A Project Report

on

ONLINE PURCHASING MANAGEMENT SYSTEM

to be submitted in partial fulfilling of the requirements for the course on

Database Management Systems – ITE1003

(A2)

by

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(Deemed to be University under section 3 of UGC Act, 1956)

Fall Semester 2020-2021

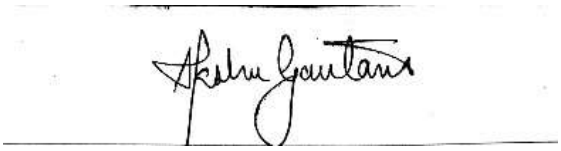
ACKNOWLEDGEMENT

We would like to express our heartfelt gratitude to Professor Dharmendra Singh Rajput from School of Information Technology, VIT Vellore, for his patient guidance, enthusiastic encouragement and useful critiques of this project work.

We would also like to thank our fellow friends, for their assistance in keeping our progress on schedule.

Finally, we wish to thank our parents for their constant support and encouragement throughout our study.

Akshu Gautam



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1. ABSTRACT

Online purchasing management is a form of electronic commerce which allows consumers to directly buy goods or services from a seller over the Internet using a web browser. Consumers find a product of interest by visiting the website of the retailer directly or by searching among alternative vendors using a shopping search engine, which displays the same product's availability and pricing at different e-retailers.

It is the combination of technology (hardware and software) and processes and procedures that oversee the monitoring and maintenance of stocked products, whether those products are company assets, raw materials and supplies, or finished products ready to be sent to vendors or end consumers. This system can widely be used by normal shops, departmental stores or MNCs for keeping a proper track of the stock. It also consists of information like manager details, customer details etc. With the help of this system we can fix a minimum quantity of any product below which we need to place an order for that product. This will help us in good sales results and never the out of stock stage for any product.

If shops are providing an online portal where their customers can enjoy easy shopping from anywhere, the shops won't be losing any more customers to the trending online shops such as flipkart or ebay. Since the application is available in the Smartphone it is easily accessible and always available.

2. INTRODUCTION

Growth of e-commerce in India is the driving factor. E-commerce is growing all over the world. India is not far behind in the same, especially in times of a global pandemic. Starting some with statistics India has an internet user base of about 475 million as of July 2018, about 40% of the population. Despite being the second largest user base in world, only behind China (650 million, 48% of population), the penetration of e-commerce is low compared to markets like the United States (266 million, 84%), or France (54 M, 81%), but is growing, adding around 6 million new entrants every month.

In India too, E-commerce has initiated new way of distribution channel and online shopping tendency to increase the needs and wants of customer. Due to change in information technology, e commerce is emerged and played in industry arena by the way of selling the product and services. Ecommerce is the trading the product and services using the network and internet tools. Technology supports the new initiative and attitude of customer buying behavior. Various studies have been initiated to understand the attitude and behavior of customer by using online shopping. It is found that online shopping support towards ease accessibility, timeless, perceived risk, product features and attribute have more impact in buying intention.

3. OBJECTIVES

- Manage details of customers, products, payments, bills, stores
- To forecast the sales by analyzing the previous sales statistics
- We can reduce the chances of any kind of frauds.
- Customer information can be maintained for business purposes.

- To keep a track of transactions to understand financial trends and peak points beneficial to business.

4. FEATURES

- Provides searching facilities based on various factors and demands.
- Detailed tracking of all information.
- No invalid values in any place of any vital information.
- Allows filtered reports of payments, customers, products etc.
- Details can be easily exported as pdf file or csv file.
- Increased management efficiency.
- Integration of various records.
- Editing, adding, updating of records is improved which leads to proper resource management.

5. REQUIREMENTS

Functional:

- Any member can register and view available products but only registered member can purchase products regardless of quantity.
- Deactivation of user accounts who have been inactive. This involves having an empty cart and no order history since last 6 months or more.
- Removal of products which have gone out of stock. Scenarios involving modification of existing data:
- Updating user information if there is change in password.

- Change in prices of items with time or at the time of sale. Scenarios involving data retrieval:
- At billing time, the items in the shopping cart will be presented as an order.
- Usually, the customer will be asked to fill shipping address, a shipping option, and payment information such as credit card number.
- Retrieval of bill (if any) for sending a confirmation email to the customer after order is placed.
- Check order history in order to check activity of users. There are three roles available: Visitor, User and Admin.
- Visitor can view available products.
- User can view and purchase products.
- Once users order item, they are able to see ordered products and grand total.
- Admin can add products, edit product information and add/remove product. Admin can add user, edit user 5 information, remove user.
- Admin can ship order to user based on order placed by sending confirmation mail.

Non-Functional:

Privacy:-

- Pages of the website must be access in the way they were intended to be accessed.
- Included files shall not be accessed outside of their parent file. Administrator can only perform administrative task on pages they are privileged to access.

Efficient:-

- Page loads should be returned and formatted in a timely fashion depending on the request being made.
- Administrators will have the ability to edit the aspects of the order forms, product descriptions, prices and website directly

Data:

This is an Online purchasing database in which customers can view the products, add them to cart and order them. To be able to purchase they must register. Each registered Customer will have a unique user_ID as primary key, Name and Password as saved information and Password cannot be null. The Products list will have many products with each one of them having a unique P_Id, Name, Price. The Cart will have primary keys: user_ID and P_Id as it's foreign key. Categories of a product will also have P_Id as their foreign key and a category_name. Information regardinf each Store will have a unique S_Id as primary key, S_Name and Number and Address which may be NULL.

6. REVIEW 1 (SURVEY, ANALYSIS)

Survey study

Internet makes life simple and innovative. People are doing business online and trade has become more easy and fast due to this. Internet provides new ways to promote business. Website becomes the essence of online business as to show their services and products. Internet gathers all competitors and consumers in one place.

It brings new lane to promote, advertise products and services in market (Barry Silverstein, 2002, p. 3).

Total global E-commerce sale in 2011 have grown to Euro 690 billion (USD 961 billion) and recorded an increase of 20 % with an estimation of increase in the coming years and to cross the 1 trillion Euro mark in 2013. Asia pacific region is leading in terms of growth as compared to mature markets like US, UK, Japan and European countries. Asia Pacific recorded 130 % growth specially China in 2011. The online retailing is becoming an integral part of an economy and country and worldwide increasingly seeing trust and confidence in purchasing online. (AadWeening, 2012)

Online consumers are always seeking new products, new attractiveness and the most important thing being price compatibility with their budget. The internet is the best way to save time and money through purchasing online within their range of budget at home or in anywhere. Online consumers don't have limits to online shopping. They also use internet for comparison of prices of goods and services, news, visit social networks and search information and so on. The recession has so much impact on online consumer behavior (Rodriguez, 2009, p. 3).

Online shopping behavior depends on variables, internet knowledge and experience and last factor is shopping incentives. These are key determinants to influence the behavior of online consumers. Online seekers are the main sources of online shoppers always want to seek information within few clicks and reach to the most relevant information according to their requirements such as competitive brands, best price offers, product specification and consumer word 2005, p. 32).

Nielson Company explains the top 10 Global sites by % Active reach in these ranking, Google is in first position then Windows then Facebook which is the

social network website. According Neilson survey 47% online consumer in Middle East/ ndicate that they have online purchasing experience. It is the other region in the world. According to this survey report, purchasing of Electronic goods are in fourth position which is the highest ranking.

According to PriceGrabber survey, consumers are divided by age wise and then take into account the online shopping to clearly shown that older age online consumers. Why is it that? The answer is that older online consumers have so much impact on online consumer behavior (Rodriguez, 2009, p. 3). Online shopping behavior depends on four factors such as Shopping motives, personality variables, internet knowledge and experience and last factor is shopping incentives. These are key determinants to influence the behavior of online consumers. Online seekers are the main sources of online shopping. Online shoppers always want to seek information within few clicks and reach to the most relevant information according to their requirements such as competitive brands, best price offers, product specification and consumer word-of-mouth (Yuan G 1.1.3 Consumer Behavior over Internet According to Consumer Behavior Report, " One in four consumers indicated that they spend more time online because of the tough economy and 53 percent of consumers said they spend about the same amount of time online".

Consumer behavior in electronics environment is critical as compared to physical world and crucial understanding can be examined if the factors that affect the purchase decisions are ignored and unambiguous. Online consumers fear the opportunity to physically examine the product which is specifically regarded as influential factor in purchase decision. Therefore, consumer behavioral pattern in online shopping can be fundamentally different from traditional environment. (Sajjad, May 2012)

Analysis:

There are three main roles available: Visitor, User and Admin.

- Visitor can view available products.
- User can view and purchase products. Once users order item, they are able to see ordered products and grand total.
- Admin can add products, edit product information and add/remove product. Admin can add user, edit user 5 information, remove user. Admin can ship order to user based on order placed by sending confirmation mail.

Scenarios involving removal of old data:

- Deactivation of user accounts who have been inactive. This involves having an empty cart and no order history since last 6 months or more.
- Removal of products which have gone out of stock.

Scenarios involving modification of existing data:

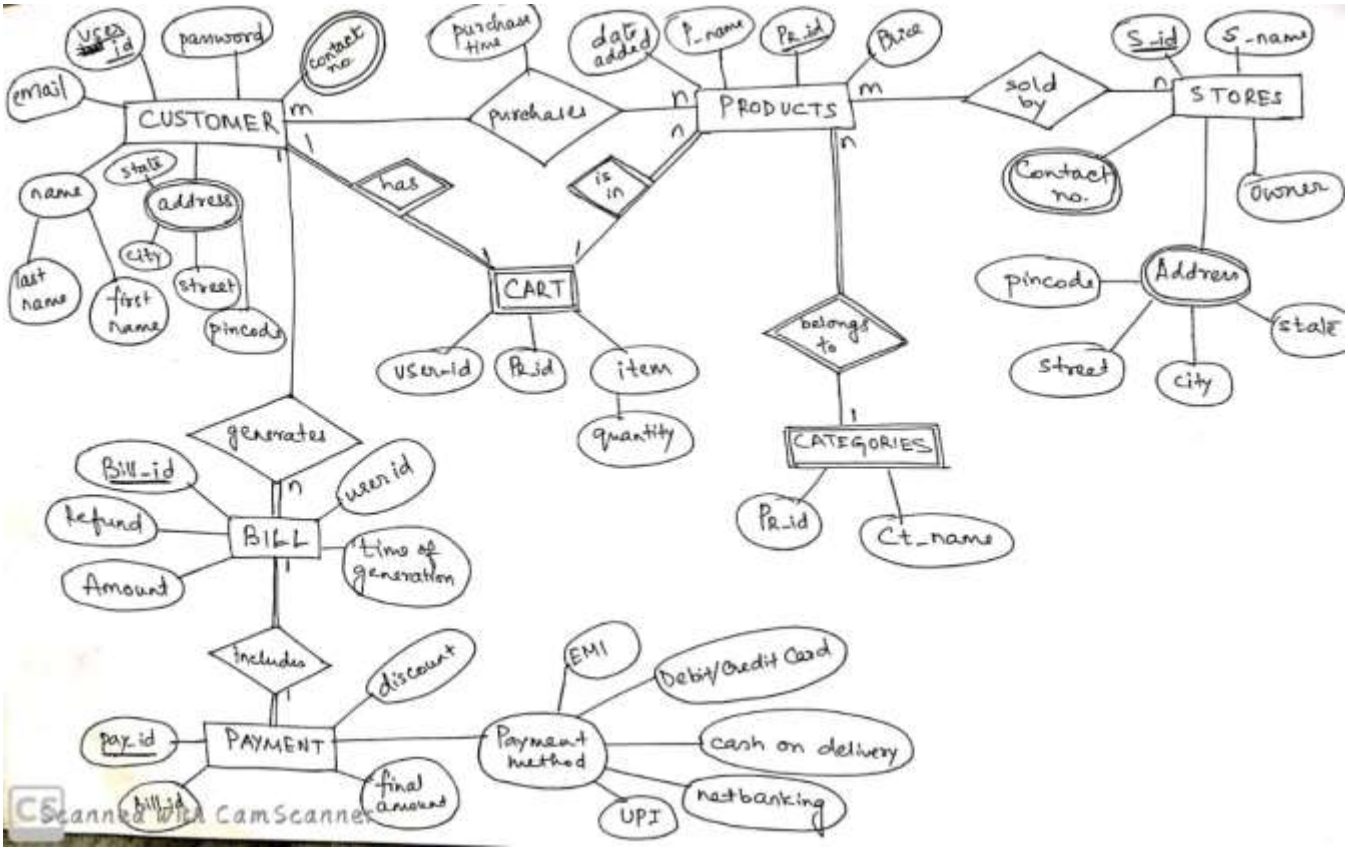
- Updating user information if there is change in password.
- Change in prices of items with time or at the time of sale.

Scenarios involving data retrieval:

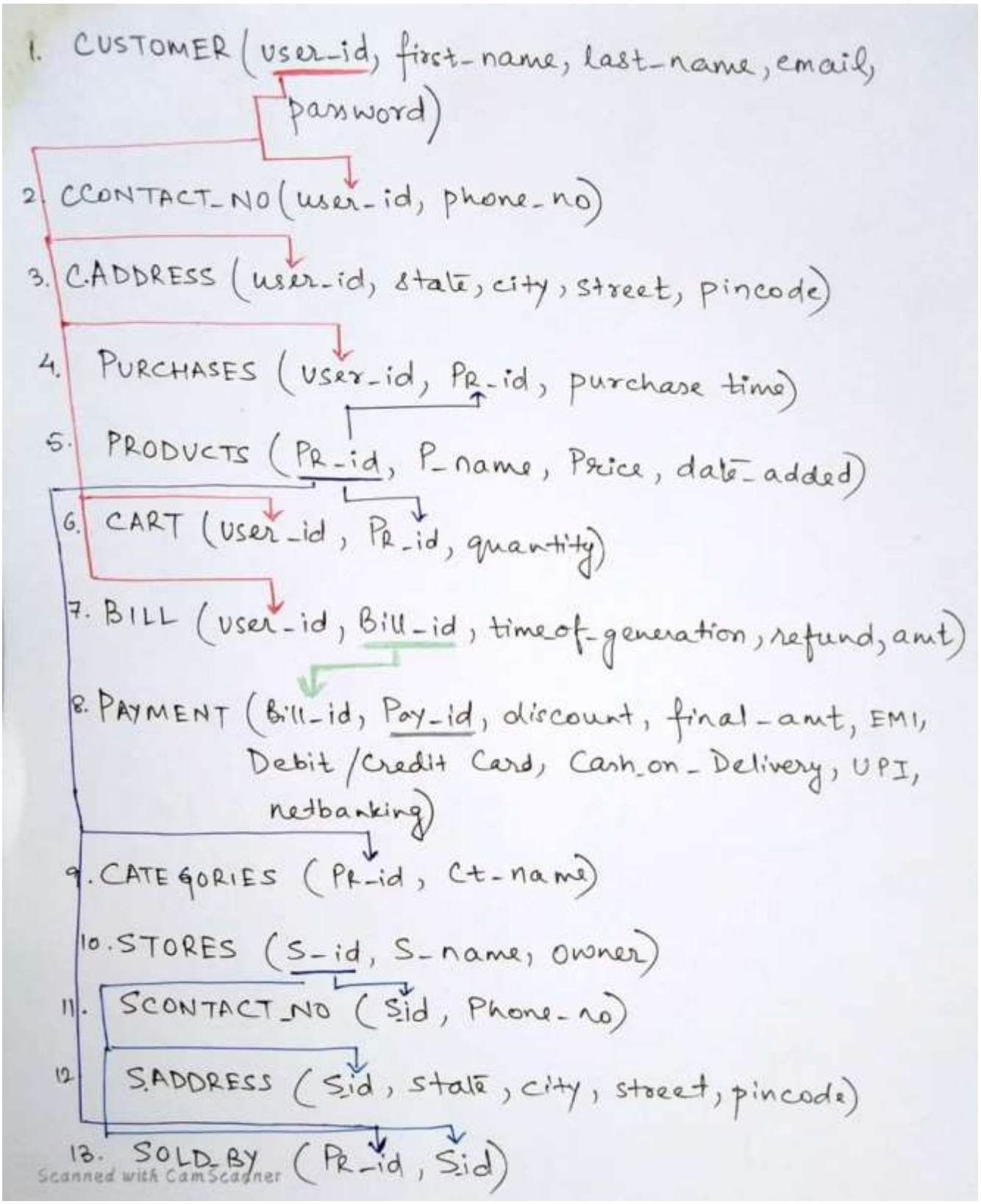
- At billing time, the items in the shopping cart will be presented as an order.
- Usually, the customer will be asked to fill shipping address, a shipping option, and payment information such as credit card number.
- Retrieval of bill (if any) for sending a confirmation email to the customer after order is placed.
- Check order history in order to check activity of users.

7. REVIEW 2 (DIAGRAM AND PROTOTYPE)

ER Diagram showing the inter relationship between various component entities.



Conversion of ER Diagram into relational database schema



Scanned with CamScanner

Important integrity constraints

1. All the primary keys should be uniform such as user_id should be like ‘U0001’, pr_id like ‘PR001’, Bill_id like ‘B0001’, Pay_id like ‘PY001’ and S_id like ‘S0001’.
2. All the phone_no attributes should hold number value only of exactly 10 digits.
3. ‘Quantity’ attribute in the ‘Cart’ entity should hold numerical value only as it denotes number of items.
4. Appropriate data type and size should be chosen for each attribute.
5. Each table should be filled with appropriate, valid and meaningful data.
6. Appropriate integrity constraints should be used while creating tables (NULL, NOT NULL, FOREIGN KEY, CHECK)
7. Category names of the products can be of type cosmetics, electronics, groceries, fashion apparels, baby products, home décor, books, stationaries etc.
8. Out of the various available payment options, one should be opted by the customer, rest all set to null.

Functional dependencies

A functional dependency A->B in a relation holds if two tuples having same value of attribute A also have same value for attribute B.

Customer: user_id->first_name, user_id->last_name, user_id->email, user_id->password.

Attribute closure: (user_id)+ = {user_id, first_name, last name, email, password}

CContact_No: user_id->phone_no

C.Address: user_id->state, user_id->city, user_id->street, user_id->pincode.

pincode->city, pincode->state

city->state

Purchases: user_id,pr_id->purchase_time, user_id,purchase_time->user_id

Products: pr_id->p_name, pr_id->price, pr_id->date_added_to_stock

Cart: user_id, pr_id->quantity

Bill: Bill_id->time_of_generation, bill_id->refund,bill_id->amt, bill_id->user_id.

Payments: pay_id->discount, pay_id->final_amt, pay_id->payment_methods.

Categories: pr_id->ct_name.

Stores: s_id->s_name,s_id->owner.

SContact_No: s_id->phone_no

S.Address: s_id->state, s_id->city, s_id->street, s_id->pincode.

pincode->city, pincode->state

city->state

Sold_by: pr_id->s_id, s_id->pr_id.

Normalization

1. *First Normal Form –*

If a relation contains composite or multi-valued attribute, it violates first normal form or a relation is in first normal form if it does not contain any composite or multi-valued attribute. A relation is in first normal form if every attribute in that relation is **singled valued attribute**.

As seen from above, it can be said that all the tables are already in 1NF.

2. *Second Normal Form –*

   A relation is in 2NF if it has **No Partial Dependency,** i.e.**,** no non-prime attribute (attributes which are not part of any candidate key) is dependent on any proper subset of any candidate key of the table.

   No such dependency is observed above.

3. *Third Normal Form –*

   A relation is in third normal form, if there is **no transitive dependency** for non-prime attributes as well as it is in second normal form.

   In the above tables, transitive dependency is observed for the customer address and store address relations.

   This is because

   user_id->city, user_id->pincode.

   pincode->city, pincode->state

   s_id->city, s_id->pincode.

   pincode->city, pincode->state

   So the relation will be decomposed as separate relations

i.e. C.Address(user_id, street, pincode)

C.Address_pin(pincode, city, state)

S.Address(s_id, street, pincode)

S.Address_pin(pincode, city, state)

Again transitive dependency is observed as pincode->city, city-> state.

So further decomposition into 2 separate relations as
S.Address_pin_city(pincode, city)

S.Address_pin_state(city, state)

4. *Boyce-Codd Normal Form –*

   A relation R is in BCNF if R is in Third Normal Form and for every FD, LHS is super key. A relation is in BCNF iff in every non-trivial functional dependency X –> Y, X is a super key or candidate key.

   Above tables are in BCNF as primary key itself is a candidate key.

Software application and database details

In this project, SQLPlus is used as the backend database. SQLPlus is an open source database management system. The features of SQLPlus are given below:

SQLPlus is a relational database management system. A relational database

- Stores information in different tables, rather than in one giant table. These tables can be referenced to each other, to access and maintain data easily.

- The database software can be used and modify by anyone according to their needs.
- It is fast, reliable and easy to use.
- To improve the performance, SQL is multithreaded database engine. (A multithreaded application performs many tasks at the same time as if multiple instances of that application were running simultaneously)
  E-commerce sites like Amazon & Flipkart will be definitely using both sql and Nosql technologies.

Alone sql is not sufficient for managing such large volumes of data. They must be using mixed of both technology and also using the core technologies like sharding and clustering. MongoDb is very popular choice when considering Nosql.

Proposed list of tables:

1. Customer
2. C.Contact_No
3. C.Address
4. Product
5. Cart
6. Bill
7. Payment
8. Category
9. Stores
10. S.Contact_No
11. Sold_by
12. S.Address

8. REVIEW 3 (MODEL DEVELOPMENT)

```
TABLE_NAME
------------------------------
BILL
CART
CATEGORIES
CCONTACT_NO
COUNTRIES
CUSTOMER
CUSTOMERS
C_ADDRESS
DEPARTMENTS
EMPLOYEES
JOBS

TABLE_NAME
------------------------------
JOB_HISTORY
LOCATIONS
PAYMENT
PRODUCTS
REGIONS
SOLD_BY
STORES
S_ADDRESS
S_CONTACTNO
```

Customers:

```
SQL> select * from Customers;

USER_ FIRST_NAME           LAST_NAME
----- -------------------- --------------------
EMAIL
--------------------------------------------------
PASSWORD
--------------------------------------------------
U0001 AMIT                 SHARMA
amitsharma@gmail.com
ghvkjulf03##$

U0002 NEETA                SINGH
neetasingh@gmail.com
hsgd123$#hh

USER_ FIRST_NAME           LAST_NAME
----- -------------------- --------------------
EMAIL
--------------------------------------------------
PASSWORD
--------------------------------------------------

U0003 AKSHU                GAUTAM
akshugautam@gmail.com
jhknm#*123

U0004 DEBASMITA            CHOUDHARY
debasmita12@gmail.com

USER_ FIRST_NAME           LAST_NAME
----- -------------------- --------------------
EMAIL
--------------------------------------------------
PASSWORD
--------------------------------------------------
kxbffddh#345

U0005 KRITIKA              GARG
kritika20@gmail.com
xfdvfd34#3
```

C.Contact_No:

```
SQL> Create table CContact_No(user_id varchar(5), phone_no varchar(10) not null check(length(phone_no)=10),foreign key(user_id) references Customers(user_id));

Table created.

SQL> insert into CContact_No values ('U0001',9023658470);

1 row created.

SQL> insert into CContact_No values ('U0002',8035674523);

1 row created.

SQL> insert into CContact_No values ('U0003',9034562356);

1 row created.

SQL> insert into CContact_No values ('U0004',9084562234);

1 row created.

SQL> insert into CContact_No values ('U0005',8074562456);

1 row created.
```

```
SQL> select * from CContact_No;

USER_ PHONE_NO
----- ----------
U0001 9023658470
U0002 8035674523
U0003 9034562356
U0004 9084562234
U0005 8074562456
```

Address

```
SQL> create table C_Address(user_id varchar(5), state varchar(10), city varchar(10), street varchar(10), pincode varchar(6), foreign key(user_id) references Customers(user_id));

Table created.

SQL> insert into C_Address values ('U0001','Goa','Panjim','123 sec-30','100042');

1 row created.

SQL> insert into C_Address values ('U0002','Punjab','Amritsar','456 sec-20','100102');

1 row created.

SQL> insert into C_Address values ('U0003','Haryana','Faridabad','156 sec-28','121008');

1 row created.

SQL> insert into C_Address values ('U0004','Chandigarh','','211 sec-18','121004');

1 row created.

SQL> insert into C_Address values ('U0005','Gujarat','Ahemdabad','265 sec-10','121002');

1 row created.
```

```
SQL> select * from C_Address;

USER_ STATE      CITY       STREET     PINCOD
----- ---------- ---------- ---------- ------
U0001 Goa        Panjim     123 sec-30 100042
U0002 Punjab     Amritsar   456 sec-20 100102
U0003 Haryana    Faridabad  156 sec-28 121008
U0004 Chandigarh            213 sec-18 121004
U0005 Gujarat    Ahemdabad  265 sec-10 121002
```

Product

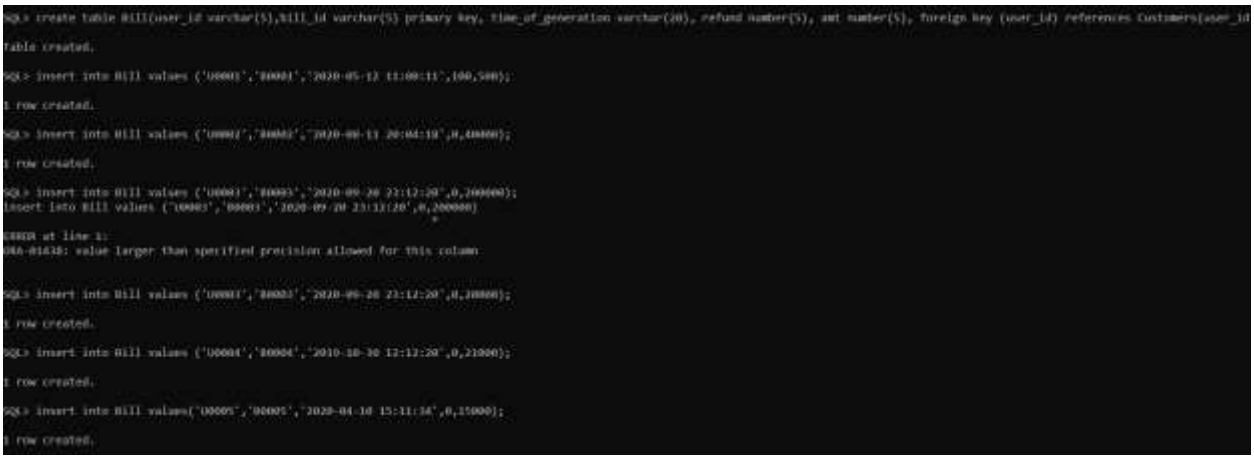
```
SQL> create table Products(PR_id varchar(5) ,P_name varchar(100), Price number(5), purchase_time varchar(20), primary key(PR_id));

Table created.

SQL> insert into Products values ('PR001','dettol soap','100','2020-05-12 11:00:11');

1 row created.

SQL> insert into Products values ('PR002','Mobile','20000','2020-08-11 20:04:18');

1 row created.

SQL> insert into Products values ('PR003','Laptop','200000','2020-09-20 23:12:20');
insert into Products values ('PR003','Laptop','200000','2020-09-20 23:12:20')
                                                *

ERROR at line 1:
ORA-01438: value larger than specified precision allowed for this column


SQL> insert into Products values ('PR003','Laptop','50000','2020-09-20 23:12:20');

1 row created.

SQL> insert into Products values ('PR004','Television','70000','2019-10-30 12:12:20');

1 row created.

SQL> insert into Products values ('PR005','Mobile','50000','2020-04-10 15:11:34');

1 row created.
```

```
SQL> select * from Products;

PR_ID
-----
P_NAME
--------------------------------------------------
     PRICE PURCHASE_TIME
---------- -------------------
PR001
dettol soap
       100 2020-05-12 11:00:11

PR002
Mobile
     20000 2020-08-11 20:04:18

PR_ID
-----
P_NAME
--------------------------------------------------
     PRICE PURCHASE_TIME
---------- -------------------

PR003
Laptop
     50000 2020-09-20 23:12:20

PR004
Television

PR_ID
-----
P_NAME
--------------------------------------------------
     PRICE PURCHASE_TIME
---------- -------------------
     70000 2019-10-30 12:12:20

PR005
Mobile
     50000 2020-04-10 15:11:34
```

Cart

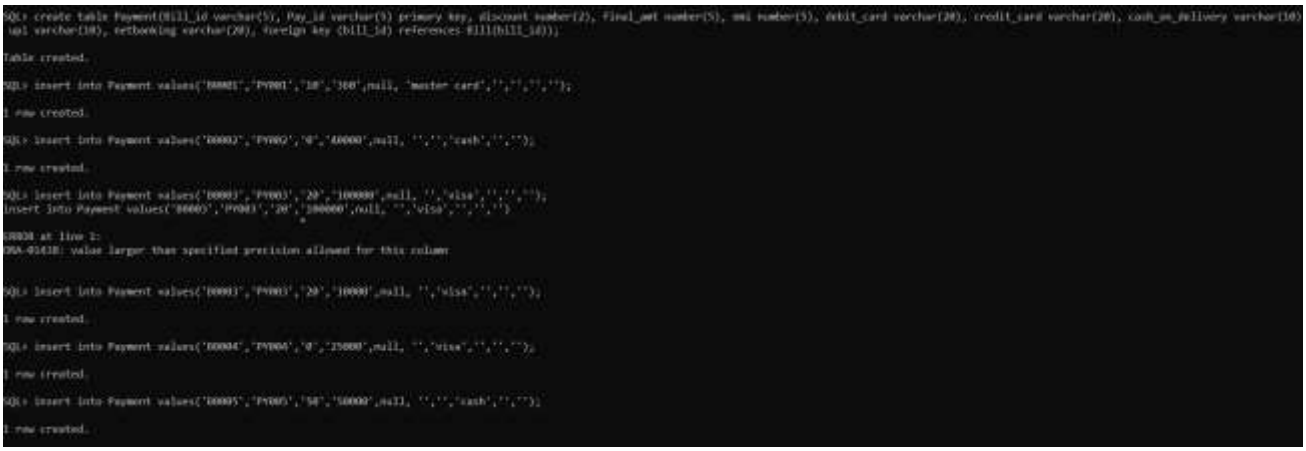
```
SQL> select * from cart;

USER_ PR_ID   QUANTITY
----- ----- ----------
U0005 PR005          2
U0001 PR001          4
U0002 PR002          2
U0003 PR003          1
```

Bill




```
SQL> select * from Bill;

USER_ BILL_ TIME_OF_GENERATION       REFUND        AMT
----- ----- -------------------- ---------- ----------
U0001 B0001 2020-05-12 11:00:11         100        500
U0002 B0002 2020-08-11 20:04:18           0      40000
U0003 B0003 2020-09-20 23:12:20           0      20000
U0004 B0004 2019-10-30 12:12:20           0      21000
U0005 B0005 2020-04-10 15:11:34           0      15000
```

Payment




```
SQL> select * from Payment;

BILL_ PAY_I   DISCOUNT  FINAL_AMT        EMI DEBIT_CARD
----- ----- ---------- ---------- ---------- --------------------
CREDIT_CARD          CASH_ON_DE UPI        NETBANKING
-------------------- ---------- ---------- --------------------
B0001 PY001          10         360          master card


B0002 PY002           0      40000
                      cash

B0003 PY003          20      10000
visa


BILL_ PAY_I   DISCOUNT  FINAL_AMT        EMI DEBIT_CARD
----- ----- ---------- ---------- ---------- --------------------
CREDIT_CARD          CASH_ON_DE UPI        NETBANKING
-------------------- ---------- ---------- --------------------
B0004 PY004           0      25000
visa

B0005 PY005          50      50000
                      cash
```

Category

```
SQL> create table Categories (PR_id varchar(5), ct_name varchar(50) not null, foreign key (PR_id) references Products(PR_id));

Table created.

SQL> insert into Categories (pr_id, ct_name) values('PR001', 'soaps');

1 row created.

SQL> insert into Categories (pr_id, ct_name) values('PR002', 'electronics');

1 row created.

SQL> insert into Categories (pr_id, ct_name) values('PR003', 'electronics');

1 row created.

SQL> insert into Categories (pr_id, ct_name) values('PR004', 'electronics');

1 row created.

SQL> insert into Categories (pr_id, ct_name) values('PR005', 'electronics');

1 row created.
```

```
SQL> select * from Categories;

PR_ID CT_NAME
----- --------------------------------------------
PR001 soaps
PR002 electronics
PR003 electronics
PR004 electronics
PR005 electronics
```

Stores

```
SQL> select * from stores;

S_ID  S_NAME
----- --------------------------------------------------
S_OWNER
--------------------------------------------------
S0001 balaji shop
Anna Raja

S0002 Global Electronics
Ravi Dubey

S0003 Electronic Plaza
Raja Babu


S_ID  S_NAME
----- --------------------------------------------------
S_OWNER
--------------------------------------------------
S0004 Global Electronics
Raja Babu

S0005 Cool Tech
Raja Babu
```

S_contact

```
SQL> select * from S_ContactNo;

S_ID  PHONE_NO
----- ----------
S0001 9874563210
S0002 9011563210
S0003 9111163000
S0004 8123444101
S0005 9911223344
```

Sold_by

```
SQL> select * from sold_by;

PR_ID S_ID
----- -----
PR001 S0001
PR002 S0002
PR003 S0003
PR004 S0004
PR005 S0005
```

S_address

```
SQL> select * from S_Address;

S_ID  STATE      CITY       STREET     PINCOD
----- ---------- ---------- ---------- ------
S0001 Haryana    Meerut     ali road   504269
S0002 Tamil Nadu Chennai    Ap road    102345
S0004 Karnataka  Bangalore  YZ road    601846
S0005 Punjab     Ambala     ABC road   502377
S0003 Karnataka  Bangalore  YZ road    601846
```

UPDATION

```
SQL> update Stores set s_name='INDIA ELECTRONICS' where s_id='S0005';

1 row updated.
```

```
SQL>  update Customers set email ='kg@gmail.com' where first_name ='Kritika';

0 rows updated.
```

```
SQL> Update Stores set s_owner='Babu Rao'  where s_id = 'S0005';

1 row updated.
```

DELETION

```
SQL> Delete  from cart where PR_id ='PR001';

1 row deleted.
```

```
SQL> Delete from Customers where user_id ='U0002';
Delete from Customers where user_id ='U0002'
*
ERROR at line 1:
ORA-02292: integrity constraint (HR.SYS_C0012178) violated - child record found
```

RETRIEVAL

```
SQL> select * from cart natural join Customers where user_id='U0003';

USER_ PR_ID   QUANTITY FIRST_NAME           LAST_NAME
----- ----- ---------- -------------------- --------------------
EMAIL
--------------------------------------------------
PASSWORD
--------------------------------------------------
U0003 PR003          1 AKSHU                GAUTAM
akshugautam@gmail.com
jhknm#*123
```

```
SQL> Select * from categories where PR_id ='PR003';

PR_ID CT_NAME
----- --------------------------------------------------
PR003 electronics
```

```
SQL> select distinct(s_name) from Stores;

S_NAME
--------------------------------------------
Global Electronics
INDIA ELECTRONICS
balaji shop
Electronic Plaza
```

```
SQL> select PR_id from Categories where ct_name='electronics';

PR_ID
-----
PR002
PR003
PR004
PR005
```

Trigger

1. Two customers cannot have the same password registered

```
create or replace trigger
checkPass before insert on
customer referencing new as n
for each row  declare rowcount
number; begin
select count(*) into rowcount from customer where password=:n.password; if
rowcount<>0 then
raise_application_error(-20001,'Password already in use');
end if;
end;
/
```

```
SQL> set serveroutput on
SQL> create or replace trigger checkPass
  2  before insert on customer
  3  referencing new as n
  4  for each row
  5  declare
  6  rowcount number;
  7  begin
  8  select count(*) into rowcount from customer where password=:n.password;
  9  if rowcount<>0 then
 10  raise_application_error(-20001,'Password already in use');
 11  end if;
 12  end;
 13  /

Trigger created.

SQL>
```

2. Minimum cost of product must be greater than 50

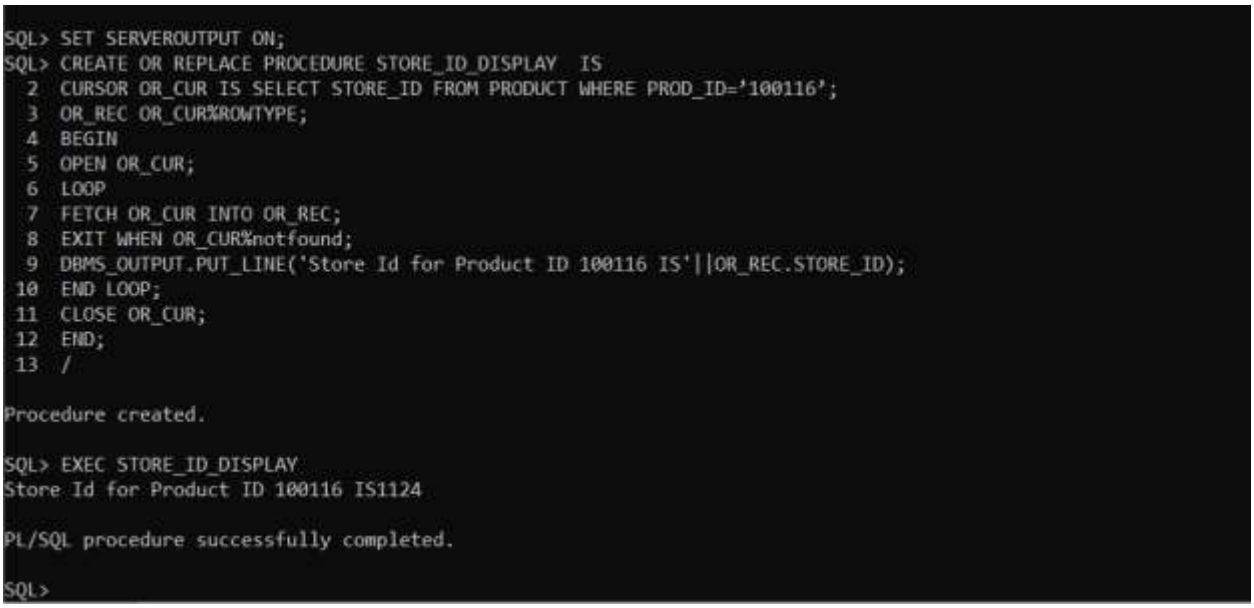
```
create or replace trigger totalcost before
insert on product referencing new as n old as
o for each row declare  total_cost
product.prod_price%type:=&price; p_id
product.prod_id%type:='&product_id'; begin
select prod_price into total_cost from product where prod_id=p_id;
if(total_cost>50) then
dbms_output.put_line('Accepted and procced further'); else
raise_application_error(-20002,'Not allowed less than 50');
end if; end;
/
```

```
SQL> set serveroutput on
SQL> create or replace trigger totalcost
  2  before insert on product
  3  referencing new as n old as o
  4  for each row
  5  declare
  6  total_cost product.prod_price%type:=&price;
  7  p_id product.prod_id%type:='&product_id';
  8  begin
  9  select prod_price into total_cost from product where prod_id=p_id;
 10  if(total_cost>50) then
 11  dbms_output.put_line('Accepted and procced further');
 12  else
 13  raise_application_error(-20002,'Not allowed less than 50');
 14  end if;
 15  end;
 16  /
Enter value for price: 10
old   6: total_cost product.prod_price%type:=&price;
new   6: total_cost product.prod_price%type:=10;
Enter value for product_id: 100115
old   7: p_id product.prod_id%type:='&product_id';
new   7: p_id product.prod_id%type:='100115';

Trigger created.
```

PL/SQL PROCEDURE:

Finding store id who is producing particular product with the help of product id

```
set serveroutput on;
create or replace procedure store_id_display (pro_id
varchar(6))  is
cursor or_cur is select store_id from product where
prod_id='100116'
or_rec or_cur%rowtype;
begin
open or_cur;
loop
fetch or_cur into or_rec;
exit when or_cur%notfound;
dbms_output.put_line('store id for product id 100116
is'||or_rec.prod_id);
end loop;
close or_cur;
end;
```



```
SQL> SET SERVEROUTPUT ON;
SQL> CREATE OR REPLACE PROCEDURE STORE_ID_DISPLAY  IS
  2  CURSOR OR_CUR IS SELECT STORE_ID FROM PRODUCT WHERE PROD_ID='100116';
  3  OR_REC OR_CUR%ROWTYPE;
  4  BEGIN
  5  OPEN OR_CUR;
  6  LOOP
  7  FETCH OR_CUR INTO OR_REC;
  8  EXIT WHEN OR_CUR%notfound;
  9  DBMS_OUTPUT.PUT_LINE('Store Id for Product ID 100116 IS'||OR_REC.STORE_ID);
 10  END LOOP;
 11  CLOSE OR_CUR;
 12  END;
 13  /

Procedure created.

SQL> EXEC STORE_ID_DISPLAY
Store Id for Product ID 100116 IS1124

PL/SQL procedure successfully completed.

SQL>
```

PL/SQL FUNCTION

Finding the payment method of a particular customer using invoice id

```
set serveroutput on;
create or replace function get_paymethod( x number)
return char is
method payment.payment_method%type;
begin
select payment_method into method from payment
where invoice_id=x;
return method;
end;
/
```

```
SQL> SET SERVEROUTPUT ON;
SQL> CREATE OR REPLACE FUNCTION GET_PAYMETHOD( X NUMBER) RETURN CHAR IS
  2  METHOD PAYMENT.PAYMENT_METHOD%TYPE;
  3  BEGIN
  4  SELECT PAYMENT_METHOD INTO METHOD FROM PAYMENT WHERE INVOICE_ID=X;
  5  RETURN METHOD;
  6  END;
  7  /

Function created.

SQL> SELECT GET_PAYMETHOD(5675) FROM DUAL;

GET_PAYMETHOD(5675)
--------------------------------------------------------------------------------
Debit Card
```

9. CONCLUSION

The entire project has been successfully developed keeping in view of the distributed client server computing technology, in mind. The specification has been normalized up to 4NF to eliminate all the anomalies that may arise due to the database transaction that are executed by the general users and the organizational administration. The internal database has been selected as SqlPlus. The basic constructs of table spaces, clusters and indexes have been exploited to provide higher consistency and reliability for the data storage. The SqlPlus was a choice as it provides the constructs of high-level reliability and security. At all proper levels high care was taken to check that the system manages the data consistency with proper business rules or validations.

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