SAN JOSE STATE UNIVERSITY

SPRING 2017

Project team 18

Team Members:

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Purchase Order Management System in SQLite

Objective:

1. Design a database for Purchase Order Management System.

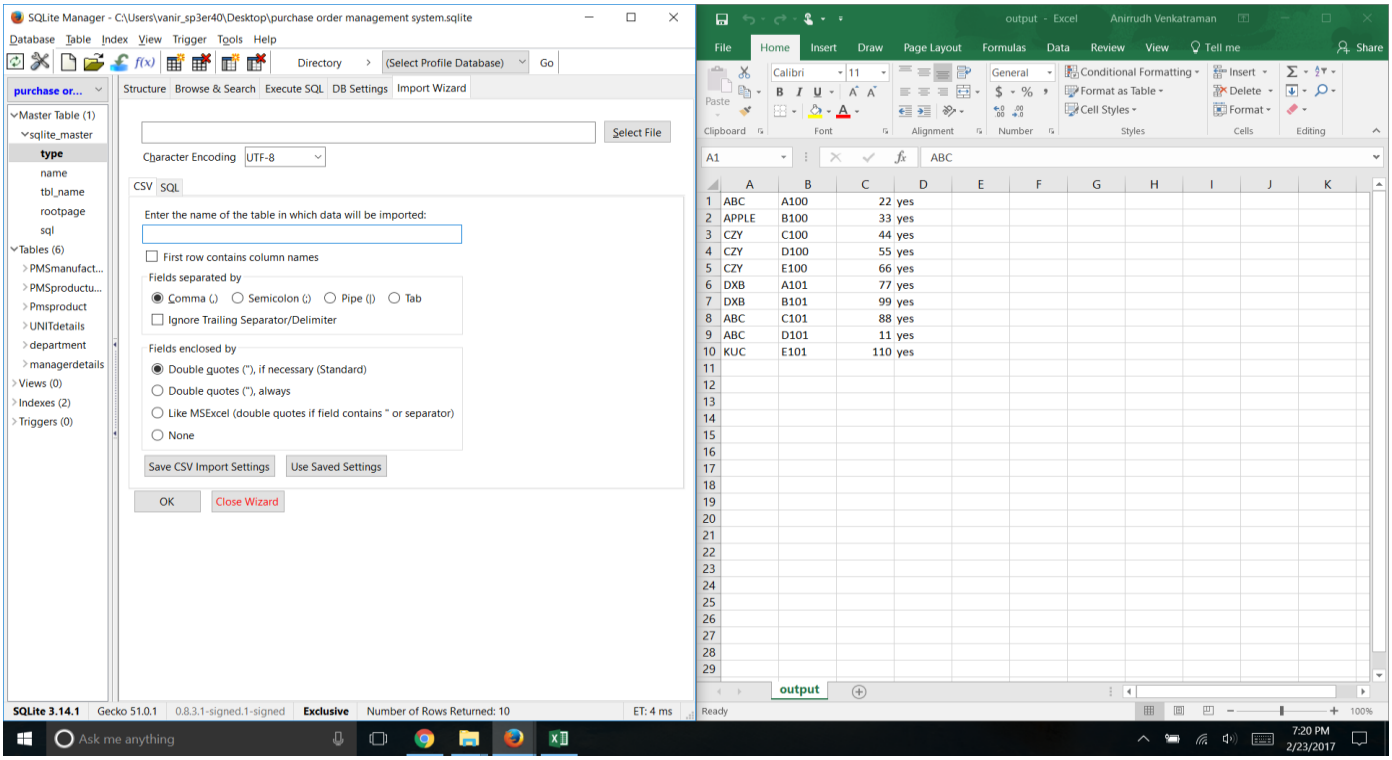
2. Create a sample schema with necessary tables.

3. Insert sample data into the tables.

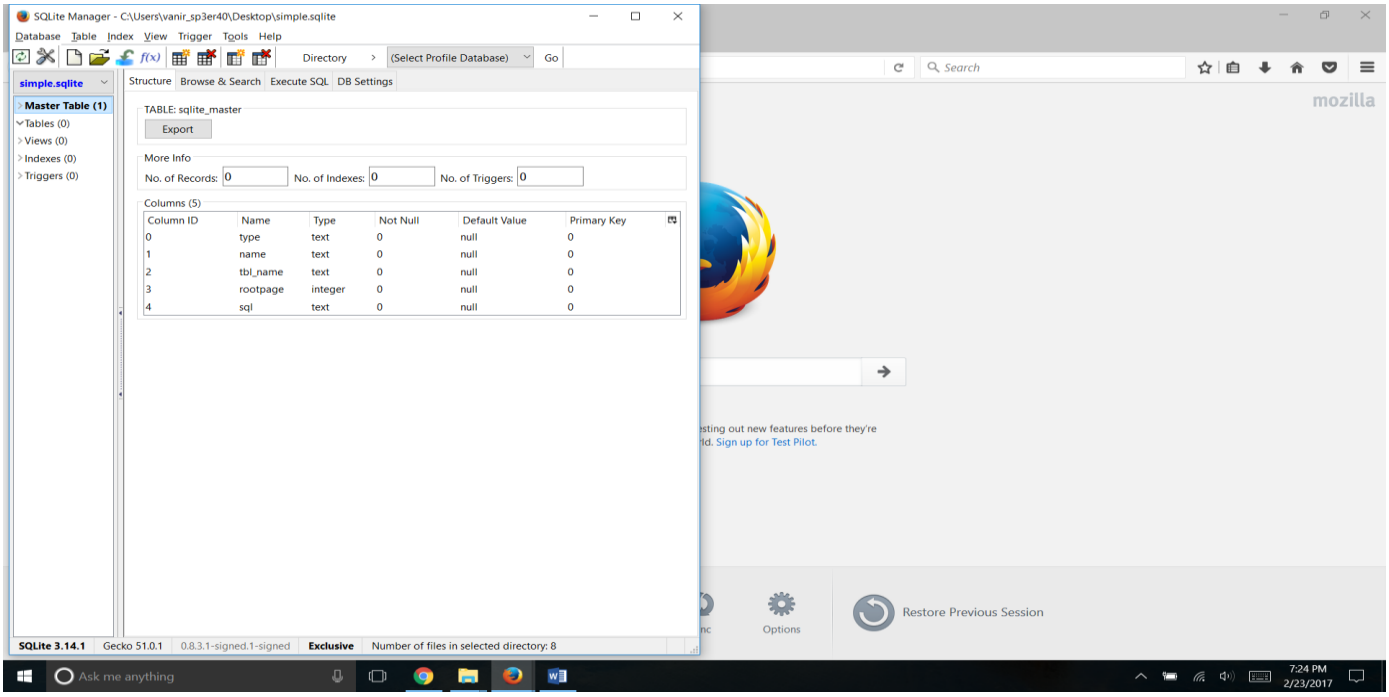
4. Execute different queries.

SQLite manager with Mozilla Firefox

1.Creation of database in the SQLite manager for PurchaseOrderManagementSystem



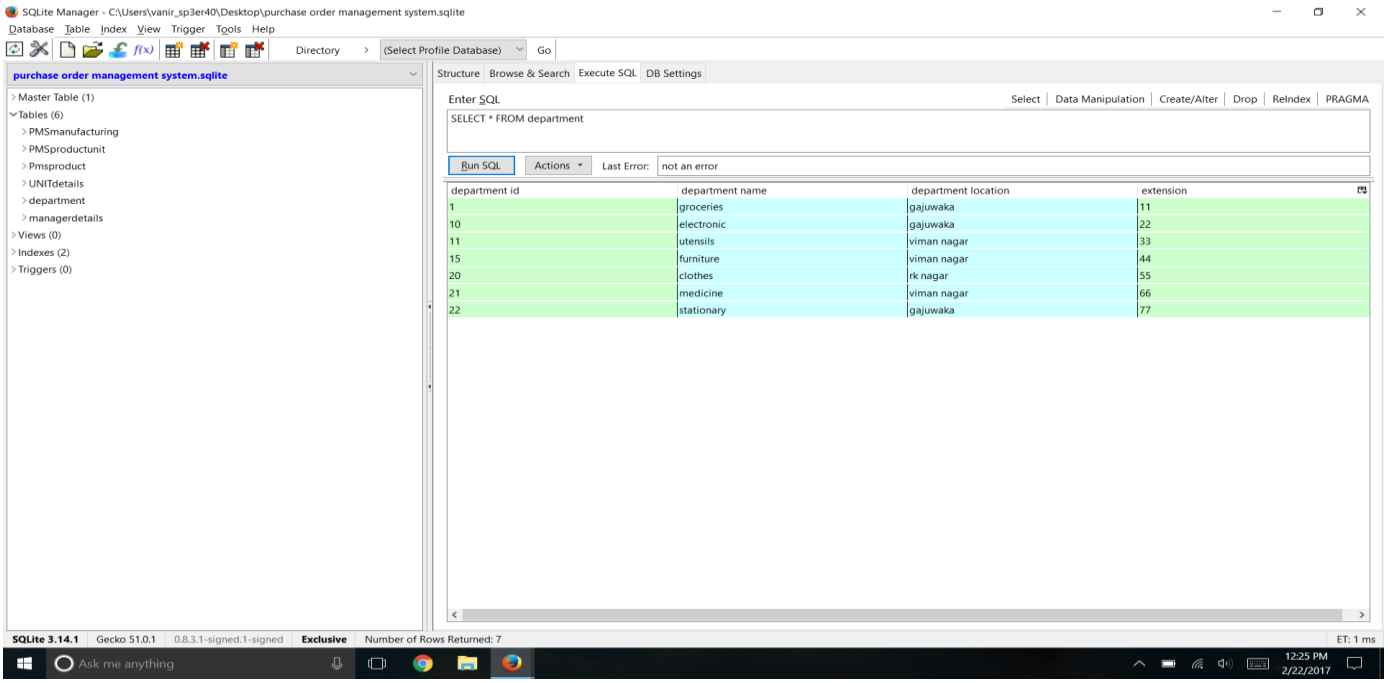
2. Adding tables to database by importing table from data present locally



Queries executed:

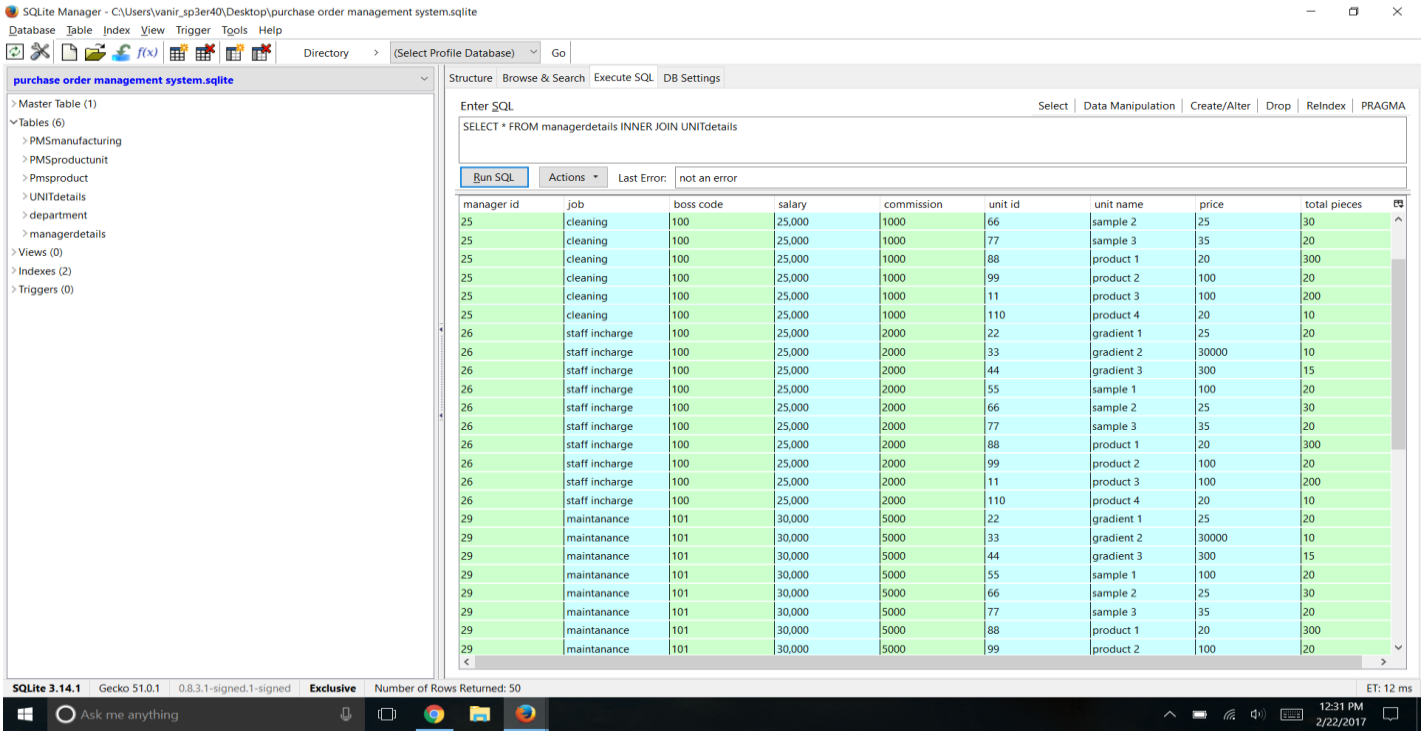
3. Displaying the synched tables from SQLite manager using

SELECT * FROM table name query



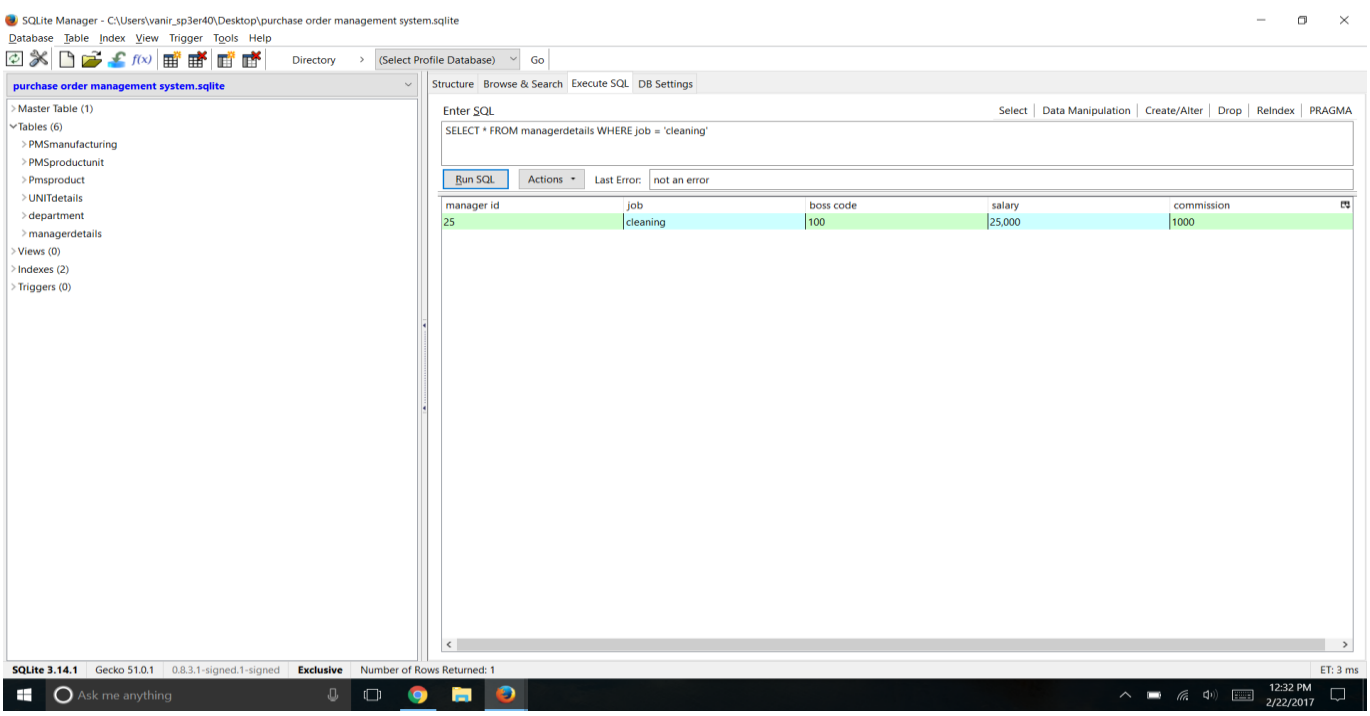
4. performing inner join between two tables by using the SQL query

SELECT *FROM table 1 INNER JOIN table 2



manager id	job	boss code	salary	commission	unit id	unit name	price	total pieces
25	cleaning	100	25,000	1000	66	sample 2	25	30
25	cleaning	100	25,000	1000	77	sample 3	35	20
25	cleaning	100	25,000	1000	88	product 1	20	300
25	cleaning	100	25,000	1000	99	product 2	100	20
25	cleaning	100	25,000	1000	11	product 3	100	200
25	cleaning	100	25,000	1000	110	product 4	20	10
26	staff incharge	100	25,000	2000	22	gradient 1	25	20
26	staff incharge	100	25,000	2000	33	gradient 2	30000	10
26	staff incharge	100	25,000	2000	44	gradient 3	300	15
26	staff incharge	100	25,000	2000	55	sample 1	100	20
26	staff incharge	100	25,000	2000	66	sample 2	25	30
26	staff incharge	100	25,000	2000	77	sample 3	35	20
26	staff incharge	100	25,000	2000	88	product 1	20	300
26	staff incharge	100	25,000	2000	99	product 2	100	20
26	staff incharge	100	25,000	2000	11	product 3	100	200
26	staff incharge	100	25,000	2000	110	product 4	20	10
29	maintanance	101	30,000	5000	22	gradient 1	25	20
29	maintanance	101	30,000	5000	33	gradient 2	30000	10
29	maintanance	101	30,000	5000	44	gradient 3	300	15
29	maintanance	101	30,000	5000	55	sample 1	100	20
29	maintanance	101	30,000	5000	66	sample 2	25	30
29	maintanance	101	30,000	5000	77	sample 3	35	20
29	maintanance	101	30,000	5000	88	product 1	20	300
29	maintanance	101	30,000	5000	99	product 2	100	20

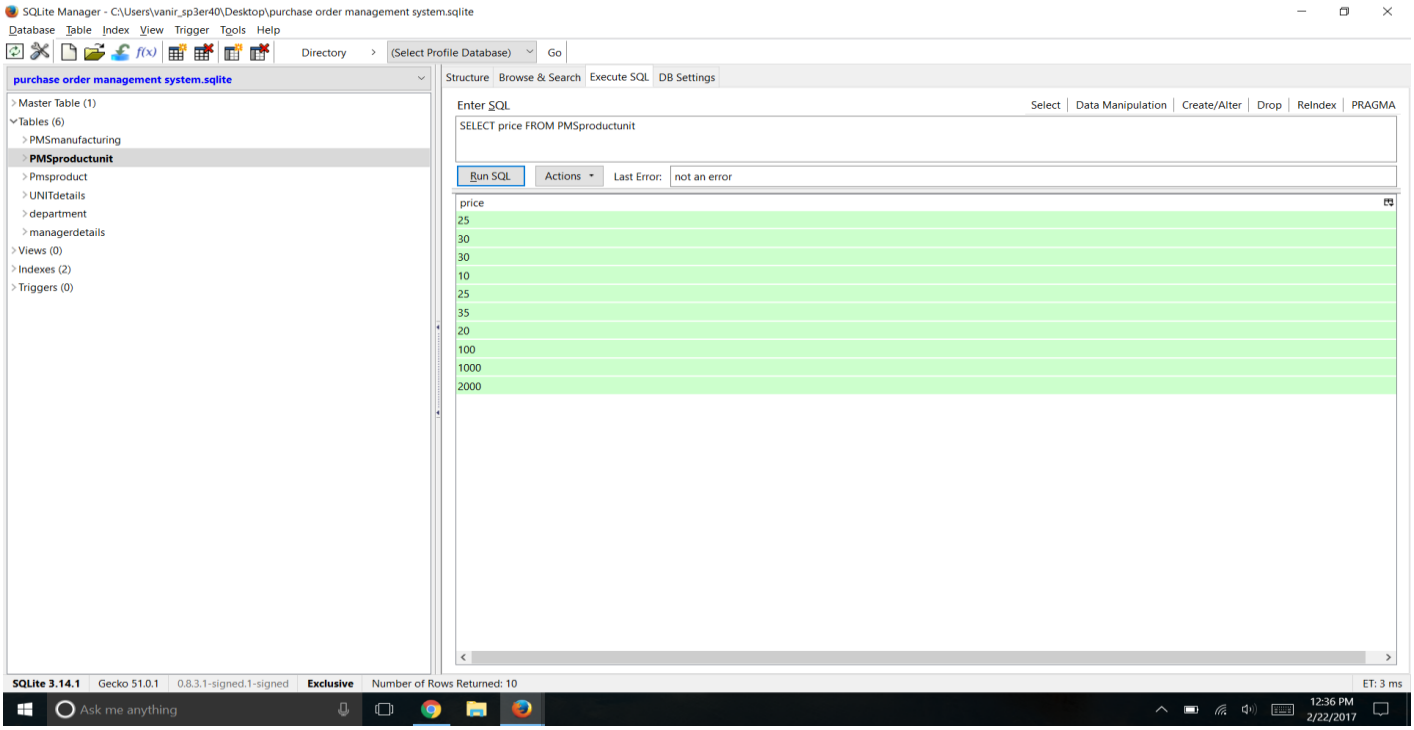
5. Selecting a particular value from a table using SQL query SELECT * FROM table1 WHERE value



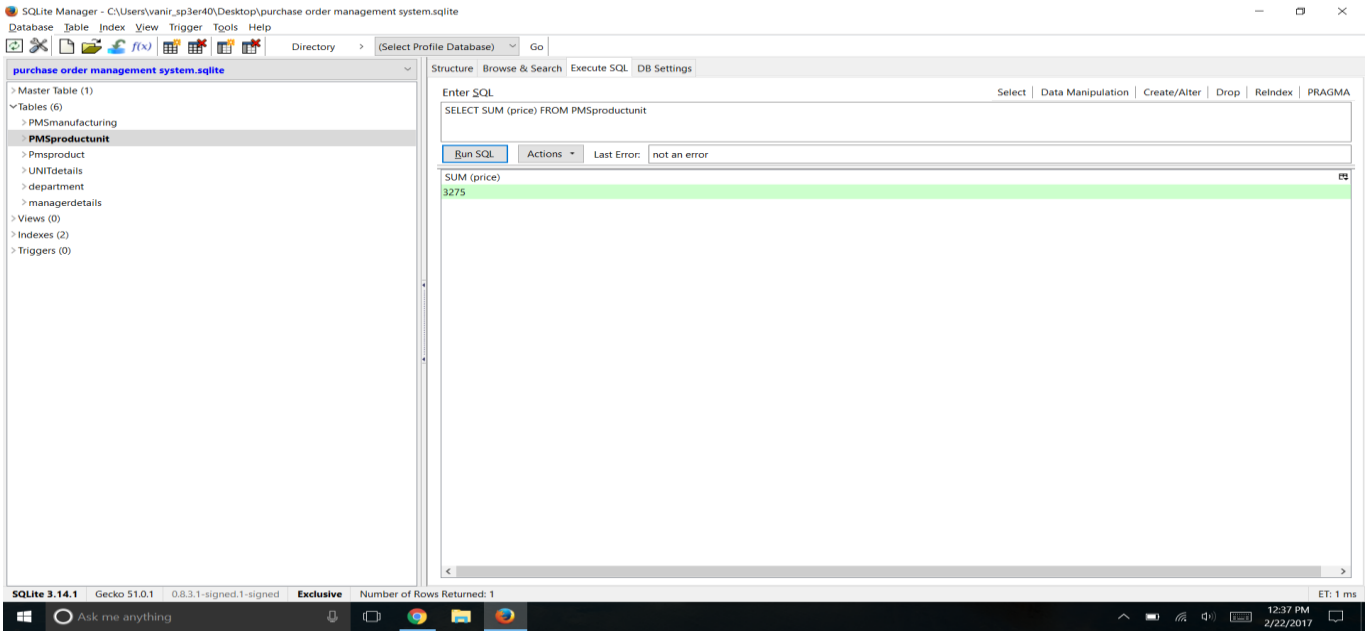
manager id	job	boss code	salary	commission
25	cleaning	100	25,000	1000

6. selecting particular column from a table using query

SELECT column name FROM table name

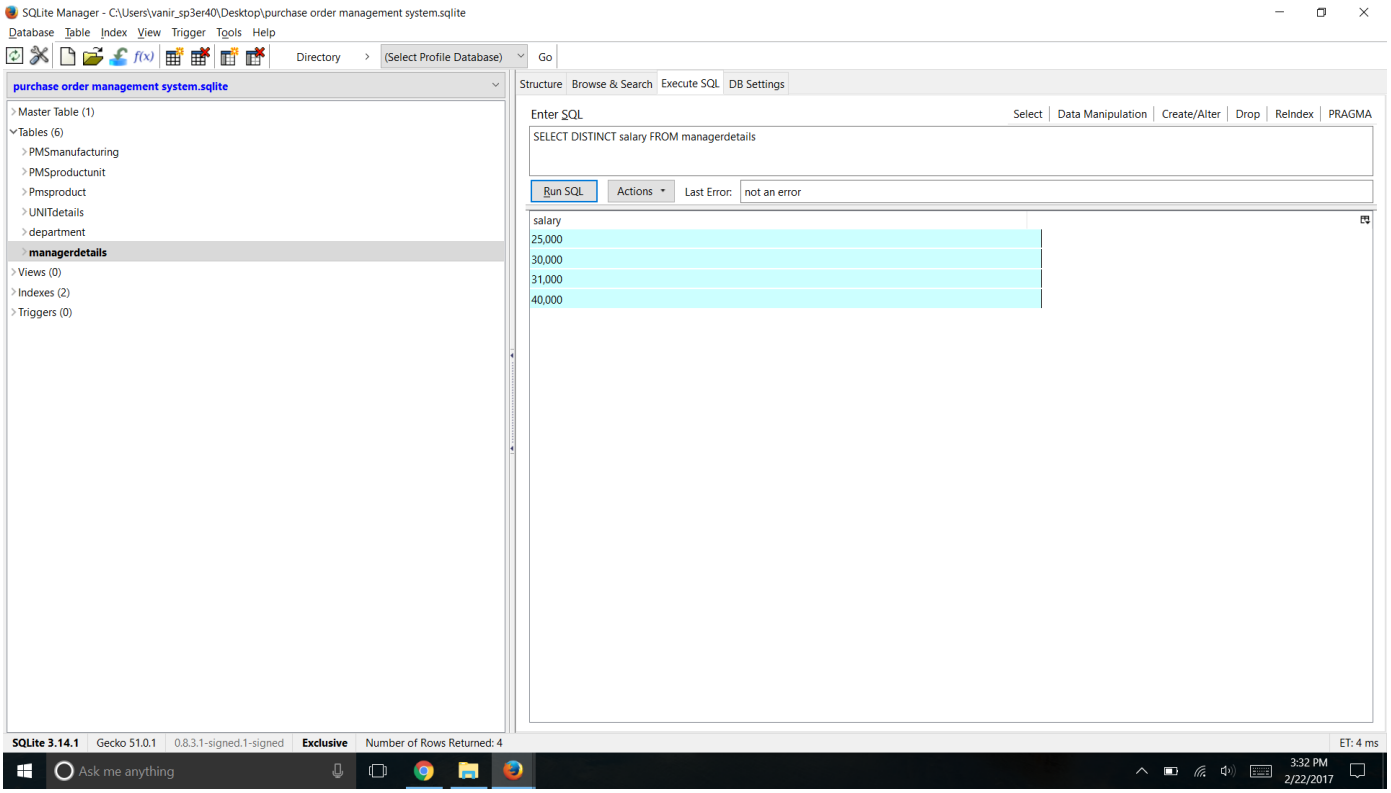


7. Finding sum of values added in a particular column using the SQL query



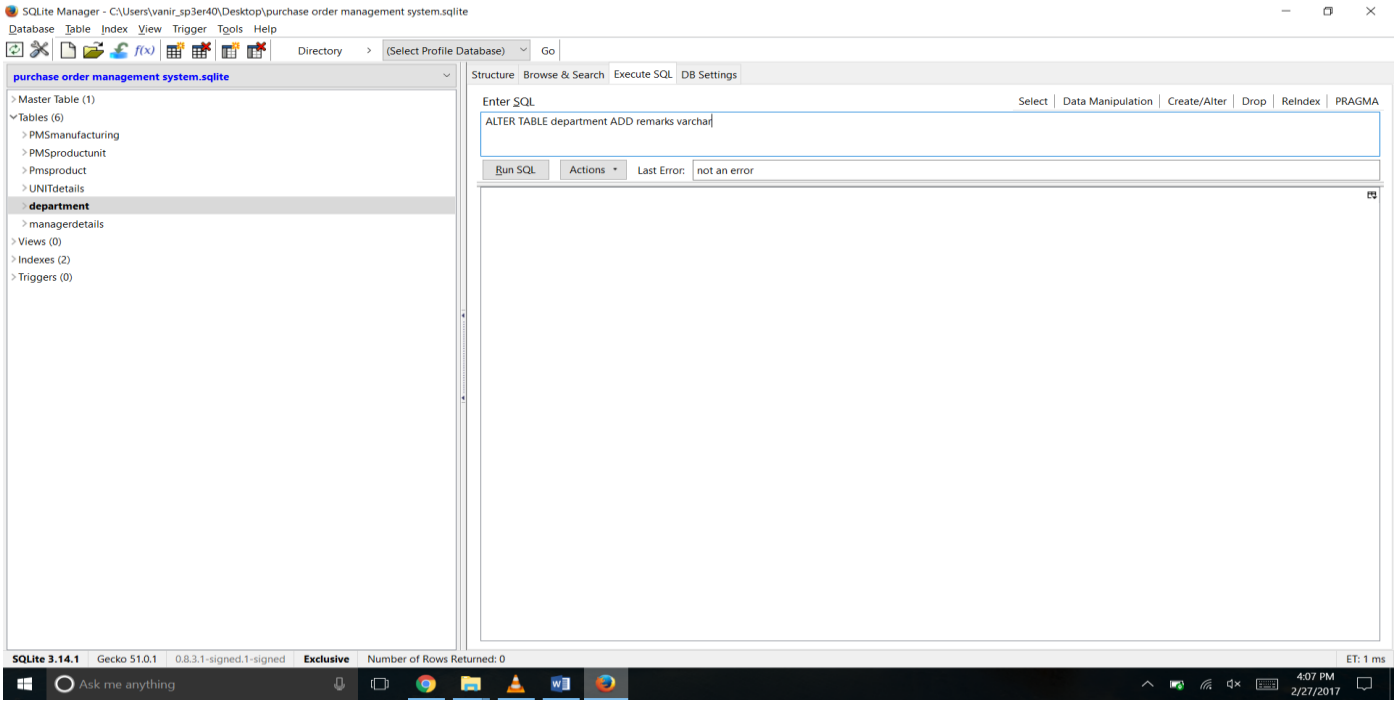
8. Selecting distinct value from the entries made in the table using query

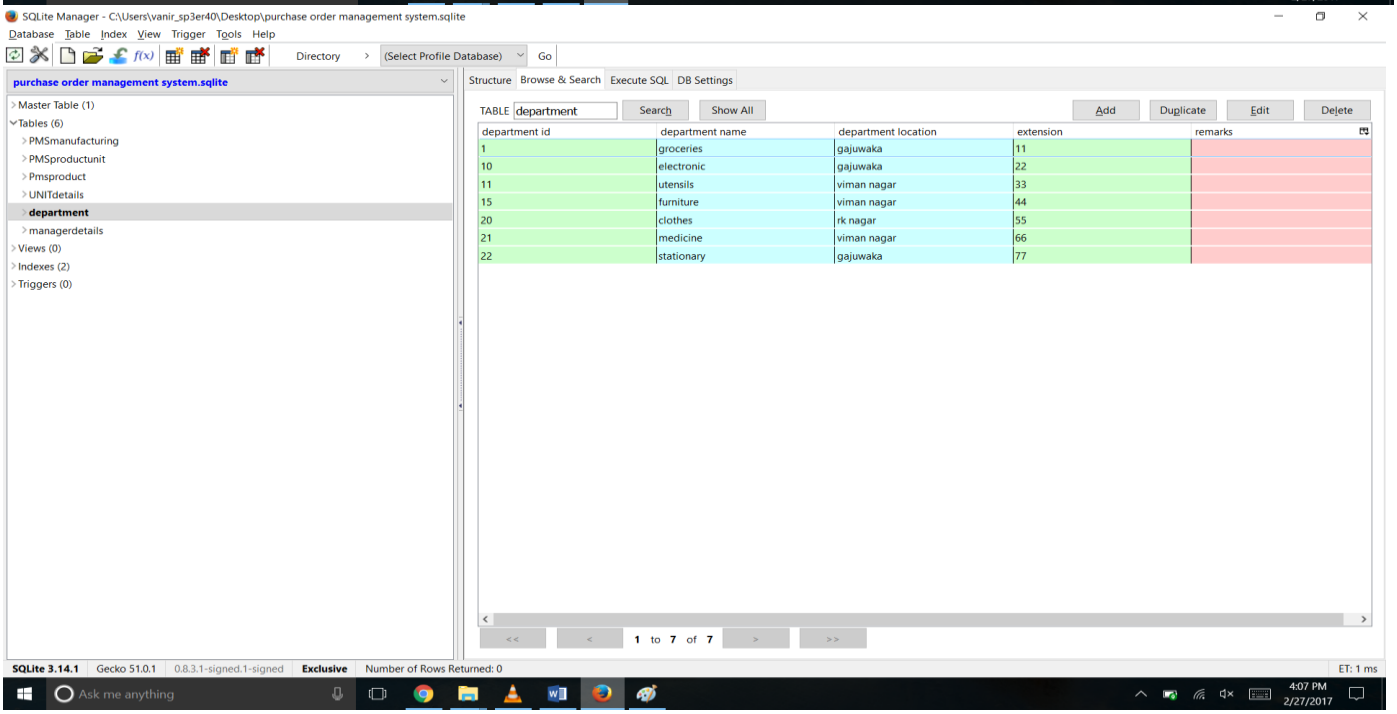
SELECT DISTINCT value FROM table name



9. Adding a column to a table in the database

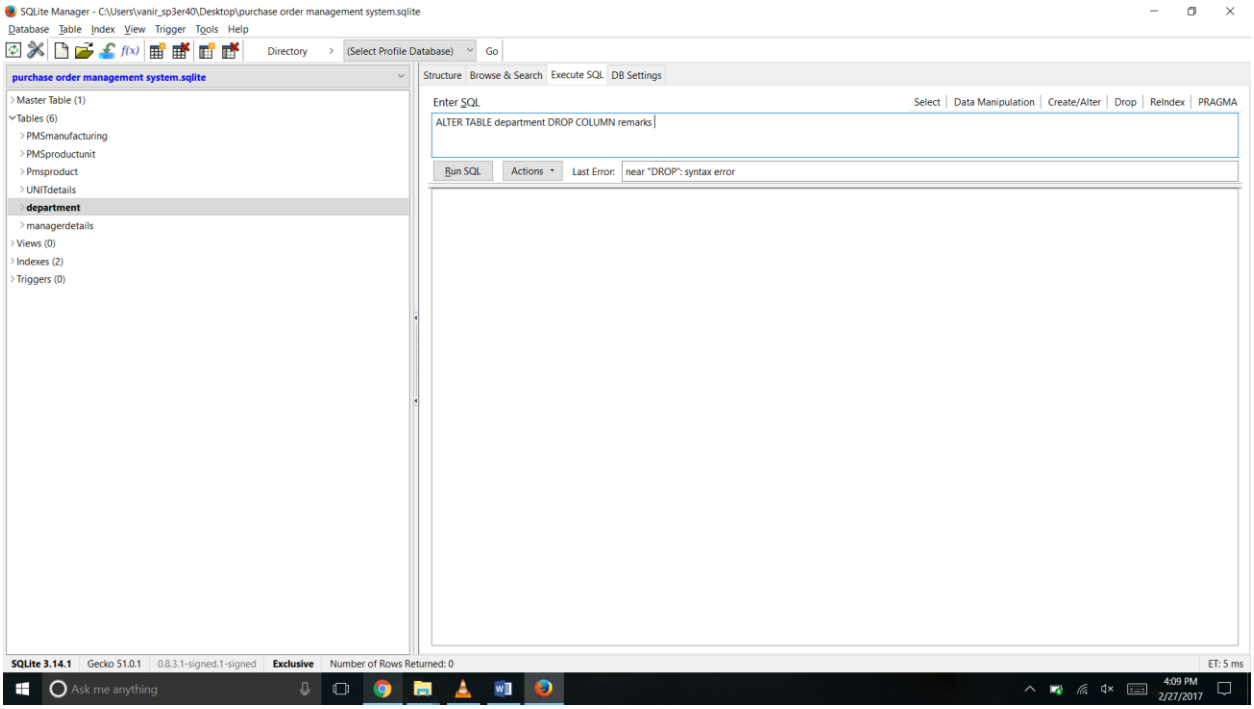
ALTER TABLE <table name> ADD <column name > <type>

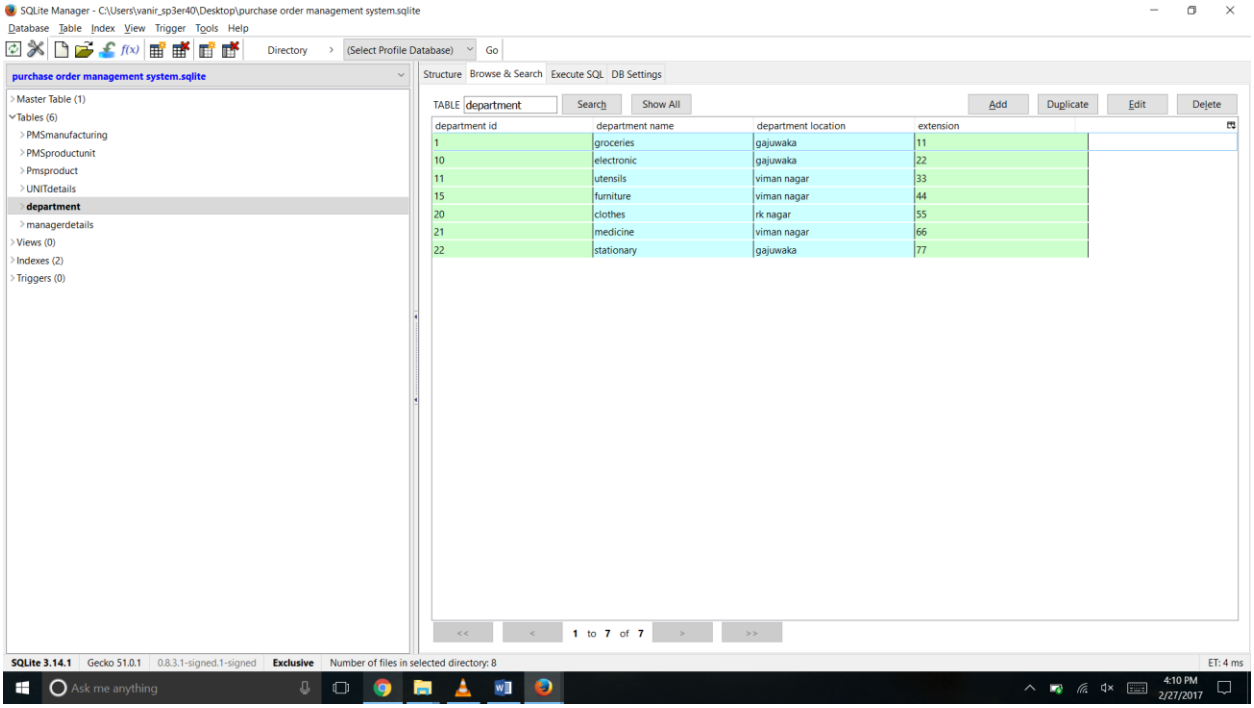




10. Removing a column from the table

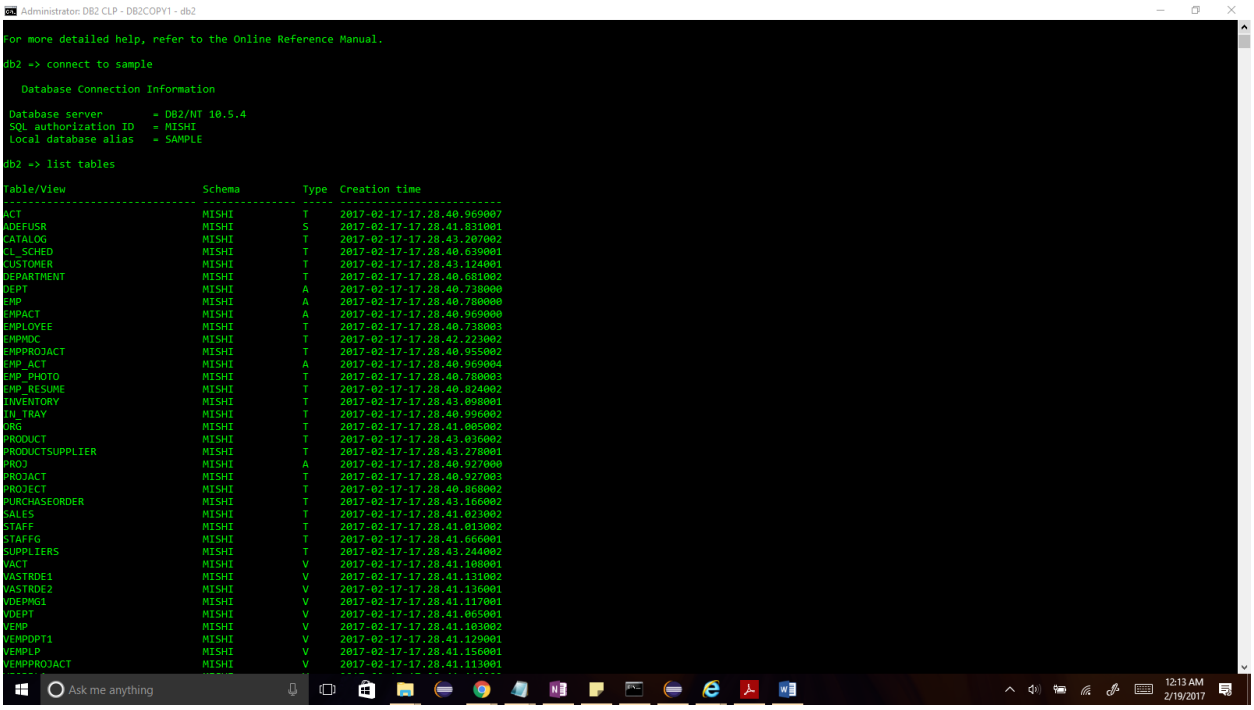
ALTER TABLE <table> name DROP COLUMN <column name>



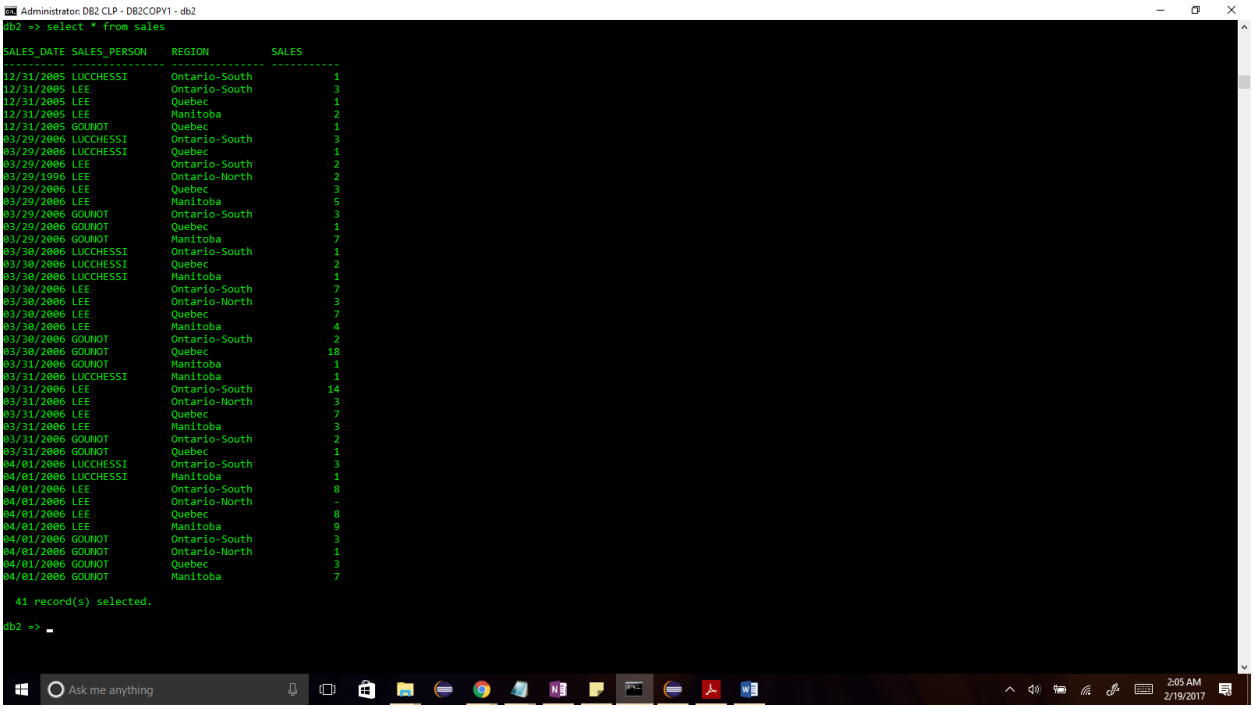


DB2 Express C

1. **We will create a sample database of DB2.**



```
Administrator: DB2 CLP - DB2COPY1 - db2

For more detailed help, refer to the Online Reference Manual.

db2 => connect to sample

   Database Connection Information

 Database server        = DB2/NT 10.5.4
 SQL authorization ID   = MISHI
 Local database alias   = SAMPLE

db2 => list tables

Table/View                      Schema          Type  Creation time
------------------------------- --------------- ----- --------------------------
ACT                             MISHI           T     2017-02-17-17.28.40.969007
ADEFUSR                         MISHI           S     2017-02-17-17.28.41.831001
CATALOG                         MISHI           T     2017-02-17-17.28.43.207002
CL_SCHED                        MISHI           T     2017-02-17-17.28.40.639001
CUSTOMER                        MISHI           T     2017-02-17-17.28.43.124001
DEPARTMENT                      MISHI           T     2017-02-17-17.28.40.681002
DEPT                            MISHI           A     2017-02-17-17.28.40.738000
EMP                             MISHI           A     2017-02-17-17.28.40.780000
EMPACT                          MISHI           A     2017-02-17-17.28.40.969000
EMPLOYEE                        MISHI           T     2017-02-17-17.28.40.738003
EMPMDC                          MISHI           T     2017-02-17-17.28.42.223002
EMPPROJACT                      MISHI           T     2017-02-17-17.28.40.955002
EMP_ACT                         MISHI           A     2017-02-17-17.28.40.969004
EMP_PHOTO                       MISHI           T     2017-02-17-17.28.40.780003
EMP_RESUME                      MISHI           T     2017-02-17-17.28.40.824002
INVENTORY                       MISHI           T     2017-02-17-17.28.43.098001
IN_TRAY                         MISHI           T     2017-02-17-17.28.40.996002
ORG                             MISHI           T     2017-02-17-17.28.41.005002
PRODUCT                         MISHI           T     2017-02-17-17.28.43.036002
PRODUCTSUPPLIER                 MISHI           T     2017-02-17-17.28.43.278001
PROJ                            MISHI           A     2017-02-17-17.28.40.927000
PROJACT                         MISHI           T     2017-02-17-17.28.40.927003
PROJECT                         MISHI           T     2017-02-17-17.28.40.868002
PURCHASEORDER                   MISHI           T     2017-02-17-17.28.43.166002
SALES                           MISHI           T     2017-02-17-17.28.41.023002
STAFF                           MISHI           T     2017-02-17-17.28.41.013002
STAFFG                          MISHI           T     2017-02-17-17.28.41.666001
SUPPLIERS                       MISHI           T     2017-02-17-17.28.43.244002
VACT                            MISHI           V     2017-02-17-17.28.41.108001
VASTRDE1                        MISHI           V     2017-02-17-17.28.41.131002
VASTRDE2                        MISHI           V     2017-02-17-17.28.41.136001
VDEPMG1                         MISHI           V     2017-02-17-17.28.41.117001
VDEPT                           MISHI           V     2017-02-17-17.28.41.065001
VEMP                            MISHI           V     2017-02-17-17.28.41.103002
VEMPDPT1                        MISHI           V     2017-02-17-17.28.41.129001
VEMPLP                          MISHI           V     2017-02-17-17.28.41.156001
VEMPPROJACT                     MISHI           V     2017-02-17-17.28.41.113001
```



```
Administrator: DB2 CLP - DB2COPY1 - db2
db2 => select * from sales

SALES_DATE SALES_PERSON    REGION          SALES
---------- --------------- --------------- -----
12/31/2005 LUCCHESSI       Ontario-South       1
12/31/2005 LEE             Ontario-South       3
12/31/2005 LEE             Quebec              1
12/31/2005 LEE             Manitoba            2
12/31/2005 GOUNOT          Quebec              1
03/29/2006 LUCCHESSI       Ontario-South       3
03/29/2006 LUCCHESSI       Quebec              1
03/29/2006 LEE             Ontario-South       2
03/29/1996 LEE             Ontario-North       2
03/29/2006 LEE             Quebec              3
03/29/2006 LEE             Manitoba            5
03/29/2006 GOUNOT          Ontario-South       3
03/29/2006 GOUNOT          Quebec              1
03/29/2006 GOUNOT          Manitoba            7
03/30/2006 LUCCHESSI       Ontario-South       1
03/30/2006 LUCCHESSI       Quebec              2
03/30/2006 LUCCHESSI       Manitoba            1
03/30/2006 LEE             Ontario-South       7
03/30/2006 LEE             Ontario-North       3
03/30/2006 LEE             Quebec              7
03/30/2006 LEE             Manitoba            4
03/30/2006 GOUNOT          Ontario-South       2
03/30/2006 GOUNOT          Quebec             18
03/31/2006 GOUNOT          Manitoba            1
03/31/2006 LUCCHESSI       Manitoba            1
03/31/2006 LEE             Ontario-South      14
03/31/2006 LEE             Ontario-North       3
03/31/2006 LEE             Quebec              7
03/31/2006 LEE             Manitoba            3
03/31/2006 GOUNOT          Ontario-South       2
03/31/2006 GOUNOT          Quebec              1
04/01/2006 LUCCHESSI       Ontario-South       3
04/01/2006 LUCCHESSI       Manitoba            1
04/01/2006 LEE             Ontario-South       8
04/01/2006 LEE             Ontario-North       -
04/01/2006 LEE             Quebec              8
04/01/2006 LEE             Manitoba            9
04/01/2006 GOUNOT          Ontario-South       3
04/01/2006 GOUNOT          Ontario-North       1
04/01/2006 GOUNOT          Quebec              3
04/01/2006 GOUNOT          Manitoba            7

  41 record(s) selected.

db2 =>
```

2. **A sample query using where clause and group by clause**

Administrator: DB2 CLP - DB2COPY1 - db2

```
  36 record(s) selected.

db2 => SELECT WEEK(SALES_DATE) AS WEEK, DAYOFWEEK(SALES_DATE) AS DAY_WEEK, SALES_PERSON,SALES AS UNITS_SOLD FROM SALES WHERE WEEK(SALES_DATE) = 13

WEEK        DAY_WEEK    SALES_PERSON    UNITS_SOLD
----------- ----------- --------------- -----------
         13           4 LUCCHESSI                 3
         13           4 LUCCHESSI                 1
         13           4 LEE                       2
         13           6 LEE                       2
         13           4 LEE                       3
         13           4 LEE                       5
         13           4 GOUNOT                    3
         13           4 GOUNOT                    1
         13           4 GOUNOT                    7
         13           5 LUCCHESSI                 1
         13           5 LUCCHESSI                 2
         13           5 LUCCHESSI                 1
         13           5 LEE                       7
         13           5 LEE                       3
         13           5 LEE                       7
         13           5 LEE                       4
         13           5 GOUNOT                    2
         13           5 GOUNOT                   18
         13           6 GOUNOT                    1
         13           6 LUCCHESSI                 1
         13           6 LEE                      14
         13           6 LEE                       3
         13           6 LEE                       7
         13           6 LEE                       3
         13           6 GOUNOT                    2
         13           6 GOUNOT                    1
         13           7 LUCCHESSI                 3
         13           7 LUCCHESSI                 1
         13           7 LEE                       8
         13           7 LEE                       -
         13           7 LEE                       8
         13           7 LEE                       9
         13           7 GOUNOT                    3
         13           7 GOUNOT                    1
         13           7 GOUNOT                    3
         13           7 GOUNOT                    7

  36 record(s) selected.

db2 => _
```

Administrator: DB2 CLP - DB2COPY1 - db2

```
         13           4 GOUNOT                    7
         13           5 LUCCHESSI                 1
         13           5 LUCCHESSI                 2
         13           5 LUCCHESSI                 1
         13           5 LEE                       7
         13           5 LEE                       3
         13           5 LEE                       7
         13           5 LEE                       4
         13           5 GOUNOT                    2
         13           5 GOUNOT                   18
         13           6 GOUNOT                    1
         13           6 LUCCHESSI                 1
         13           6 LEE                      14
         13           6 LEE                       3
         13           6 LEE                       7
         13           6 LEE                       3
         13           6 GOUNOT                    2
         13           6 GOUNOT                    1
         13           7 LUCCHESSI                 3
         13           7 LUCCHESSI                 1
         13           7 LEE                       8
         13           7 LEE                       -
         13           7 LEE                       8
         13           7 LEE                       9
         13           7 GOUNOT                    3
         13           7 GOUNOT                    1
         13           7 GOUNOT                    3
         13           7 GOUNOT                    7

  36 record(s) selected.

db2 => SELECT WEEK(SALES_DATE) AS WEEK, DAYOFWEEK(SALES_DATE) AS DAY_WEEK, SALES_PERSON, SUM(SALES) AS UNITS_SOLD FROM SALES WHERE WEEK(SALES_DATE) = 13 GROUP BY WEEK(SALES_DATE), DAYOFWEEK(SALES_D
ATE), SALES_PERSON ORDER BY WEEK, DAY_WEEK, SALES_PERSON

WEEK        DAY_WEEK    SALES_PERSON    UNITS_SOLD
----------- ----------- --------------- -----------
         13           4 GOUNOT                   11
         13           4 LEE                      10
         13           4 LUCCHESSI                 4
         13           5 GOUNOT                   20
         13           5 LEE                      21
         13           5 LUCCHESSI                 4
         13           6 GOUNOT                    4
         13           6 LEE                      29
         13           6 LUCCHESSI                 1
         13           7 GOUNOT                   14
         13           7 LEE                      25
         13           7 LUCCHESSI                 4

  12 record(s) selected.

db2 => _
```

```
Administrator: DB2 CLP - DB2COPY1
L_VALUE       DOUBLE, FOREIGN KEY (EXPLAIN_REQUESTER, EXPLAIN_TIME, SOURCE_NAME, SOURCE_SCHEMA, SOURCE_VERSION, EXPLAIN_LEVEL, STMTNO, SECTNO, OPERATOR_ID) REFERENCES EXPLAIN_OPERATOR ON DELETE CASC
ADE) ORGANIZE BY ROW
DB20000I  The SQL command completed successfully.

COMMIT WORK
DB20000I  The SQL command completed successfully.


C:\Program Files (x86)\IBM\SQLLIB\MISC>db2 -tvf D:\test.sql
select week(Sales_date) as week, dayofweek(sales_date) as day_week, sales_person,sum(sales) as units_sold from sales where week(sales_date) = 13 group by week(sales_date),dayofweek(sales_date), sal
es_person order by week, day_week, sales_person
SQL0217W  The statement was not executed as only Explain information requests
are being processed.  SQLSTATE=01604


C:\Program Files (x86)\IBM\SQLLIB\MISC>db2 set current explain mode no
DB20000I  The SQL command completed successfully.

C:\Program Files (x86)\IBM\SQLLIB\MISC>db2exfmt -d sample -1 -o D:\test1.sql.exfmt
DB2 Universal Database Version 10.5, 5622-044 (c) Copyright IBM Corp. 1991, 2012
Licensed Material - Program Property of IBM
IBM DATABASE 2 Explain Table Format Tool

Connecting to the Database.
Connect to Database Successful.
Binding package - Bind was Successful
Output is in D:\test1.sql.exfmt.
Executing Connect Reset -- Connect Reset was Successful.

C:\Program Files (x86)\IBM\SQLLIB\MISC>start notepad D:\test1.sql.exfmt

C:\Program Files (x86)\IBM\SQLLIB\MISC>
```

3. **Query and exfmt**

Query

```
SELECT WEEK(SALES_DATE) AS WEEK, DAYOFWEEK(SALES_DATE) AS DAY_WEEK, SUM(SALES) AS UNITS_SOLD FROM SALES
 GROUP BY ROLLUP (WEEK(SALES_DATE), DAYOFWEEK(SALES_DATE)) ORDER BY WEEK, DAY_WEEK
```

Snapshot

```
test1.sql - Notepad
File  Edit  Format  View  Help
DB2 Universal Database Version 10.5, 5622-044 (c) Copyright IBM Corp. 1991, 2012
Licensed Material - Program Property of IBM
IBM DATABASE 2 Explain Table Format Tool



******************** EXPLAIN INSTANCE ********************

DB2_VERSION:       10.05.4
FORMATTED ON DB:   SAMPLE
SOURCE_NAME:       SQLC2K26
SOURCE_SCHEMA:     NULLID
SOURCE_VERSION:
EXPLAIN_TIME:      2017-02-19-02.27.12.420000
EXPLAIN_REQUESTER: MISHI

Database Context:
----------------
            Parallelism:         None
            CPU Speed:           1.417033e-007
            Comm Speed:          0
            Buffer Pool size:    250
            Sort Heap size:      256
            Database Heap size:  600
            Lock List size:      4096
            Maximum Lock List:   22
            Average Applications: 1
            Locks Available:     28835

Package Context:
----------------
            SQL Type:            Dynamic
            Optimization Level: 5
            Blocking:            Block All Cursors
            Isolation Level:     Cursor Stability



---------------- STATEMENT 1  SECTION 201 ----------------
            QUERYNO:       32
            QUERYTAG:      CLP
            Statement Type:  Select
```

test1.sql - Notepad

File Edit Format View Help

```
            Updatable:      No
            Deletable:      No
            Query Degree:    1

Original Statement:
------------------
select
  week(Sales_date) as week,
  dayofweek(sales_date) as day_week,
  sales_person,
  sum(sales) as units_sold
from
  sales
where
  week(sales_date) = 13
group by
  week(sales_date),
  dayofweek(sales_date),
  sales_person
order by
  week,
  day_week,
  sales_person


Optimized Statement:
-------------------
SELECT
  Q3.$C3 AS "WEEK",
  Q3.$C2 AS "DAY_WEEK",
  Q3.SALES_PERSON AS "SALES_PERSON",
  Q3.$C1 AS "UNITS_SOLD"
FROM
  (SELECT
     Q2.SALES_PERSON,
     SUM(Q2.SALES),
     Q2.$C2,
     Q2.$C1
   FROM
     (SELECT
        Q1.SALES_PERSON,
        "SYSFUN "."WEEK"(Q1.SALES_DATE),
```

Ask me anything 2:34 AM 2/19/2017

test1.sql - Notepad

File Edit Format View Help

```
                    ------------
                    +Q1.$RID$+Q1.SALES+Q1.SALES_PERSON
                    +Q1.SALES_DATE


            Output Streams:
            --------------
                2) To Operator #4

                    Estimated number of rows:    0.788462
                    Number of columns:                  4
                    Subquery predicate ID:        Not Applicable

                    Column Names:
                    ------------
                    +Q2.SALES+Q2.$C2+Q2.$C1+Q2.SALES_PERSON


Objects Used in Access Plan:
---------------------------

        Schema: MISHI
        Name:   SALES
        Type:   Table
                Time of creation:             2017-02-17-17.28.41.023002
                Last statistics update:       2017-02-18-22.38.18.197000
                Number of columns:                  4
                Number of rows:               41
                Width of rows:                      34
                Number of buffer pool pages:        1
                Number of data partitions:    1
                Distinct row values:                No
                Tablespace name:              USERSPACE1
                Tablespace overhead:                6.725000
                Tablespace transfer rate:     0.080000
                Source for statistics:              Single Node
                Prefetch page count:                32
                Container extent page count:        32
                Table overflow record count:  0
                Table Active Blocks:                -1
                Average Row Compression Ratio:      0
                Percentage Rows Compressed:         0
```

Ask me anything 2:35 AM 2/19/2017

IBM Graph

Graph Data store

- Sign up for IBM Bluemix at www.bluemix.net (Links to an external site.)
- Navigate the catalog for Data and Analytics section
- Click on IBM Graph service, create the service and follow the documentation to create a sample graph application using the API documentation: https://ibm-graph-docs.ng.bluemix.net/api.html (Links to an external site.)

According to IBM Bluemix website:

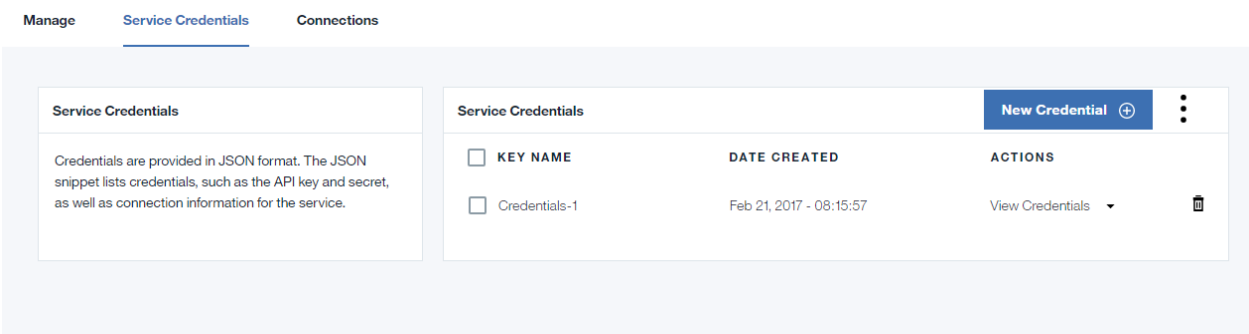
"IBM Graph is an easy-to-use, fully managed graph database service for storing and querying data points, their connections, and properties. IBM Graph offers an Apache TinkerPop3 compatible API and plugs into your Bluemix application seamlessly. This service can be used for building recommendation engines, analyzing social networks, and fraud detection."

The idea is to create object nodes for everything, which pertains some properties, be it a person, an organization, a place etc. represented as Vertices and the relationship between these vertices are called Edges which also exhibit some properties.

In the following document, we will see systematic instructions for creating a sample Graph database using POSTMAN, and IBM BLUEMIX GRAPH Service.

Pre-Requirements: POSTMAN desktop app, internet connection.

Signup on Bluemix, and search for IBM Graph service. Open "Service Credentials" and note the values.




```
{
 "apiURL": "https://ibmgraph-alpha.ng.bluemix.net/dbecc80a-ed8f-4901-86dd-71d60ade8237/g",
 "username": "c3b54935-38f4-4042-9419-33fe8382b392",
 "apiURI": "https://ibmgraph-alpha.ng.bluemix.net/dbecc80a-ed8f-4901-86dd-71d60ade8237",
 "password": "559af5fb-e45a-45f8-9b26-c12c93ecf9cf"
}
```

Now on POSTMAN , execute the following commands:

1. **Get gds-token**

URL: https://ibmgraph-alpha.ng.bluemix.net/dbecc80a-ed8f-4901-86dd-71d60ade8237/_session

Method: GET

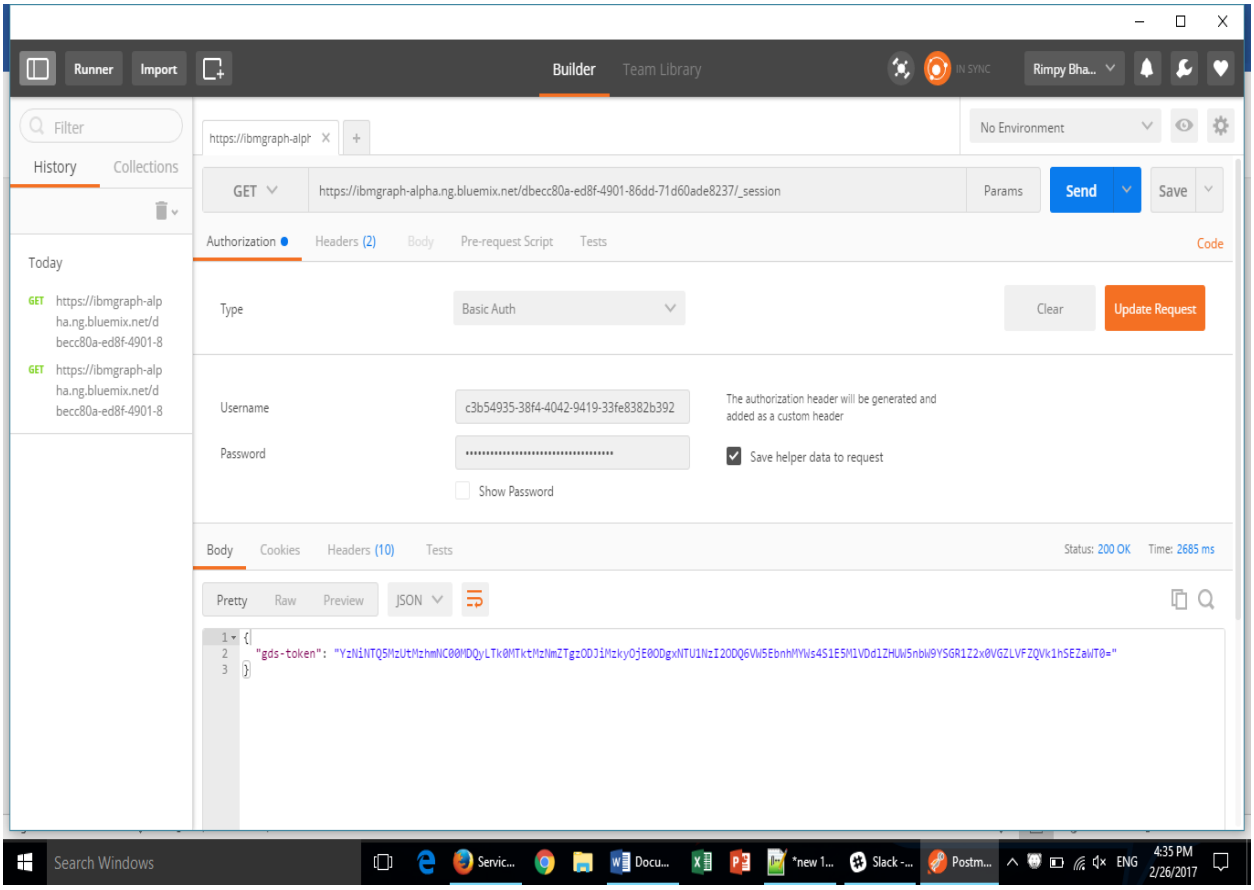
Status : 200 OK

Response:

{

"gds-token":
"YzNiNTQ5MzUtMzhmNC00MDQyLTk0MTktMzNmZTgzODJiMzkyOjE0ODgxNTU1NzI2ODQ6VW5EbnhMYWs4S1E5MlVDdlZHUW5nbW9YSGR1Z2x0VGZLVFZQVk1hSEZaWT0="

}



2. Create a graph

URL: https://ibmgraph-alpha.ng.bluemix.net/dbecc80a-ed8f-4901-86dd-71d60ade8237/_graphs/bookgraph (where bookgraph is the name of the graph we wish to create)

Method: POST

Status: 201 Created

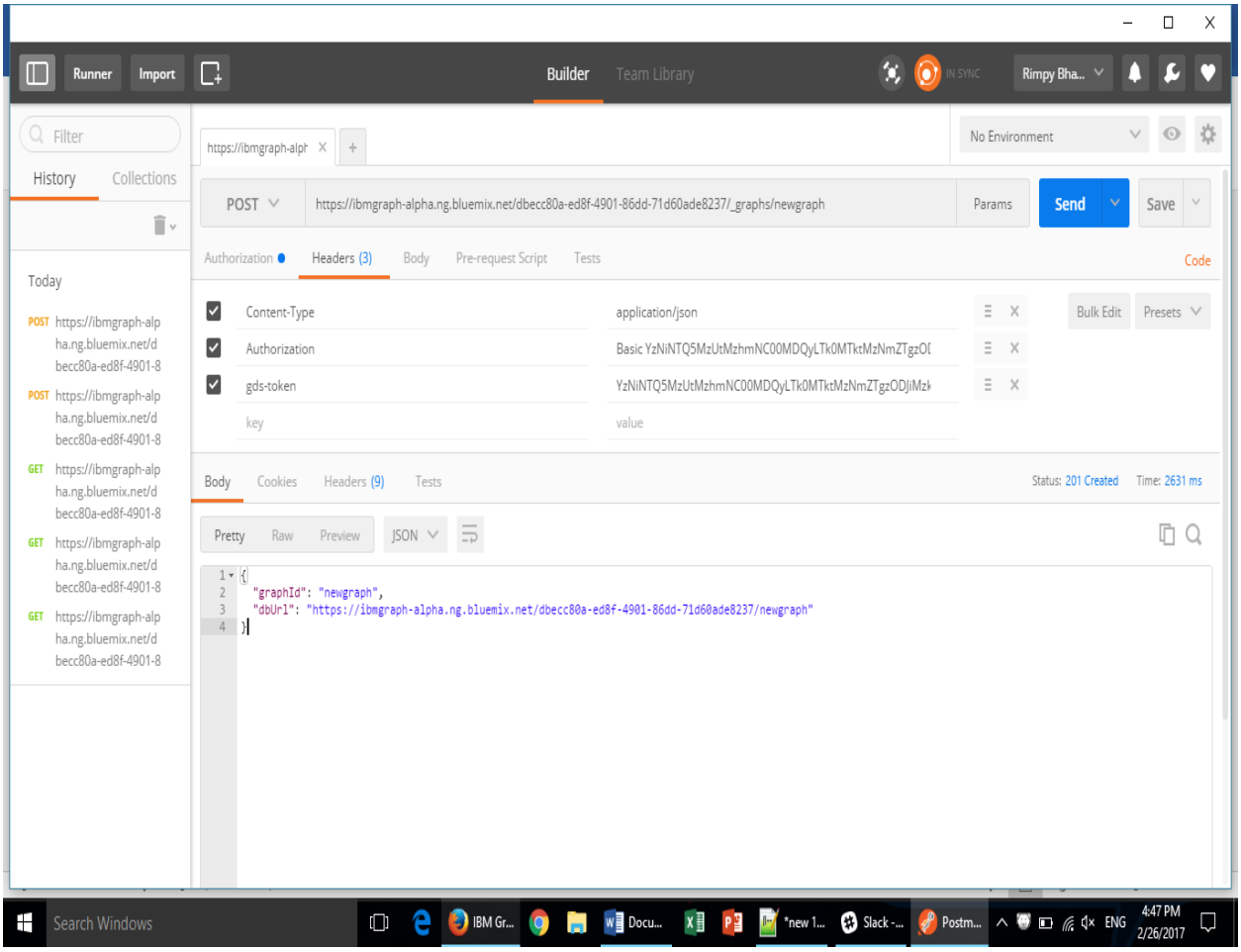
Response:

{

"graphId": "bookgraph",

"dbUrl": "https://ibmgraph-alpha.ng.bluemix.net/dbecc80a-ed8f-4901-86dd-71d60ade8237/bookgraph"

}



3. **Get properties of the new graph created**

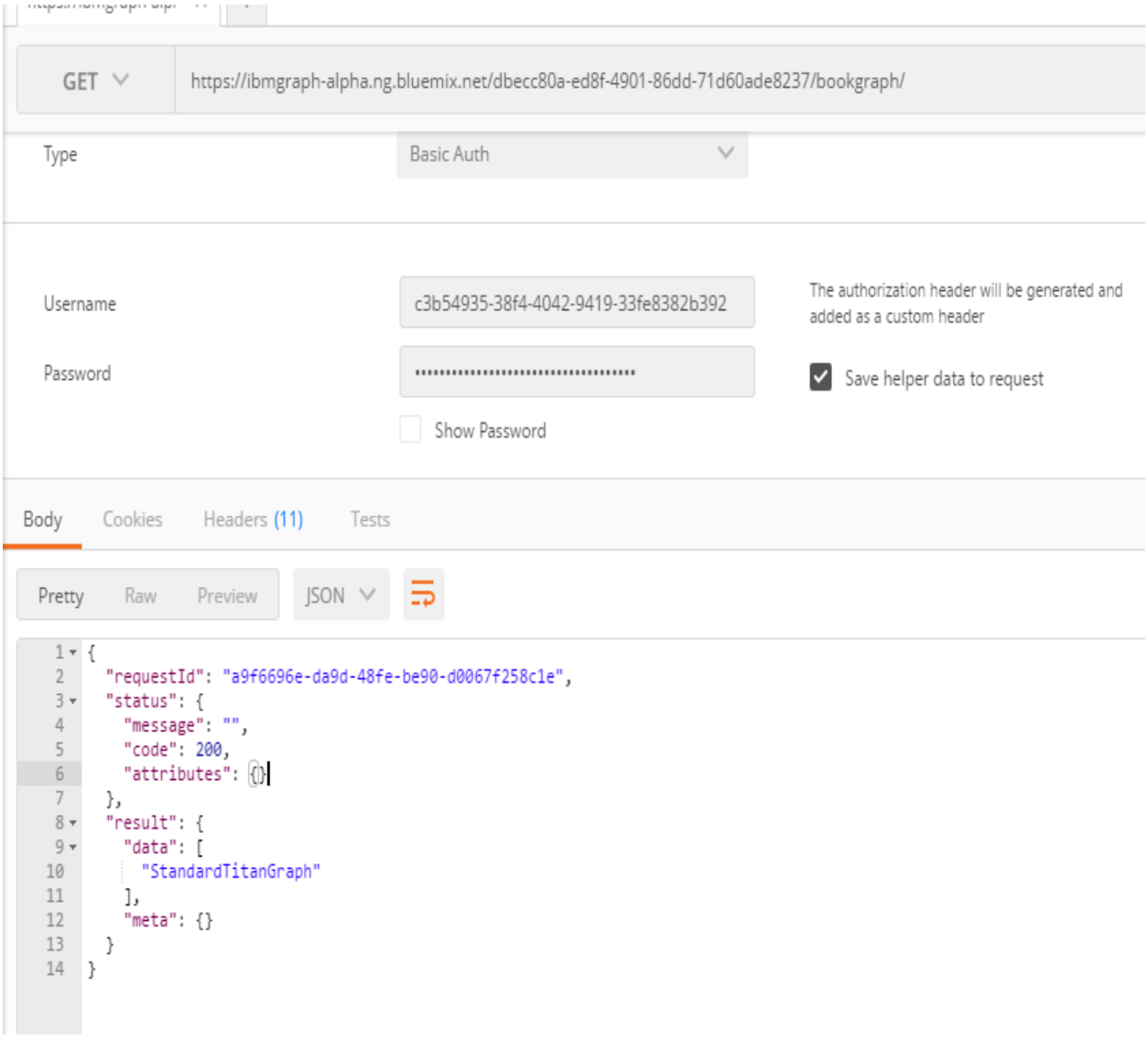
URL: https://ibmgraph-alpha.ng.bluemix.net/dbecc80a-ed8f-4901-86dd-71d60ade8237/bookgraph

Method: GET

Status: 200 OK

Response:

{ "requestId": "afbefa6b-f56b-4d4d-a2e2-95b5c1e7b4cf","status": { "message": "", "code": 200, "attributes": {} }, "result": { "data": ["StandardTitanGraph"], "meta": {} }}



4. Add Schema in POSTMAN

URL : https://ibmgraph-alpha.ng.bluemix.net/dbecc80a-ed8f-4901-86dd-71d60ade8237/bookgraph/schema

Method : POST

GET https://ibmgraph-alpha.ng.bluemix.net/dbecc80a-ed8f-4901-86dd-71d60ade8237/bookgraph/schema

Body Cookies Headers (11) Tests

Pretty Raw Preview JSON


```
{
  "requestId": "a1402a8f-6544-4566-86b2-1d27d4842ce8",
  "status": {
    "message": "",
    "code": 200,
    "attributes": {}
  },
  "result": {
    "data": [
      {
        "propertyKeys": [
          {
            "name": "authorName",
            "dataType": "String",
            "cardinality": "SINGLE"
          },
          {
            "name": "noOfBooksWritten",
            "dataType": "Integer",
            "cardinality": "SINGLE"
          },
          {
            "name": "avgRating",
            "dataType": "Float",
            "cardinality": "SINGLE"
          },
          {
            "name": "noOfStars",
            "dataType": "Integer",
            "cardinality": "SINGLE"
          },
```


5. Add vertices and edges in Bluemix using Gremlin queries

def v1 = graph.addVertex("name", "Mr. Salman Rushdie", label, "author", "noOfBooksWritten", 10);

def v2 = graph.addVertex("firstName", "Amreen", "lastName", "Wahab", label, "reader", "username", "amreenwahab","email", "amreenwahab@gmail.com");

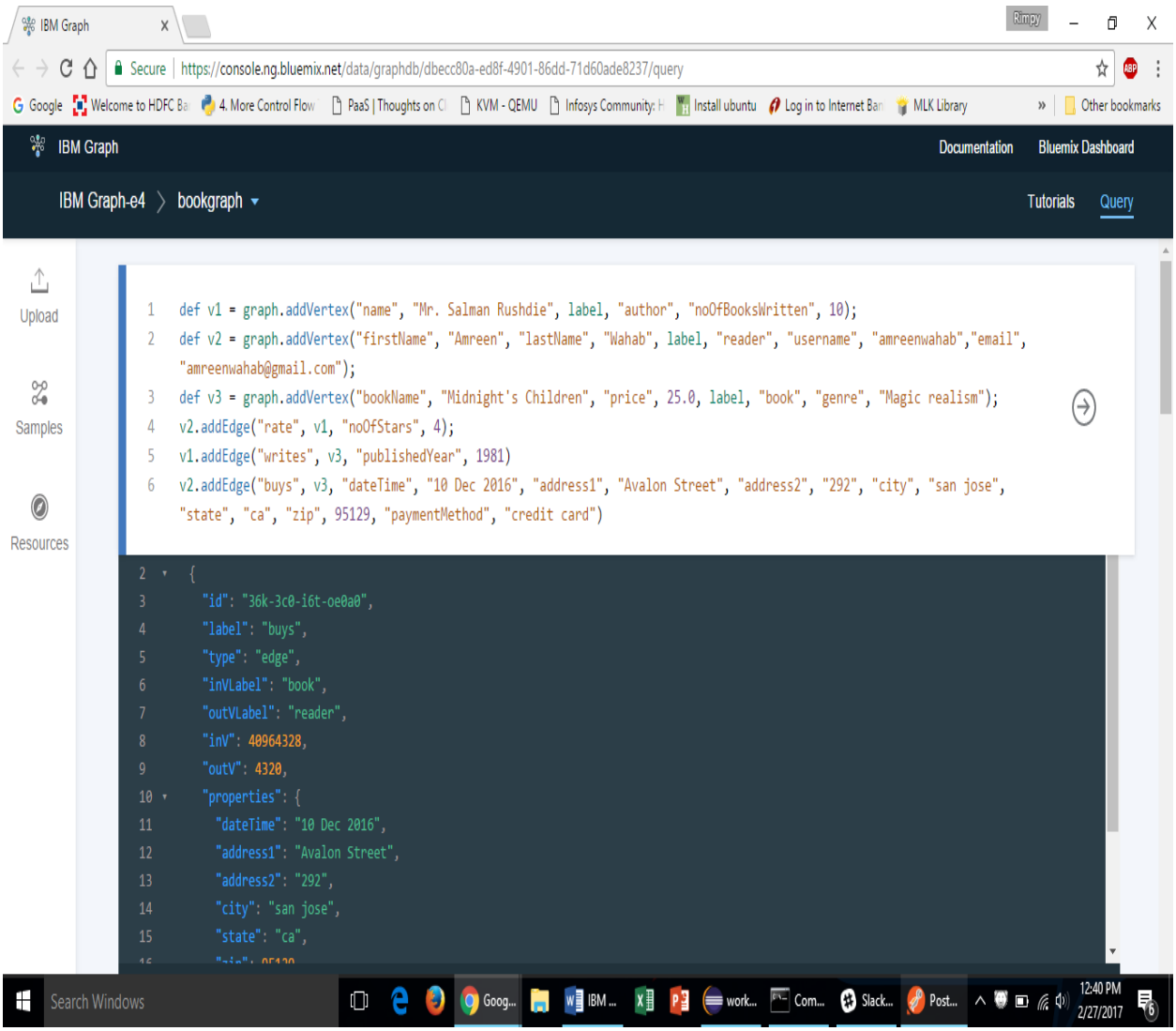
def v3 = graph.addVertex("bookName", "Midnight's Children", "price", 25.0, label, "book", "genre", "Magic realism");

v2.addEdge("rate", v1, "noOfStars", 4);

v1.addEdge("writes", v3, "publishedYear", 1981)

v2.addEdge("buys", v3, "dateTime", "10 Dec 2016", "address1", "Avalon Street", "address2", "292", "city", "san jose", "state", "ca", "zip", 95129, "paymentMethod", "credit card"

Response:



6. **Get books read by a user using their first name :**

def gt = graph.traversal();

gt.V().hasLabel("reader").has("firstName", "Rimpy").outE("buys").inV().hasLabel("book").path();

```
def gt = graph.traversal();
gt.V().hasLabel("reader").has("firstName", "Rimpy").outE("buys").inV().hasLabel("book").path();
```


```
[
  {
    "labels": [
      [],
      [],
      []
    ],
    "objects": [
      {
        "id": 4208,
        "label": "reader",
        "type": "vertex",
        "properties": {
          "firstName": [
            {
```


Filter: Label Type Properties

Vertices: 2

7. Find the author of book named “The Lost Symbol”

```
def gt = graph.traversal();
gt.V().hasLabel("book").has("bookName", "The Lost Sysmbol").inE("writes").outV().hasLabel("author").path();
```

Graph: **bookgraph**

```
def gt = graph.traversal();gt.V().hasLabel("book").has("bookName", "The Lost Sysmbol").inE("writes")
```


```
      {
        "id": 4120,
        "label": "author",
        "type": "vertex",
        "properties": {
          "name": [
            {
              "id": "16r-36g-27t1",
              "value": "Dan Brown"
            }
          ],
          "noOfBooksWritten": [
            {
              "id": "1kz-36g-dfp",
              "value": 15
            }
```


8. Find the author who has written the book read by a reader.

```
def gt = graph.traversal();
gt.V().hasLabel("reader").has("firstName", "Sahithi").outE("buys").inV().hasLabel("book").has("bookName", "The Lost Sysmbol").inE("writes").outV().hasLabel("author").path();
```

Graph: **bookgraph**

```
def gt = graph.traversal();gt.V().hasLabel("reader").has("firstName", "Sahithi").outE("buys").inV().
```


```
[
  {
    "labels": [
      [],
      [],
      [],
      [],
      []
    ],
    "objects": [
      {
        "id": 8216,
        "label": "reader",
        "type": "vertex",
        "properties": {
```


9. **Get the rating for the book “Sahithi” reads traversing through the author.**

```
def gt = graph.traversal();
gt.V().hasLabel("reader").has("firstName", "Sahithi").outE("buys").inV().hasLabel("book").has("bookName", "The Lost Sysmbol").inE("writes").outV().hasLabel("author").inE("rate").outV().hasLabel("reader").path();
```

Graph: **bookgraph**

```
def gt = graph.traversal();gt.V().hasLabel("reader").has("firstName", "Sahithi").outE("buys").inV().
```


```
[
  {
    "labels": [
      [],
      [],
      [],
      [],
      [],
      [],
      []
    ],
    "objects": [
      {
        "id": 8216,
        "label": "reader",
```


Conclusion:

Therefore, using IBM Bluemix, we can work on IBM graph using REST API’s and Gremlin queries. Graph databases are used in complex scenarios such as big data analysis, social media and continuously flowing information like stock etc. The node-oriented queries allow the data to be retrieved as indexes instead of the tabular manner of traditional RDBMS.A real time scenario example is credit card fraudulency, where the pattern can help us reach a point of start of abnormal (spike in purchases) activities.