Database Management System through web-Based Programming

Introduction

A database management system (DBMS) is a software package designed to define, manipulate, retrieve and manage data in a database. A DBMS generally manipulates the data itself, the data format, field names, record structure and file structure. It also defines rules to validate and manipulate this data. A DBMS relieves users of framing programs for data maintenance. Fourth-generation query languages, such as SQL, are used along with the DBMS package to interact with a database.

Examples of Database Applications

The following are examples of database applications:

• Computerized library systems

• Automated teller machines

• Flight reservation systems

• Computerized parts inventory systems

Advantages & Disadvantage

Physical data independence deals with hiding the details of the storage structure from user applications. The application should not be involved with these issues, since there is no difference in the operation carried out against the data. The data independence and operation independence together give the feature of data abstraction.

In Database Management System, a transitive dependency is a functional dependency which holds by virtue of transitivity. A transitive dependency can occur only in a relation that has three or more attributes. Let A, B, and C designate three distinct attributes (or distinct collections of attributes) in the relation. Suppose all three of the following conditions hold:

1. $A \rightarrow B$
2. It is not the case that $B \rightarrow A$
3. $B \rightarrow C$

Then the functional dependency $A \rightarrow C$ (which follows from 1 and 3 by the axiom of transitivity) is a transitive dependency.

Functional dependency is a relationship that exists when one attribute uniquely determines another *attribute*

For example, the elements writer, novel, and consumer may be described using ER diagrams this way: ER diagram with basic objects

In the diagram, the elements inside rectangles are called entities while the items inside diamonds denote the relationships between entities.

ER Model is represented by means of an ER diagram. Any object, for example, entities, attributes of an entity, relationship sets, and attributes of relationship sets, can be represented with the help of an ER diagram.

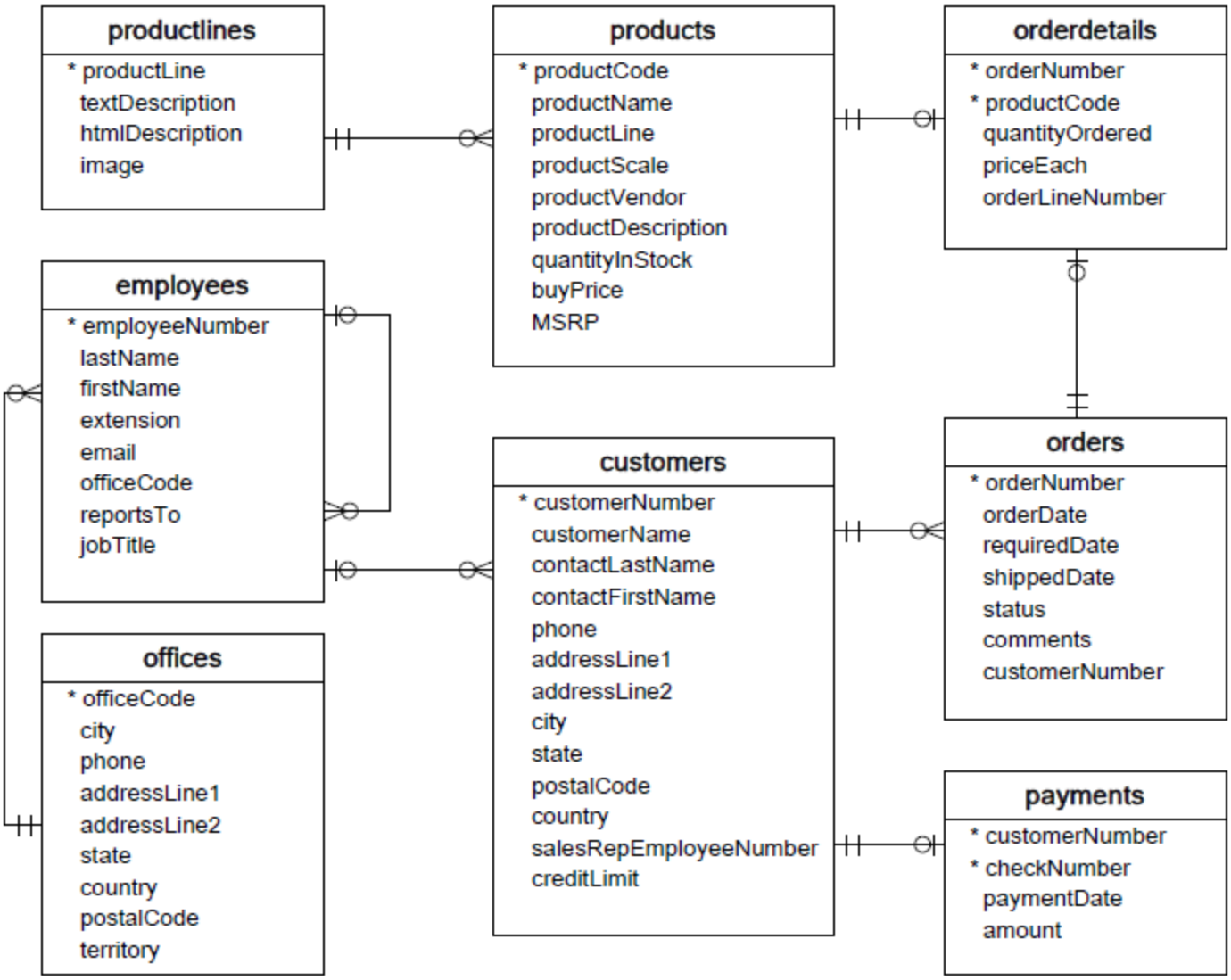
Entity

Entities are represented by means of rectangles. Rectangles are named with the entity set they represent. Attributes

Attributes are the properties of entities. Attributes are represented by means of ellipses. Every ellipse represents one attribute and is directly connected to its entity (rectangle). If the attributes are composite, they are further divided in a tree like structure. Every node is then connected to its attribute. That is, composite attributes are represented by ellipses that are connected.

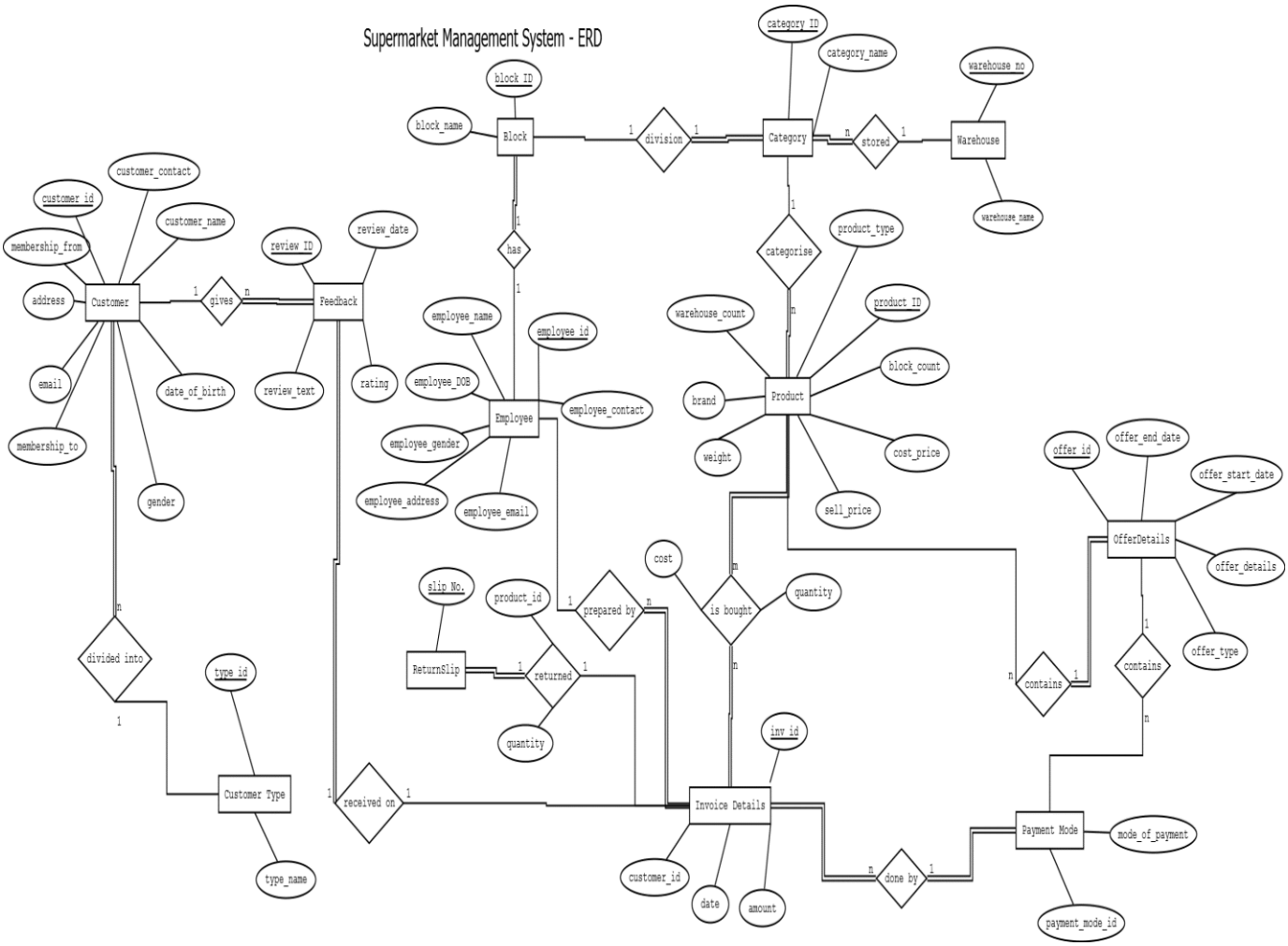
Supermarket database system

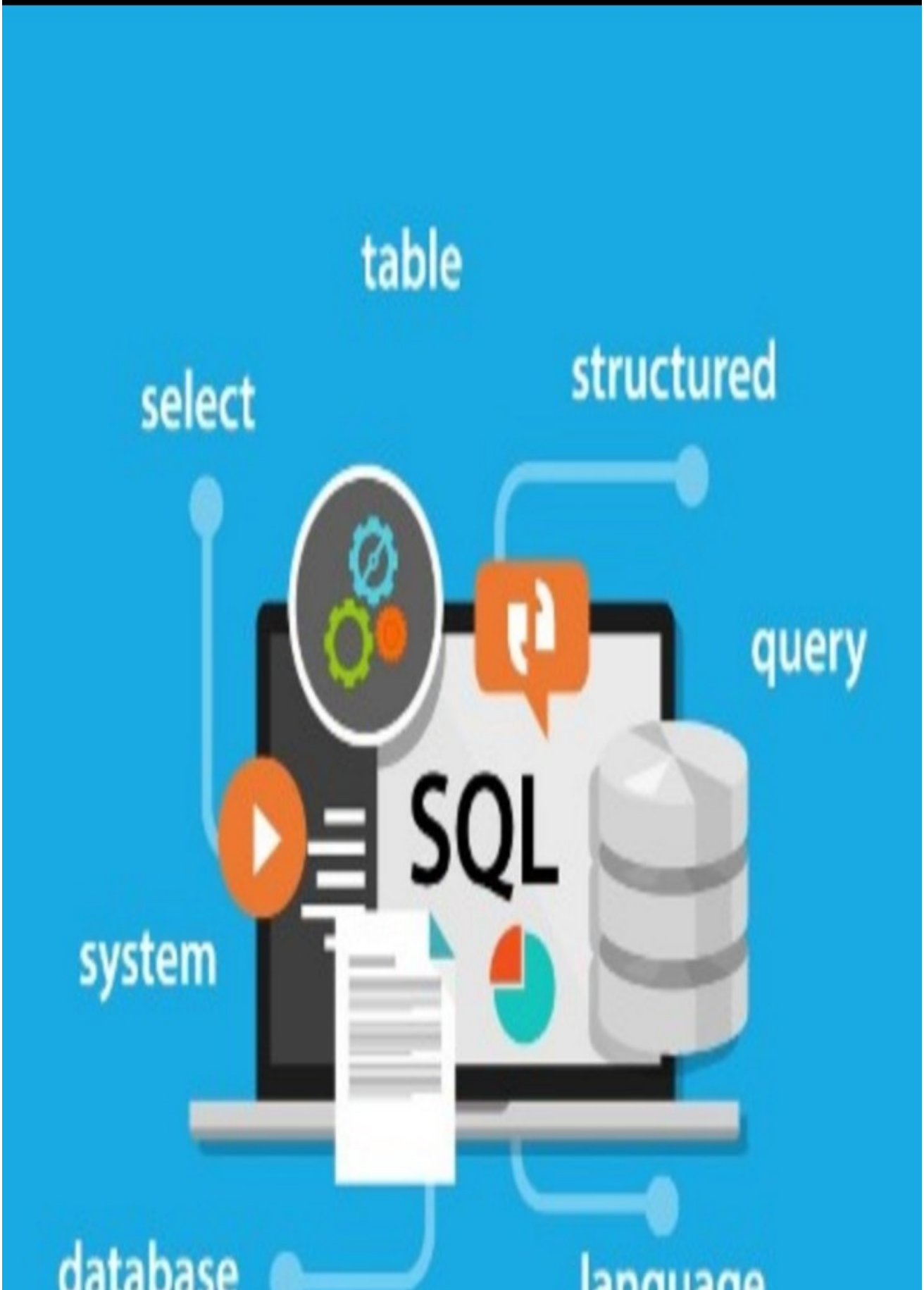
The “Supermarket Database Management System” is a **Database based on the sales transaction of items in a supermarket**. It manages the sales activity done in a supermarket. It maintains the stock details, records of the sales, customer details, return policies and also works on feedback.



Functional dependency diagram

For understanding above ER Diagram and Relations, we have to use the software ‘SQL Practice IDE’. This software gets installed on the mobile phones easily. As we are going through this pandemic and we are unable to take offline classes and we are unable to make the students practice, so this software will help them to run the sql commands on their mobile phones and the student can perform different DDL and DML queries using their own handsets.





SQL Practice IDE

```
Create table student(name char, rollno
Integer ,marks Integer );
```

Execute

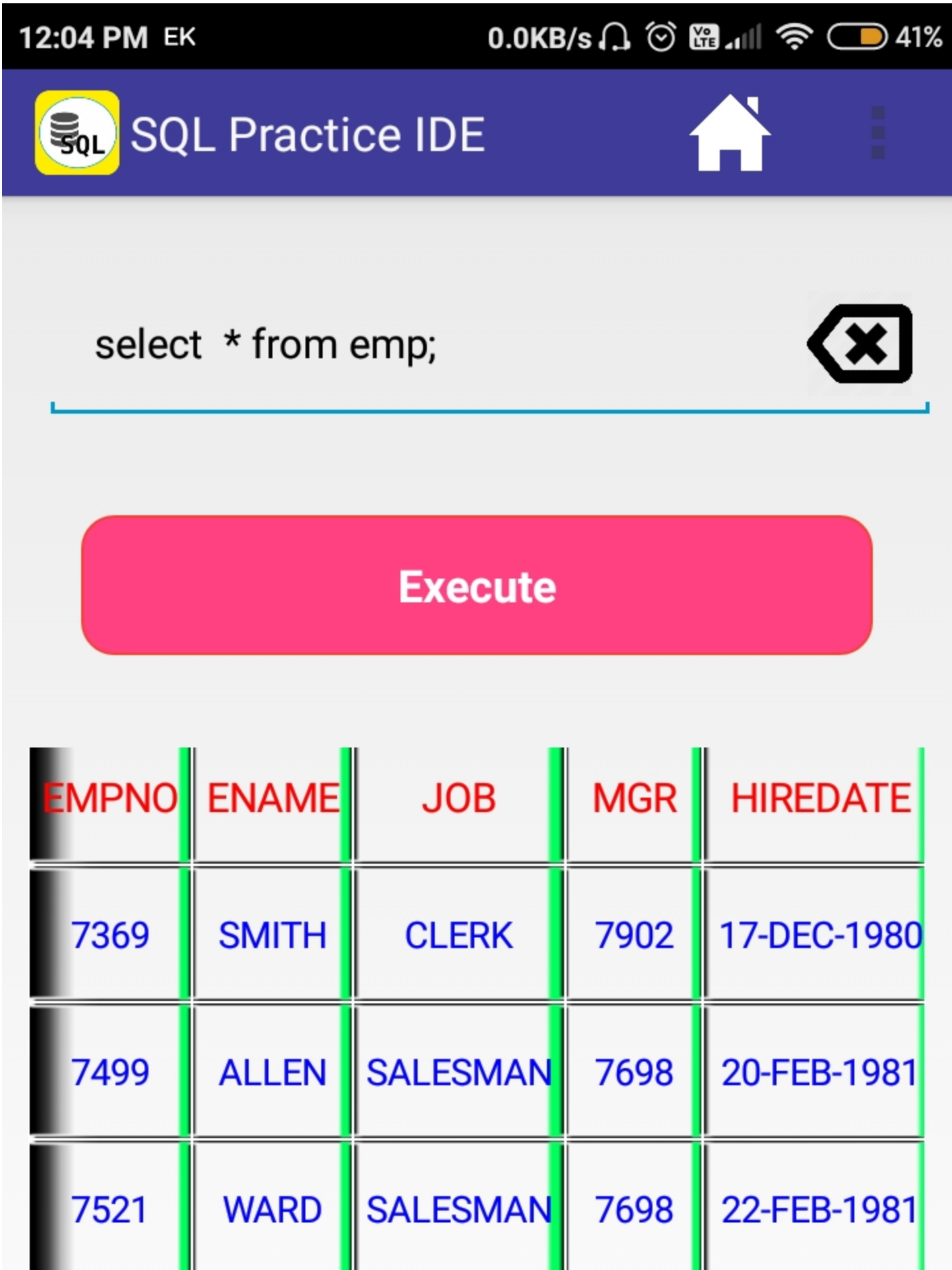
Table Create Successfully

SQL Practice IDE

desc student;

Execute

cid	name	type	notnull	dflt_value	pk
0	name	char	0		0
1	rollno	Integer	0		0
2	marks	Integer	0		0


12:04 PM EK
0.0KB/s
41%
SQL Practice IDE
select * from emp;
Execute
EMPNO
ENAME
JOB
MGR
HIREDATE
7369
SMITH
CLERK
7902
17-DEC-1980
7499
ALLEN
SALESMAN
7698
20-FEB-1981
7521
WARD
SALESMAN
7698
22-FEB-1981

Queries regarding Supermarket Database System

1. Find the most profitable product sold.

select profit,product_id,brand from (select distinct product_id, brand, (selling_price-cost_price) as profit from buys natural join product) as r3 natural join (select max(profite) as profit from (select distinct product_id,brand,(selling_price-cost_price) as profite from buys natural join product) as r2) as r4 where r4.profit=r3.profit;

2. Count the number of platinum card holder who shopped for more than ₹ 2000.

select count(distinct cust_id) from invoicedetails natural join customer natural join customertype where invoicedetails.amount > 2000 and customertype.type_name='Platinum';

3. List details of product which are bought through thepayment mode, PayTm and had the product offer KHUSIWALIDIAWLI.

select * from (select DISTINCT product_id from (select inv_id from InvoiceDetails as i join PaymentMode as p on (i.payment_mode_id=p.payment_mode_id) where mode_of_payment='Paytm')as d join Buys as b on(d.inv_id=b.invoice_id)) as s join Product as pro
on(s.product_id=pro.product_id) where offer_id='KHUSIWALIDIWALI';

4. List product id, product type and category id of product which are sold whose category id begins with MF and stored in warehouse ending with 002.

select distinct product_id , product_type,category_id from buys natural join product natural join category where

```
category.warehouse_no like '%002' and
product.category_id like 'MF%';
```

5. Find the most valuable customer of the year.

```
select sum,cust_id,year,customer_name from
(select sum,cust_id,year from (select sum(amount) as sum, cust_id,extract(year from
inv_date) as year from invoicedetails group by cust_id,year) as r1 natural join (select
max(sume) as sum ,year from (select sum(amount) as sume, cust_id, extract(year from
inv_date) as year from invoicedetails group by cust_id,year) as r2 group by year ) as r3
where r1.sum=r3.sum and r3.year=r1.year order by year) as r5 join customer on
(r5.cust_id=customer.customer_id);
```

6. If a customer went to shops on 31 dec, 2016 , list the offers applicable for him on that day.

```
select offers_id,offers_type,offers_details from OfferDetails where
offers_start_date < '2016-12-31' and offers_end_date > '2016-12-31';
```

7. List the incharge name, incharge id and gender of all block incharges under whose work no product of his block were returned by any customer.

```
select employee_name, employee_id ,gender from (select block_incharge_id from
block except select block_incharge_id from (select store_id from (select distinct
category_id from ReturnSlip as rs join Product as p on (rs.product_id=p.product_id))
as e join category as c on(e.category_id=c.category_id))as f join block as b on
(f.store_id=b.block_id))as bl join employee as emp
on (bl.block_incharge_id=emp.employee_id);
```

8. List the product id, product type, warehouse count and block count of products which were returned and whose block count is 30 % more than their warehouse count.

```
select  p.product_id, p.product_type, p.warehouse_count,     p.block_count from returnslip as r join Product as p on          (r.product_id=p.product_id)  where block_count > 0.3 * warehouse_count;
```

9. List the customer id who shopped for atleast a total of 3 quantities of any product (maybe same product) and paid a amount greater tha ₹ 3000 on 5 march, 2015 and were having the Platinum card.

```
select distinct cust_id,type_name from(select DISTINCT cust_id ,  inv_date ,amount from (select invoice_id , sum(quantity) from Buys    group by invoice_id having sum(quantity)>3 or sum(quantity)=3)as p          natural join InvoiceDetails where amount >3000 and inv_date='2015-          03-05' ) as j natural join Customer as c natural join CustomerType where CustomerType.type_name='Platinum';
```

10. List product id and quantity of products sold under offer OFF10.

```
select product_id, count(product_id) , sum(quantity) as quan_max  from buys natural join product
where offer_id='OFF10'
group by product_id order by sum(quantity) desc ;
```

11. List the employee name and id who is incharge of grocery department.

```
select  distinct employee_name,employee_id from employee inner join block
on(employee_id=block_incharge_id)
inner join category on (block_id=store_id) where block_name='Grocery';
```

12. List the offer id and quantity of product under that offer which were returned.

select max,offer_id from (select offer_id ,sum(quantity) as max from returnslip natural join product group by offer_id) as r2 natural join (select max(sum) as max from (select sum(quantity) as sum, offer_id from returnslip natural join product group by offer_id) as r1) as r3 where r3.max=r2.max;

13. Find the customer type which is most attracted by offer KHUSIWALIDIWALI.

select sum, customer_type_id from (select max(count) as sum from (select count(customer_type_id) as count, customer_type_id from product natural join buys inner join invoicedetails on (invoice_id=inv_id) inner join customer on (cust_id=customer_id) inner join customertype on (customer_type_id=type_id) where offer_id = 'KHUSIWALIDIWALI' group by (customer_type_id)) as r3) as r4 natural join (select count(customer_type_id) as sum, customer_type_id from product natural join buys inner join invoicedetails on (invoice_id=inv_id) inner join customer on(cust_id=customer_id) inner join customertype on (customer_type_id=type_id) where offer_id = 'KHUSIWALIDIWALI' group by (customer_type_id)) as r2 where r2.sum=r4.sum;

Students Feedback

A survey has been conducted in which **certain questions have been asked of students** and **faculty.**

Q1 The Case Study increased your knowledge and skills in the subject matter.

Q2 The course gave you the confidence to do more advanced work in the subject

Q3 Do you believe that what you are being asked to learn in this course is important

Q4 Overall, this course met your expectations for the quality of the course

Q5 The course was helpful in progress toward my degree

Q6 The instructor's teaching methods were effective.

Q7 The instructor encouraged student participation in class.