CMPE 272

Database Assignment Team-14

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Kanika Gupta
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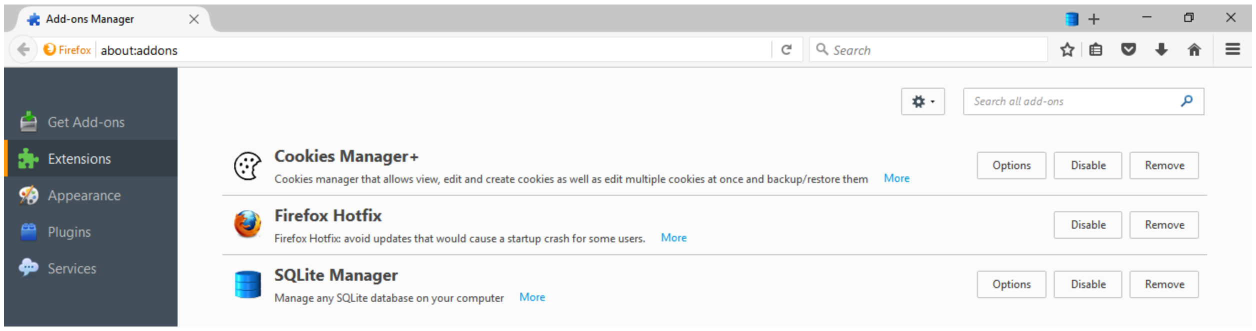
Swati Gupta

SQLite

1. Install SQLite Add-ons for Firefox

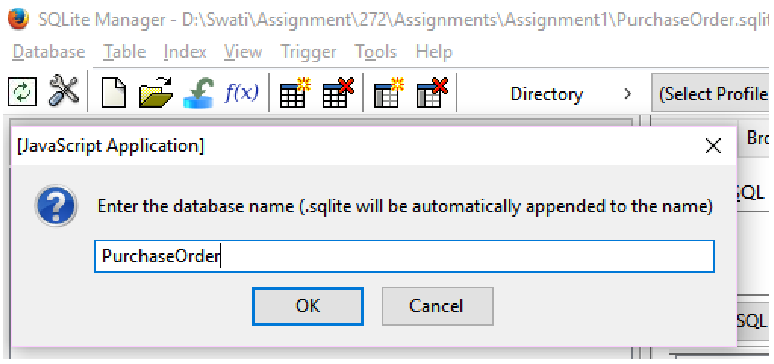


Cookies Manager+
Cookies manager that allows view, edit and create cookies as well as edit multiple cookies at once and backup/restore them More
Options Disable Remove

Firefox Hotfix
Firefox Hotfix: avoid updates that would cause a startup crash for some users. More
Disable Remove

SQLite Manager
Manage any SQLite database on your computer More
Options Disable Remove

2. Design a database for Purchase Order Management System


SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlit
Database Table Index View Trigger Tools Help
Directory
(Select Profile

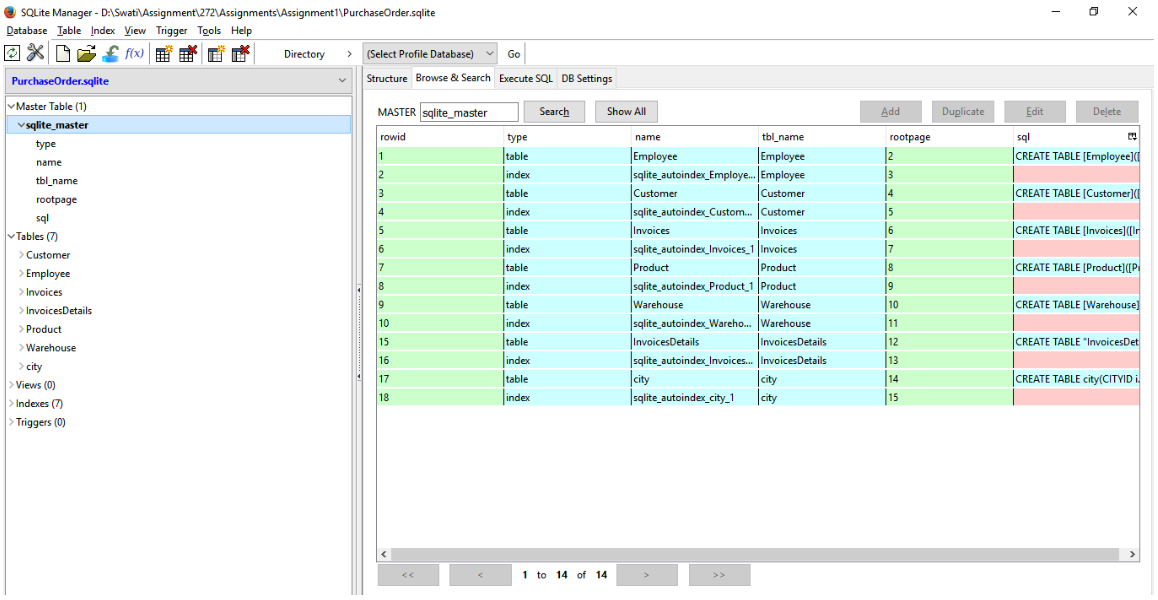
[JavaScript Application]

Enter the database name (.sqlite will be automatically appended to the name)

PurchaseOrder

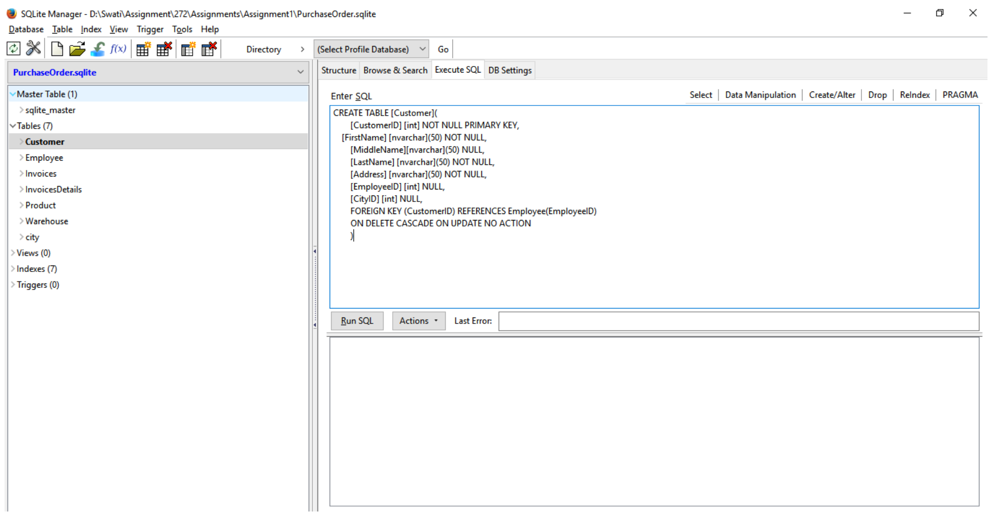
OK Cancel

3. Create a sample schema with necessary tables from previous step



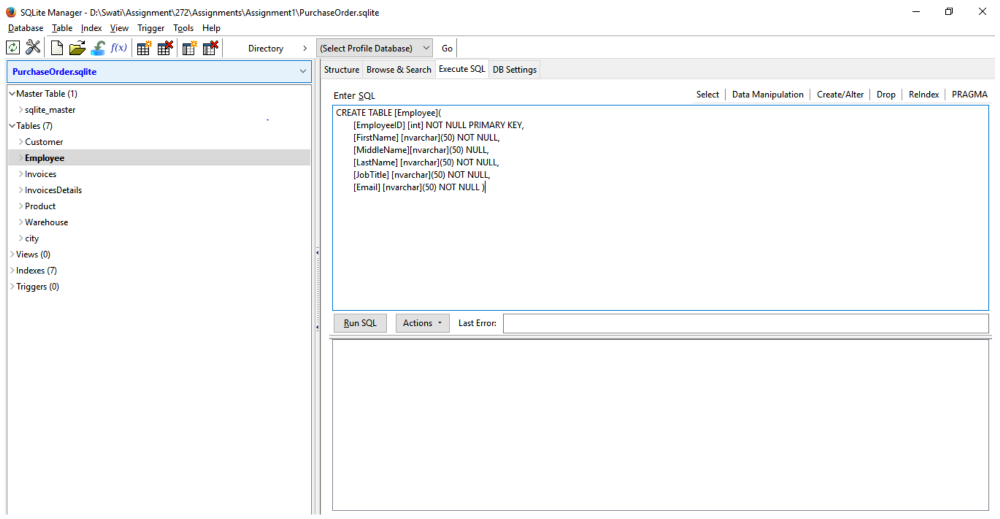
rowid	type	name	tbl_name	rootpage	sql
1	table	Employee	Employee	2	CREATE TABLE [Employee]([
2	index	sqlite_autoindex_Employe...	Employee	3	
3	table	Customer	Customer	4	CREATE TABLE [Customer]([
4	index	sqlite_autoindex_Custom...	Customer	5	
5	table	Invoices	Invoices	6	CREATE TABLE [Invoices]([In
6	index	sqlite_autoindex_Invoices_1	Invoices	7	
7	table	Product	Product	8	CREATE TABLE [Product]([P
8	index	sqlite_autoindex_Product_1	Product	9	
9	table	Warehouse	Warehouse	10	CREATE TABLE [Warehouse]
10	index	sqlite_autoindex_Wareho...	Warehouse	11	
15	table	InvoicesDetails	InvoicesDetails	12	CREATE TABLE "InvoicesDet
16	index	sqlite_autoindex_Invoices...	InvoicesDetails	13	
17	table	city	city	14	CREATE TABLE city(CITYID i.
18	index	sqlite_autoindex_city_1	city	15	

Customer Table:



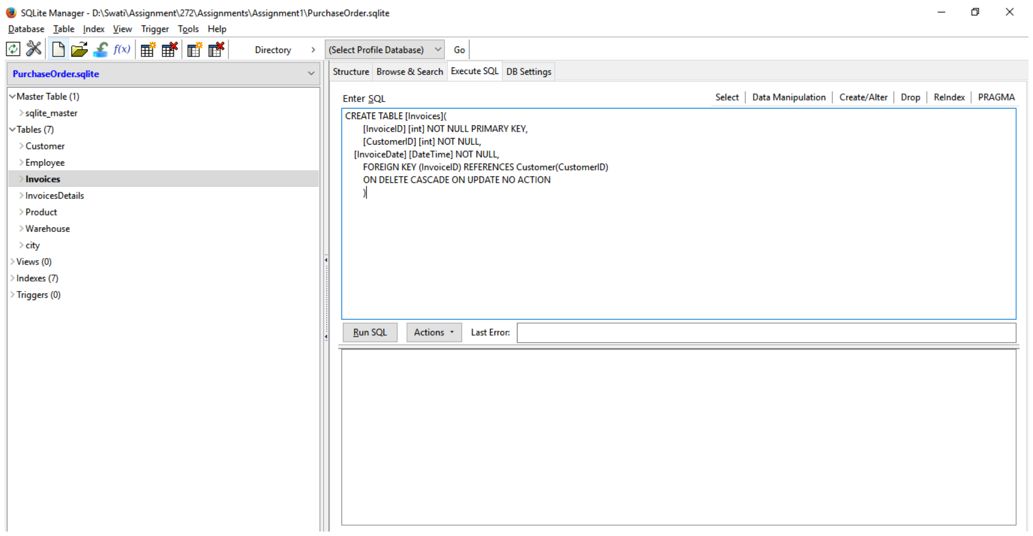
```
CREATE TABLE [Customer](
      [CustomerID] [int] NOT NULL PRIMARY KEY,
   [FirstName] [nvarchar](50) NOT NULL,
      [MiddleName][nvarchar](50) NULL,
      [LastName] [nvarchar](50) NOT NULL,
      [Address] [nvarchar](50) NOT NULL,
      [EmployeeID] [int] NULL,
      [CityID] [int] NULL,
      FOREIGN KEY (CustomerID) REFERENCES Employee(EmployeeID)
      ON DELETE CASCADE ON UPDATE NO ACTION
      )
```

Employee Table:



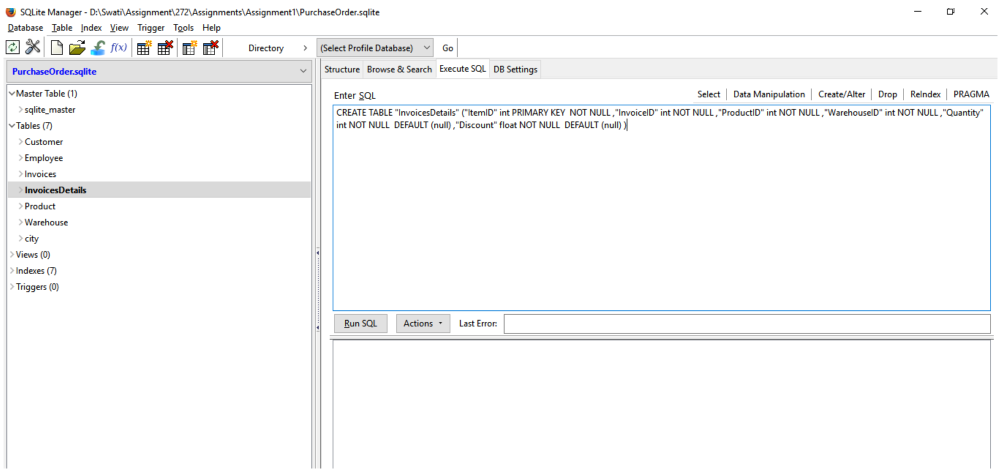
```
CREATE TABLE [Employee](
      [EmployeeID] [int] NOT NULL PRIMARY KEY,
      [FirstName] [nvarchar](50) NOT NULL,
      [MiddleName][nvarchar](50) NULL,
      [LastName] [nvarchar](50) NOT NULL,
      [JobTitle] [nvarchar](50) NOT NULL,
      [Email] [nvarchar](50) NOT NULL )
```

Invoices Table:



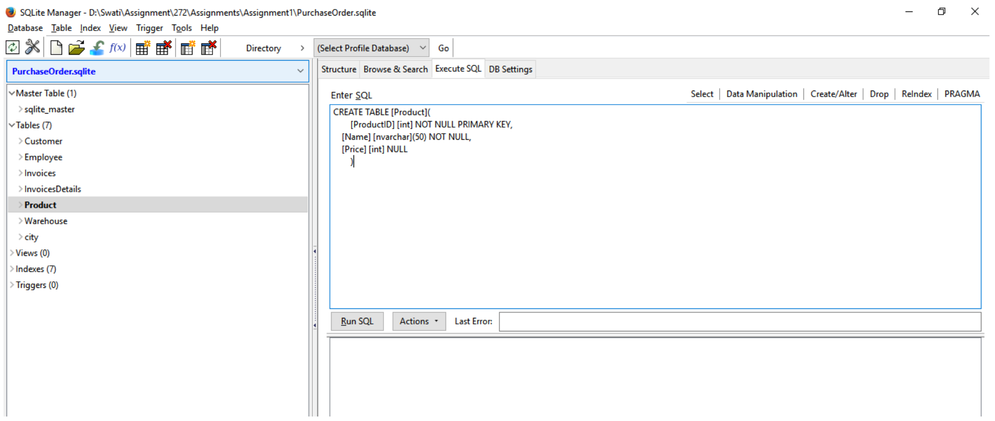
```
CREATE TABLE [Invoices](
      [InvoiceID] [int] NOT NULL PRIMARY KEY,
      [CustomerID] [int] NOT NULL,
   [InvoiceDate] [DateTime] NOT NULL,
      FOREIGN KEY (InvoiceID) REFERENCES Customer(CustomerID)
      ON DELETE CASCADE ON UPDATE NO ACTION
      )
```

InvoicesDetails Table:


SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlite
Database Table Index View Trigger Tools Help
Directory
(Select Profile Database)
Go
PurchaseOrder.sqlite
Structure Browse & Search Execute SQL DB Settings
Master Table (1)
sqlite_master
Tables (7)
Customer
Employee
Invoices
InvoicesDetails
Product
Warehouse
city
Views (0)
Indexes (7)
Triggers (0)
Enter SQL
Select | Data Manipulation | Create/Alter | Drop | ReIndex | PRAGMA
Run SQL
Actions
Last Error:

```
CREATE TABLE "InvoicesDetails" ("ItemID" int PRIMARY KEY  NOT NULL ,"InvoiceID" int NOT NULL ,"ProductID" int NOT NULL ,"WarehouseID" int NOT NULL ,"Quantity"
int NOT NULL  DEFAULT (null) ,"Discount" float NOT NULL  DEFAULT (null) )
```

Product Table:


SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlite
Database Table Index View Trigger Tools Help
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(Select Profile Database)
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PurchaseOrder.sqlite
Structure Browse & Search Execute SQL DB Settings
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sqlite_master
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Customer
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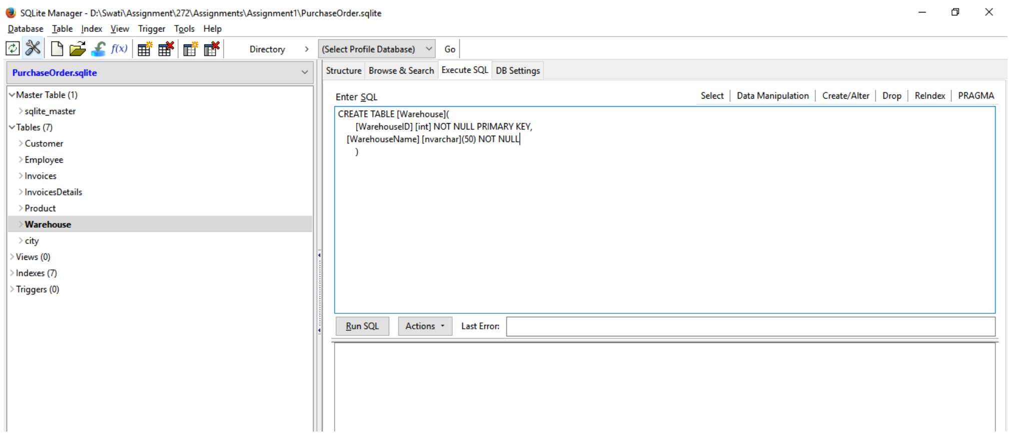
InvoicesDetails
Product
Warehouse
city
Views (0)
Indexes (7)
Triggers (0)
Enter SQL
Select | Data Manipulation | Create/Alter | Drop | ReIndex | PRAGMA
Run SQL
Actions
Last Error:

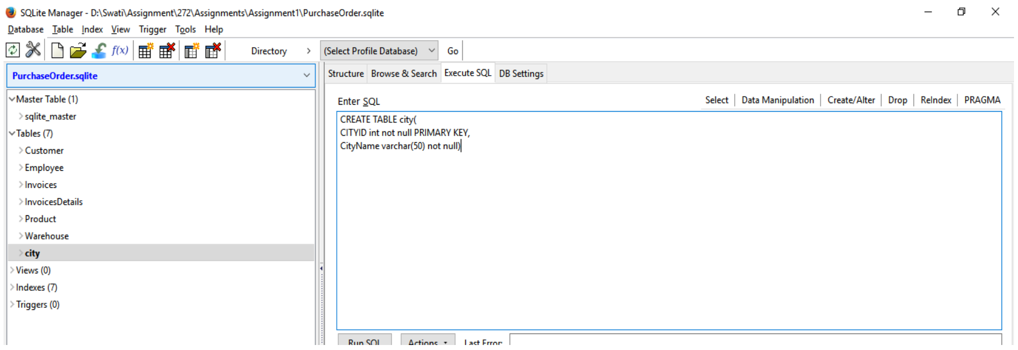
```
CREATE TABLE [Product](
      [ProductID] [int] NOT NULL PRIMARY KEY,
   [Name] [nvarchar](50) NOT NULL,
   [Price] [int] NULL
      )
```

Warehouse Table:


SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlite
Database Table Index View Trigger Tools Help
Directory
(Select Profile Database)
Go
PurchaseOrder.sqlite
Structure Browse & Search Execute SQL DB Settings
Master Table (1)
sqlite_master
Tables (7)
Customer
Employee
Invoices
InvoicesDetails
Product
Warehouse
city
Views (0)
Indexes (7)
Triggers (0)
Enter SQL
Select | Data Manipulation | Create/Alter | Drop | ReIndex | PRAGMA
Run SQL
Actions
Last Error:

```
CREATE TABLE [Warehouse](
      [WarehouseID] [int] NOT NULL PRIMARY KEY,
   [WarehouseName] [nvarchar](50) NOT NULL
      )
```

City Table:

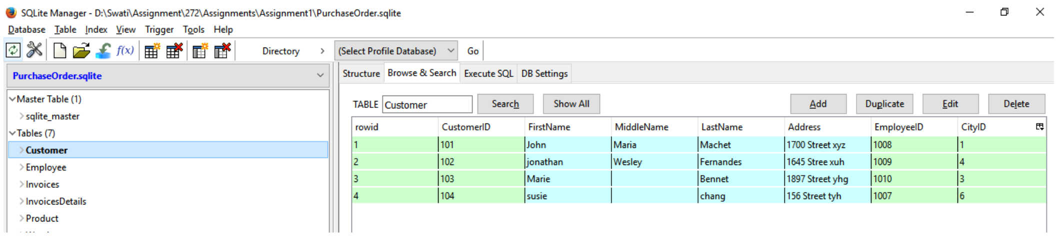


SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlite

```
CREATE TABLE city(
CITYID int not null PRIMARY KEY,
CityName varchar(50) not null)
```

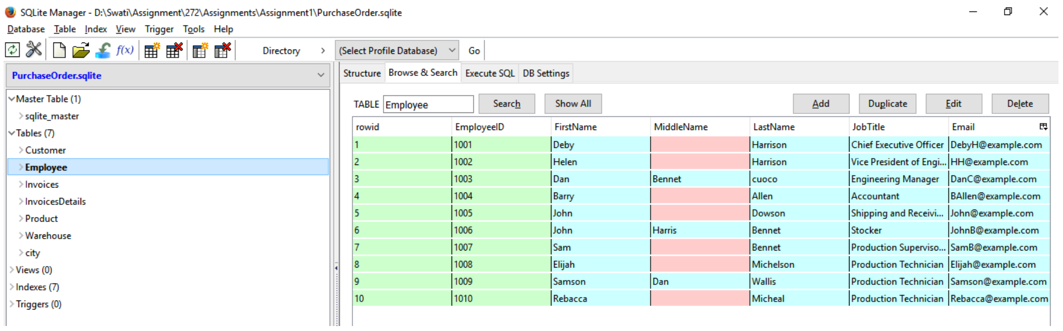
4. Insert sample data

Customer Table:



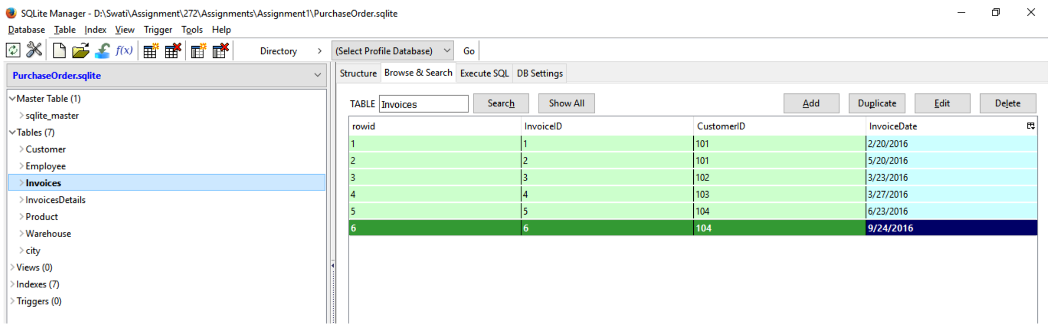
rowid	CustomerID	FirstName	MiddleName	LastName	Address	EmployeeID	CityID
1	101	John	Maria	Machet	1700 Street xyz	1008	1
2	102	jonathan	Wesley	Fernandes	1645 Stree xuh	1009	4
3	103	Marie		Bennet	1897 Street yhg	1010	3
4	104	susie		chang	156 Street tyh	1007	6

Employee Table:



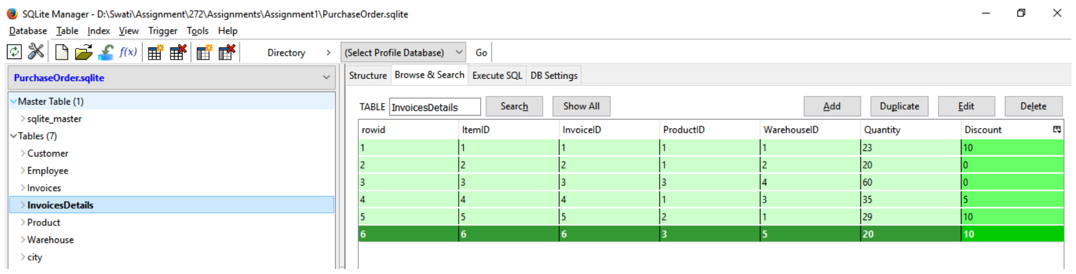
rowid	EmployeeID	FirstName	MiddleName	LastName	JobTitle	Email
1	1001	Deby		Harrison	Chief Executive Officer	DebyH@example.com
2	1002	Helen		Harrison	Vice President of Engi...	HH@example.com
3	1003	Dan	Bennet	cuoco	Engineering Manager	DanC@example.com
4	1004	Barry		Allen	Accountant	BAllen@example.com
5	1005	John		Dowson	Shipping and Receivi...	John@example.com
6	1006	John	Harris	Bennet	Stocker	JohnB@example.com
7	1007	Sam		Bennet	Production Superviso...	SamB@example.com
8	1008	Elijah		Michelson	Production Technician	Elijah@example.com
9	1009	Samson	Dan	Wallis	Production Technician	Samson@example.com
10	1010	Rebacca		Micheal	Production Technician	Rebacca@example.com

Invoices Table:



rowid	InvoiceID	CustomerID	InvoiceDate
1	1	101	2/20/2016
2	2	101	5/20/2016
3	3	102	3/23/2016
4	4	103	3/27/2016
5	5	104	6/23/2016
6	6	104	9/24/2016

InvoiceDetails Table:


SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlite

Database Table Index View Trigger Tools Help
Directory
(Select Profile Database)
Go
PurchaseOrder.sqlite
Master Table (1)
sqlite_master
Tables (7)
Customer
Employee
Invoices
InvoicesDetails
Product
Warehouse
city
Structure Browse & Search Execute SQL DB Settings
Search Show All Add Duplicate Edit Delete

TABLE InvoicesDetails

rowid	ItemID	InvoiceID	ProductID	WarehouseID	Quantity	Discount
1	1	1	1	1	23	10
2	2	2	1	2	20	0
3	3	3	3	4	60	0
4	4	4	1	3	35	5
5	5	5	2	1	29	10
6	6	6	3	5	20	10

Product Table:

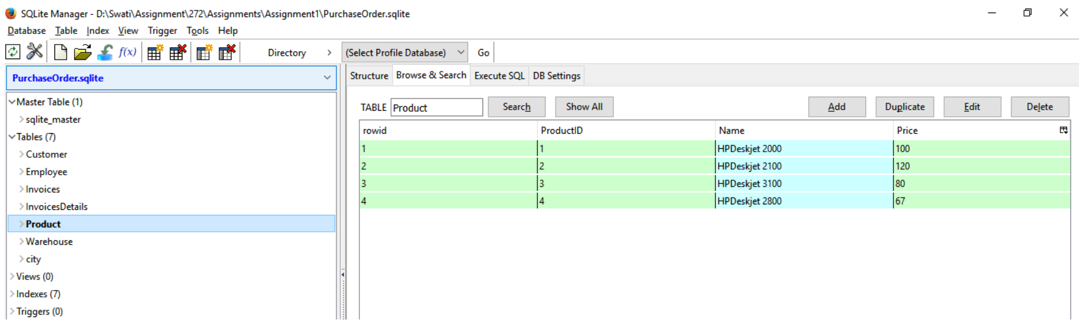
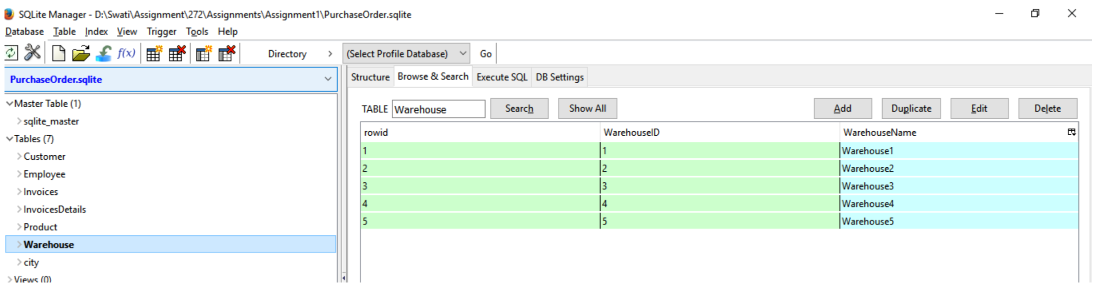

SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlite

TABLE Product

rowid	ProductID	Name	Price
1	1	HPDeskjet 2000	100
2	2	HPDeskjet 2100	120
3	3	HPDeskjet 3100	80
4	4	HPDeskjet 2800	67

Warehouse Table:


SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlite

Database Table Index View Trigger Tools Help
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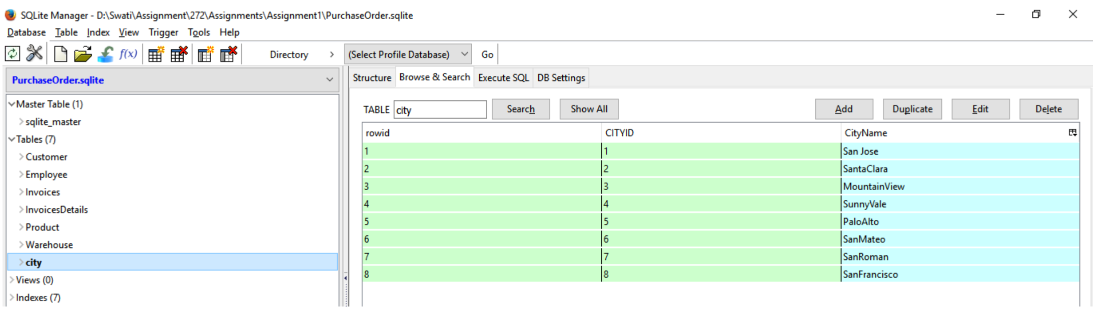
PurchaseOrder.sqlite
Master Table (1)
sqlite_master
Tables (7)
Customer
Employee
Invoices
InvoicesDetails
Product
Warehouse
city
Views (0)
Structure Browse & Search Execute SQL DB Settings
Search Show All Add Duplicate Edit Delete

TABLE Warehouse

rowid	WarehouseID	WarehouseName
1	1	Warehouse1
2	2	Warehouse2
3	3	Warehouse3
4	4	Warehouse4
5	5	Warehouse5

City Table:


SQLite Manager - D:\Swati\Assignment\272\Assignments\Assignment1\PurchaseOrder.sqlite

Database Table Index View Trigger Tools Help
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PurchaseOrder.sqlite
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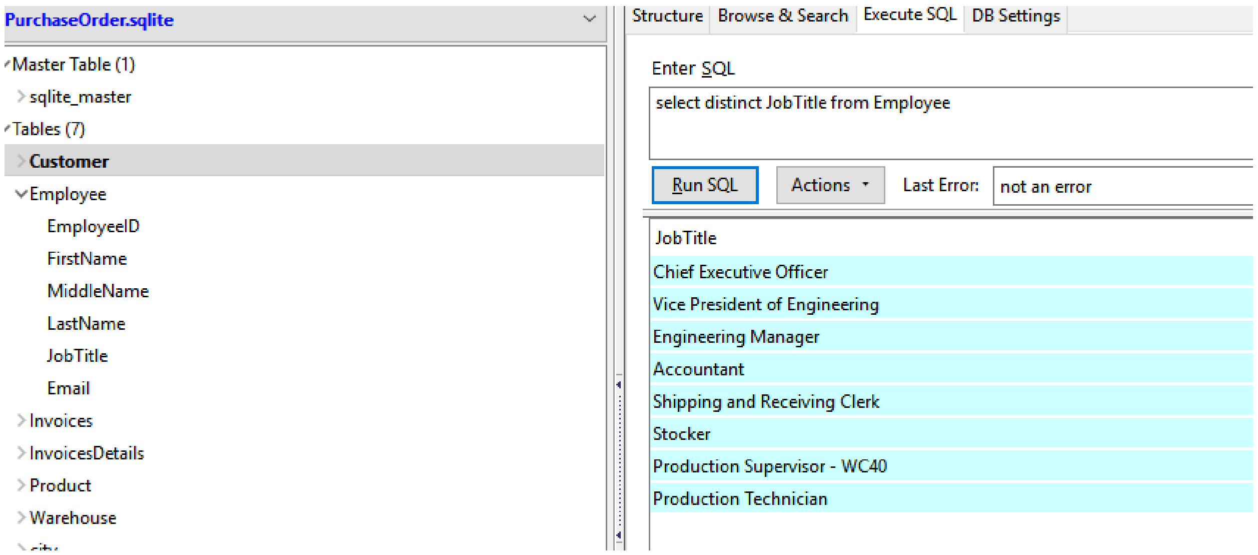
sqlite_master
Tables (7)
Customer
Employee
Invoices
InvoicesDetails
Product
Warehouse
city
Views (0)
Indexes (7)
Structure Browse & Search Execute SQL DB Settings
Search Show All Add Duplicate Edit Delete

TABLE city

rowid	CITYID	CityName
1	1	San Jose
2	2	SantaClara
3	3	MountainView
4	4	SunnyVale
5	5	PaloAlto
6	6	SanMateo
7	7	SanRoman
8	8	SanFrancisco

5. Try different queries learnt in this chapter

a. Get distinct JobTitle from Employee

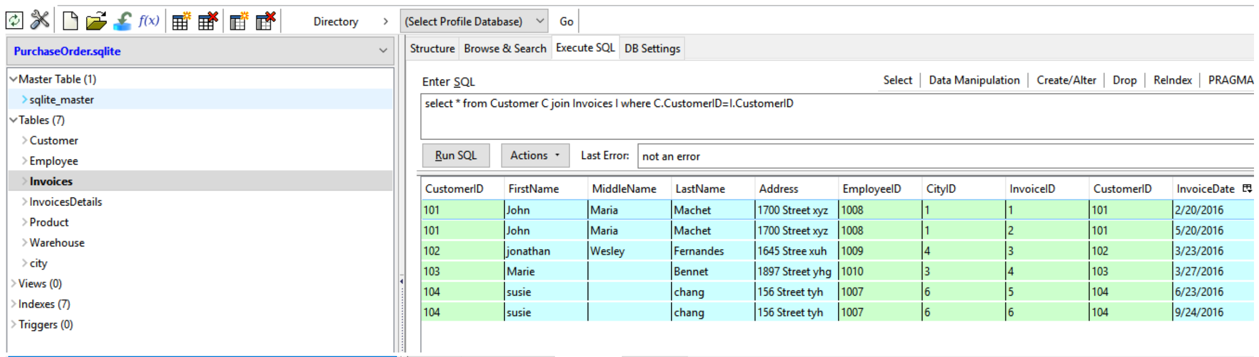


```
select distinct JobTitle from Employee
```

Last Error: not an error

JobTitle
Chief Executive Officer
Vice President of Engineering
Engineering Manager
Accountant
Shipping and Receiving Clerk
Stocker
Production Supervisor - WC40
Production Technician

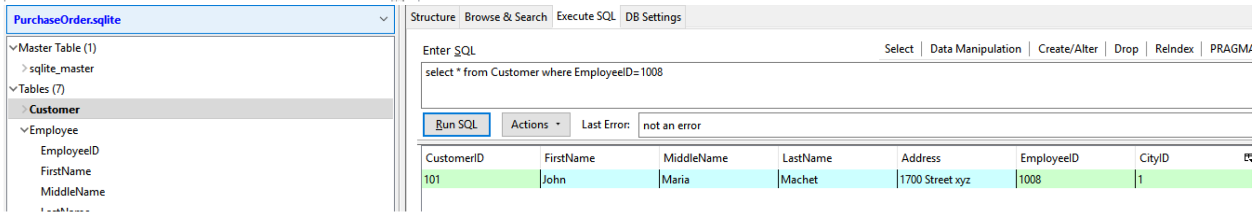
b. select * from Customer C join Invoices I where C.CustomerID=I.CustomerID



```
select * from Customer C join Invoices I where C.CustomerID=I.CustomerID
```

Last Error: not an error

CustomerID	FirstName	MiddleName	LastName	Address	EmployeeID	CityID	InvoiceID	CustomerID	InvoiceDate
101	John	Maria	Machet	1700 Street xyz	1008	1	1	101	2/20/2016
101	John	Maria	Machet	1700 Street xyz	1008	1	2	101	5/20/2016
102	jonathan	Wesley	Fernandes	1645 Stree xuh	1009	4	3	102	3/23/2016
103	Marie		Bennet	1897 Street yhg	1010	3	4	103	3/27/2016
104	susie		chang	156 Street tyh	1007	6	5	104	6/23/2016
104	susie		chang	156 Street tyh	1007	6	6	104	9/24/2016



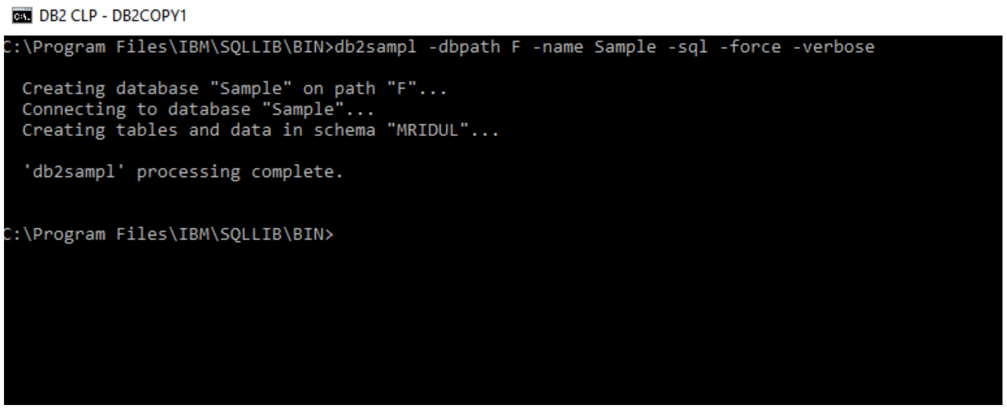
```
select * from Customer where EmployeeID=1008
```

Last Error: not an error

CustomerID	FirstName	MiddleName	LastName	Address	EmployeeID	CityID
101	John	Maria	Machet	1700 Street xyz	1008	1

DB2 Express C

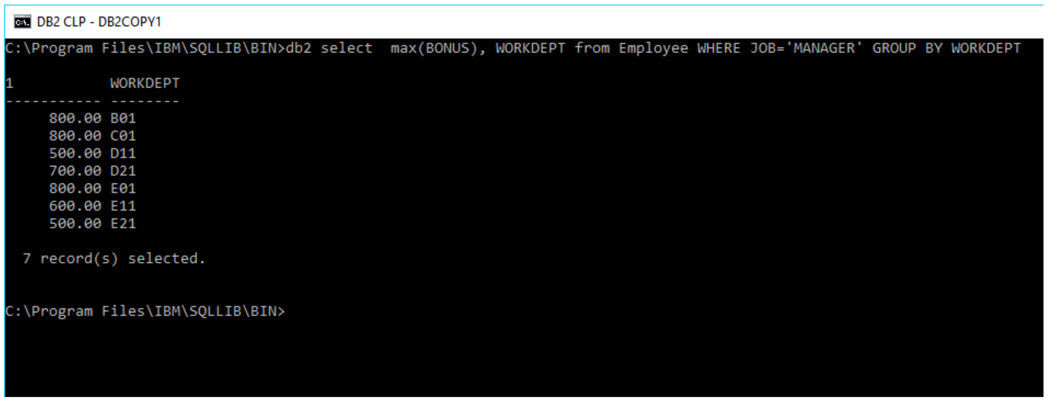
1. Create Sample database (use: db2sampl command)



DB2 CLP - DB2COPY1

```
C:\Program Files\IBM\SQLLIB\BIN>db2sampl -dbpath F -name Sample -sql -force -verbose

  Creating database "Sample" on path "F"...
  Connecting to database "Sample"...
  Creating tables and data in schema "MRIDUL"...

  'db2sampl' processing complete.


C:\Program Files\IBM\SQLLIB\BIN>
```

2. Run a sample query (use where clause and Group by)



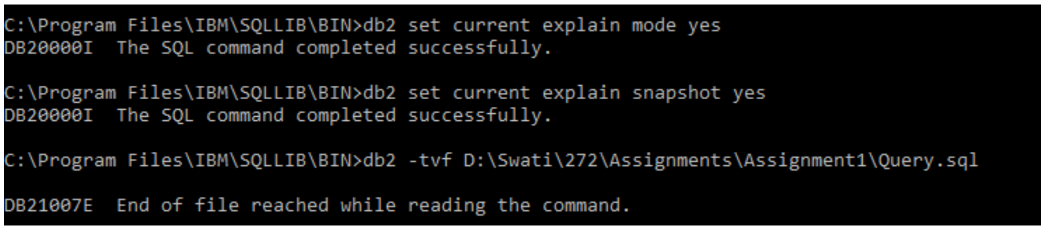
DB2 CLP - DB2COPY1

```
C:\Program Files\IBM\SQLLIB\BIN>db2 select  max(BONUS), WORKDEPT from Employee WHERE JOB='MANAGER' GROUP BY WORKDEPT

1           WORKDEPT
----------- --------
     800.00 B01
     800.00 C01
     500.00 D11
     700.00 D21
     800.00 E01
     600.00 E11
     500.00 E21

  7 record(s) selected.


C:\Program Files\IBM\SQLLIB\BIN>
```

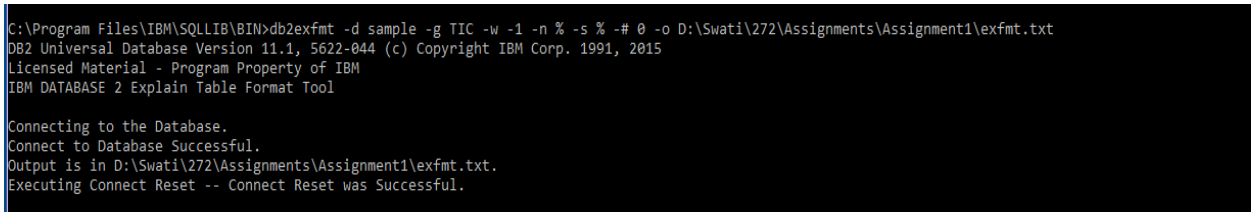
Query:

db2 Select max(BONUS), WORKDEPT from Employee WHERE JOB='MANAGER' GROUP BY WORKDEPT

3. Generate query explain plan (use: db2exfmt tool)



```
C:\Program Files\IBM\SQLLIB\BIN>db2 set current explain mode yes
DB20000I  The SQL command completed successfully.

C:\Program Files\IBM\SQLLIB\BIN>db2 set current explain snapshot yes
DB20000I  The SQL command completed successfully.

C:\Program Files\IBM\SQLLIB\BIN>db2 -tvf D:\Swati\272\Assignments\Assignment1\Query.sql

DB21007E  End of file reached while reading the command.
```



```
C:\Program Files\IBM\SQLLIB\BIN>db2exfmt -d sample -g TIC -w -1 -n % -s % -# 0 -o D:\Swati\272\Assignments\Assignment1\exfmt.txt
DB2 Universal Database Version 11.1, 5622-044 (c) Copyright IBM Corp. 1991, 2015
Licensed Material - Program Property of IBM
IBM DATABASE 2 Explain Table Format Tool

Connecting to the Database.
Connect to Database Successful.
Output is in D:\Swati\272\Assignments\Assignment1\exfmt.txt.
Executing Connect Reset -- Connect Reset was Successful.
```

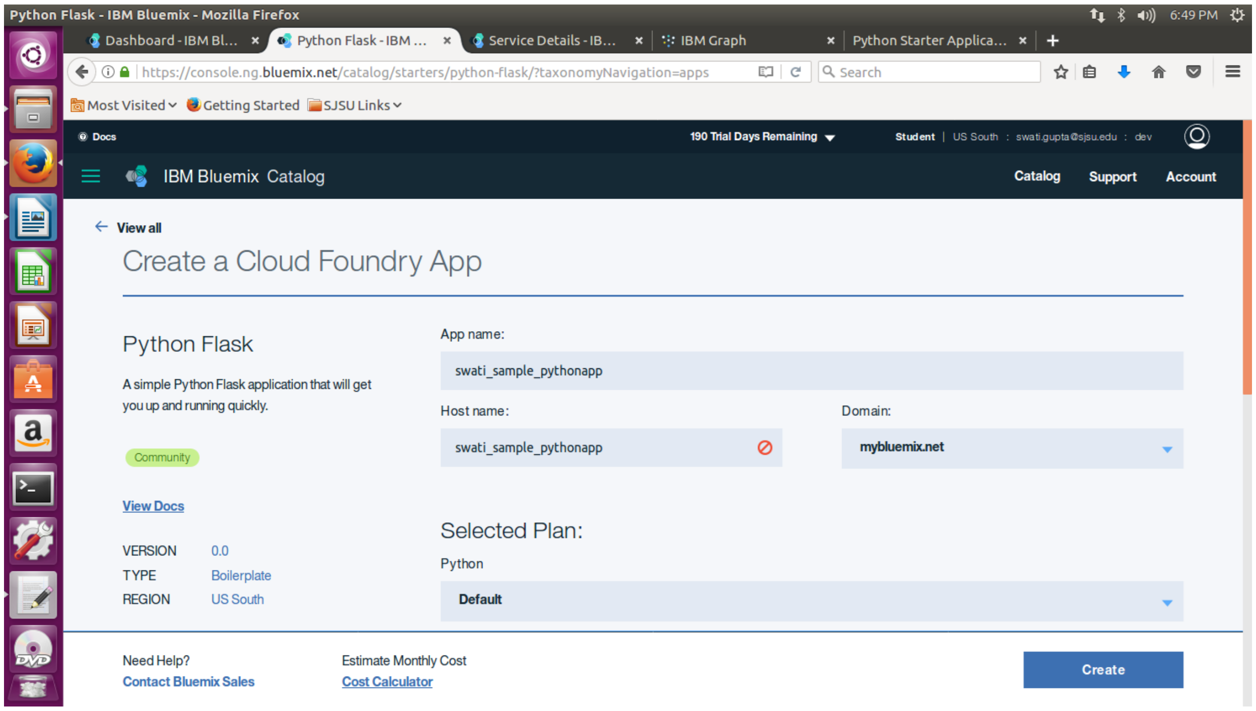
Output:

exfmt.txt

Graph Data store

Create the service and follow the documentation to create a sample graph application using the API documentation

1. Creation of Cloudant Foundry App


Python Flask - IBM Bluemix - Mozilla Firefox

https://console.ng.bluemix.net/catalog/starters/python-flask/?taxonomyNavigation=apps

IBM Bluemix Catalog

Create a Cloud Foundry App

Python Flask

A simple Python Flask application that will get you up and running quickly.

App name: swati_sample_pythonapp

Host name: swati_sample_pythonapp

Domain: mybluemix.net

Selected Plan:

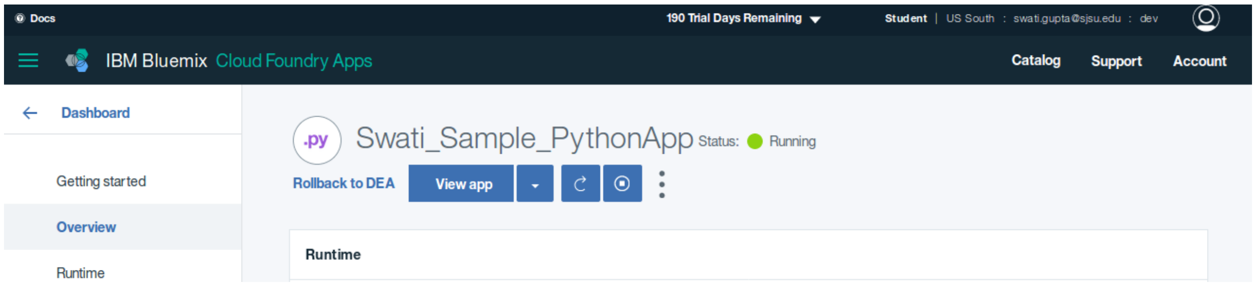
Python: Default

VERSION	0.0
TYPE	Boilerplate
REGION	US South

Need Help? Contact Bluemix Sales

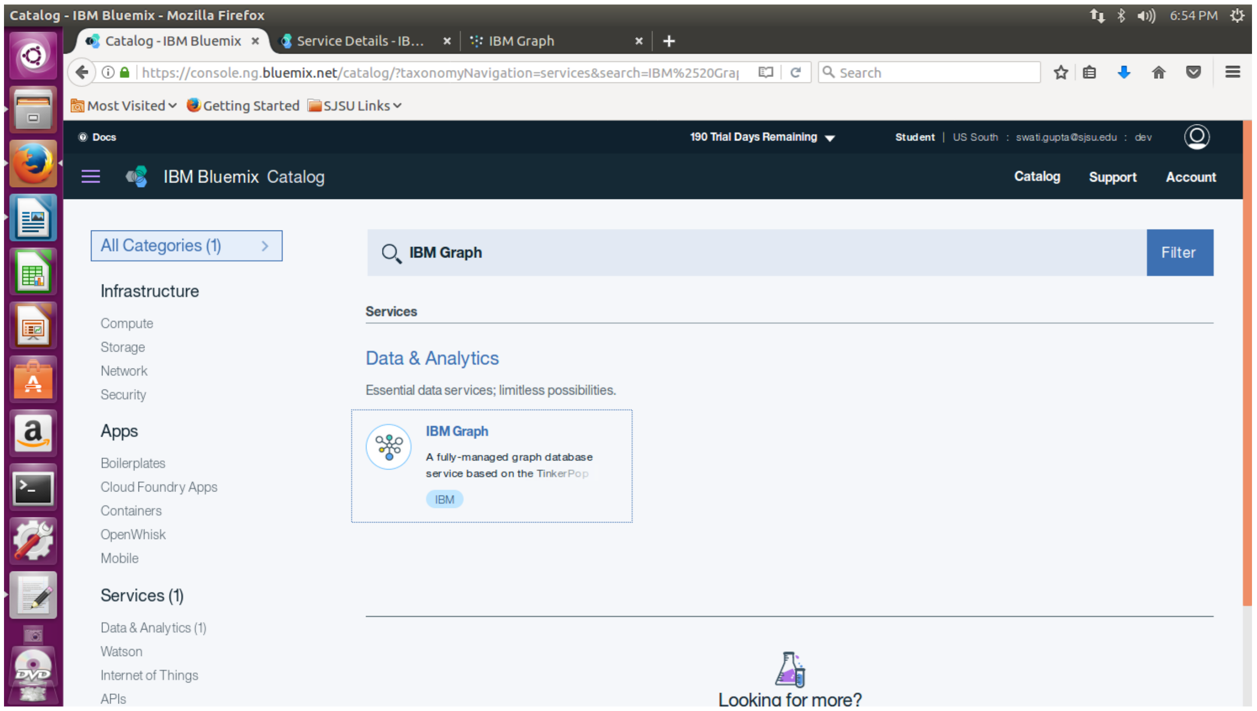
Estimate Monthly Cost Cost Calculator

App is running as shown in below screenshot

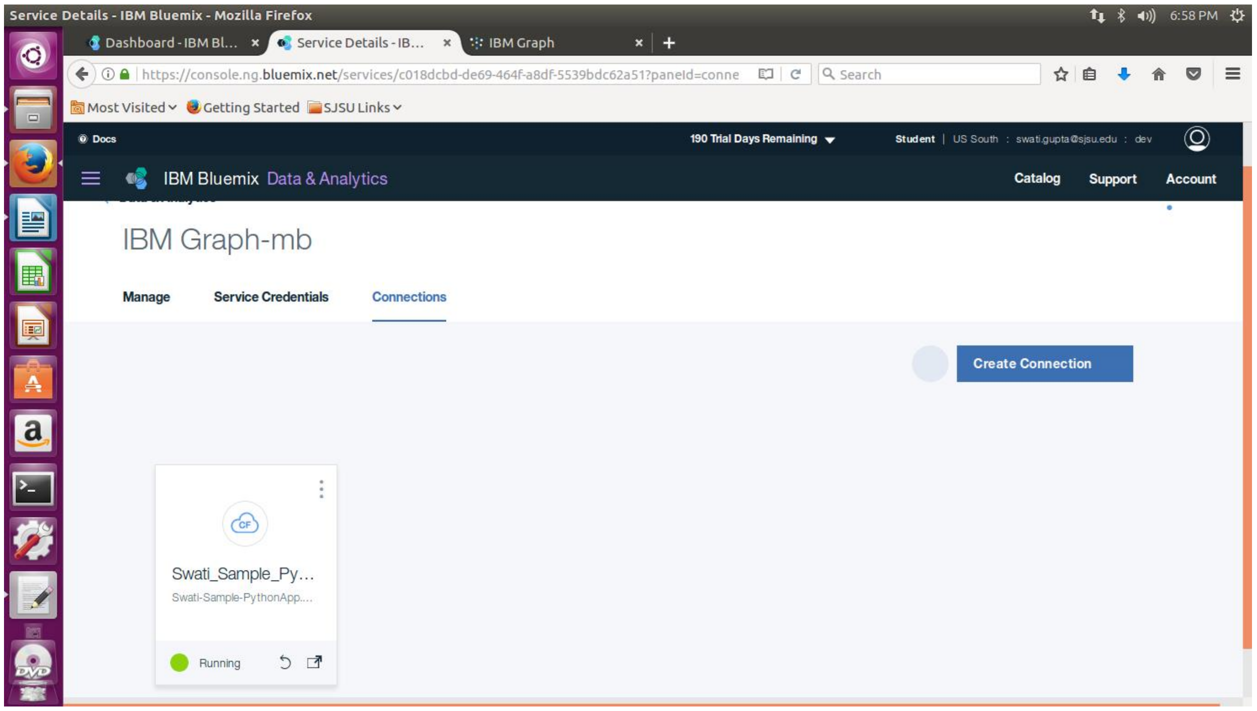

IBM Bluemix Cloud Foundry Apps

Swati_Sample_PythonApp Status: Running

2. Creation of IBM Graph Service

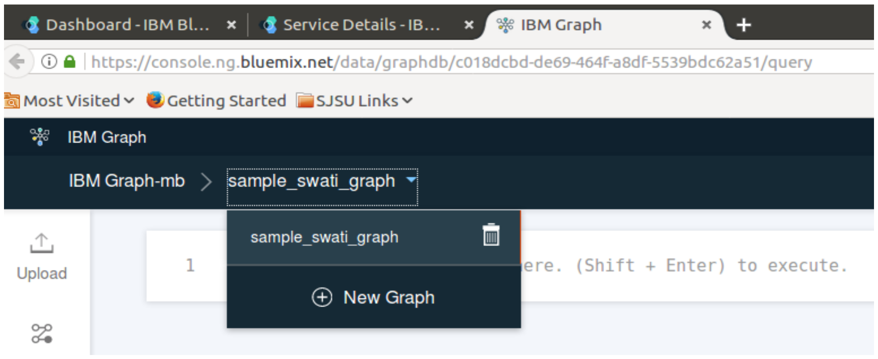


Added Connection of App to IBM Graph Service



Service Details - IBM Bluemix - Mozilla Firefox
https://console.ng.bluemix.net/services/c018dcbd-de69-464f-a8df-5539bdc62a51?paneId=conne
IBM Bluemix Data & Analytics
IBM Graph-mb
Manage
Service Credentials
Connections
Create Connection
Swati_Sample_Py...
Swati-Sample-PythonApp....
Running

3. Creation Of Graph



Adding Schema(Icecream) for the Graph

Vertex Creation

Vertex 1: Customer

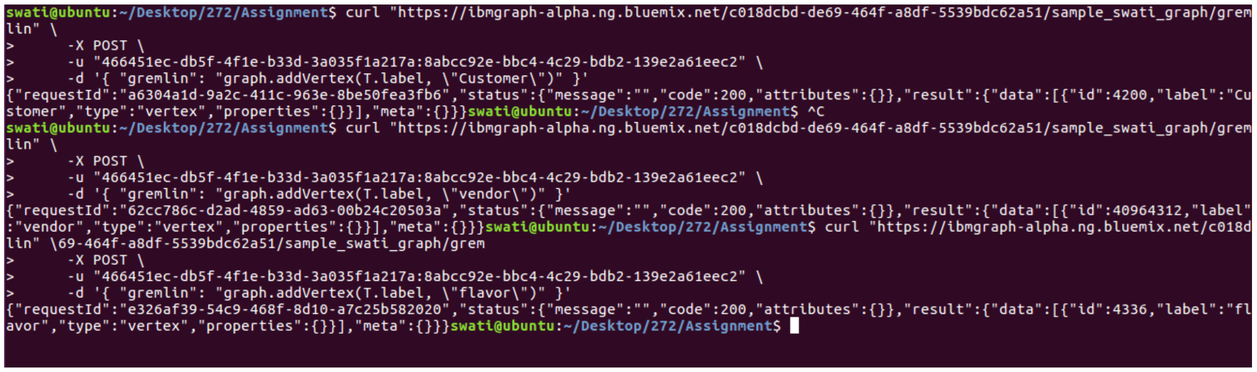
curl "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_graph/gremlin" \
-X POST \
-u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
-d '{ "gremlin": "graph.addVertex(T.label, \"Customer\")" }'

Vertex 2: Vendor

curl "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_graph/gremlin" \
-X POST \
-u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
-d '{ "gremlin": "graph.addVertex(T.label, \"vendor\")" }'

Vertex 3: flavor

curl "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_graph/gremlin" \
-X POST \
-u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
-d '{ "gremlin": "graph.addVertex(T.label, \"flavor\")" }'

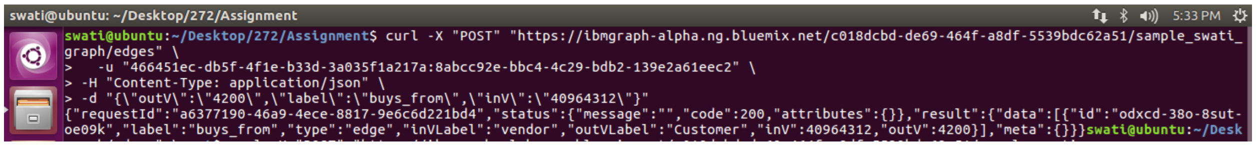


```
swati@ubuntu:~/Desktop/272/Assignment$ curl "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_graph/grem
lin" \
>       -X POST \
>       -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
>       -d '{ "gremlin": "graph.addVertex(T.label, \"Customer\")" }'
{"requestId":"a6304a1d-9a2c-411c-963e-8be50fea3fb6","status":{"message":"","code":200,"attributes":{}},"result":{"data":[{"id":4200,"label":"Cu
stomer","type":"vertex","properties":{}}],"meta":{}}}swati@ubuntu:~/Desktop/272/Assignment$ ^C
swati@ubuntu:~/Desktop/272/Assignment$ curl "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_graph/grem
lin" \
>       -X POST \
>       -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
>       -d '{ "gremlin": "graph.addVertex(T.label, \"vendor\")" }'
{"requestId":"62cc786c-d2ad-4859-ad63-00b24c20503a","status":{"message":"","code":200,"attributes":{}},"result":{"data":[{"id":40964312,"label"
:"vendor","type":"vertex","properties":{}}],"meta":{}}}swati@ubuntu:~/Desktop/272/Assignment$ curl "https://ibmgraph-alpha.ng.bluemix.net/c018d
lin" \69-464f-a8df-5539bdc62a51/sample_swati_graph/grem
>       -X POST \
>       -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
>       -d '{ "gremlin": "graph.addVertex(T.label, \"flavor\")" }'
{"requestId":"e326af39-54c9-468f-8d10-a7c25b582020","status":{"message":"","code":200,"attributes":{}},"result":{"data":[{"id":4336,"label":"fl
avor","type":"vertex","properties":{}}],"meta":{}}}swati@ubuntu:~/Desktop/272/Assignment$
```

Edge Creation

Edge 1: buys_from

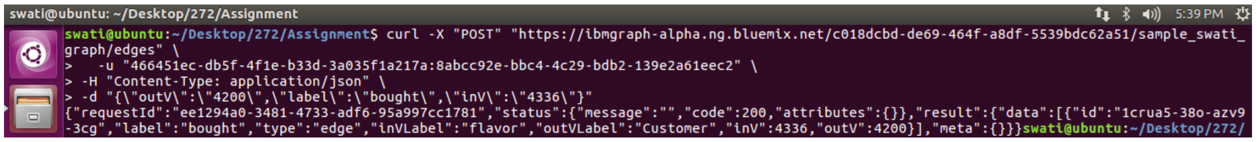
```
curl -X "POST" "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_graph/edges" \
  -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
        -H "Content-Type: application/json" \
        -d "{\"outV\":\"4200\",\"label\":\"buys_from\",\"inV\":\"40964312\"}"
```



```
swati@ubuntu: ~/Desktop/272/Assignment
swati@ubuntu:~/Desktop/272/Assignment$ curl -X "POST" "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_
graph/edges" \
>    -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
> -H "Content-Type: application/json" \
> -d "{\"outV\":\"4200\",\"label\":\"buys_from\",\"inV\":\"40964312\"}"
{"requestId":"a6377190-46a9-4ece-8817-9e6c6d221bd4","status":{"message":"","code":200,"attributes":{}},"result":{"data":[{"id":"odxcd-38o-8sut-
oe09k","label":"buys_from","type":"edge","inVLabel":"vendor","outVLabel":"Customer","inV":40964312,"outV":4200}],"meta":{}}}swati@ubuntu:~/Desk
```

Edge 2: bought

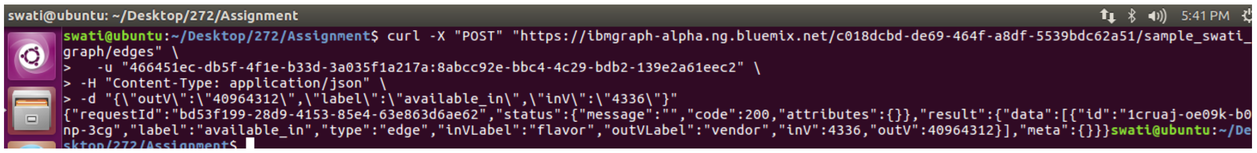
```
curl -X "POST" "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_graph/edges" \
  -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
        -H "Content-Type: application/json" \
        -d "{\"outV\":\"4200\",\"label\":\"bought\",\"inV\":\"4336\"}"
```



```
swati@ubuntu: ~/Desktop/272/Assignment
swati@ubuntu:~/Desktop/272/Assignment$ curl -X "POST" "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_
graph/edges" \
>    -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
> -H "Content-Type: application/json" \
> -d "{\"outV\":\"4200\",\"label\":\"bought\",\"inV\":\"4336\"}"
{"requestId":"ee1294a0-3481-4733-adf6-95a997cc1781","status":{"message":"","code":200,"attributes":{}},"result":{"data":[{"id":"1crua5-38o-azv9
-3cg","label":"bought","type":"edge","inVLabel":"flavor","outVLabel":"Customer","inV":4336,"outV":4200}],"meta":{}}}swati@ubuntu:~/Desktop/272/
```

Edge 3: available_in

```
curl -X "POST" "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_graph/edges" \
  -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
        -H "Content-Type: application/json" \
        -d "{\"outV\":\"40964312\",\"label\":\"available_in\",\"inV\":\"4336\"}"
```



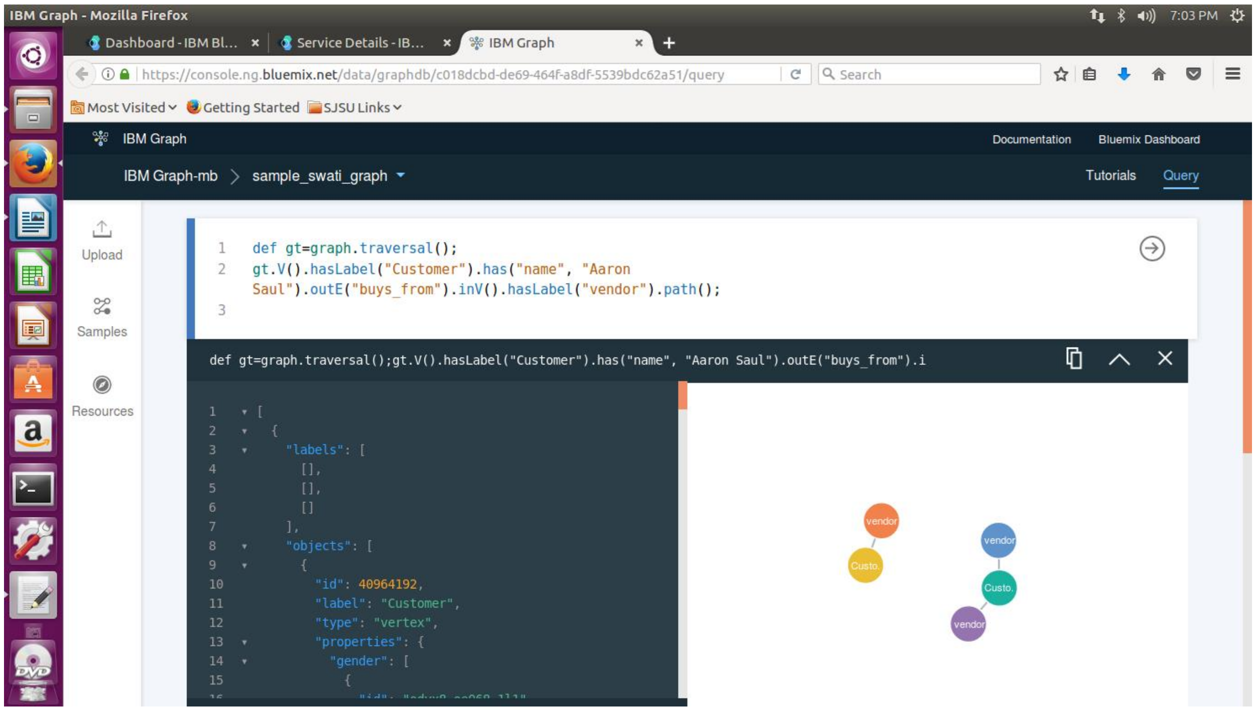
```
swati@ubuntu: ~/Desktop/272/Assignment
swati@ubuntu:~/Desktop/272/Assignment$ curl -X "POST" "https://ibmgraph-alpha.ng.bluemix.net/c018dcbd-de69-464f-a8df-5539bdc62a51/sample_swati_
graph/edges" \
>    -u "466451ec-db5f-4f1e-b33d-3a035f1a217a:8abcc92e-bbc4-4c29-bdb2-139e2a61eec2" \
> -H "Content-Type: application/json" \
> -d "{\"outV\":\"40964312\",\"label\":\"available_in\",\"inV\":\"4336\"}"
{"requestId":"bd53f199-28d9-4153-85e4-63e863d6ae62","status":{"message":"","code":200,"attributes":{}},"result":{"data":[{"id":"1cruaj-oe09k-b0
np-3cg","label":"available_in","type":"edge","inVLabel":"flavor","outVLabel":"vendor","inV":4336,"outV":40964312}],"meta":{}}}swati@ubuntu:~/De
sktop/272/Assignment$
```

Inserted Data using below groovy code

```
def v1 = graph.addVertex("name", "Aaron Saul", label, "Customer", "age", 10, "gender", "male");
def v2 = graph.addVertex("name", "Declan McKenna", label, "Customer", "age", 10, "gender", "female");
def v3 = graph.addVertex("name", "Scoop", label, "vendor", "vendorid", 1);
def v4 = graph.addVertex("name", "BaskinRobins", label, "vendor", "vendorid", 2);
def v5 = graph.addVertex("name", "Vanilla", label, "flavour", "flavourid", 1, "vendorid" 1);
def v6 = graph.addVertex("name", "Chocolate", label, "flavour", "flavourid", 2,"vendorid" 1);
def v7 = graph.addVertex("name", "Vanilla", label, "flavour", "flavourid", 1, "vendorid" 2);
def v8 = graph.addVertex("name", "Chocolate", label, "flavour", "flavourid", 2,"vendorid" 2);
v1.addEdge("buys_from", v3);
v2.addEdge("buys_from", v3);
v1.addEdge("buys_from", v4);
```

```
v2.addEdge("buys_from", v4);
v1.addEdge("bought", v6);
v2.addEdge("bought", v7);
v1.addEdge("bought", v5);
v2.addEdge("bought", v8);
v3.addEdge("available_in", v5);
v3.addEdge("available_in", v6);
v4.addEdge("available_in", v7);
v4.addEdge("available_in", v8);
```

Traversing through Graph



```
def gt=graph.traversal();
gt.V().hasLabel("Customer").has("name", "Aaron
Saul").outE("buys_from").inV().hasLabel("vendor").path();
```

```
def gt=graph.traversal();gt.V().hasLabel("Customer").has("name", "Aaron Saul").outE("buys_from").i
```

```
[
  {
    "labels": [
      [],
      [],
      []
    ],
    "objects": [
      {
        "id": 40964192,
        "label": "Customer",
        "type": "vertex",
        "properties": {
          "gender": [
            {
```