

# Project Implementation Report

## Business Database for Supermarket Shelf

IST 659

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## Project Summary

Nowadays, the usage of information technology is increasing rapidly in every field. A better information system helps to increase the efficiency of work, reduce the cost of management, improve the quality of data management and service.

The **main problem** for our project to solve is the latency time in the management of the supermarket.

1. When people shop in supermarkets, the situations of stockouts usually make customers unhappy. It is because the staff could not know the goods are out of stock in a short time. The staff need to wait for the reports from the customers or wait until they notice the situation by themselves. The replenishment could not always be quick. The lack of goods on the shelves makes the store receive reports of dissatisfaction from the customers.
2. The latency time sometimes caused overdue foods or drugs to stay on the shelves. Once the overdue products are sold to the customers, the store will get punishments and lose fame and money.
3. The situations of the selling are hard to predict. The market could not do the perfect purchasing of the goods. The amounts and types of goods purchasing are not best optimized. It caused the supermarkets to waste a lot of goods every year.

Great methods of information management make the working efficiency much higher than before. The business database could help solve the problems the supermarkets meet. The database will record every good the stores or warehouses purchased from the manufacturers. It records the names, dates of manufacture, expiration dates, prices. Every good has its ID so the managers could track every good. By using a good database, the managers will know when some old goods need to be replaced by fresh goods.

People get information earlier with higher veracity by a better information system. Information systems also help saving expenditure on manpower which is one of the most expensive parts of expenses. Repetitive actions could be avoided by the information system. Accurate controlling makes the quality of service better.

The business database of this project is for the product shelves controlling supermarkets. The main thing to manage is the goods on the shelves. The database records every good coming to the warehouses. It helps in controlling the inventory status in the supermarkets and warehouses. The database also helps the management department to do the predictions about business. The database will help the supermarkets operating better.

## Normal Process of the System

The products on the shelves in the supermarkets are monitored by sensors on the shelves. The sensors could detect how many products left on the shelves. Once there is low or sold-out, the manager of the supermarket will get the notification immediately. The managers can ask employees to do replenishment from the storage of the supermarket first. If the stock is low, the managers could send orders to the warehouses for supplement early. Moreover, when a product is near its due date, the employee will get notification to move it to sales shelves or throw the overdue products away.

On the other hand, the database could record the selling so that the department of management could do prediction by the data. As a result, warehouses and inventories could be optimized a lot.

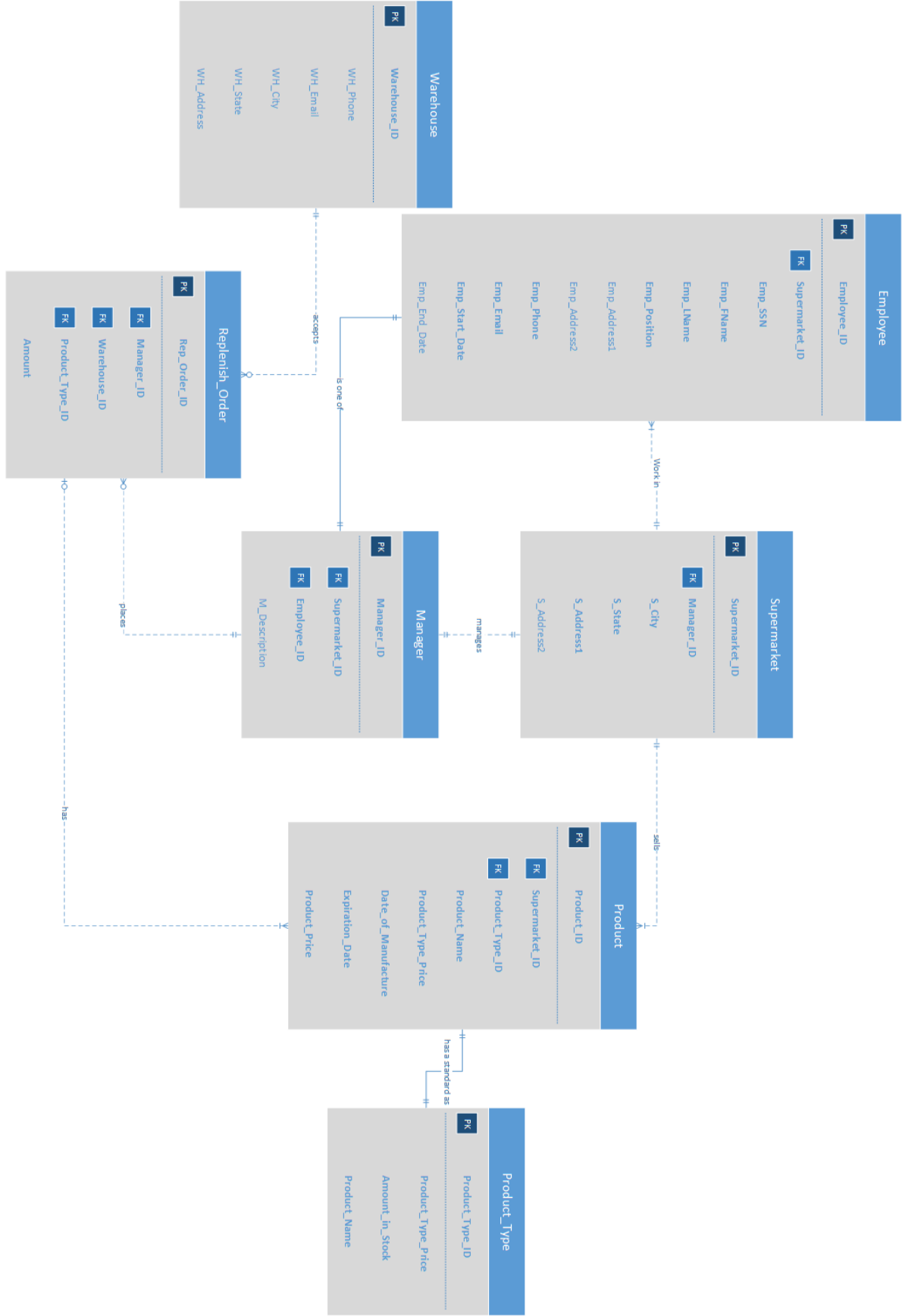
## Entities and Attributes Table

Entities and Attributes	Field Type	NULL /Not NULL	Description
<b>Employee</b>	/	/	All the employees
Employee_ID	VARCHAR(10)	Not NULL	The Employee ID, <b>Primary Key</b>
Supermarket_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b>
Emp_SSN	VARCHAR(11)	Not NULL	Social Security Number
Emp_FName	VARCHAR(25)	Not NULL	First Name
Emp_LName	VARCHAR(25)	Not NULL	Last Name
Emp_Position	VARCHAR(10)	Not NULL	Manager/Employee /Internship
Emp_Address1	VARCHAR(30)	Not NULL	Address line 1
Emp_Address2	VARCHAR(30)		Address line 2
Emp_Phone	VARCHAR(12)	Not NULL	Employee's phone number
Emp_Email	VARCHAR(50)	Not NULL	Employee's email address
Emp_Start_Date	Date	Not NULL	Employee's start date of working
Emp_End_Date	Date		Employee's end date of working
<b>Supermarket</b>			All the supermarkets
Supermarket_ID	VARCHAR(10)	Not NULL	<b>Primary Key</b>
Manager_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b>
S_City	VARCHAR(30)	Not NULL	The city of the supermarket
S_State	VARCHAR(2)	Not NULL	The state of the supermarket
S_Address1	VARCHAR(30)	Not NULL	Address line 1
S_Address2	VARCHAR(30)		Address line 2

<b>Manager</b>			Managers of supermarkets
Manager_ID	VARCHAR(10)	Not NULL	<b>Primary Key</b>
Employee_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b>
Supermarket_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b>
M_Description	VARCHAR(99)	Not NULL	Description about the manager.
<b>Product_Type</b>			The Sample of a type of products for providing the standard.
Product_Type_ID	VARCHAR(10)	Not NULL	<b>Primary Key</b>
Product_Name	VARCHAR(30)	Not NULL	
Product_Type_Price	INTEGER	Not NULL	The standard price
Amount_in_Stock	INTEGER	Not NULL	the amount of products in stock
<b>Product</b>			
Product_ID	VARCHAR(10)	Not NULL	<b>Primary Key</b>
Product_Type_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b> the standard of the product
Product Type Price	INTEGER	Not NULL	The standard price
Supermarket_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b>
Product Name	VARCHAR(30)	Not NULL	
Date of Manufacture	DATE	Not NULL	The date of production
Expiration_Date	DATE	Not NULL	The expiration date of product
Product_Price	INTEGER	Not NULL	The actual price of the product
<b>Warehouse</b>			The main warehouses which have products inventory
Warehouse_ID	VARCHAR(10)	Not NULL	<b>Primary Key</b>
WH_Phone	VARCHAR(12)	Not NULL	The phone number of warehouse
WH_Email	VARCHAR(50)	Not NULL	the email address of warehouse
WH_City	VARCHAR(30)	Not NULL	the city of the warehouse
WH_State	VARCHAR(2)	Not NULL	the State of the warehouse
WH_Address_1	VARCHAR(30)	Not NULL	address line 1
WH_Address_2	VARCHAR(30)		address line 2
<b>Replenish Order</b>			the order that the managers

			made to the warehouse
Rep_Order_ID	VARCHAR(10)	Not NULL	<b>Primary Key</b>
Manager_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b>
Warehouse_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b>
Product_Type_ID	VARCHAR(10)	Not NULL	<b>Foreign Key</b>
Amount	INTEGER	Not NULL	Product Amount

# Entity Relational Data Model



# Database System Architecture

We used the following tools to create and implement this project:

1. **MS Visio:** We created entity relationship diagram using MS Visio. Here we created entities and defined their attributes along with the keys (primary & foreign). We established the relationships and dependencies between entities.
2. **SQL Server:** We used SQL Server as the database that stored all the tables and their data. We created tables in the database using SQL queries. Also, we used SQL server to create and deploy triggers required for the project.
3. **MS Access:** We used MS Access to create the interface for the system. Using Access, we link our tables that were created in SQL Server. Once, the tables were linked, we created forms that could take user input or display the necessary information to the users. Based on the data, we used MS Access to generate reports for the users of the system.

## SQL Scripts for Creating Table and Inserting Data

### Creating Tables:

We created tables in SQL Server using the following SQL queries:

#### 1.Employee\_C Table

```
CREATE TABLE Employee_C (  
    Employee_ID VARCHAR(10) PRIMARY KEY,  
    Supermarket_ID VARCHAR(10) NOT NULL,  
    Emp_SSN VARCHAR(11),  
    Emp_FName VARCHAR(25),  
    Emp_LName VARCHAR(25) NOT NULL,  
    Emp_Position VARCHAR(10) NOT NULL check(Emp_Position IN  
( 'Internship', 'Manager', 'Employee' )),  
    Emp_Address1 VARCHAR(30) NOT NULL,  
    Emp_Address2 VARCHAR(30),  
    Emp_Phone VARCHAR(12) NOT NULL,  
    Emp_Email VARCHAR(50) NOT NULL,  
    Emp_Start_Date DATE NOT NULL,  
    Emp_End_Date DATE,  
)
```

#### 2. Manager\_C Table

```
CREATE TABLE Manager_C(  
    Manager_ID VARCHAR(10) PRIMARY KEY,  
    Employee_ID VARCHAR(10) NOT NULL,  
    Supermarket_ID VARCHAR(10) NOT NULL,  
    M_Description VARCHAR(99) NOT NULL,  
)
```

#### 3. Supermarket\_C Table



```
CREATE TABLE Supermarket_C(
    Supermarket_ID VARCHAR(10) PRIMARY KEY,
    Manager_ID VARCHAR(10) NOT NULL,
    S_City VARCHAR(30) NOT NULL,
    S_State VARCHAR(2) NOT NULL,
    S_Address1 VARCHAR(30) NOT NULL,
    S_Address2 VARCHAR(30),
)
```

#### 4. Product\_Type\_C Table

```
CREATE TABLE Product_Type_C(
    Product_Type_ID VARCHAR(10) PRIMARY KEY,
    Product_Name VARCHAR(10) NOT NULL,
    Product_Type_Price VARCHAR(10) NOT NULL,
    Amount_in_Stock INTEGER NOT NULL,
)
```

#### 5. Product\_C Table

```
CREATE TABLE Product_C(
    Product_ID VARCHAR(10) PRIMARY KEY,
    Product_Type_ID VARCHAR(10) NOT NULL,
    Product_Type_Price INTEGER NOT NULL,
    Supermarket_ID VARCHAR(10) NOT NULL,
    Product_Name VARCHAR(30) NOT NULL,
    Date_of_Manufacture DATE NOT NULL,
    Expiration_Date DATE NOT NULL,
    Product_Price INTEGER NOT NULL,
)
```

#### 6. Warehouse\_C Table

```
CREATE TABLE Warehouse_C(
    Warehouse_ID VARCHAR(10) PRIMARY KEY,
    WH_Phone VARCHAR(12) NOT NULL,
    WH_Email VARCHAR(50) NOT NULL,
    WH_City VARCHAR(30) NOT NULL,
    WH_State VARCHAR(2) NOT NULL,
    WH_Address_1 VARCHAR(30) NOT NULL,
    WH_Address_2 VARCHAR(30),
)
```

#### 7. Replenish\_Order\_C Table

```
CREATE TABLE Replenish_Order_C(
    Rep_Order_ID VARCHAR(10) PRIMARY KEY,
    Manager_ID VARCHAR(10) NOT NULL,
    Warehouse_ID VARCHAR(10) NOT NULL,
    Product_Type_ID VARCHAR(10) NOT NULL,
    Amount INTEGER NOT NULL,
)
```

## Inserting Data:

We used the following SQL queries to insert data in the tables created using the above queries:

### 1.Employee\_C Table

```
insert into Employee_C
Values('E000001','S0001','123-4566-45','Jay','Macie','Manager'
,'Big
Palace','','315-372-0047','JM123@Super.com','04-13-2019','');
insert into Employee_C
Values('E000002','S0002','123-4566-01','Alice','Neel','Manager'
,'14 Rose
Ave','','315-372-0021','AN123@Super.com','04-13-2019','');
insert into Employee_C
Values('E000003','S0003','123-4566-02','Betty','Parsons','Mana
ger','23 LAFEYETTE
Road','','315-372-0015','BP125@Super.com','04-13-2019','');
insert into Employee_C
Values('E000004','S0004','123-4566-03','Jack','Tworkov','Manag
er','21 Nuts
Road','','315-372-0117','JT126@Super.com','04-13-2019','');
insert into Employee_C
Values('E000005','S0005','123-4566-04','James','Kempton','Mana
ger','33 Maxine
Ave','','315-372-2147','JK127@Super.com','04-13-2019','');
insert into Employee_C
Values('E000006','S0001','123-4566-05','Merry','Lindner','Empl
oyee','25 Vestie
Road','','315-372-0337','ML128@Super.com','04-14-2019','');
insert into Employee_C
Values('E000007','S0001','123-4566-06','Chris','Rose','Empley
e','15 Stone
Ave','','315-372-0347','CR129@Super.com','04-15-2019','');
insert into Employee_C
Values('E000008','S0002','123-4566-07','Walt','Disney','Employ
ee','78 Seymour Ave
','','315-312-0047','WD210@Super.com','04-14-2019','');
insert into Employee_C
Values('E000009','S0002','123-4566-08','Esther','Swinden','Emp
loyee','19 Elwood
Road','','315-322-0047','ES213@Super.com','04-16-2019','');
insert into Employee_C
Values('E000010','S0003','123-4566-09','Albert','Walker','Empl
oyee','91 Charles
Ave','','315-472-0047','AW315@Super.com','04-14-2019','');
insert into Employee_C
Values('E000011','S0003','123-4566-10','John','Wedin','Employee
```

```

e', '27 Water
Road', '', '315-382-0047', 'JW111@Super.com', '04-15-2019', '');
insert into Employee_C
Values('E000012', 'S0004', '123-4566-11', 'Ansel', 'Adams', 'Employ
ee', '18 Double
Street', '', '315-272-0047', 'AA193@Super.com', '04-16-2019', '');
insert into Employee_C
Values('E000013', 'S0004', '123-4566-12', 'Isaac', 'Soyer', 'Employ
ee', '45 Isaac
Road', '', '315-278-0047', 'IS103@Super.com', '04-14-2019', '');
insert into Employee_C
Values('E000014', 'S0005', '123-4566-13', 'Joseph', 'Davis', 'Emplo
yee', '64 Haven
Street', '', '315-372-0557', 'JD783@Super.com', '04-14-2019', '');
insert into Employee_C
Values('E000015', 'S0005', '123-4566-14', 'Charles', 'Martz', 'Empl
oyee', '16 Lipton
Road', '', '315-372-0667', 'CM003@Super.com', '04-15-2019', '');

```

## 2. Manager\_C Table

```

insert into Manager_C Values('M0001', 'E000001', 'S0001', 'a good
manager');
insert into Manager_C Values('M0002', 'E000002', 'S0002', 'a
great manager');
insert into Manager_C Values('M0003', 'E000003', 'S0003', 'a nice
manager');
insert into Manager_C Values('M0004', 'E000004', 'S0004', 'a fine
manager');
insert into Manager_C Values('M0005', 'E000005', 'S0005', 'an
experienced manager');

```

## 3. Supermarket\_C Table

```

insert into Supermarket_C
Values('S0001', 'M0001', 'Syracuse', 'NY', 'Comstock Ave', '123');
insert into Supermarket_C
Values('S0002', 'M0002', 'Fairmount', 'NY', 'Coker Ave', '002');
insert into Supermarket_C
Values('S0003', 'M0003', 'Auburn', 'NY', 'Pepsor Ave', '012');
insert into Supermarket_C
Values('S0004', 'M0004', 'Fulton', 'NY', 'Starmark Pl', '542');
insert into Supermarket_C
Values('S0005', 'M0005', 'Cortland', 'NY', 'Dunkin Rd', '009');

```

## 4. Product\_Type\_C Table

```

insert into Product_Type_C Values('PT000001', 'Big
Apple', '5', '5000');
insert into Product_Type_C
Values('PT000002', 'Banana', '1', '3100');

```

```

insert into Product_Type_C
Values('PT000003','Avocado','2','2323');
insert into Product_Type_C Values('PT000004','C
Plate','8','3322');
insert into Product_Type_C Values('PT000005','G
Pot','21','1231');
insert into Product_Type_C
Values('PT000006','Eggfruit','4','1333');
insert into Product_Type_C
Values('PT000007','Mouse','33','2213');
insert into Product_Type_C
Values('PT000008','Headphone','89','1444');
insert into Product_Type_C
Values('PT000009','Cap','25','7821');
insert into Product_Type_C
Values('PT000010','Bag','69','5321');

```

### 5. Product\_C Table

```

insert into Product_C
Values('P000000001','PT000001','5','S0001','Big
Apple','10-13-2019','12-13-2019','5');
insert into Product_C
Values('P000000002','PT000001','5','S0001','Big
Apple','10-14-2019','12-15-2019','5');
insert into Product_C
Values('P000000003','PT000002','1','S0001','Banana','10-13-201
9','12-13-2019','1');
insert into Product_C
Values('P000000004','PT000002','1','S0001','Banana','10-14-201
9','12-14-2019','1');
insert into Product_C
Values('P000000005','PT000003','2','S0001','Avocado','10-13-20
19','12-13-2019','2');
insert into Product_C
Values('P000000006','PT000003','2','S0001','Avocado','10-14-20
19','12-14-2019','2');
insert into Product_C
Values('P000000007','PT000004','8','S0001','C
Plate','10-13-2019','12-13-2019','8');
insert into Product_C
Values('P000000008','PT000004','8','S0001','C
Plate','10-13-2019','12-13-2019','8');
insert into Product_C
Values('P000000009','PT000005','21','S0001','G
Pot','10-13-2019','12-13-2019','21');
insert into Product_C
Values('P000000010','PT000005','21','S0001','G
Pot','10-15-2019','12-15-2019','21');

```

```

insert into Product_C
Values('P000000011','PT000006','4','S0001','Eggfruit','10-12-2
019','12-12-2019','4');
insert into Product_C
Values('P000000012','PT000006','4','S0001','Eggfruit','10-12-2
019','12-12-2019','4');
insert into Product_C
Values('P000000013','PT000007','33','S0001','Mouse','10-15-201
9','12-15-2019','33');
insert into Product_C
Values('P000000014','PT000007','33','S0001','Mouse','10-11-201
9','12-11-2019','33');
insert into Product_C
Values('P000000015','PT000001','89','S0001','Headphone','10-12
-2019','12-12-2019','89');
insert into Product_C
Values('P000000016','PT000001','89','S0001','Headphone','10-11
-2019','12-11-2019','89');
insert into Product_C
Values('P000000017','PT000001','25','S0001','Cap','10-10-2019'
,'12-10-2019','25');
insert into Product_C
Values('P000000018','PT000001','25','S0001','Cap','10-22-2019'
,'12-22-2019','25');
insert into Product_C
Values('P000000019','PT000001','69','S0001','Bag','10-13-2019'
,'12-13-2019','69');
insert into Product_C
Values('P000000020','PT000001','69','S0001','Bag','10-11-2019'
,'12-11-2019','69');

```

## 6. Warehouse\_C Table

```

insert into Warehouse_C Values('WH00001
','315-666-0001','WH00001@S.com','Syracuse','NY','101 A Nice
Street','');
insert into Warehouse_C Values('WH00002
','315-666-0002','WH00002@S.com','Cortland','NY','101 A Good
Street','');
insert into Warehouse_C Values('WH00003
','315-666-0003','WH00003@S.com','Fulton','NY','101 A Great
Street','');

```

## 7.Replenish\_Order\_C Table

```

insert into Replenish_Order_C
Values('R000000001','M0001','WH00001','PT000001','5000');
insert into Replenish_Order_C
Values('R000000002','M0001','WH00001','PT000008','50');

```

```

insert into Replenish_Order_C
Values('R000000003','M0004','WH00003','PT000001','5000');
insert into Replenish_Order_C
Values('R000000004','M0001','WH00001','PT000003','1000');
insert into Replenish_Order_C
Values('R000000005','M0005','WH00002','PT000001','5000');

```

## Outputs:

The below tables contain data which was inserted using SQL scripts, Access forms

### 1.Employee\_C Table

	Employee_ID	Supermarket_ID	Emp_SSN	Emp_FName	Emp_LName	Emp_Position	Emp_Address1	Emp_Address2	Emp_Phone	Emp_Email	Emp_Start_Date	Emp_End_Date
1	E000001	S0001	123-4566-45	Jay	Macie	Manager	Big Palace		315-372-0047	JM123@Super.com	2019-04-13	1900-01-01
2	E000002	S0002	123-4566-01	Alice	Neel	Manager	14 Rose Ave		315-372-0021	AN123@Super.com	2019-04-13	1900-01-01
3	E000003	S0003	123-4566-02	Betty	Parsons	Manager	23 LAFEYETTE Road		315-372-0015	BP125@Super.com	2019-04-13	1900-01-01
4	E000004	S0004	123-4566-03	Jack	Tworkov	Manager	21 Nuts Road		315-372-0117	JT126@Super.com	2019-04-13	1900-01-01
5	E000005	S0005	123-4566-04	James	Kempton	Manager	33 Maxine Ave		315-372-2147	JK127@Super.com	2019-04-13	1900-01-01
6	E000006	S0001	123-4566-05	Meny	Lindner	Employee	25 Vestie Road		315-372-0337	ML128@Super.com	2019-04-14	1900-01-01
7	E000007	S0001	123-4566-06	Chris	Rose	Employee	15 Stone Ave		315-372-0347	CR129@Super.com	2019-04-15	1900-01-01
8	E000008	S0002	123-4566-07	Walt	Disney	Employee	78 Seymour Ave		315-312-0047	WD210@Super.com	2019-04-14	1900-01-01
9	E000009	S0002	123-4566-08	Esther	Swinden	Employee	19 Elwood Road		315-322-0047	ES213@Super.com	2019-04-16	1900-01-01
10	E000010	S0003	123-4566-09	Albert	Walker	Employee	91 Charles Ave		315-472-0047	AW315@Super.com	2019-04-14	1900-01-01
11	E000011	S0003	123-4566-10	John	Wedin	Employee	27 Water Road		315-382-0047	JW111@Super.com	2019-04-15	1900-01-01
12	E000012	S0004	123-4566-11	Ansel	Adams	Employee	18 Double Street		315-272-0047	AA193@Super.com	2019-04-16	1900-01-01
13	E000013	S0004	123-4566-12	Isaac	Soyer	Employee	45 Isaac Road		315-278-0047	IS103@Super.com	2019-04-14	1900-01-01
14	E000014	S0005	123-4566-13	Joseph	Davis	Employee	64 Haven Street		315-372-0557	JD783@Super.com	2019-04-14	1900-01-01
15	E000015	S0005	123-4566-14	Charles	Martz	Employee	16 Lipton Road		315-372-0667	CM003@Super.com	2019-04-15	1900-01-01

### 2. Manager\_C Table

	Manager_ID	Employee_ID	Supermarket_ID	M_Description
1	M0001	E000001	S0001	a good manager
2	M0002	E000002	S0002	a great manager
3	M0003	E000003	S0003	a nice manager
4	M0004	E000004	S0004	a fine manager
5	M0005	E000005	S0005	an experienced manager

### 3. Supermarket\_C Table

	Supermarket_ID	Manager_ID	S_City	S_State	S_Address1	S_Address2
1	S0001	M0001	Syracuse	NY	Comstock Ave	123
2	S0002	M0002	Fairmount	NY	Coker Ave	002
3	S0003	M0003	Auburn	NY	Pepsor Ave	012
4	S0004	M0004	Fulton	NY	Stamark Pl	542
5	S0005	M0005	Cortland	NY	Dunkin Rd	009

#### 4. Product\_Type\_C Table

Results		Messages		
	Product_Type_ID	Product_Name	Product_Type_Price	Amount_in_Stock
1	PT000001	Big Apple	5	5000
2	PT000002	Banana	1	3100
3	PT000003	Avocado	2	2323
4	PT000004	C Plate	8	3322
5	PT000005	G Pot	21	1231
6	PT000006	Eggfruit	4	1333
7	PT000007	Mouse	33	2213
8	PT000008	Headphone	89	1444
9	PT000009	Cap	25	7821
10	PT000010	Bag	69	5321

#### 5. Product\_C Table

Results		Messages						
	Product_ID	Product_Type_ID	Product_Type_Price	Supermarket_ID	Product_Name	Date_of_Manufacture	Expiration_Date	Product_Price
1	P000000001	PT000001	5	S0001	Big Apple	2019-10-13	2019-12-13	5
2	P000000002	PT000001	5	S0001	Big Apple	2019-10-14	2019-12-15	5
3	P000000003	PT000002	1	S0001	Banana	2019-10-13	2019-12-13	1
4	P000000004	PT000002	1	S0001	Banana	2019-10-14	2019-12-14	1
5	P000000005	PT000003	2	S0001	Avocado	2019-10-13	2019-12-13	2
6	P000000006	PT000003	2	S0001	Avocado	2019-10-14	2019-12-14	2
7	P000000007	PT000004	8	S0001	C Plate	2019-10-13	2019-12-13	8
8	P000000008	PT000004	8	S0001	C Plate	2019-10-13	2019-12-13	8
9	P000000009	PT000005	21	S0001	G Pot	2019-10-13	2019-12-13	21
10	P000000010	PT000005	21	S0001	G Pot	2019-10-15	2019-12-15	21
11	P000000011	PT000006	4	S0001	Eggfruit	2019-10-12	2019-12-12	4
12	P000000012	PT000006	4	S0001	Eggfruit	2019-10-12	2019-12-12	4
13	P000000013	PT000007	33	S0001	Mouse	2019-10-15	2019-12-15	33
14	P000000014	PT000007	33	S0001	Mouse	2019-10-11	2019-12-11	33
15	P000000015	PT000001	89	S0001	Headphone	2019-10-12	2019-12-12	89
16	P000000016	PT000001	89	S0001	Headphone	2019-10-11	2019-12-11	89
17	P000000017	PT000001	25	S0001	Cap	2019-10-10	2019-12-10	25
18	P000000018	PT000001	25	S0001	Cap	2019-10-22	2019-12-22	25
19	P000000019	PT000001	69	S0001	Bag	2019-10-13	2019-12-13	69
20	P000000020	PT000001	69	S0001	Bag	2019-10-11	2019-12-11	69

#### 6. Warehouse\_C Table

Results		Messages					
	Warehouse_ID	WH_Phone	WH_Email	WH_City	WH_State	WH_Address_1	WH_Address_2
1	WH00001	315-666-0001	WH00001@S.com	Syracuse	NY	101 A Nice Street	
2	WH00002	315-666-0002	WH00002@S.com	Cortland	NY	101 A Good Street	
3	WH00003	315-666-0003	WH00003@S.com	Fulton	NY	101 A Great Street	

## 7.Replenish\_Order\_C Table

Results		Messages			
	Rep_Order_ID	Manager_ID	Warehouse_ID	Product_Type_ID	Amount
1	R000000001	M0001	WH00001	PT000001	5000
2	R000000002	M0001	WH00001	PT000008	50
3	R000000003	M0004	WH00003	PT000001	5000
4	R000000004	M0001	WH00001	PT000003	1000
5	R000000005	M0005	WH00002	PT000001	5000



# Major Data Questions

1. Show all products expired in 2019.

```
SELECT * FROM Product_C
WHERE Expiration_Date BETWEEN '01-01-2019 00:00:01' and '12-31-2019 23:59:59';
```

	Product_ID	Product_Type_ID	Product_Type_Price	Supermarket_ID	Product_Name	Date_of_Manufacture	Expiration_Date	Product_Price
1	P000000001	PT000001	5	S0001	Big Apple	2019-10-13	2019-12-13	5
2	P000000002	PT000001	5	S0001	Big Apple	2019-10-14	2019-12-15	5
3	P000000003	PT000002	1	S0001	Banana	2019-10-13	2019-12-13	1
4	P000000004	PT000002	1	S0001	Banana	2019-10-14	2019-12-14	1
5	P000000005	PT000003	2	S0001	Avocado	2019-10-13	2019-12-13	2
6	P000000006	PT000003	2	S0001	Avocado	2019-10-14	2019-12-14	2
7	P000000007	PT000004	8	S0001	C Plate	2019-10-13	2019-12-13	8
8	P000000008	PT000004	8	S0001	C Plate	2019-10-13	2019-12-13	8
9	P000000009	PT000005	21	S0001	G Pot	2019-10-13	2019-12-13	21
10	P000000010	PT000005	21	S0001	G Pot	2019-10-15	2019-12-15	21
11	P000000011	PT000006	4	S0001	Eggfruit	2019-10-12	2019-12-12	4
12	P000000012	PT000006	4	S0001	Eggfruit	2019-10-12	2019-12-12	4
13	P000000013	PT000007	33	S0001	Mouse	2019-10-15	2019-12-15	33
14	P000000014	PT000007	33	S0001	Mouse	2019-10-11	2019-12-11	33
15	P000000015	PT000001	89	S0001	Headphone	2019-10-12	2019-12-12	89
16	P000000016	PT000001	89	S0001	Headphone	2019-10-11	2019-12-11	89
17	P000000017	PT000001	25	S0001	Cap	2019-10-10	2019-12-10	25
18	P000000018	PT000001	25	S0001	Cap	2019-10-22	2019-12-22	25
19	P000000019	PT000001	69	S0001	Bag	2019-10-13	2019-12-13	69
20	P000000020	PT000001	69	S0001	Bag	2019-10-11	2019-12-11	69

From the table we selected, we can see all products expired in 2019.

2. How many managers do we have among employees?

```
SELECT COUNT(Employee_ID) FROM Employee_C WHERE Emp_Position = 'Manager';
```

	(No column name)
1	5

Among all employees, we have 5 managers.

3. Show all employees who started work on 4/14/2019?

```
SELECT * FROM Employee_C
WHERE Emp_Start_Date = '4/14/2019';
```

	Employee_ID	Supermarket_ID	Emp_SSN	Emp_FName	Emp_LName	Emp_Position	Emp_Address1	Emp_Address2	Emp_Phone	Emp_Email	Emp_Start_Date	Emp_End_Date
1	E000006	S0001	123-4566-05	Merry	Lindner	Employee	25 Vestie Road		315-372-0337	ML128@Super.com	2019-04-14	1900-01-01
2	E000008	S0002	123-4566-07	Walt	Disney	Employee	78 Seymour Ave		315-312-0047	WD210@Super.com	2019-04-14	1900-01-01
3	E000010	S0003	123-4566-09	Albert	Walker	Employee	91 Charles Ave		315-472-0047	AW315@Super.com	2019-04-14	1900-01-01
4	E000013	S0004	123-4566-12	Isaac	Soyer	Employee	45 Isaac Road		315-278-0047	IS103@Super.com	2019-04-14	1900-01-01
5	E000014	S0005	123-4566-13	Joseph	Davis	Employee	64 Haven Street		315-372-0557	JD783@Super.com	2019-04-14	1900-01-01

This is the employees who started work on 4/14/2019

4. Which product has the greatest inventory?

```
SELECT TOP(1) Product_Name, Amount_in_Stock FROM Product_Type_C order by  
Amount_in_Stock desc;
```

Results		Messages
	Product_Name	Amount_in_Stock
1	Cap	7821

From the result, we can see cap is the product which has the greatest inventory.

5. The employee whose name is Chris Rose is missing today. Find his Phone Number and Email Address for contacting.

```
SELECT Emp_FName, Emp_LName, Emp_Phone, Emp_Email  
FROM Employee_C  
WHERE Emp_FName = 'Chris' and Emp_LName = 'Rose';
```

Results Messages

	Emp_FName	Emp_LName	Emp_Phone	Emp_Email
1	Chris	Rose	315-372-0347	CR129@Super.com

From the result, we know his Phone Number and Email Address.

# Interfaces

The system mainly has **two** big parts of interfaces. The **first** part of the interfaces is for the managers who will input the data of the products. The **second** part of the interfaces is for the employees who will only have the right to view all the information of the products.

## First Form

Managers and Employees have different stages

### Scenario 1: Manager login

1. View Employee
2. View product types
  - a. Edit product
3. View products
  - a. Edit products
4. View Supermarket
5. View Warehouse
6. Make Replenish Order
7. Log off

### Scenario 2: Employee login

1. View products types
2. View product
3. Log off

The image shows a web browser window with a title bar that says "First Form". The main content area has a large heading "What is your Identity?". Below the heading are two blue buttons with white text: "Manager" and "Employee". The buttons are stacked vertically. The browser window has standard minimize, maximize, and close buttons in the top right corner.

This is the first page of the system where **Managers** and **Employees** have different stages

# Supermarket Data System

User Name

User Password

OK

Cancel

Managers need their user Name and Password  
to login the system

# Supermarket Data System

Fail Error

✕

Fail to Login

OK

User Name

12345

User Password

12345

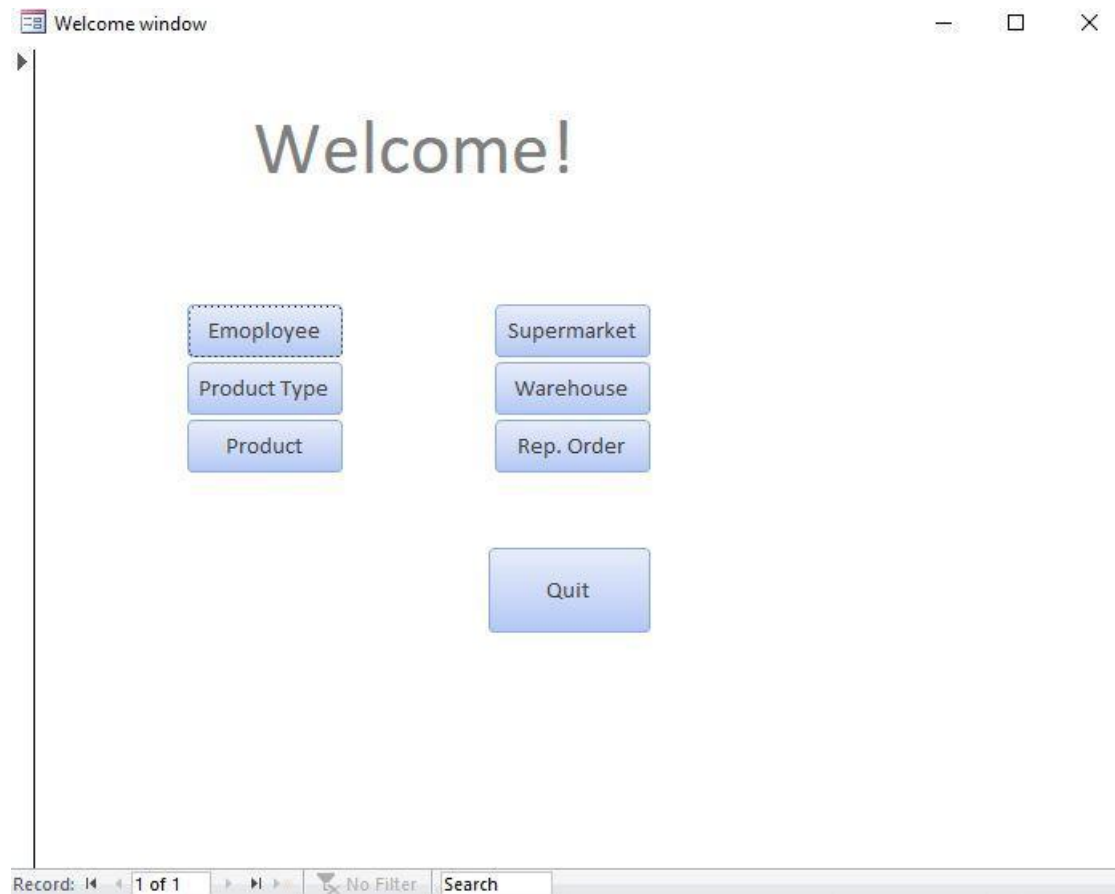
OK

Cancel

Login will be failed if the combination is wrong

The image shows a software window titled "Login Form" with a close button (X) in the top right corner. The main heading "Supermarket Data System" is centered. Below it, a "Success" dialog box is displayed, containing an information icon (i) and the text "Login Successful", with an "OK" button. Underneath the dialog, the "User Name" field contains "ist659M001" and the "User Password" field contains "123456". At the bottom of the form are two buttons: "OK" and "Cancel".

Login Successful Window, then the pop up window will close automatically



The homepage of a Manager  
They can view 6 tables and edit them



**Supermarket**

Supermarket\_ID: S0001

Manager\_ID: M0001

S\_City: Syracuse

S\_State: NY

S\_Address1: Comstock Ave

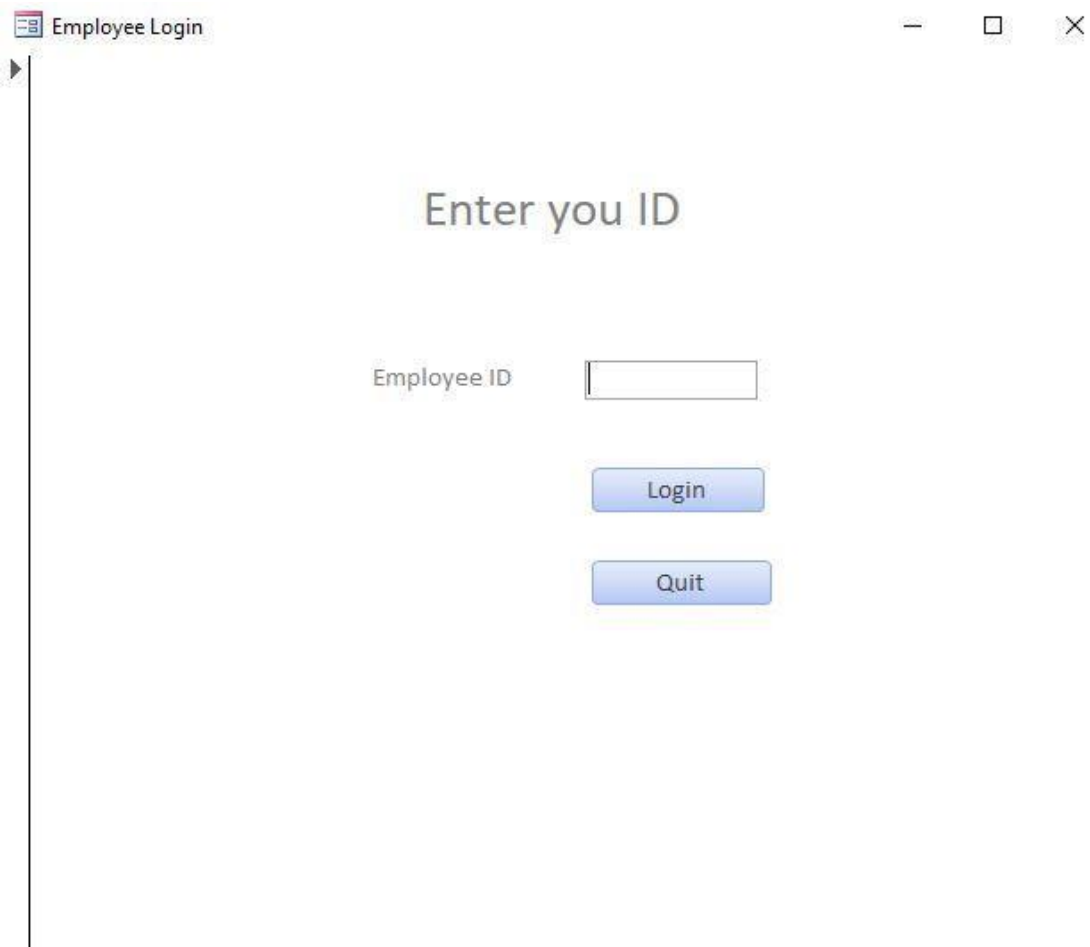
S\_Address2: 123

Supermarket_ID	Manager_ID	S_City	S_State	S_Address1	S_Address2
S0001	M0001	Syracuse	NY	Comstock Ave	123
S0002	M0002	Fairmount	NY	Coker Ave	002
S0003	M0003	Auburn	NY	Pepsor Rd	012
S0004	M0004	Fulton	NY	Starmark Pl	542
S0005	M0005	Cortland	NY	Dunkin Rd	009
*					

Record: 1 of 5 | No Filter | Search

Add Record Delete Record

This is how managers view and edit the tables.

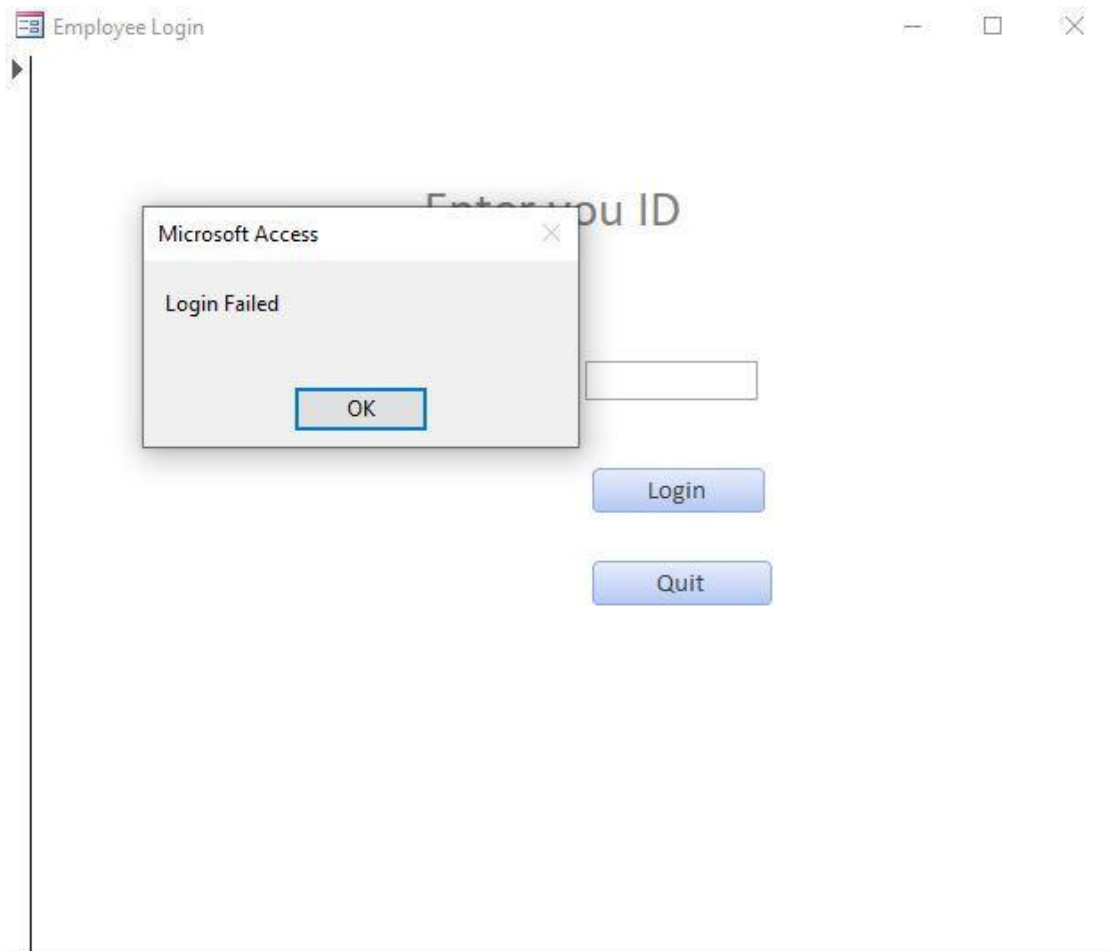


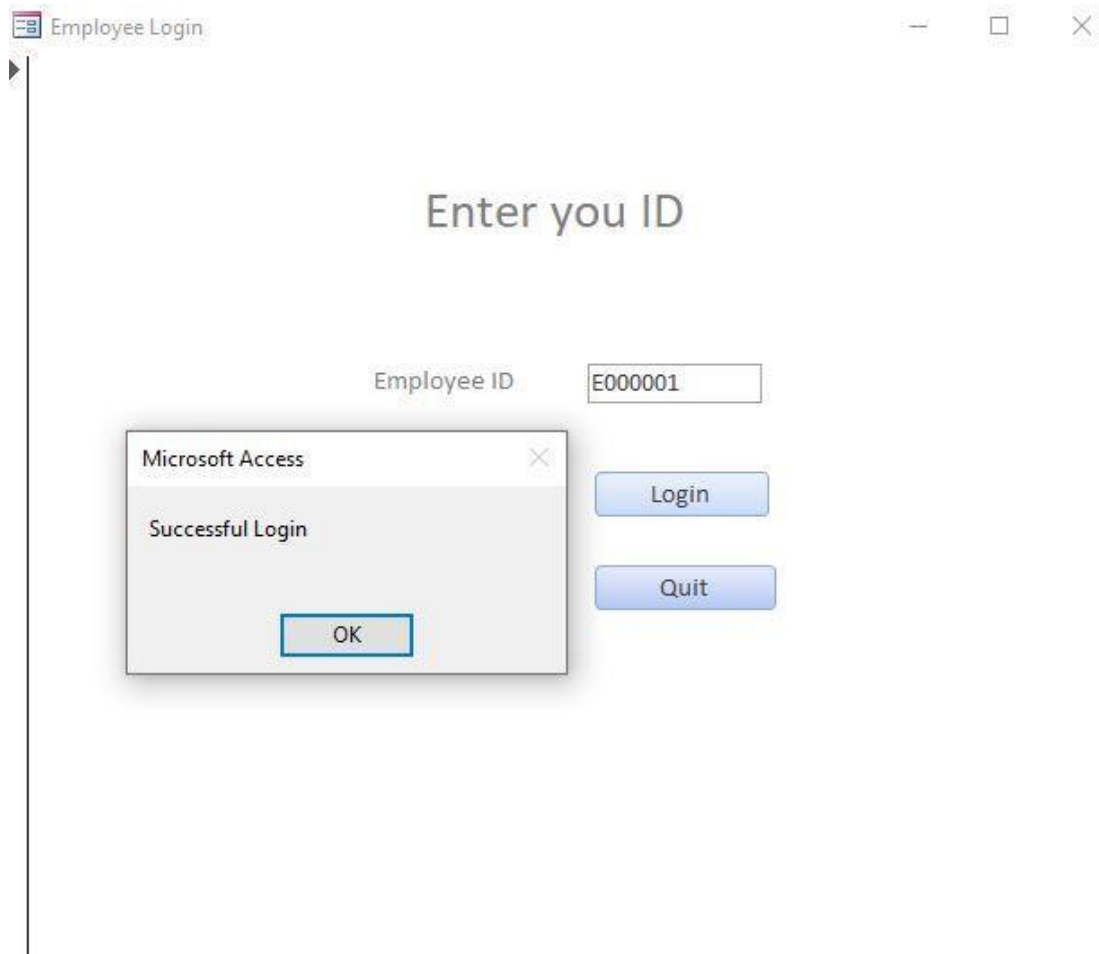
The image shows a screenshot of a software window titled "Employee Login". The window has a standard title bar with a minimize button, a maximize button, and a close button. The main content area of the window is white and contains the following elements:

- A large, bold, black text prompt: "Enter you ID".
- A label "Employee ID" positioned to the left of a text input field.
- A blue button with the text "Login" below the input field.
- A blue button with the text "Quit" below the "Login" button.

A vertical line is visible on the left side of the window, extending from the top to the bottom of the main content area.

Login form of employees  
They only need their Employee ID  
(Read only)





Homepage of Employee after login



# Sample Reports

Product_Type_ID	Product_Name	Product_Type_Price	Amount_in_Stock
PT000001	Big Apple	5	5000
PT000002	Banana	1	3100
PT000003	Avocado	2	2323
PT000004	C Plate	8	3322
PT000005	G Pot	21	1231
PT000006	Eggfruit	4	1333
PT000007	Mouse	33	2213
PT000008	Headphone	89	1444
PT000009	Cap	25	7821
PT000010	Bag	69	5321

dbo\_Employee\_C Friday, December 6, 2019 6:25:29 PM

Employee_ID	Supermarket_ID	Emp_SSN	Emp_FName	Emp_LName	Emp_Position	Emp_Address1	Emp_Adc	Emp_Phone	Emp_Email	Emp_Start_Date
E000001	S0001	123-4566-45	Jay	Macle	Manager	Big Palace		315-372-0047	JM123@Super.com	4/13/2019
E000002	S0002	123-4566-01	Alice	Neel	Manager	14 Rose Ave		315-372-0021	AN123@Super.com	4/13/2019
E000003	S0003	123-4566-02	Betty	Parsons	Manager	23 LAFAYETTE Road		315-372-0015	BP125@Super.com	4/13/2019
E000004	S0004	123-4566-03	Jack	Tworokv	Manager	21 Nuts Road		315-372-0117	JT126@Super.com	4/13/2019
E000005	S0005	123-4566-04	James	Kempton	Manager	33 Maxine Ave		315-372-2147	JK127@Super.com	4/13/2019
E000006	S0001	123-4566-05	Merry	Lindner	Employee	25 Vestie Road		315-372-0337	ML128@Super.com	4/14/2019
E000007	S0001	123-4566-06	Chris	Rose	Employee	15 Stone Ave		315-372-0347	CR129@Super.com	4/15/2019
E000008	S0002	123-4566-07	Walt	Disney	Employee	78 Seymour Ave		315-312-0047	WD210@Super.com	4/14/2019
E000009	S0002	123-4566-08	Esther	Swinden	Employee	19 Elwood Road		315-322-0047	ES213@Super.com	4/16/2019
E000010	S0003	123-4566-09	Albert	Walker	Employee	91 Charles Ave		315-472-0047	AW315@Super.com	4/14/2019
E000011	S0003	123-4566-10	John	Wedin	Employee	27 Water Road		315-382-0047	JW111@Super.com	4/15/2019
E000012	S0004	123-4566-11	Ansel	Adams	Employee	18 Double Street		315-272-0047	AA193@Super.com	4/16/2019
E000013	S0004	123-4566-12	Isaac	Soyer	Employee	45 Isaac Road		315-278-0047	IS103@Super.com	4/14/2019