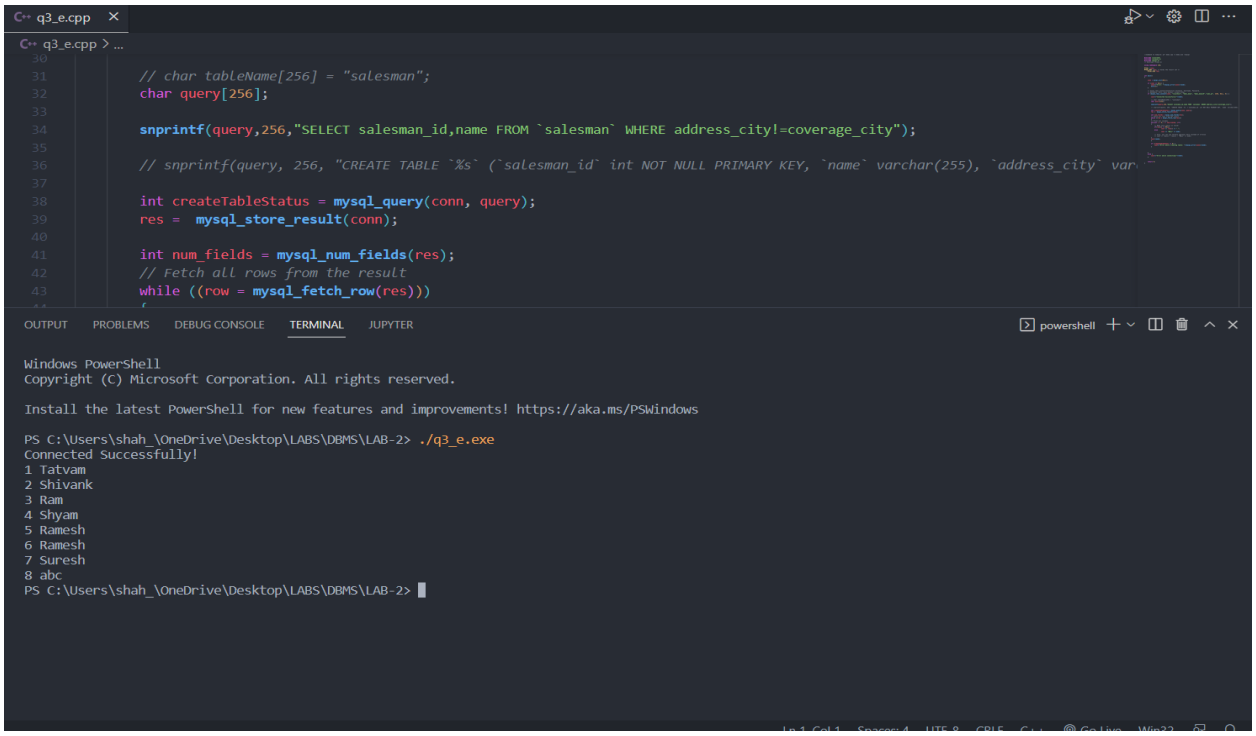
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2> ./q3_d.exe
Connected Successfully!
9 ruthvik Mangalore Mangalore 100
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2>

e.


q3_e.cpp
// char tableName[256] = "salesman";
char query[256];
snprintf(query,256,"SELECT salesman_id,name FROM `salesman` WHERE address_city!=coverage_city");
// snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` var
int createTableStatus = mysql_query(conn, query);
res = mysql_store_result(conn);
int num_fields = mysql_num_fields(res);
// Fetch all rows from the result
while ((row = mysql_fetch_row(res)))
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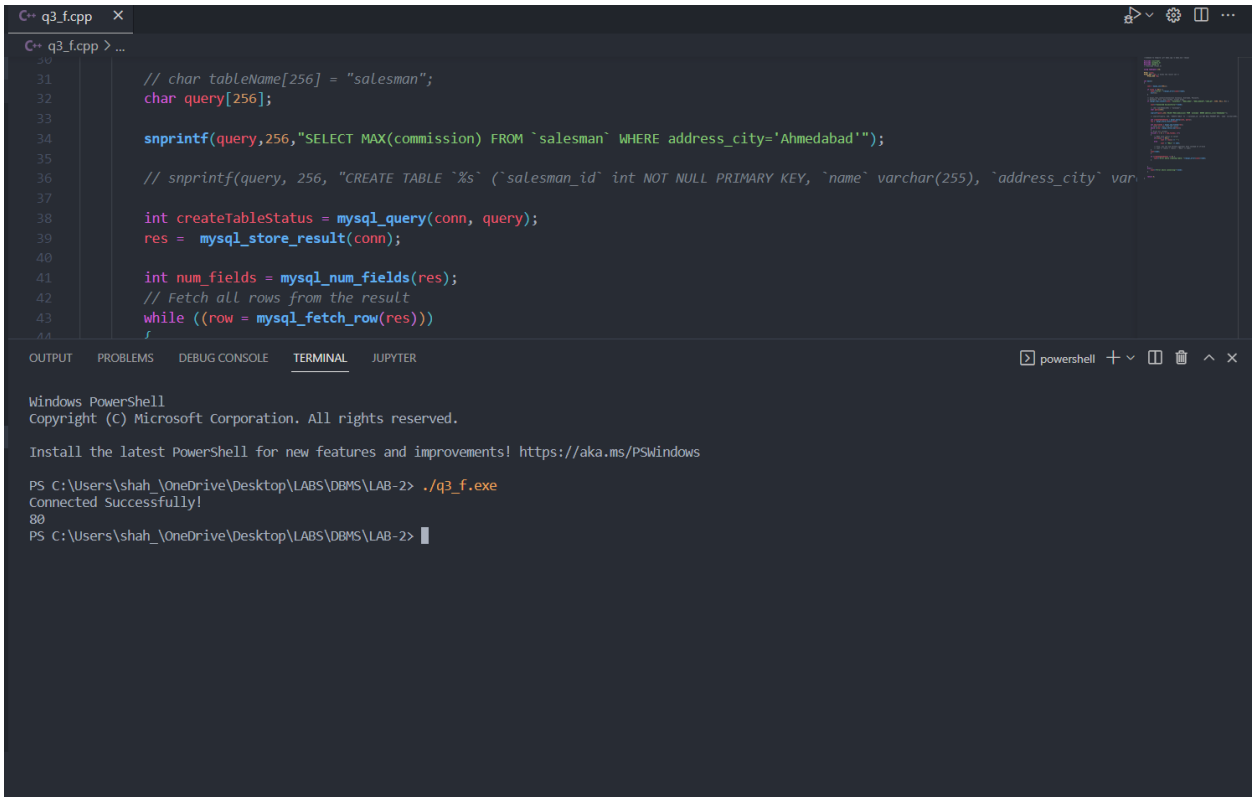
Connected Successfully!
1 Tatvam
2 Shivank
3 Ram
4 Shyam
5 Ramesh
6 Ramesh
7 Suresh
8 abc
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2>

f.


q3_f.cpp
// char tableName[256] = "salesman";
char query[256];
snprintf(query,256,"SELECT MAX(commission) FROM `salesman` WHERE address_city='Ahmedabad'");
// snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` var
int createTableStatus = mysql_query(conn, query);
res = mysql_store_result(conn);
int num_fields = mysql_num_fields(res);
// Fetch all rows from the result
while ((row = mysql_fetch_row(res)))
OUTPUT PROBLEMS DEBUG CONSOLE TERMINAL JUPYTER
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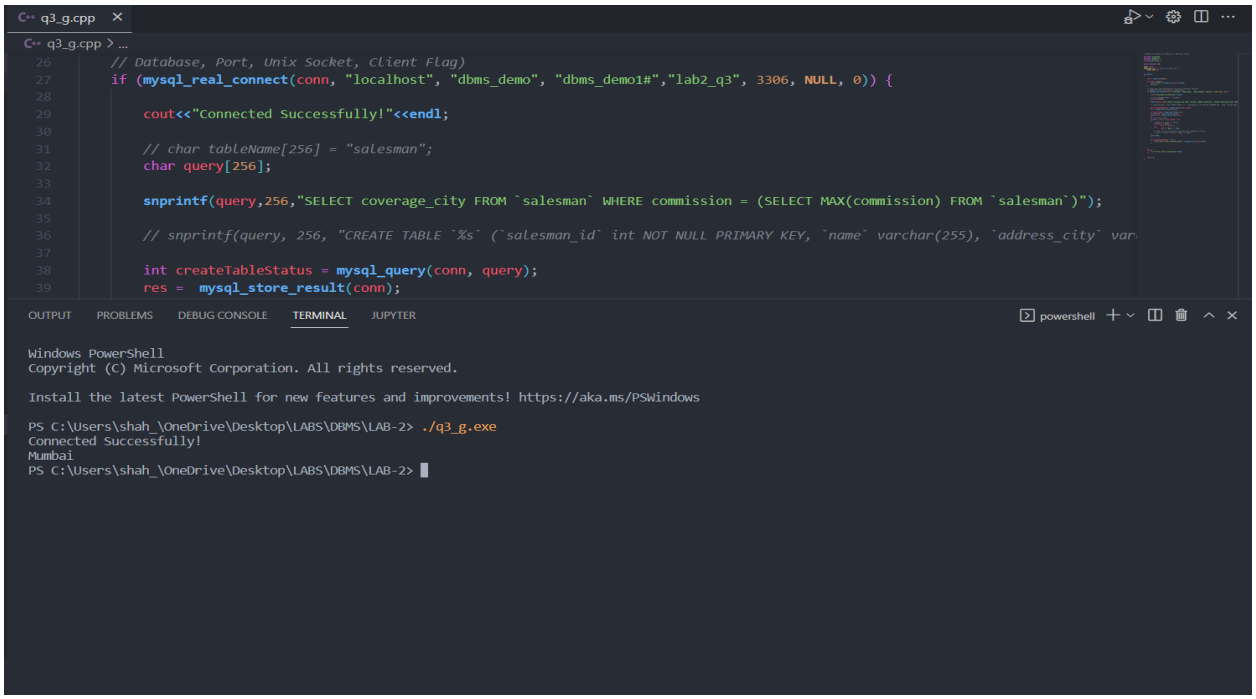
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2> ./q3_f.exe
Connected Successfully!
80
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2>

g.


q3_g.cpp
// Database, Port, Unix Socket, Client Flag)
if (mysql_real_connect(conn, "localhost", "dbms_demo", "dbms_demo1#","lab2_q3", 3306, NULL, 0)) {
cout<<"Connected Successfully!"<<endl;
// char tableName[256] = "salesman";
char query[256];
snprintf(query,256,"SELECT coverage_city FROM `salesman` WHERE commission = (SELECT MAX(commission) FROM `salesman`)");
// snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` var
int createTableStatus = mysql_query(conn, query);
res = mysql_store_result(conn);
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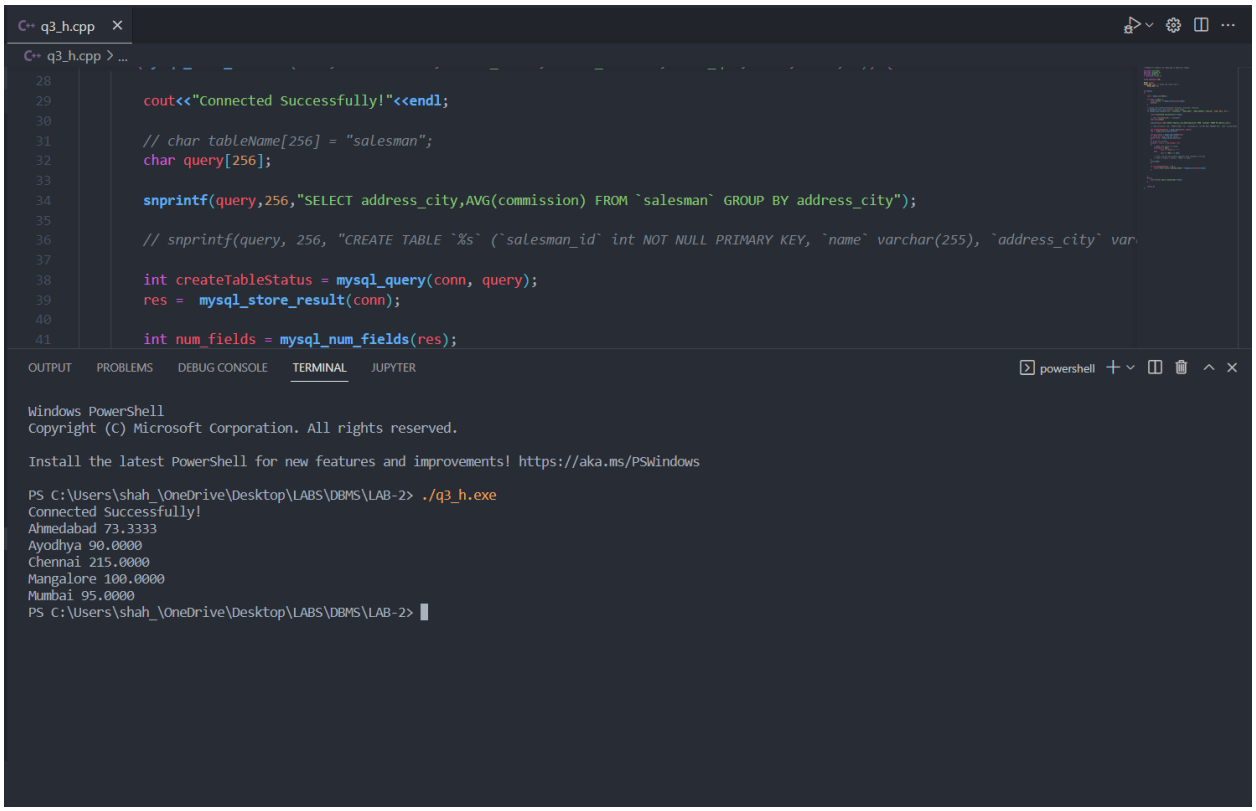
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2> ./q3_g.exe
Connected Successfully!
Mumbai
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2>

h.


q3_h.cpp
cout<<"Connected Successfully!"<<endl;
// char tableName[256] = "salesman";
char query[256];
snprintf(query,256,"SELECT address_city,AVG(commission) FROM `salesman` GROUP BY address_city");
// snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` var
int createTableStatus = mysql_query(conn, query);
res = mysql_store_result(conn);
int num_fields = mysql_num_fields(res);
OUTPUT
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JUPYTER
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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2> ./q3_h.exe
Connected Successfully!
Ahmedabad 73.3333
Ayodhya 90.0000
Chennai 215.0000
Mangalore 100.0000
Mumbai 95.0000
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2>

i.

```
C++ q3_i.cpp > main()
22          exit(1);
23      }
24
25      // mysql_real_connect(Connection Instance, Username, Password,
26      // Database, Port, Unix Socket, Client Flag)
27      if (mysql_real_connect(conn, "localhost", "dbms_demo", "dbms_demo1#","lab2_q3", 3306, NULL, 0)) {
28
29          cout<<"Connected Successfully!"<<endl;
30
31          // char tableName[256] = "salesman";
32          char query[256];
33
```

```
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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> g++ q3_i.cpp -o q3_i.exe -lmysql
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> ./q3_i.exe
Connected Successfully!
Ahmedabad
Mangalore
Mumbai
Vadodara
```

j.

```
C++ q3_j.cpp > main()
24
25      // mysql_real_connect(Connection Instance, Username, Password,
26      // Database, Port, Unix Socket, Client Flag)
27      if (mysql_real_connect(conn, "localhost", "dbms_demo", "dbms_demo1#","lab2_q3", 3306, NULL, 0)) {
28
29          cout<<"Connected Successfully!"<<endl;
30
31          // char tableName[256] = "salesman";
32          char query[256];
33
34          snprintf(query,256,"SELECT commission FROM `salesman` GROUP BY coverage_city");
35          // cout<<"yee"<<endl;
36
```

```
OUTPUT  PROBLEMS  DEBUG CONSOLE  TERMINAL  JUPYTER

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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> g++ q3C_j.cpp -o q3C_j.exe -lmysql
g++.exe: error: q3C_j.cpp: No such file or directory
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> g++ q3_j.cpp -o q3_j.exe -lmysql
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> ./q3_j.exe
Connected Successfully!
90
100
400
60
80
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes>
```
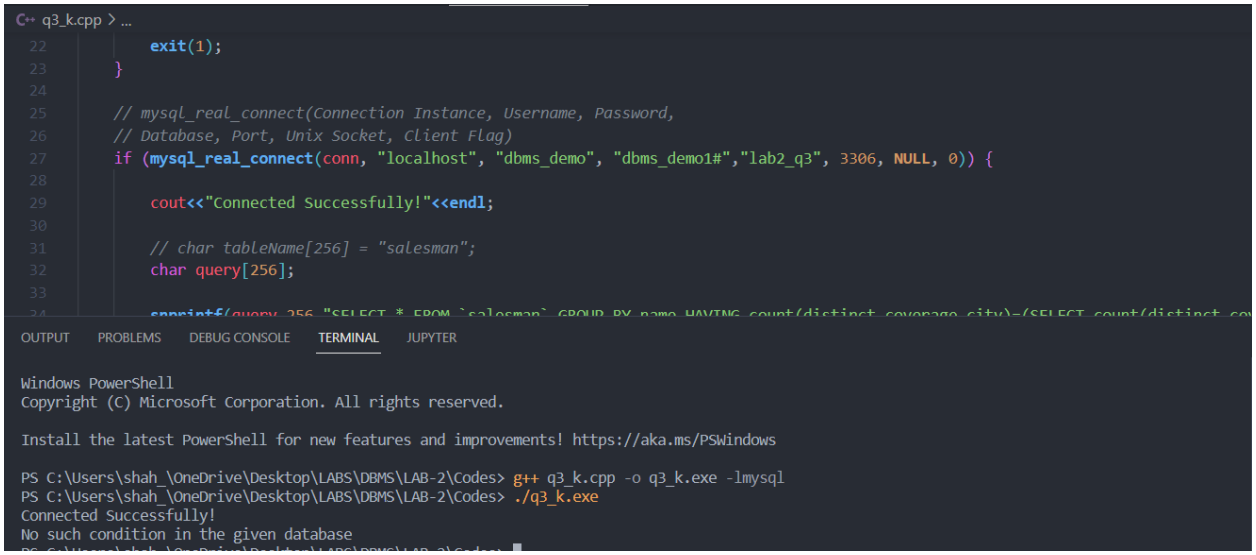

k.


q3_k.cpp > ...
exit(1);
}
// mysql_real_connect(Connection Instance, Username, Password,
// Database, Port, Unix Socket, Client Flag)
if (mysql_real_connect(conn, "localhost", "dbms_demo", "dbms_demo1#","lab2_q3", 3306, NULL, 0)) {
cout<<"Connected Successfully!"<<endl;
// char tableName[256] = "salesman";
char query[256];
OUTPUT
PROBLEMS
DEBUG CONSOLE
TERMINAL
JUPYTER
Windows PowerShell
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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> g++ q3_k.cpp -o q3_k.exe -lmysql
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> ./q3_k.exe
Connected Successfully!
No such condition in the given database

l.


q3_l.cpp > main()
exit(1);
}
// mysql_real_connect(Connection Instance, Username, Password,
// Database, Port, Unix Socket, Client Flag)
if (mysql_real_connect(conn, "localhost", "dbms_demo", "dbms_demo1#","lab2_q3", 3306, NULL, 0)) {
cout<<"Connected Successfully!"<<endl;
// char tableName[256] = "salesman";
char query[256];
snprintf(query,256,"ALTER TABLE salesman ADD date_of_employment varchar(255)");
// cout<<"yee"<<endl;
// snprintf(query, 256, "CREATE TABLE `%s` (`salesman_id` int NOT NULL PRIMARY KEY, `name` varchar(255), `address_city` var
int createTableStatus = mysql_query(conn, query);
snprintf(query,256,"ALTER TABLE salesman ADD date_of_release varchar(255)");
createTableStatus = mysql_query(conn, query);
if (createTableStatus != 0) {
cout<<"Error while creating table: "<<mysql_error(conn)<<endl;
}

Q3 B.

The Functional dependencies in the table are :
{salesman_id -> (name,address_city,date_of_employment,date_of_release),
(salesman_id,coverage_city)->commission_rate}

Therefore, taking the closure of (salesman_id,coverage_city) will give us all the column names and hence that is our primary key.

It is in 1NF since there are no multivalued attributes in the table.
But it is not in 2NF since our primary key is (salesman_id,coverage_city) but we have partial dependencies in our table (e.g., salesman_id -> (name,address_city)). Hence, it is not in 2NF.

YES, we can improve upon it by decomposing the partial dependencies into different tables.
We make the following tables : T(A,B,C,D,E,F,G) -> T1(A,B,C,F,G) + T2(A,D,E)
(where : A=salesman_id, B=name, C=address_city, D=coverage_city,
E=commission_rate, F=date_of_employment, G =date_of_release)

Therefore, Functional Dependencies of T1 : {A->BCFG} , Candidate Key : {A}
Functional Dependencies of T2 : {AD->E} , Candidate Key : {AD}

Therefore, now checking both the tables T1 and T2 are in BCNF form since for all the F.D's the LHS is candidate key of respective tables.

Showing rows 0 - 7 (8 total, Query took 0.0003 seconds.)

```
SELECT * FROM `t1`
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 Filter rows: Search this table Sort by key: None

Extra options

	salesman_id	name	address_city	date_of_employment	date_of_release
Edit Copy Delete	1	Tatvam	Ahmedabad	2022-02-21	NULL
Edit Copy Delete	2	Shivank	Ayodhya	2020-03-14	2021-05-16
Edit Copy Delete	3	Ram	Ahmedabad	2020-01-05	NULL
Edit Copy Delete	4	Shyam	Ahmedabad	2022-02-15	NULL
Edit Copy Delete	5	Ramesh	Mumbai	2022-03-01	NULL
Edit Copy Delete	7	Suresh	Chennai	2020-01-12	2021-04-16
Edit Copy Delete	8	abc	Chennai	2021-02-11	NULL
Edit Copy Delete	9	ruthvik	Mangalore	2022-01-17	NULL

```
SELECT * FROM `t2`
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 Filter rows: Search this table

Extra options

	salesman_id	coverage_city	commission
Edit Copy Delete	1	Surat	60
Edit Copy Delete	2	Surat	90
Edit Copy Delete	3	Vadodara	80
Edit Copy Delete	4	Vadodara	80
Edit Copy Delete	5	Ahmedabad	90
Edit Copy Delete	5	Surat	100
Edit Copy Delete	7	Surat	30
Edit Copy Delete	8	Mumbai	400
Edit Copy Delete	9	Mangalore	100

Q3 C.

a.

```
q3C_a.cpp > main()
32          char tableName[256] = "salesman";
33          char query[256];
34          int createTableStatus;
35
36          snprintf(query, 256, "SELECT * FROM t1 WHERE date_of_release is NULL");
37          createTableStatus = mysql_query(conn, query);
38
39
40          if (createTableStatus != 0) {
41              cout<<"Error while creating table: "<<mysql_error(conn)<<endl;
42          }
43
44          res =  mysql_store_result(conn);
```

```
OUTPUT  PROBLEMS  DEBUG CONSOLE  TERMINAL  JUPYTER

4 Shyam Ahmedabad 2022-02-15 NULL

5 Ramesh Mumbai 2022-03-01 NULL

8 abc Chennai 2021-02-11 NULL

9 ruthvik Mangalore 2022-01-17 NULL
```

b.

```
q3C_b.cpp > main()
28      if (mysql_real_connect(conn, "localhost", "dbms_demo", "dbms_demo1#","lab2_q3", 3306, NULL, 0)) {
29
30          cout<<"Connected Successfully!"<<endl;
31
32          char tableName[256] = "salesman";
33          char query[256];
34          int createTableStatus;
35
36          snprintf(query, 256, "SELECT * FROM t1 WHERE date_of_release is NOT NULL");
37          createTableStatus = mysql_query(conn, query);
38
39
40          if (createTableStatus != 0) {
```

```
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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> ./q3C_b.exe
Connected Successfully!
2 Shivank Ayodhya 2020-03-14 2021-05-16
7 Suresh Chennai 2020-01-12 2021-04-16
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes>
```

c.

```
C++ q3C_c.cpp > main()
33          char query[256];
34          int createTableStatus;
35
36          snprintf(query, 256, "SELECT * FROM t1 WHERE date_of_employment = (SELECT MIN(date_of_employment) FROM t1) AND date_of_rel
37          createTableStatus = mysql_query(conn, query);
38
39
40          if (createTableStatus != 0) {
41              cout<<"Error while creating table: "<<mysql_error(conn)<<endl;
42          }
43
44          res =  mysql_store_result(conn);
45

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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> ./q3C_c.exe
Connected Successfully!
3 Ram Ahmedabad 2020-01-05 NULL
```

d.

```
C++ q3C_d.cpp > main()
32          char tableName[256] = "salesman";
33          char query[256];
34          int createTableStatus;
35
36          snprintf(query, 256, "SELECT count(*) FROM t1 where YEAR(date_of_employment) = '2022'");
37          createTableStatus = mysql_query(conn, query);
38
39
40          if (createTableStatus != 0) {
41              cout<<"Error while creating table: "<<mysql_error(conn)<<endl;
42          }
43
44          res =  mysql_store_result(conn);

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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> ./q3C_d.exe
Connected Successfully!
4
```

e.

```
C++ q3C_e.cpp > main()
30          cout<<"Connected Successfully!"<<endl;
31
32          char tableName[256] = "salesman";
33          char query[256];
34          int createTableStatus;
35
36          snprintf(query, 256, "(SELECT extract(Year from date_of_employment) as year,count(name) as num from t1 group by (select ext
37          createTableStatus = mysql_query(conn, query);
38
39
40          if (createTableStatus != 0) {
41              cout<<"Error while creating table: "<<mysql_error(conn)<<endl;
```

```
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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> ./q3C_e.exe
Connected Successfully!
2022 4
```

f.

```
C++ q3C_f.cpp > main()
28      if (mysql_real_connect(conn, "localhost", "dbms_demo", "dbms_demo1#","lab2_q3", 3306, NULL, 0)) {
29
30          cout<<"Connected Successfully!"<<endl;
31
32          char tableName[256] = "salesman";
33          char query[256];
34          int createTableStatus;
35
36          snprintf(query, 256, "(SELECT extract(Year from date_of_release) as year,count(name) as num from t1 WHERE date_of_release i
37          createTableStatus = mysql_query(conn, query);
38
39
```

```
OUTPUT  PROBLEMS  DEBUG CONSOLE  TERMINAL  JUPYTER

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PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes> ./q3C_f.exe
Connected Successfully!
2021 2
PS C:\Users\shah_\OneDrive\Desktop\LABS\DBMS\LAB-2\Codes>
```
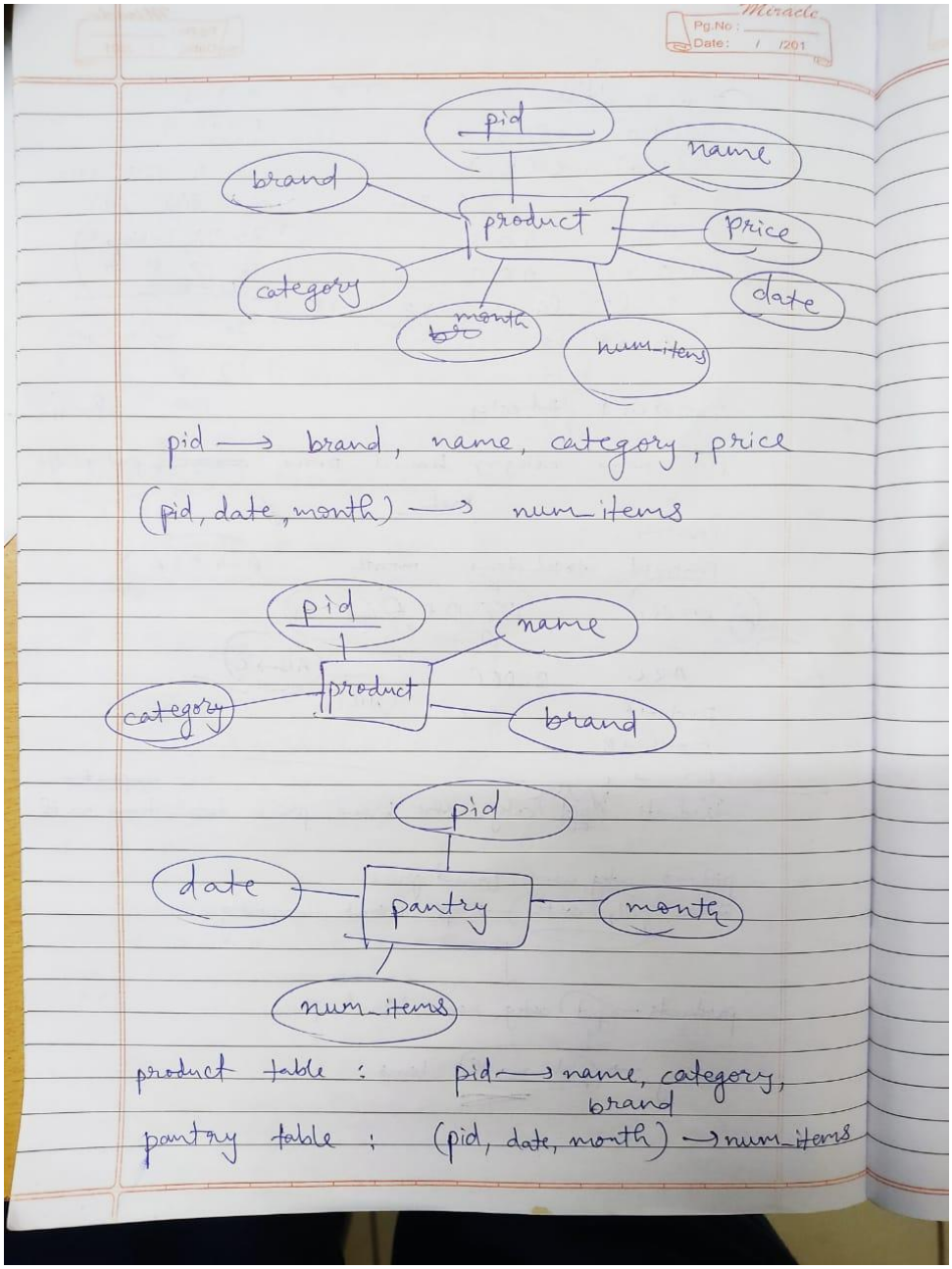

Q4 .

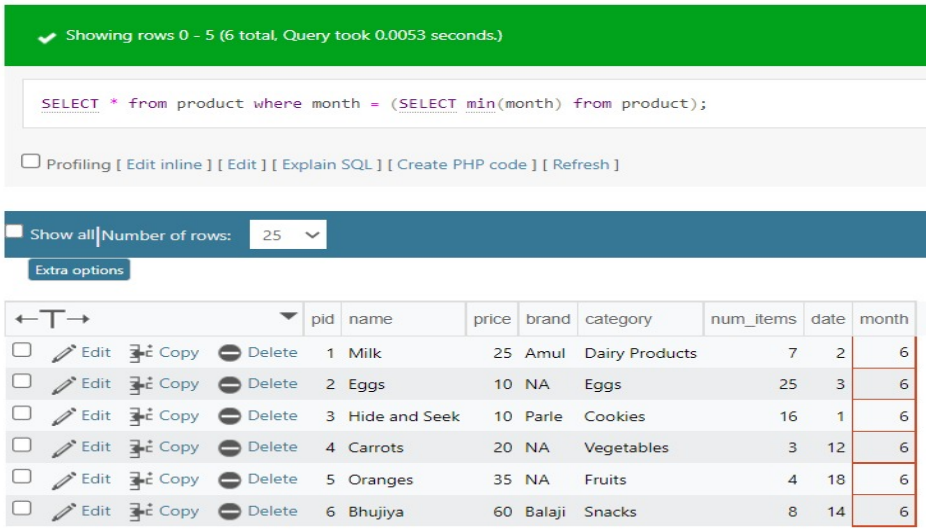
A. We created a product table which has attributes pid, name, brand, category, price, date, month, num_items. The relations and ER diagram is given in 1st figure in upper part.



Q4 B. We see that the products table is in 2nd normal form as the pid has partial dependency. So we break the table into two tables as shown in the above diagram. Now the final tables are in BCNF.

Q4 C.Execution times for Normalized and Un-Normalized tables

i.



Showing rows 0 - 5 (6 total, Query took 0.0053 seconds.)

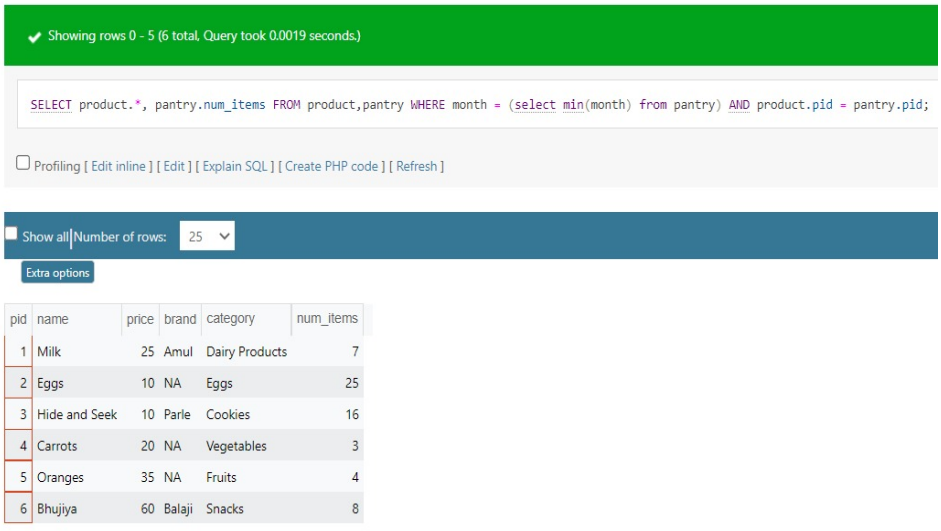
```
SELECT * from product where month = (SELECT min(month) from product);
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25

Extra options

	pid	name	price	brand	category	num_items	date	month
Edit Copy Delete	1	Milk	25	Amul	Dairy Products	7	2	6
Edit Copy Delete	2	Eggs	10	NA	Eggs	25	3	6
Edit Copy Delete	3	Hide and Seek	10	Parle	Cookies	16	1	6
Edit Copy Delete	4	Carrots	20	NA	Vegetables	3	12	6
Edit Copy Delete	5	Oranges	35	NA	Fruits	4	18	6
Edit Copy Delete	6	Bhujiya	60	Balaji	Snacks	8	14	6



Showing rows 0 - 5 (6 total, Query took 0.0019 seconds.)

```
SELECT product.*, pantry.num_items FROM product,pantry WHERE month = (select min(month) from pantry) AND product.pid = pantry.pid;
```

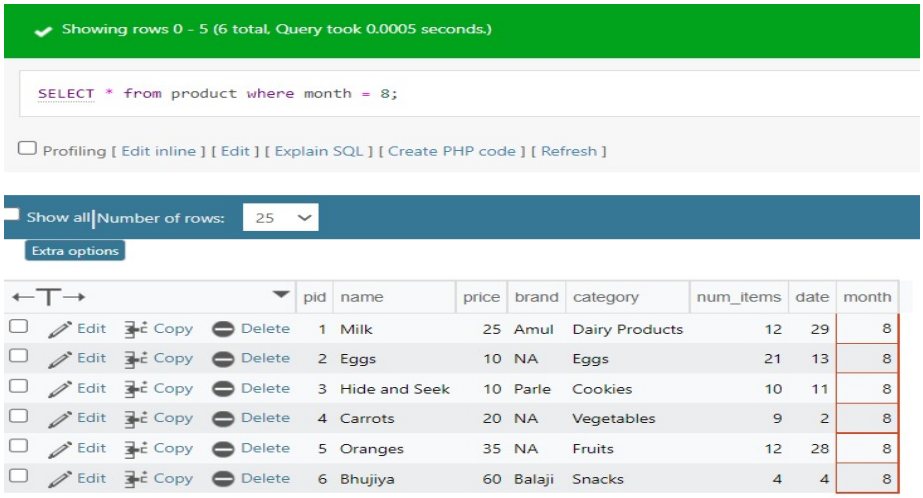
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

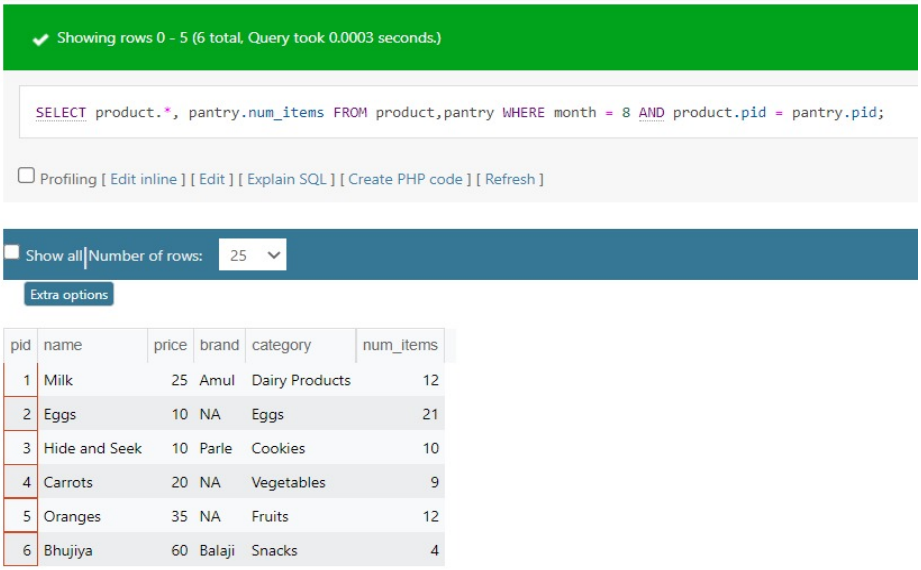
Show all | Number of rows: 25

Extra options

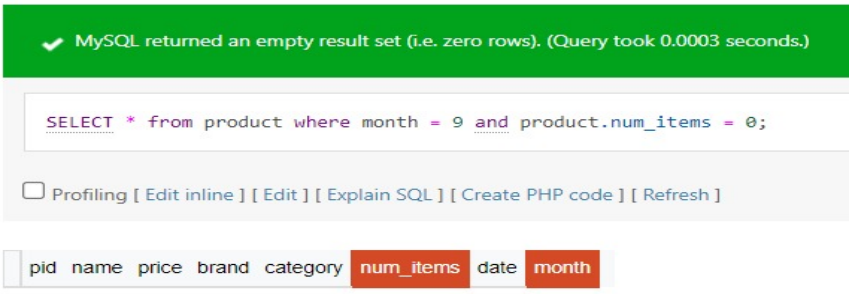
pid	name	price	brand	category	num_items
1	Milk	25	Amul	Dairy Products	7
2	Eggs	10	NA	Eggs	25
3	Hide and Seek	10	Parle	Cookies	16
4	Carrots	20	NA	Vegetables	3
5	Oranges	35	NA	Fruits	4
6	Bhujiya	60	Balaji	Snacks	8

ii.


Showing rows 0 - 5 (6 total, Query took 0.0005 seconds.)
SELECT * from product where month = 8;
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
Show all | Number of rows: 25
Extra options
pid name price brand category num_items date month
Edit Copy Delete 1 Milk 25 Amul Dairy Products 12 29 8
Edit Copy Delete 2 Eggs 10 NA Eggs 21 13 8
Edit Copy Delete 3 Hide and Seek 10 Parle Cookies 10 11 8
Edit Copy Delete 4 Carrots 20 NA Vegetables 9 2 8
Edit Copy Delete 5 Oranges 35 NA Fruits 12 28 8
Edit Copy Delete 6 Bhujiya 60 Balaji Snacks 4 4 8


Showing rows 0 - 5 (6 total, Query took 0.0003 seconds.)
SELECT product.*, pantry.num_items FROM product,pantry WHERE month = 8 AND product.pid = pantry.pid;
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
Show all | Number of rows: 25
Extra options
pid name price brand category num_items
1 Milk 25 Amul Dairy Products 12
2 Eggs 10 NA Eggs 21
3 Hide and Seek 10 Parle Cookies 10
4 Carrots 20 NA Vegetables 9
5 Oranges 35 NA Fruits 12
6 Bhujiya 60 Balaji Snacks 4

iii.


MySQL returned an empty result set (i.e. zero rows). (Query took 0.0003 seconds.)
SELECT * from product where month = 9 and product.num_items = 0;
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
pid name price brand category num_items date month

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0003 seconds.)

```
SELECT product.*, pantry.num_items FROM product,pantry WHERE month = 9 AND pantry.num_items = 0;
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

pid	name	price	brand	category	num_items

iv.

Showing rows 0 - 5 (6 total, Query took 0.0003 seconds.)

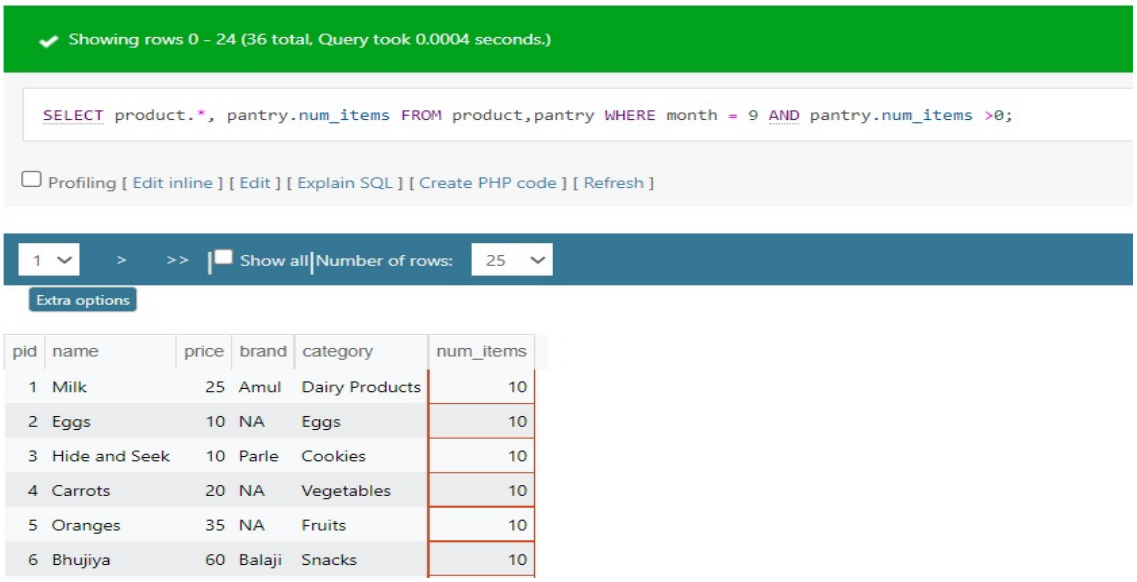
```
SELECT * from product where month = 9 and product.num_items > 0;
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

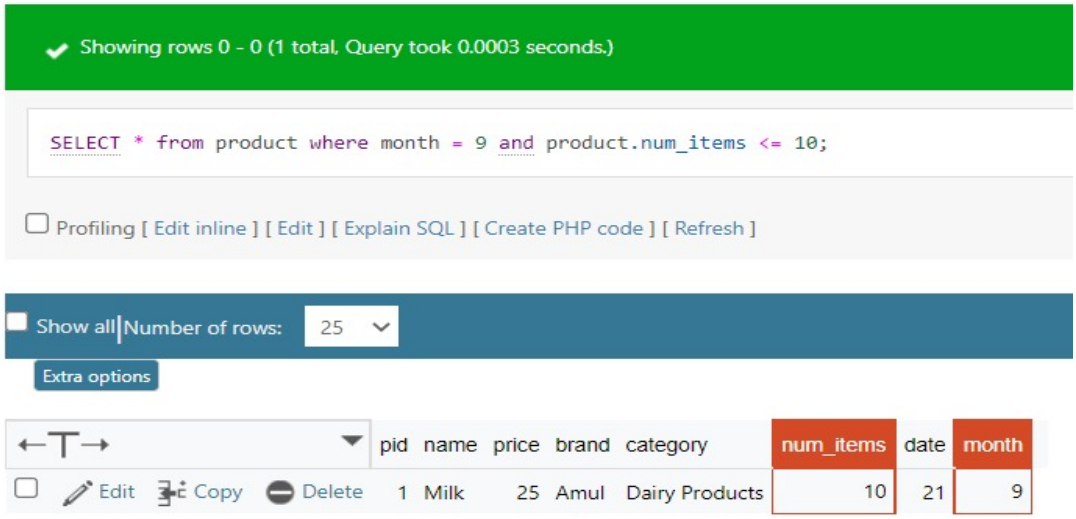
Show all | Number of rows: 25

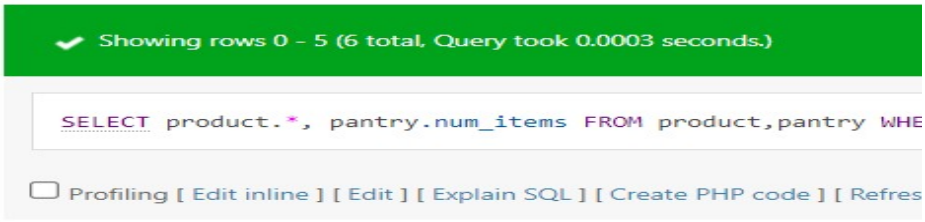
Extra options

	pid	name	price	brand	category	num_items	date	month
Edit Copy Delete	1	Milk	25	Amul	Dairy Products	10	21	9
Edit Copy Delete	2	Eggs	10	NA	Eggs	35	30	9
Edit Copy Delete	3	Hide and Seek	10	Parle	Cookies	50	15	9
Edit Copy Delete	4	Carrots	20	NA	Vegetables	12	7	9
Edit Copy Delete	5	Oranges	35	NA	Fruits	14	4	9
Edit Copy Delete	6	Bhujiya	60	Balaji	Snacks	20	14	9


Showing rows 0 - 24 (36 total, Query took 0.0004 seconds.)
SELECT product.*, pantry.num_items FROM product,pantry WHERE month = 9 AND pantry.num_items >0;
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
1 > >> Show all Number of rows: 25
Extra options
pid name price brand category num_items
1 Milk 25 Amul Dairy Products 10
2 Eggs 10 NA Eggs 10
3 Hide and Seek 10 Parle Cookies 10
4 Carrots 20 NA Vegetables 10
5 Oranges 35 NA Fruits 10
6 Bhujiya 60 Balaji Snacks 10

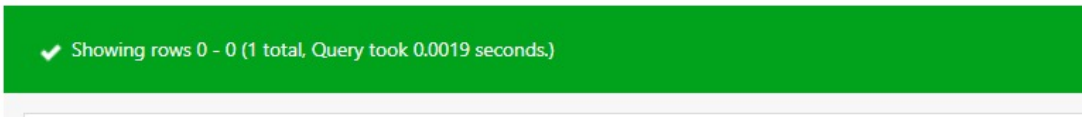
V.


Showing rows 0 - 0 (1 total, Query took 0.0003 seconds.)
SELECT * from product where month = 9 and product.num_items <= 10;
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
Show all Number of rows: 25
Extra options
pid name price brand category num_items date month
Edit Copy Delete 1 Milk 25 Amul Dairy Products 10 21 9



pid	name	price	brand	category	num_items
1	Milk	25	Amul	Dairy Products	10
2	Eggs	10	NA	Eggs	10
3	Hide and Seek	10	Parle	Cookies	10
4	Carrots	20	NA	Vegetables	10
5	Oranges	35	NA	Fruits	10
6	Bhujiya	60	Balaji	Snacks	10

vi.



sum(price)	avg(price)
640	26.666666666666668

Q4 D.

After seeing the normalization results from the above question we can easily see that the time required for executing queries in normalized tables is either less than or equal to that required by the queries in the unnormalized table. Therefore, Normalization is a better approach to follow