Cicero Coffee Corner Database Project

Course Name : ITMD 523 Adv Topics in Data Mgmt
Semester : Fall 2016
Professor Name : Prof. Luke Papademas
Student Name : Manthan Sudhir Kapadia
Date of Submission : December 11, 2016

OBJECTIVE:

To research, study and do analysis for Cicero Coffee Corner. The area of research, study and analysis includes database management, implementation of data analytics techniques, improvising existing model and providing quality solution for scalability

Client Name: Cicero Coffee Corner

Title of Contents:

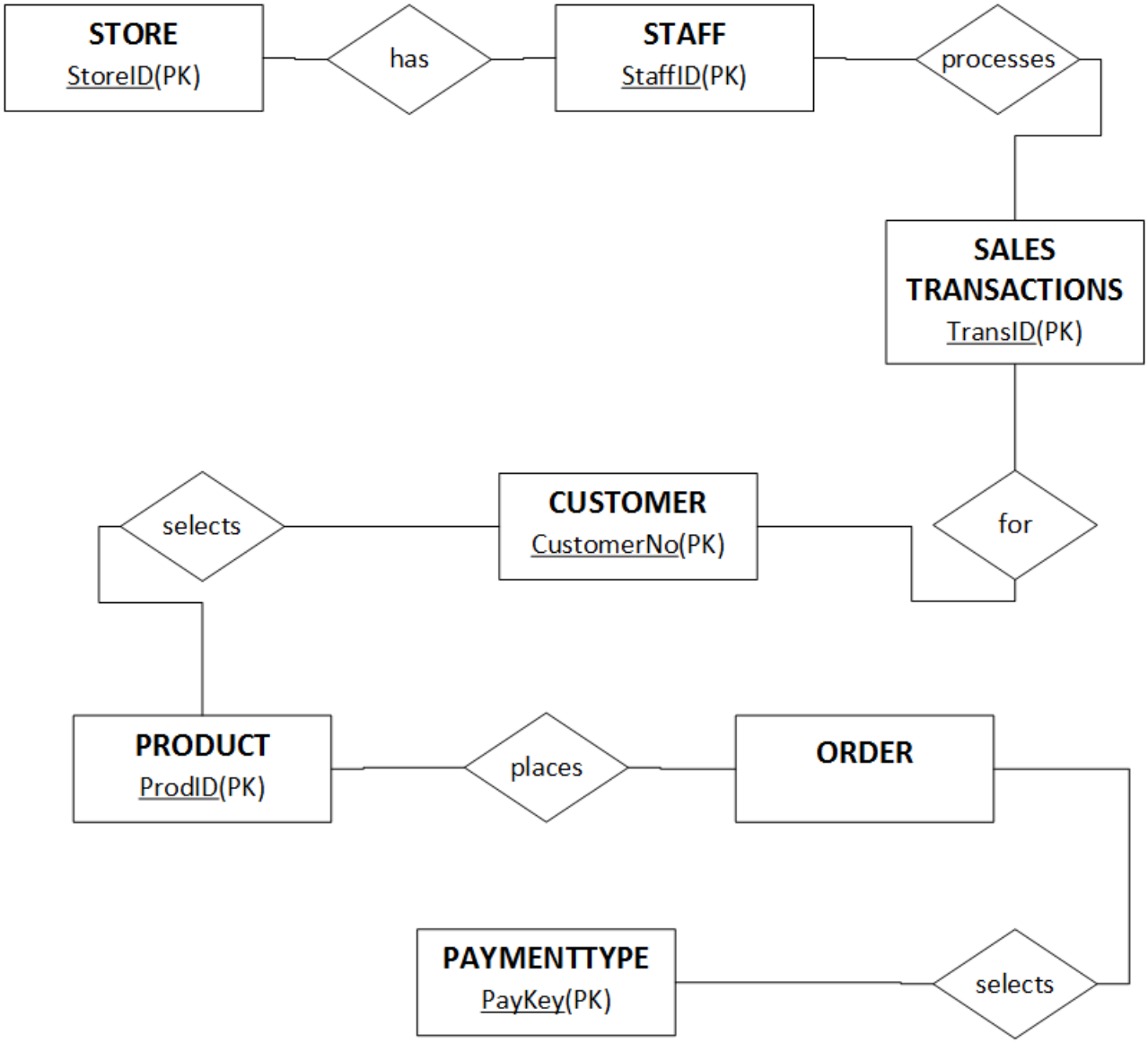
PHASE 1: PRELIMINARY INVESTIGATION

Some of the questions that the business team should ask the client for the business rules of their coffee company are fully understood are listed below:

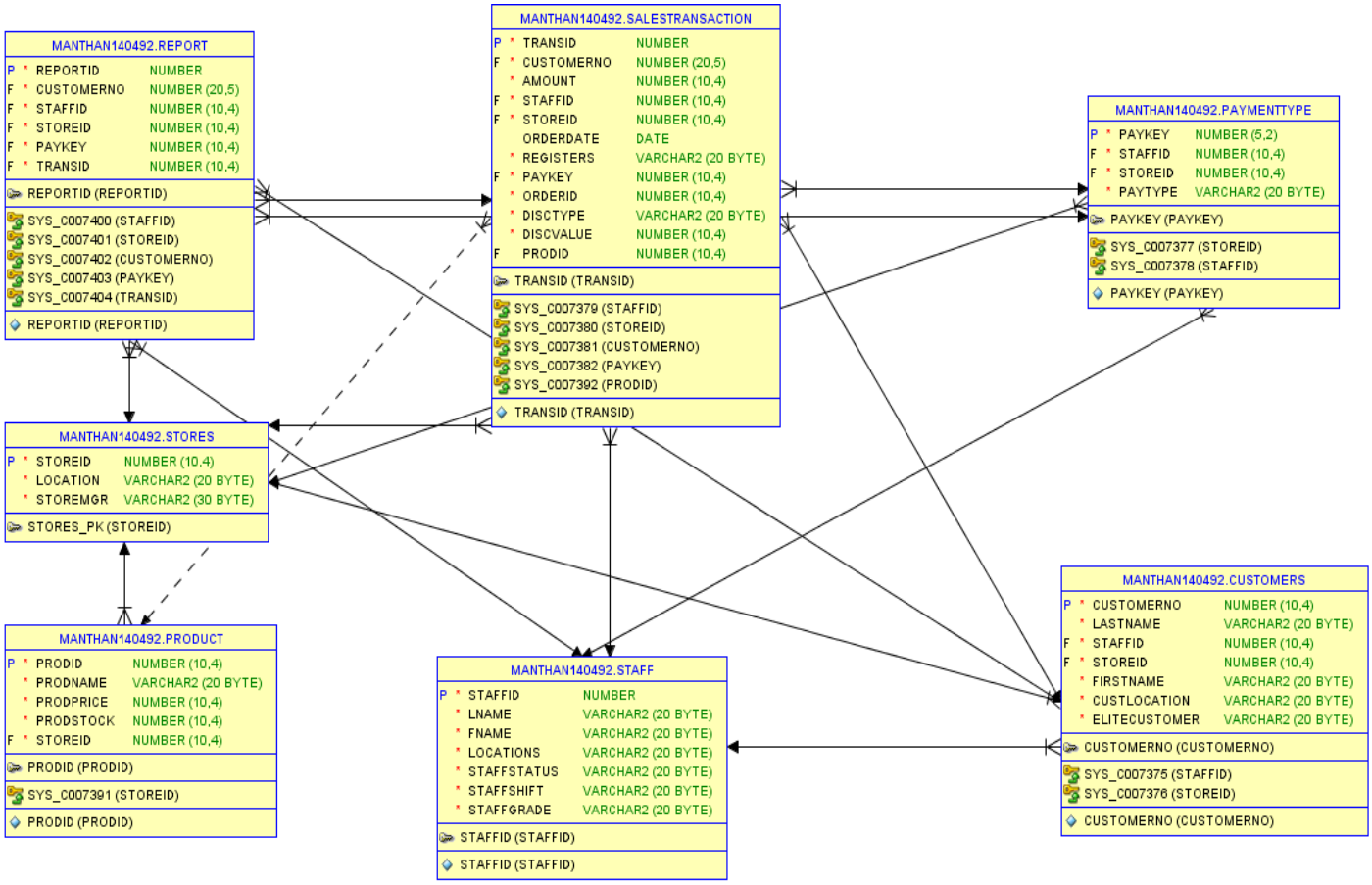
1) Incorporation of Wireless cash register system.
2) Should there be any special management for elite customers?
3) How to engage custom events in existing cash register system?
4) What should be different types of reporting and auditing options?
5) Should the cash register system terminals be continuously synchronized?
6) What should be the total number of transactions supported during uptime of each cash register system?
7) How often maintenance of cash register system should be done?
8) What are different modes of signing in the cash register system for coffee shop staff?
9) What should be the frequency of data backup?
10) What special arrangements should be made in cash register system for the orders which are returned due to several reasons?
11) How should **ON THE GO** type of orders be processed?
12) What are the existing payment modes?

PHASE 2: DESIGNING THE CONCEPTUAL MODEL

In the conceptual model, an overview of the entire structure is given.


STORE
StoreID(PK)
has
STAFF
StaffID(PK)
processes
SALES TRANSACTIONS
TransID(PK)
for
CUSTOMER
CustomerNo(PK)
selects
PRODUCT
ProdID(PK)
places
ORDER
PAYMENTTYPE
PayKey(PK)
selects

PHASE 3: DATA MODELLING AND SAMPLE RECORDS



PHASE 4: DISCUSSING THE BUSNIESS ANALYTICS

Some of analytical data questions that could be beneficial to the client are:

1. A list of employees at all stores.
   This gives a list of details of all the staff that works in all the store of coffee store.
2. A list of all the stores located in US.
   This gives list of all stores which are based in US.
3. What is the most preferred mode of payment?
   This gives records of the mode of payment which is most common amongst all the customers.
4. Report for revenue generated after giving discounts on bi-weekly basis.
   Different types of discounts are given eg. Senior citizen, Police etc. so this report will give revenue generated under discount section. This report will be generated bi-weekly basis.
5. Report for sale of products on monthly basis.
   This report will pull all the details about sale of products. This report is generated monthly basis.
6. Report for revenue generation on quarterly basis.
   This report gives details about the over-all revenue generation of the store.
7. Report for sales or revenue generation during special event days.

There are special events like coffee week, Halloween etc. during which there are special offers. The report gives details about sales or revenue generated during this tenure.

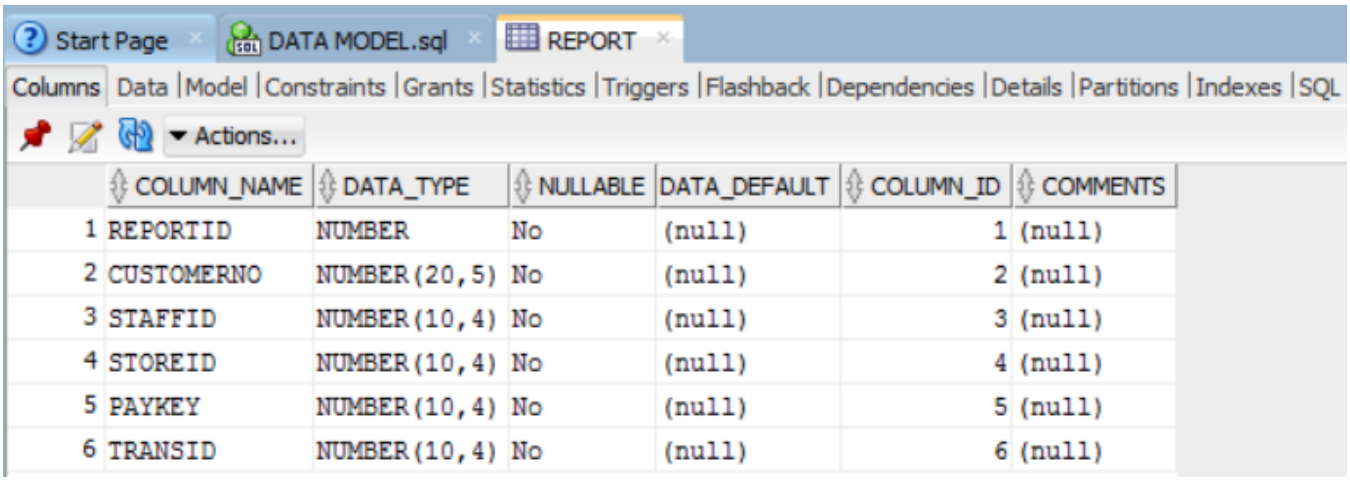
8. Report for shift of employees.
   This report gives details about employees in the coffee store.
9. List of available stock at stores.
   This list gives details about products, available stock and at which store.
10. Report for highest selling product based on store location.
    This list gives details about product which has the highest sale count which helps in determining the strategy for sale of products who have less count.

PHASE 5: PREPARING FOR ALTERNATIVES AND MODIFICATIONS

Many a times there are few modifications or alternatives which need to be considered for getting better results. In this scenario, certain modifications which can be thought of are:

1. Special section should be there which deals in taking care of the items that are returned due to several reasons. There should be provisioning which has all the details about the product and the reason for return.
2. There are many customers who come for re-filling their coffee. An enhancement can be added which directly fastens the transaction process for re-filling customers.
3. Those customers who have store card should have an option of refilling their card in-store, apart from the traditional online option. This should facilitate reloading of card, checking balance on card etc.
4. If every month say like flavor of the month is rolled out, then record is required about the flavor and in which month it was rolled out which helps in analyzing the sales as to which is the most favorite flavor amongst the customers.

PHASE 6 & 7: LOADING DATA IN TABLES AND WEB APPLICATION



	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	REPORTID	NUMBER	No	(null)	1	(null)
2	CUSTOMERNO	NUMBER(20,5)	No	(null)	2	(null)
3	STAFFID	NUMBER(10,4)	No	(null)	3	(null)
4	STOREID	NUMBER(10,4)	No	(null)	4	(null)
5	PAYKEY	NUMBER(10,4)	No	(null)	5	(null)
6	TRANSID	NUMBER(10,4)	No	(null)	6	(null)

Start Page | DATA MODEL.sql | SALESTRANSACTION

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	TRANSID	NUMBER	No	(null)	1	(null)
2	CUSTOMERNO	NUMBER(20,5)	No	(null)	2	(null)
3	AMOUNT	NUMBER(10,4)	No	(null)	3	(null)
4	STAFFID	NUMBER(10,4)	No	(null)	4	(null)
5	STOREID	NUMBER(10,4)	No	(null)	5	(null)
6	ORDERDATE	DATE	Yes	(null)	6	(null)
7	REGISTERS	VARCHAR2(20 BYTE)	No	(null)	7	(null)
8	PAYKEY	NUMBER(10,4)	No	(null)	8	(null)
9	ORDERID	NUMBER(10,4)	No	(null)	9	(null)
10	DISCTYPE	VARCHAR2(20 BYTE)	No	(null)	10	(null)
11	DISCVALUE	NUMBER(10,4)	No	(null)	11	(null)
12	PRODID	NUMBER(10,4)	Yes	(null)	12	(null)

Start Page | DATA MODEL.sql | PAYMENTTYPE

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	PAYKEY	NUMBER(5,2)	No	(null)	1	(null)
2	STAFFID	NUMBER(10,4)	No	(null)	2	(null)
3	STOREID	NUMBER(10,4)	No	(null)	3	(null)
4	PAYTYPE	VARCHAR2(20 BYTE)	No	(null)	4	(null)

Start Page | DATA MODEL.sql | STORES

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	STOREID	NUMBER(10,4)	No	(null)	1	(null)
2	LOCATION	VARCHAR2(20 BYTE)	No	(null)	2	(null)
3	STOREMGR	VARCHAR2(30 BYTE)	No	(null)	3	(null)

Start Page | DATA MODEL.sql | PRODUCT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	PRODID	NUMBER(10,4)	No	(null)	1	(null)
2	PRODNAME	VARCHAR2(20 BYTE)	No	(null)	2	(null)
3	PRODPRICE	NUMBER(10,4)	No	(null)	3	(null)
4	PRODSTOCK	NUMBER(10,4)	No	(null)	4	(null)
5	STOREID	NUMBER(10,4)	No	(null)	5	(null)

Start Page | DATA MODEL.sql | STAFF

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	STAFFID	NUMBER	No	(null)	1	(null)
2	LNAME	VARCHAR2(20 BYTE)	No	(null)	2	(null)
3	FNAME	VARCHAR2(20 BYTE)	No	(null)	3	(null)
4	LOCATIONS	VARCHAR2(20 BYTE)	No	(null)	4	(null)
5	STAFFSTATUS	VARCHAR2(20 BYTE)	No	(null)	5	(null)
6	STAFFSHIFT	VARCHAR2(20 BYTE)	No	(null)	6	(null)
7	STAFFGRADE	VARCHAR2(20 BYTE)	No	(null)	7	(null)

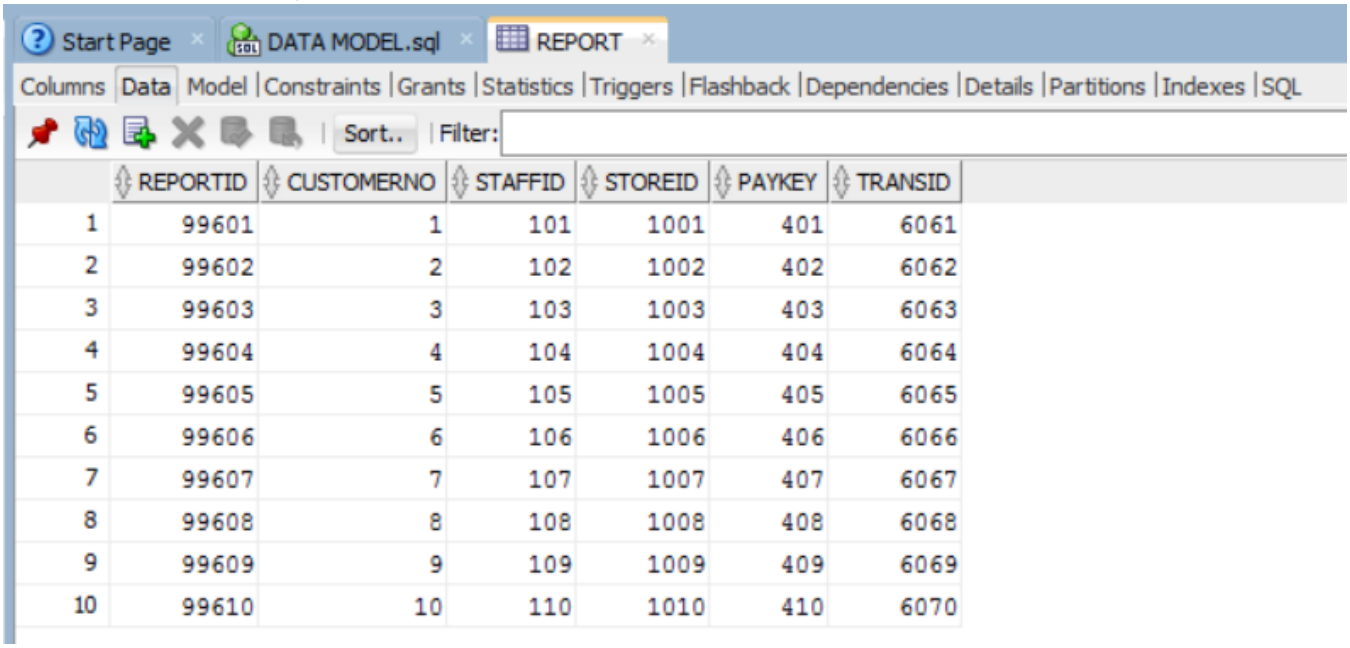
Start Page | DATA MODEL.sql | CUSTOMERS

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	CUSTOMERNO	NUMBER(10,4)	No	(null)	1	(null)
2	LASTNAME	VARCHAR2(20 BYTE)	No	(null)	2	(null)
3	STAFFID	NUMBER(10,4)	No	(null)	3	(null)
4	STOREID	NUMBER(10,4)	No	(null)	4	(null)
5	FIRSTNAME	VARCHAR2(20 BYTE)	No	(null)	5	(null)
6	CUSTLOCATION	VARCHAR2(20 BYTE)	No	(null)	6	(null)
7	ELITECUSTOMER	VARCHAR2(20 BYTE)	No	(null)	7	(null)

SELECT * FROM REPORT;



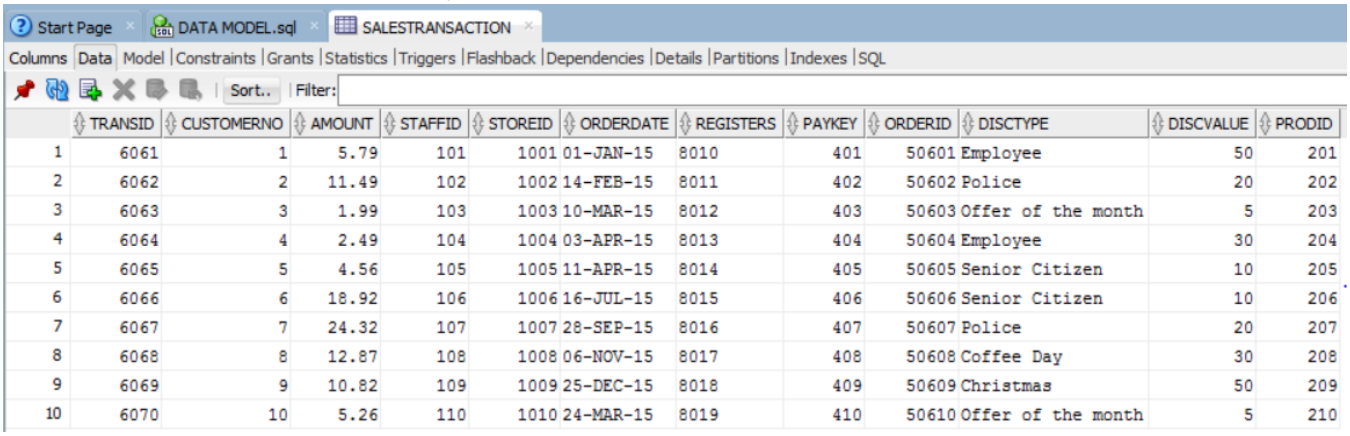
Start Page | DATA MODEL.sql | REPORT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	REPORTID	CUSTOMERNO	STAFFID	STOREID	PAYKEY	TRANSID
1	99601	1	101	1001	401	6061
2	99602	2	102	1002	402	6062
3	99603	3	103	1003	403	6063
4	99604	4	104	1004	404	6064
5	99605	5	105	1005	405	6065
6	99606	6	106	1006	406	6066
7	99607	7	107	1007	407	6067
8	99608	8	108	1008	408	6068
9	99609	9	109	1009	409	6069
10	99610	10	110	1010	410	6070

SELECT * FROM SALESTRANSACTION;



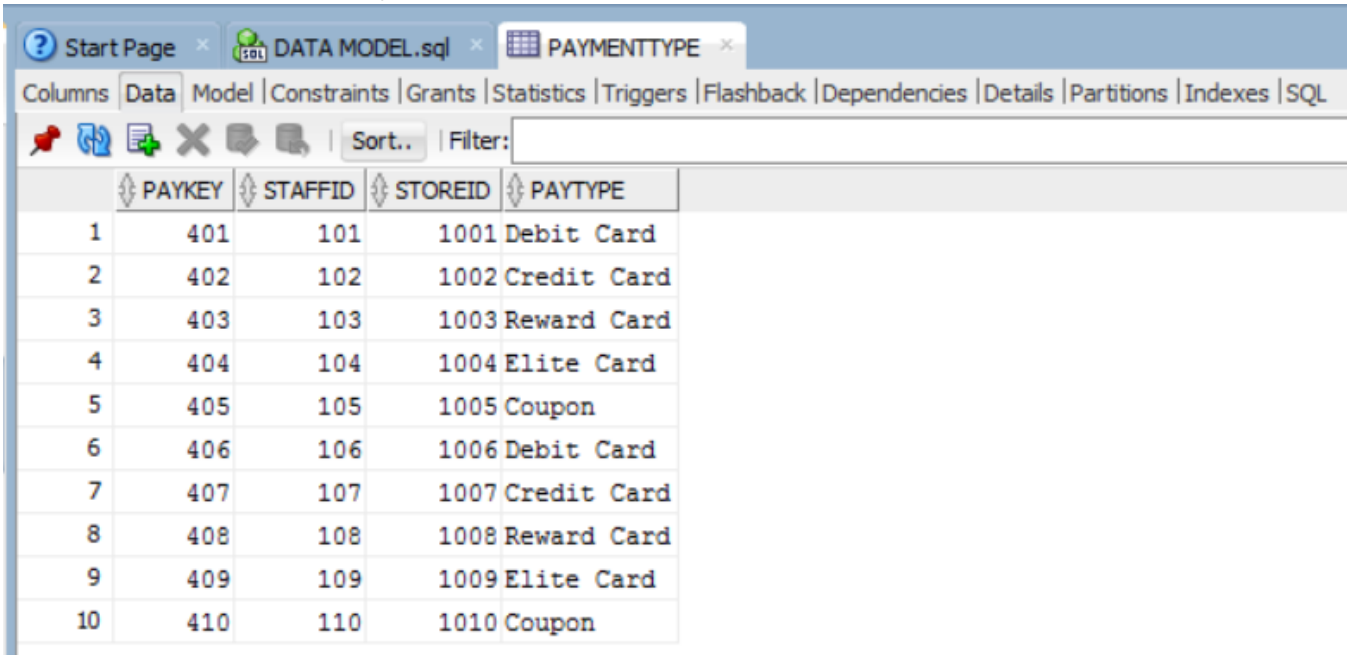
Start Page | DATA MODEL.sql | SALESTRANSACTION

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

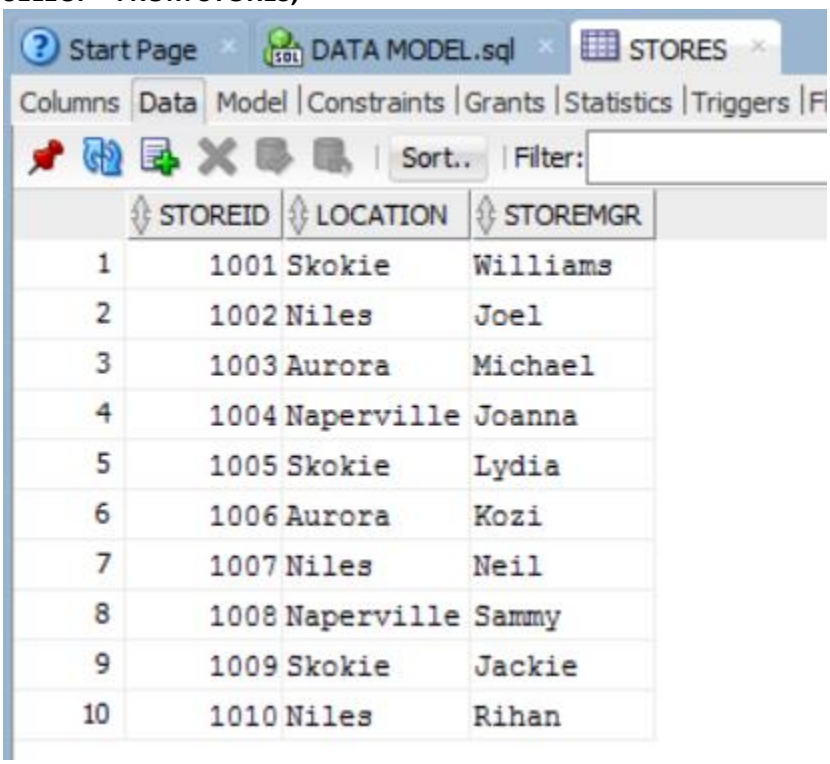
	TRANSID	CUSTOMERNO	AMOUNT	STAFFID	STOREID	ORDERDATE	REGISTERS	PAYKEY	ORDERID	DISCTYPE	DISCVALUE	PRODID
1	6061	1	5.79	101	1001	01-JAN-15	8010	401	50601	Employee	50	201
2	6062	2	11.49	102	1002	14-FEB-15	8011	402	50602	Police	20	202
3	6063	3	1.99	103	1003	10-MAR-15	8012	403	50603	Offer of the month	5	203
4	6064	4	2.49	104	1004	03-APR-15	8013	404	50604	Employee	30	204
5	6065	5	4.56	105	1005	11-APR-15	8014	405	50605	Senior Citizen	10	205
6	6066	6	18.92	106	1006	16-JUL-15	8015	406	50606	Senior Citizen	10	206
7	6067	7	24.32	107	1007	28-SEP-15	8016	407	50607	Police	20	207
8	6068	8	12.87	108	1008	06-NOV-15	8017	408	50608	Coffee Day	30	208
9	6069	9	10.82	109	1009	25-DEC-15	8018	409	50609	Christmas	50	209
10	6070	10	5.26	110	1010	24-MAR-15	8019	410	50610	Offer of the month	5	210

SELECT * FROM PAYMENTTYPE;



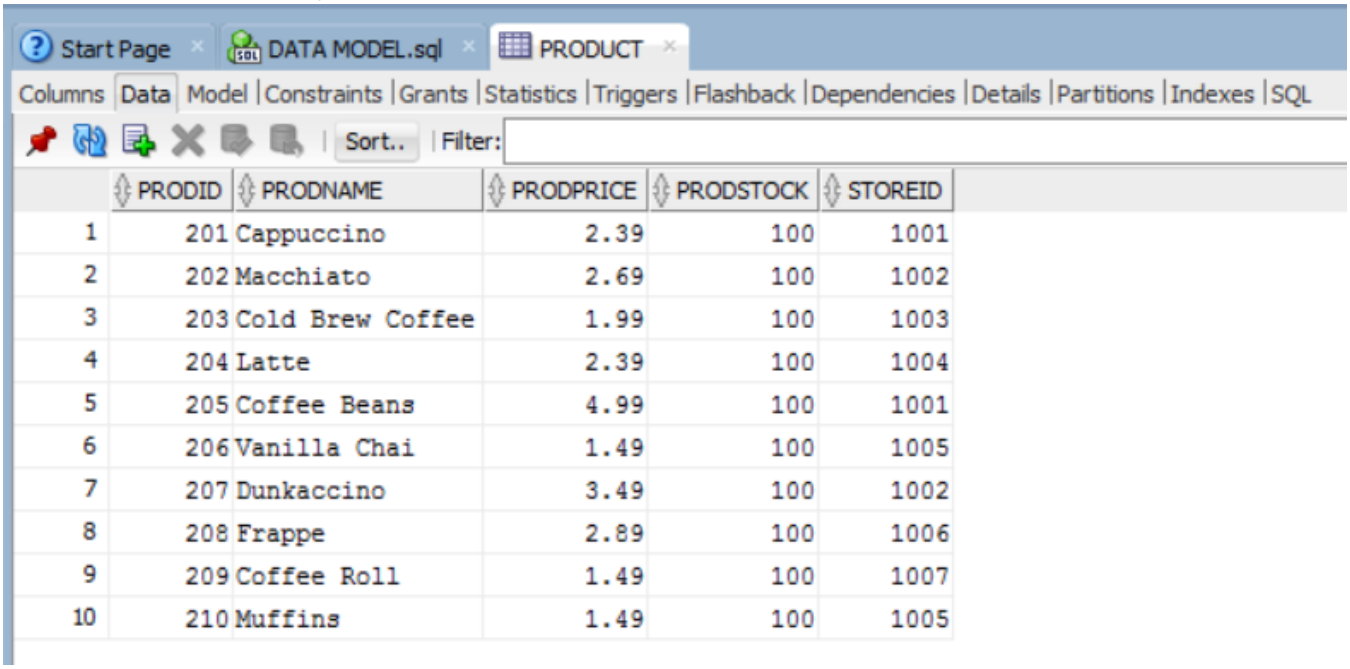
	PAYKEY	STAFFID	STOREID	PAYTYPE
1	401	101	1001	Debit Card
2	402	102	1002	Credit Card
3	403	103	1003	Reward Card
4	404	104	1004	Elite Card
5	405	105	1005	Coupon
6	406	106	1006	Debit Card
7	407	107	1007	Credit Card
8	408	108	1008	Reward Card
9	409	109	1009	Elite Card
10	410	110	1010	Coupon

SELECT * FROM STORES;



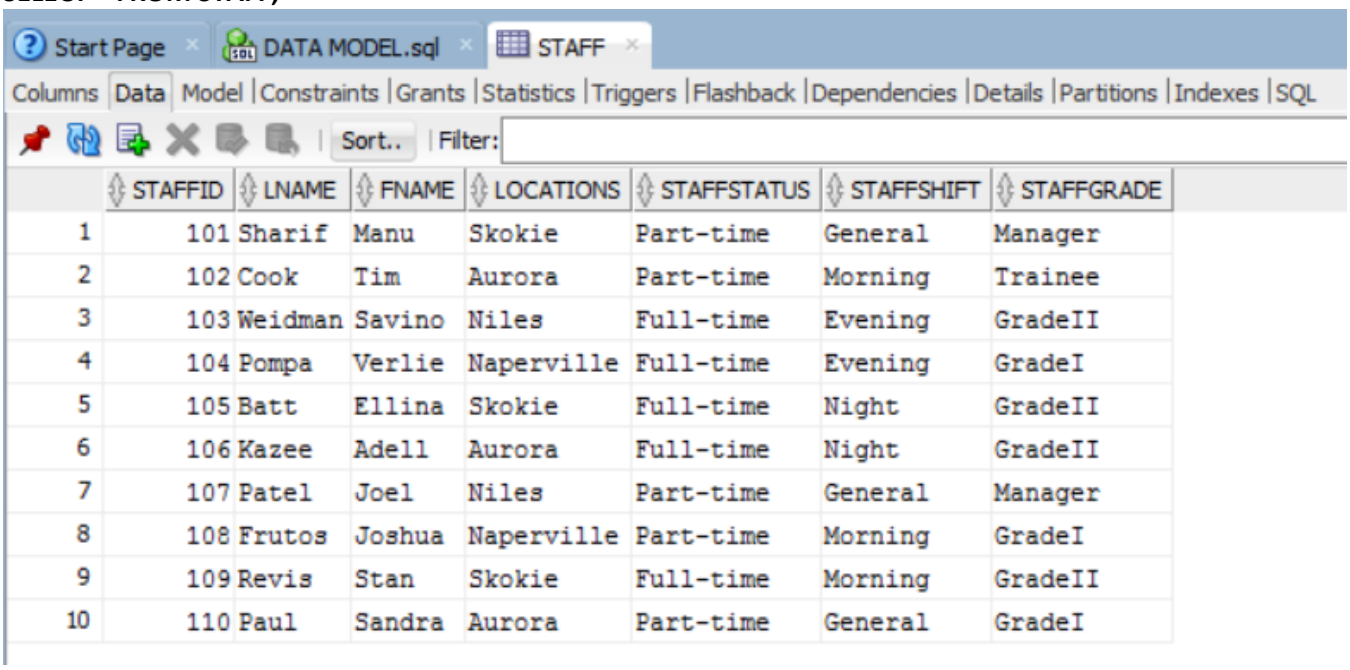
	STOREID	LOCATION	STOREMGR
1	1001	Skokie	Williams
2	1002	Niles	Joel
3	1003	Aurora	Michael
4	1004	Naperville	Joanna
5	1005	Skokie	Lydia
6	1006	Aurora	Kozi
7	1007	Niles	Neil
8	1008	Naperville	Sammy
9	1009	Skokie	Jackie
10	1010	Niles	Rihan

SELECT * FROM PRODUCT;



	PRODID	PRODNAME	PRODPRICE	PRODSTOCK	STOREID
1	201	Cappuccino	2.39	100	1001
2	202	Macchiato	2.69	100	1002
3	203	Cold Brew Coffee	1.99	100	1003
4	204	Latte	2.39	100	1004
5	205	Coffee Beans	4.99	100	1001
6	206	Vanilla Chai	1.49	100	1005
7	207	Dunkaccino	3.49	100	1002
8	208	Frappe	2.89	100	1006
9	209	Coffee Roll	1.49	100	1007
10	210	Muffins	1.49	100	1005

SELECT * FROM STAFF;



	STAFFID	LNAME	FNAME	LOCATIONS	STAFFSTATUS	STAFFSHIFT	STAFFGRADE
1	101	Sharif	Manu	Skokie	Part-time	General	Manager
2	102	Cook	Tim	Aurora	Part-time	Morning	Trainee
3	103	Weidman	Savino	Niles	Full-time	Evening	GradeII
4	104	Pompa	Verlie	Naperville	Full-time	Evening	GradeI
5	105	Batt	Ellina	Skokie	Full-time	Night	GradeII
6	106	Kazee	Adell	Aurora	Full-time	Night	GradeII
7	107	Patel	Joel	Niles	Part-time	General	Manager
8	108	Frutos	Joshua	Naperville	Part-time	Morning	GradeI
9	109	Revis	Stan	Skokie	Full-time	Morning	GradeII
10	110	Paul	Sandra	Aurora	Part-time	General	GradeI

SELECT * FROM CUSTOMERS;

Start Page | DATA MODEL.sql | CUSTOMERS

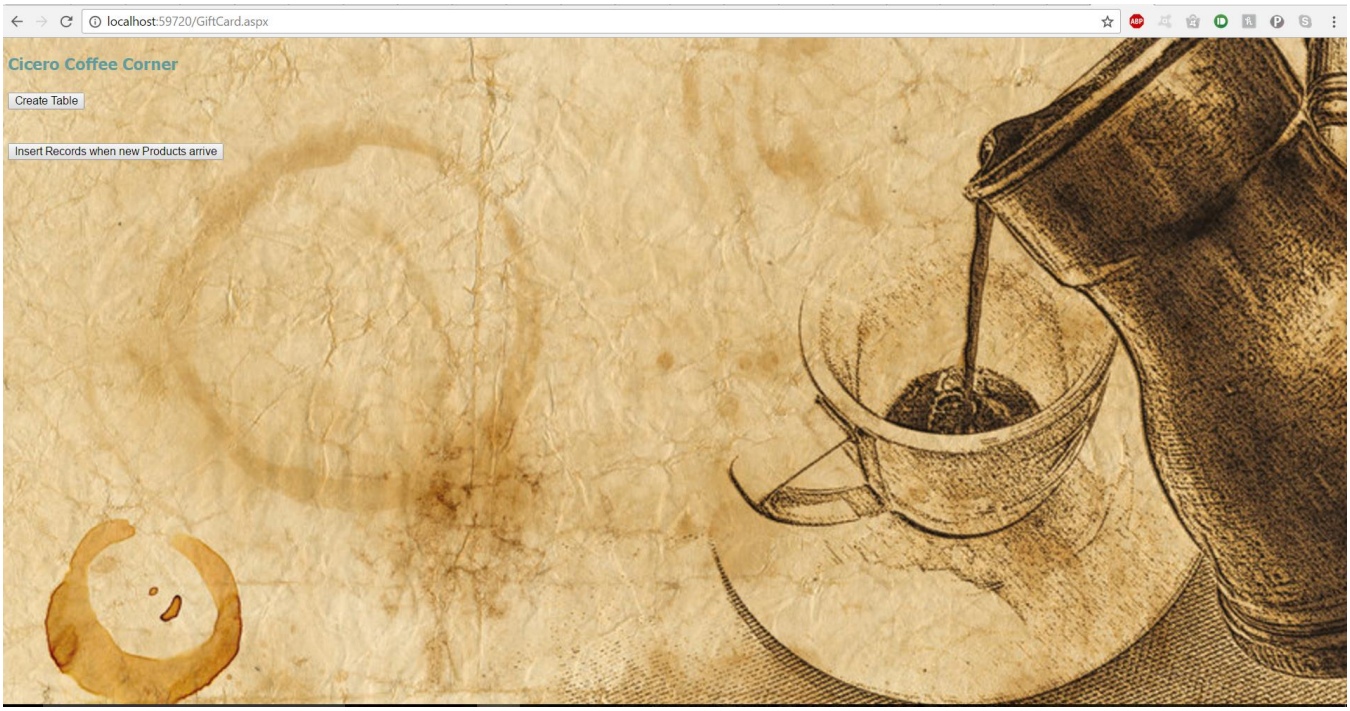
Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Sort.. | Filter:

	CUSTOMERNO	LASTNAME	STAFFID	STOREID	FIRSTNAME	CUSTLOCATION	ELITECUSTOMER
1	1	Shah	101	1001	Ricky	Skokie	No
2	2	Damen	102	1002	Jack	Aurora	Yes
3	3	Jones	103	1003	Emma	Niles	Yes
4	4	Dalhousie	104	1004	VIcky	Naperville	Yes
5	5	Samien	105	1005	John	Skokie	Yes
6	6	Shetty	106	1006	Colly	Skokie	Yes
7	7	Kutty	107	1007	Lily	Aurora	No
8	8	Lobo	108	1008	Jenny	Niles	No
9	9	Carvalho	109	1009	Sarah	Niles	No
10	10	Ponting	110	1010	Samuel	Naperville	No

MENU PAGE:

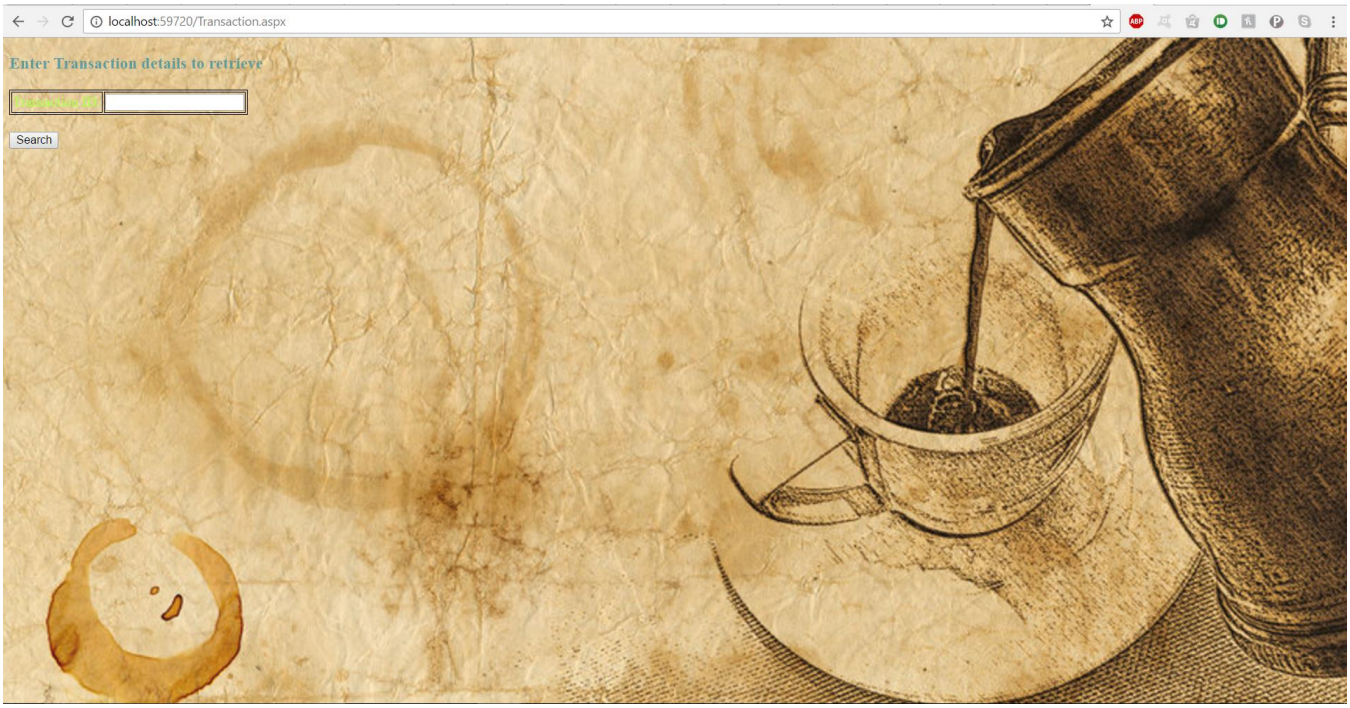
GIFTCARD TABLE:



PRODUCTS VIEW:

RETRIEVE PRODUCT DETAILS:

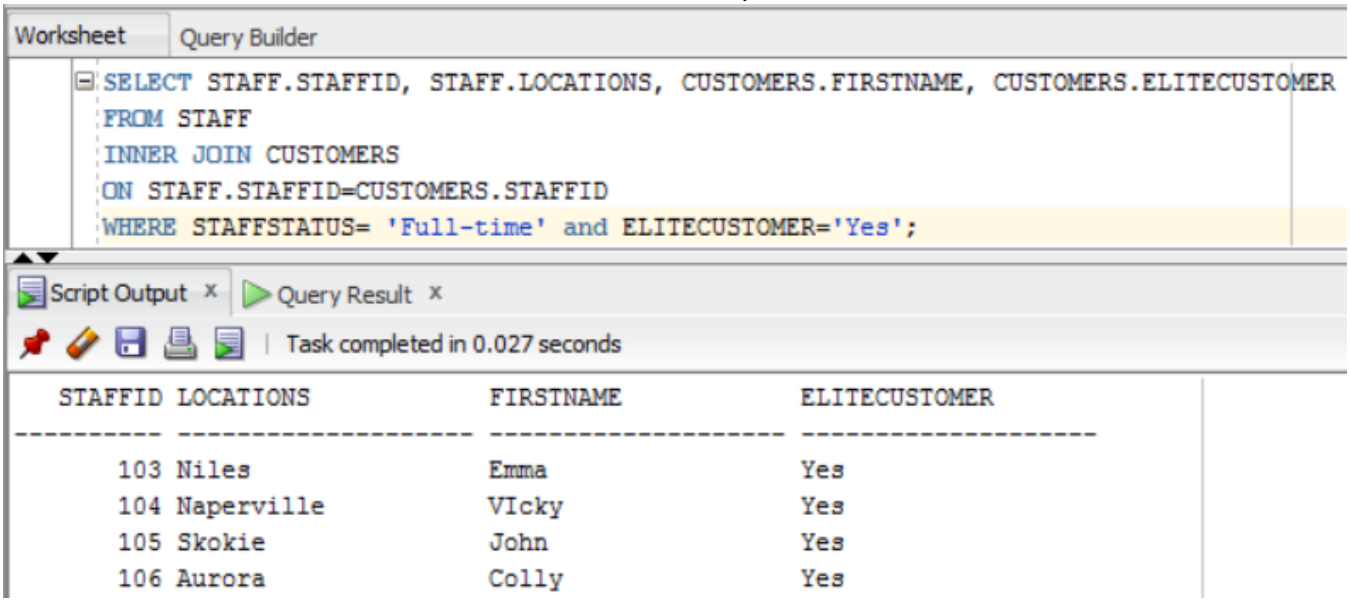
ORDER TRANSACTION DETAILS:



PHASE 8: TESTING THE DATABASE SYSTEM

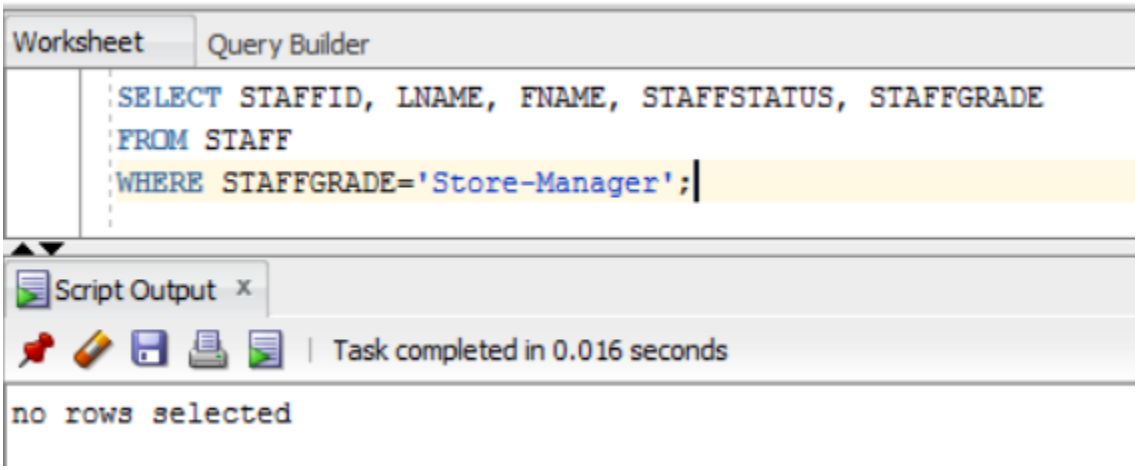
1)This query checks connectivity between staff and customers table. It gives the list of full-time employees who give special services to Elite customers.

```
SELECT STAFF.STAFFID, STAFF.LOCATIONS, CUSTOMERS.FIRSTNAME, CUSTOMERS.ELITECUSTOMER
FROM STAFF
INNER JOIN CUSTOMERS
ON STAFF.STAFFID=CUSTOMERS.STAFFID
WHERE STAFFSTATUS= 'Full-time' and ELITECUSTOMER='Yes';
```



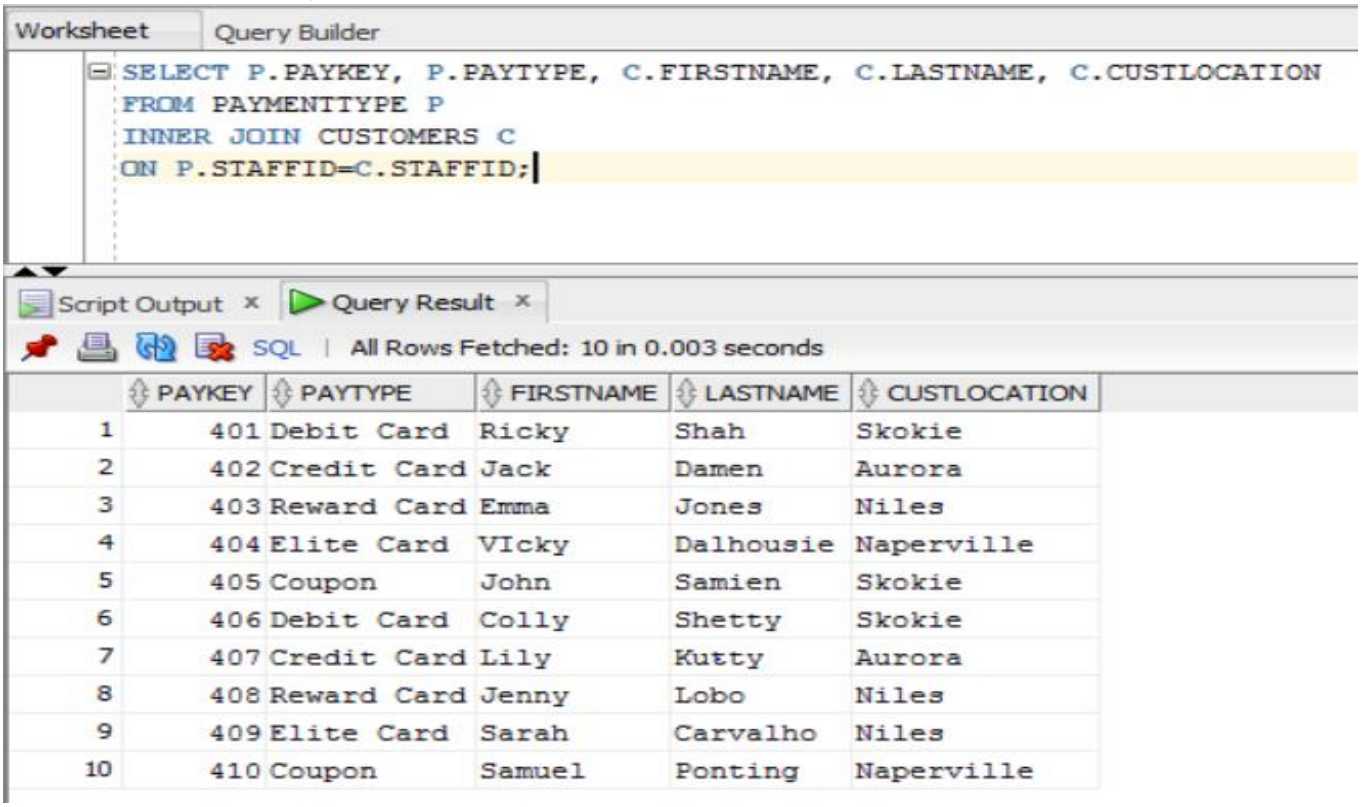
2)This query checks for consistent valid data in staff table. This query fails because there is no staff with grade of store manager. Instead there is a staff grade of Manager.

```
SELECT STAFFID, LNAME, FNAME, STAFFSTATUS, STAFFGRADE
FROM STAFF
WHERE STAFFGRADE='Store-Manager';
```



3)This query checks for connectivity between payment type and customers table.

```
SELECT P.PAYKEY, P.PAYTYPE, C.FIRSTNAME, C.LASTNAME, C.CUSTLOCATION
FROM PAYMENTTYPE P
INNER JOIN CUSTOMERS C
ON P.STAFFID=C.STAFFID;
```



	PAYKEY	PAYTYPE	FIRSTNAME	LASTNAME	CUSTLOCATION
1	401	Debit Card	Ricky	Shah	Skokie
2	402	Credit Card	Jack	Damen	Aurora
3	403	Reward Card	Emma	Jones	Niles
4	404	Elite Card	VIcky	Dalhousie	Naperville
5	405	Coupon	John	Samien	Skokie
6	406	Debit Card	Colly	Shetty	Skokie
7	407	Credit Card	Lily	Kutty	Aurora
8	408	Reward Card	Jenny	Lobo	Niles
9	409	Elite Card	Sarah	Carvalho	Niles
10	410	Coupon	Samuel	Ponting	Naperville

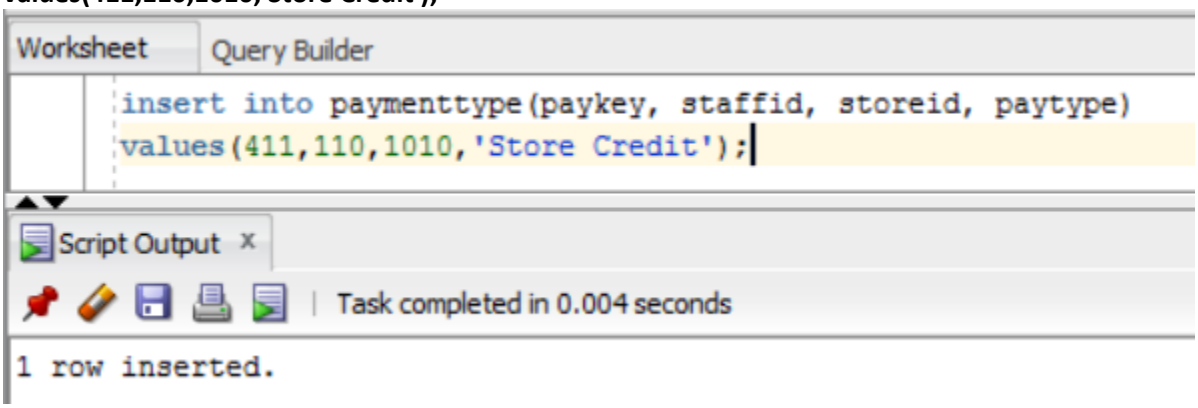
4)This query is for adding a new staff member to existing staff records

```
INSERT INTO staff(staffid, lname, fname, locations, staffstatus, staffshift, staffgrade)
        VALUES(111, 'Granger', 'Daniel', 'Niles', 'Part-time', 'Evening', 'Trainee');
 INSERT INTO staff(staffid, lname, fname, locations, staffstatus, staffshift, staffgrade)
        VALUES(112, 'Cole', 'Ash', 'Aurora', 'Full-time', 'Morning', 'Trainee');
 INSERT INTO staff(staffid, lname, fname, locations, staffstatus, staffshift, staffgrade)
        VALUES(113, 'Kohl', 'Mishy', 'Skokie', 'Full-time', 'General', 'GradeII');
```

	STAFFID	LNAME	FNAME	LOCATIONS	STAFFSTATUS	STAFFSHIFT	STAFFGRADE
1	101	Sharif	Manu	Skokie	Part-time	General	Manager
2	102	Cook	Tim	Aurora	Part-time	Morning	Trainee
3	103	Weidman	Savino	Niles	Full-time	Evening	GradeII
4	104	Pompa	Verlie	Naperville	Full-time	Evening	GradeI
5	105	Batt	Ellina	Skokie	Full-time	Night	GradeII
6	106	Kazee	Adell	Aurora	Full-time	Night	GradeII
7	107	Patel	Joel	Niles	Part-time	General	Manager
8	108	Frutos	Joshua	Naperville	Part-time	Morning	GradeI
9	109	Revis	Stan	Skokie	Full-time	Morning	GradeII
10	110	Paul	Sandra	Aurora	Part-time	General	GradeI
11	111	Granger	Daniel	Niles	Part-time	Evening	Trainee
12	112	Cole	Ash	Aurora	Full-time	Morning	Trainee
13	113	Kohl	Mishy	Skokie	Full-time	General	GradeII

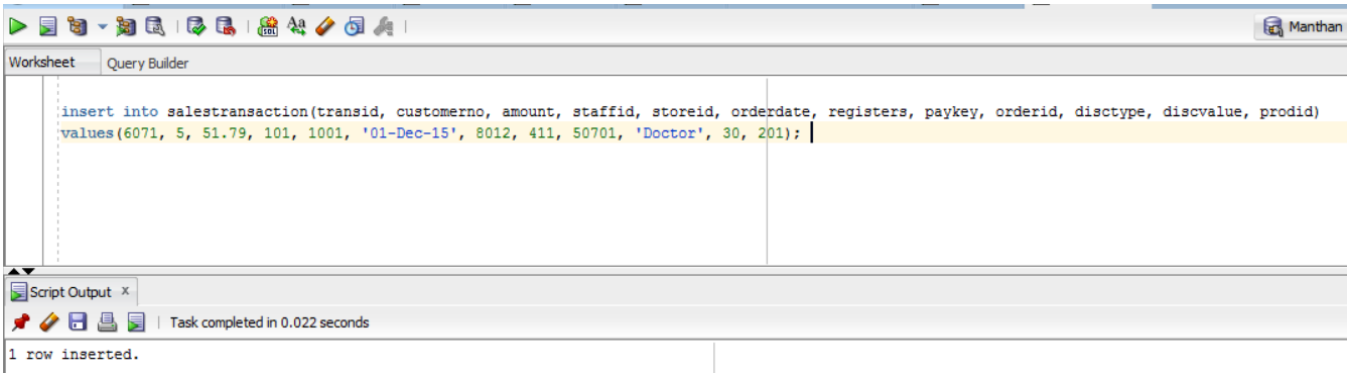
5)This query is to add new mode of payment

```
insert into paymenttype(paykey, staffid, storeid, paytype)
values(411,110,1010,'Store Credit');
```



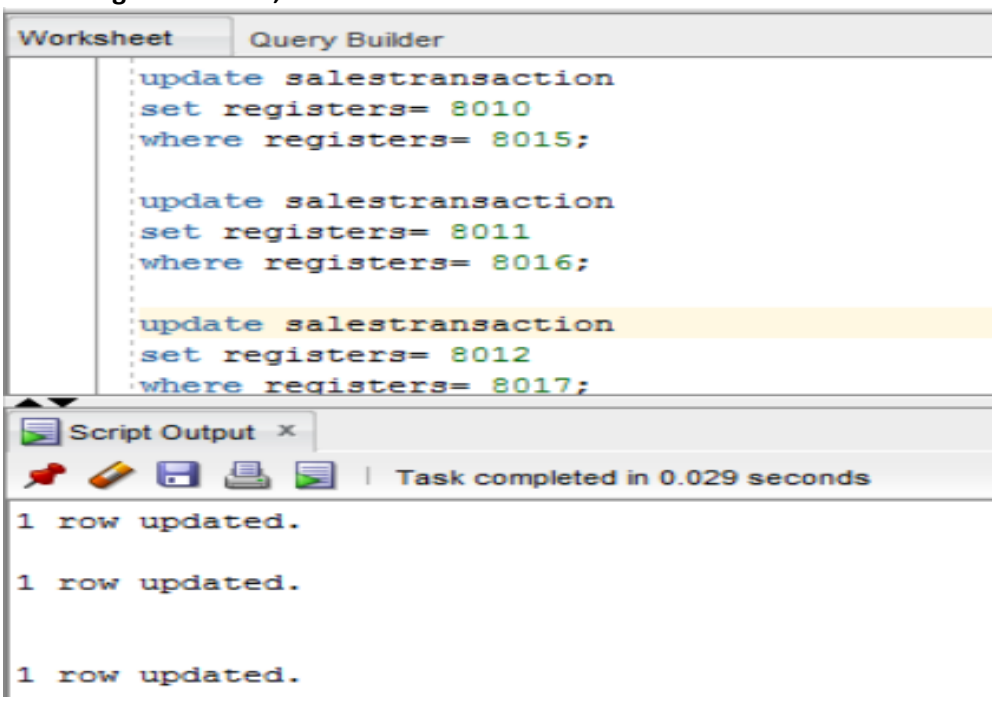
6)This query is to add a new category of discount

```
insert into salestransaction(transid, customerno, amount, staffid, storeid, orderdate, registers, paykey,
orderid, disctype, discvalue, prodid)
values(6071, 5, 51.79, 101, 1001, '01-Dec-15', 8012, 411, 50701, 'Doctor', 30, 201);
```



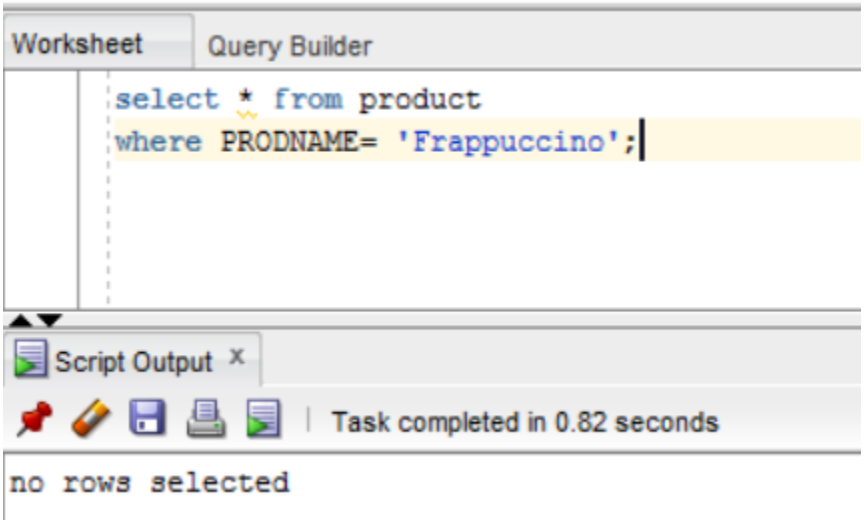
7)This query is to update the transactions of few registers which went out of order to other registers

```
update salestransaction
set registers= 8010
where registers= 8015;

update salestransaction
set registers= 8011
where registers= 8016;

update salestransaction
set registers= 8012
where registers= 8017;
```



8)This query is used to find whether product is available in product table or no to check the validity

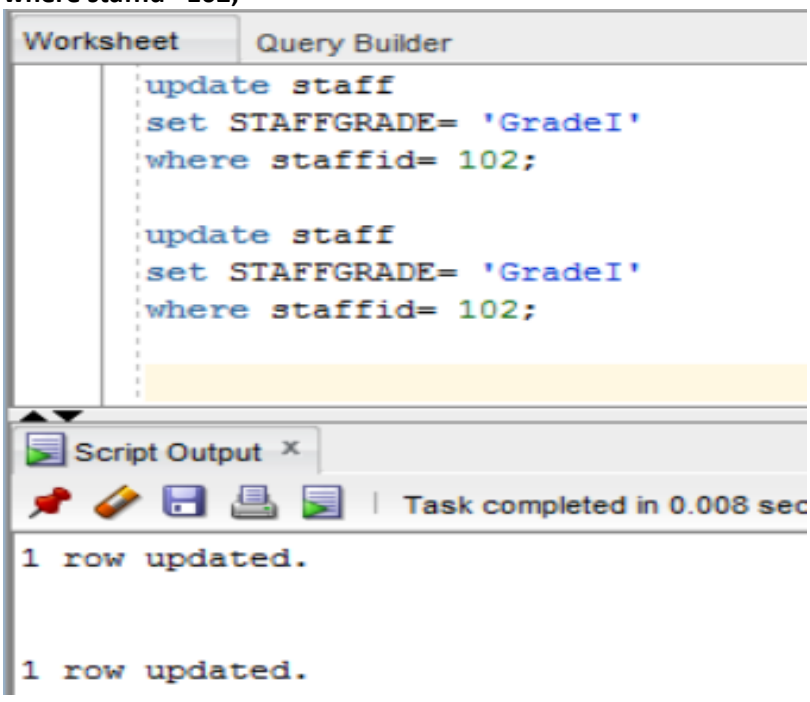
```
select * from product
where PRODNAME= 'Frappuccino';
```



9) This query is to promote two trainees to grade of grade I employees

update staff
set STAFFGRADE= 'GradeI'
where staffid= 102;

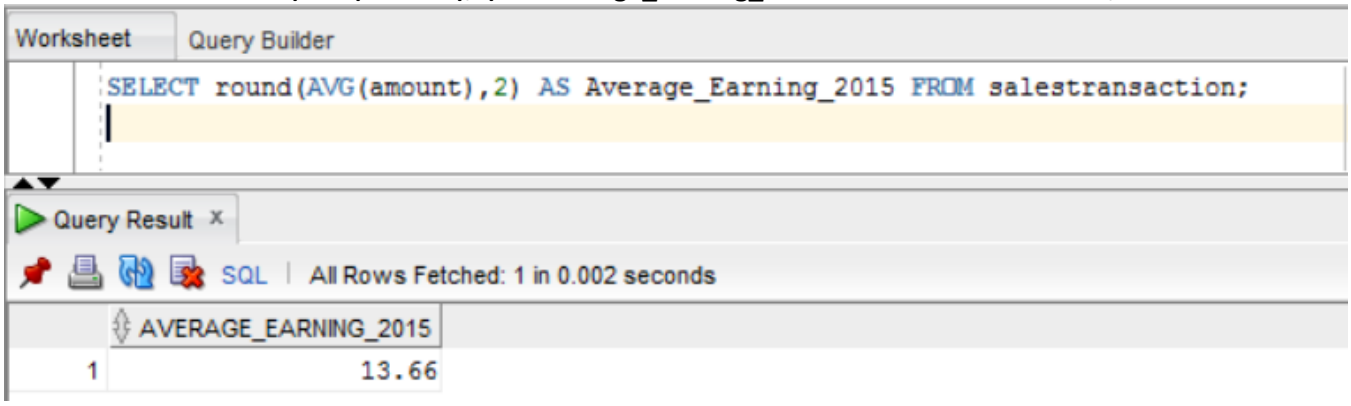
update staff
set STAFFGRADE= 'GradeI'
where staffid= 102;



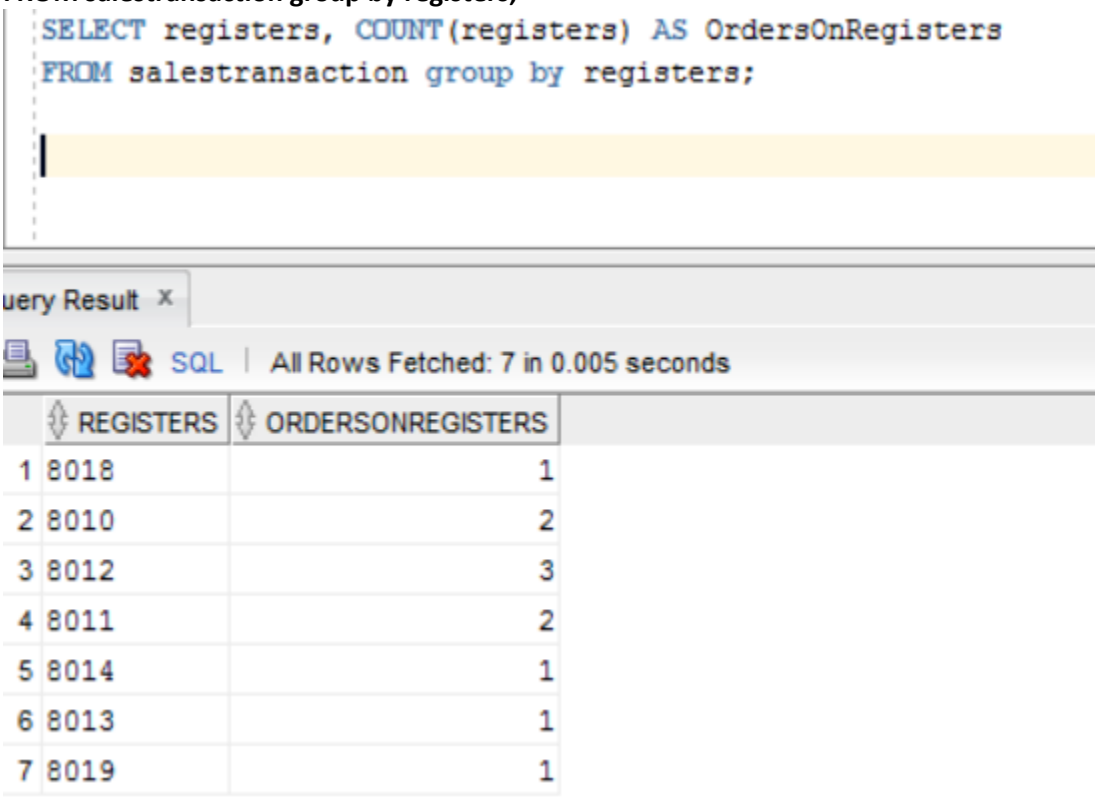
PHASE 9: DATA ANALYTICS PERFORMED

Sample queries for data analytics:

- Computing average earning in 2015 year
  SELECT round(AVG(amount),2) AS Average_Earning_2015 FROM salestransaction;

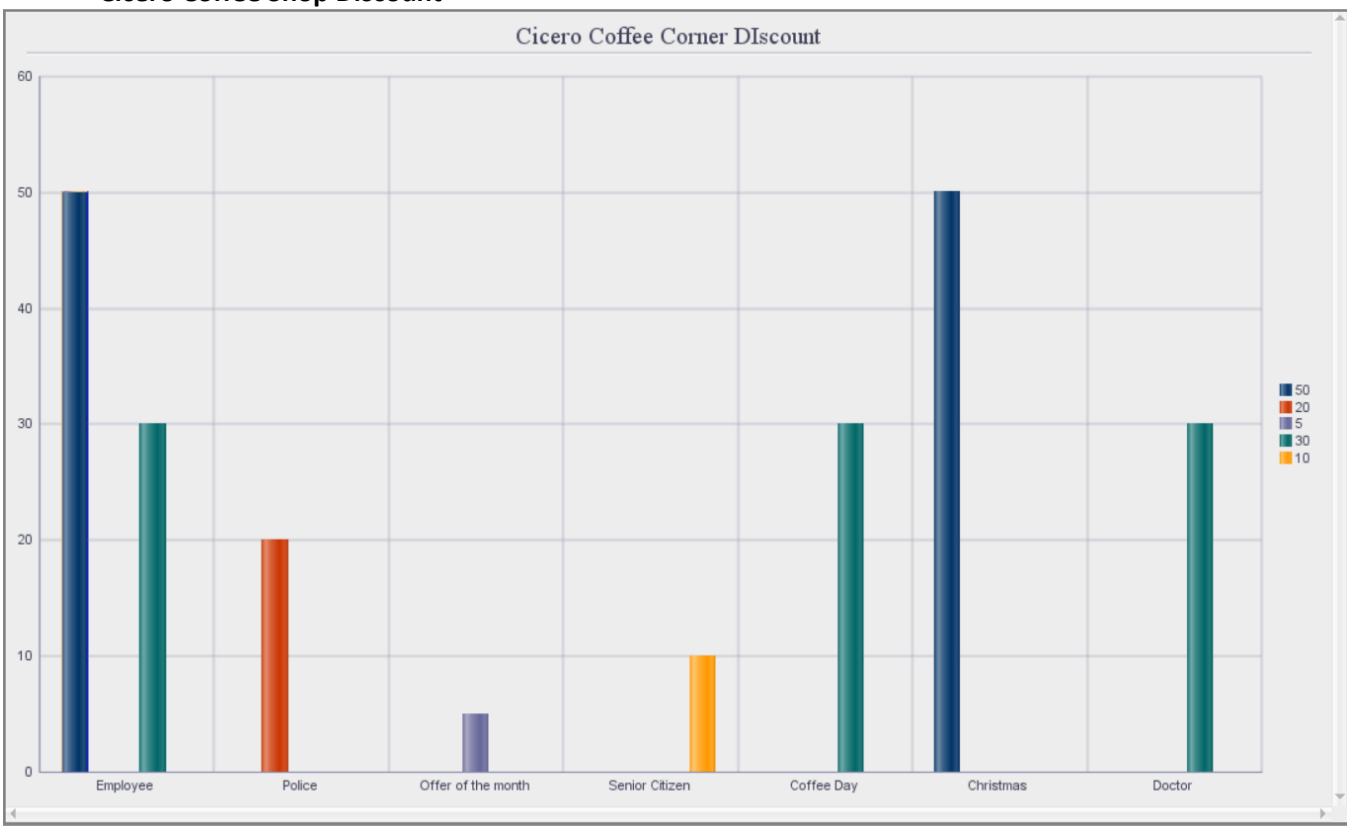


- Getting count of orders placed on registers
  SELECT registers, COUNT(registers) AS OrdersOnRegisters
  FROM salestransaction group by registers;



	REGISTERS	ORDERSONREGISTERS
1	8018	1
2	8010	2
3	8012	3
4	8011	2
5	8014	1
6	8013	1
7	8019	1

- **Cicero Coffee Shop Discount**



PHASE 10: SYSTEM ANALYSIS AND VIEWPOINTS

Overall performance of Cicero coffee corner application can be finely reviewed through each of these occupations/ professions wiz. Business intelligence, Data Gravity, Data Management, Data Mining, Data Science, and Predictive Analytics.

1) Business Intelligence: CCC is benefitted by business intelligence as it helps to improve their business efficiency by gathering and information analytics which leads in decision making and improving customer service.
2) Data Gravity: CCC type retail business have great density of data. Data gravity is about aggregation of data in cloud provided architecture which facilitates scaling, low-latency and high data analyzing bandwidth.
3) Data Management: CCC type retail business generates large amount of data which increases the level of complexity of managing the data across database. Database management provides central repository within the database which facilitates efficient synchronization among several heterogeneous applications internally used.
4) Data Mining: Data mining view for CCC type retail businesses helps in analyzing data from various angle. This analysis helps in gaining very essential information like revenue generation, product count, product sale etc.
5) Data Science: Data of CCC is of large volume and variety which expands every year. With respect to data science field, data of CCC is analyzed to extract knowledge in various forms which is a resultant of data analysis such as statistics, machine learning, predictive analysis etc.

6) Predictive Analytics: For CCC type retail business, predictive analytics helps in analyzing stocks, inventory management, location, and process improvement for the same.