


King Saud University College of Computer and Information Sciences Computer Science Department		
CSC380 Fundamentals Of Database Systems	Fall 2022	

## ***CSC 380 Project***

# **Project Topic**

## ***Restaurant Management System***

**Team:5**  
**Section:66516**

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## Overview :

### Description

Our DB system is simple and comprehensive, it serves the requirements and needs of restaurant management. The database stores the branch's data, which is managed and worked by several employees, their data is also stored, and it manages the system of reservations and orders so that it is easier for the staff to serve customers in the best possible way. Our database system provides each user with data of interest. The restaurant manager is responsible for managing staff, hiring, food costs, inventory management, and more. and he can access and manage all these things through the DB system. Staff who works in the restaurant are responsible for managing, preparing the meals, and serving the customers. Order placement and reservation by staff will be faster and easier. and will help to reduce the conflicts that happen in real-life reservations. Also, it will provide a good structure for the business.

### Requirements

- The restaurant has many branches, and Each **BRANCH** has a Location, working hours, id, and phone number.
- **CUSTOMER** is defined by name, customer id, and phone number.
- **STAFF** is defined by Name, ID, phone number, birth date, work hours, role, and monthly salary.
- **ORDER** is defined by an order ID and number of items. Order ID identifies an order uniquely.
- **RECEIPT** is defined by receipt number, total amount, order type (dine-in or dine-out), date, tax, and payment method. For each order, there is a receipt associated with it. If the order is canceled, then the receipt will be deleted.
- **MENU** is defined by menu ID and menu category.
- **TABLE** is defined by table number, number of seats, and availability status.
- Each **ITEM** is defined by name, item price, and item ID.
- Each **SUPPLIER** has an ID, Name, and Phone number.
- Each table has an order. Order contains many items, one order has at least one item.
- The customer places an order. Each customer has at least one order.
- The customer reserves a table. Each customer can reserve at most one table a day and each Reservation has a date and time associated with it.
- The menu has several items, and there are at least 5 items on the menu.
- Suppliers contract with multiple branches and branches can get contracted by multiple suppliers. You must store a start date and an end date for each contract.
- The staff works in a branch, a branch has at least one staff and could handle up to 50 employees, and there's one supervisor who supervises at least one employee. Staff in charge of a table

# Entity Relationship Diagram:

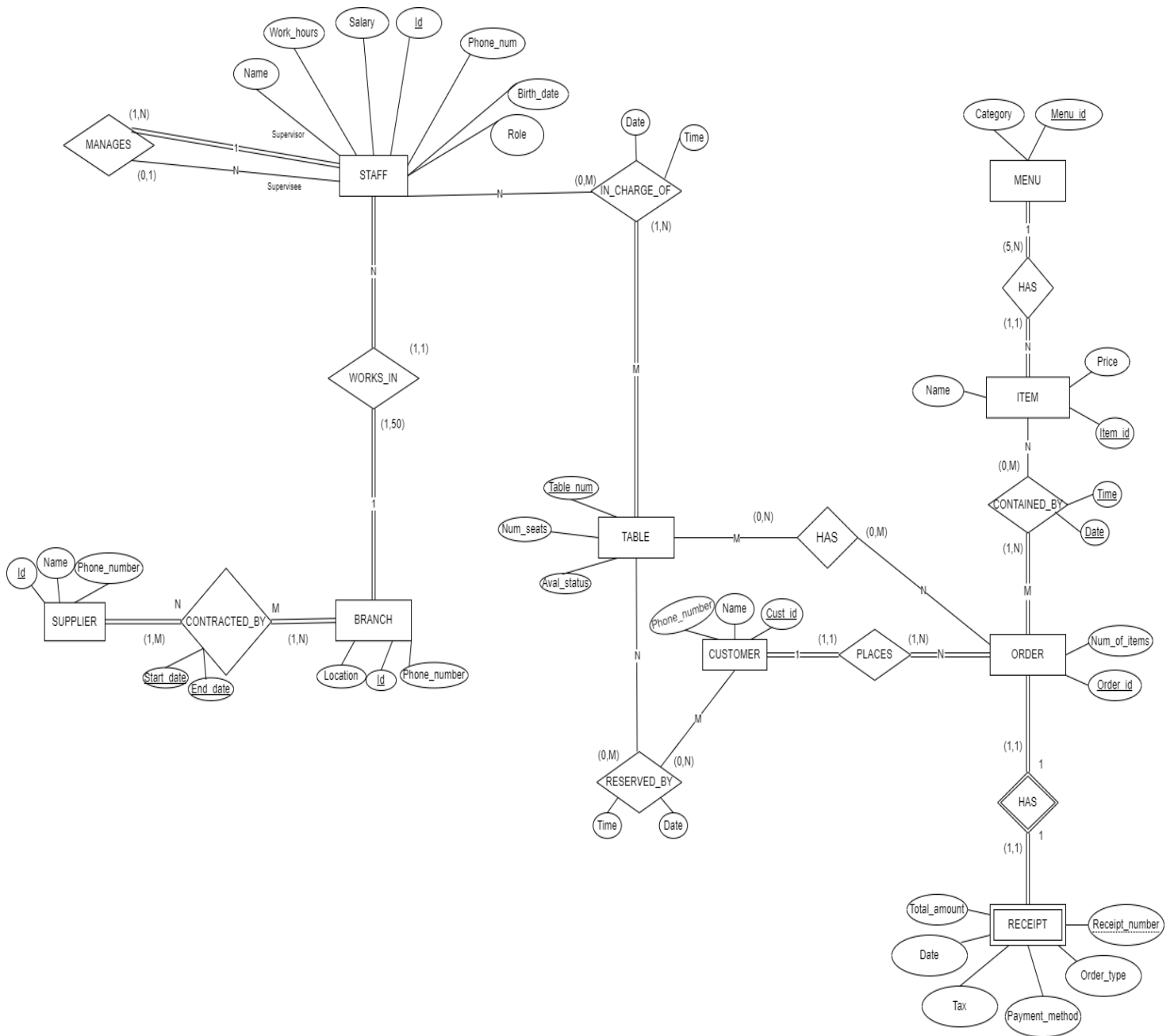


Figure 1: made by draw.io [1]

## Relational Schema :

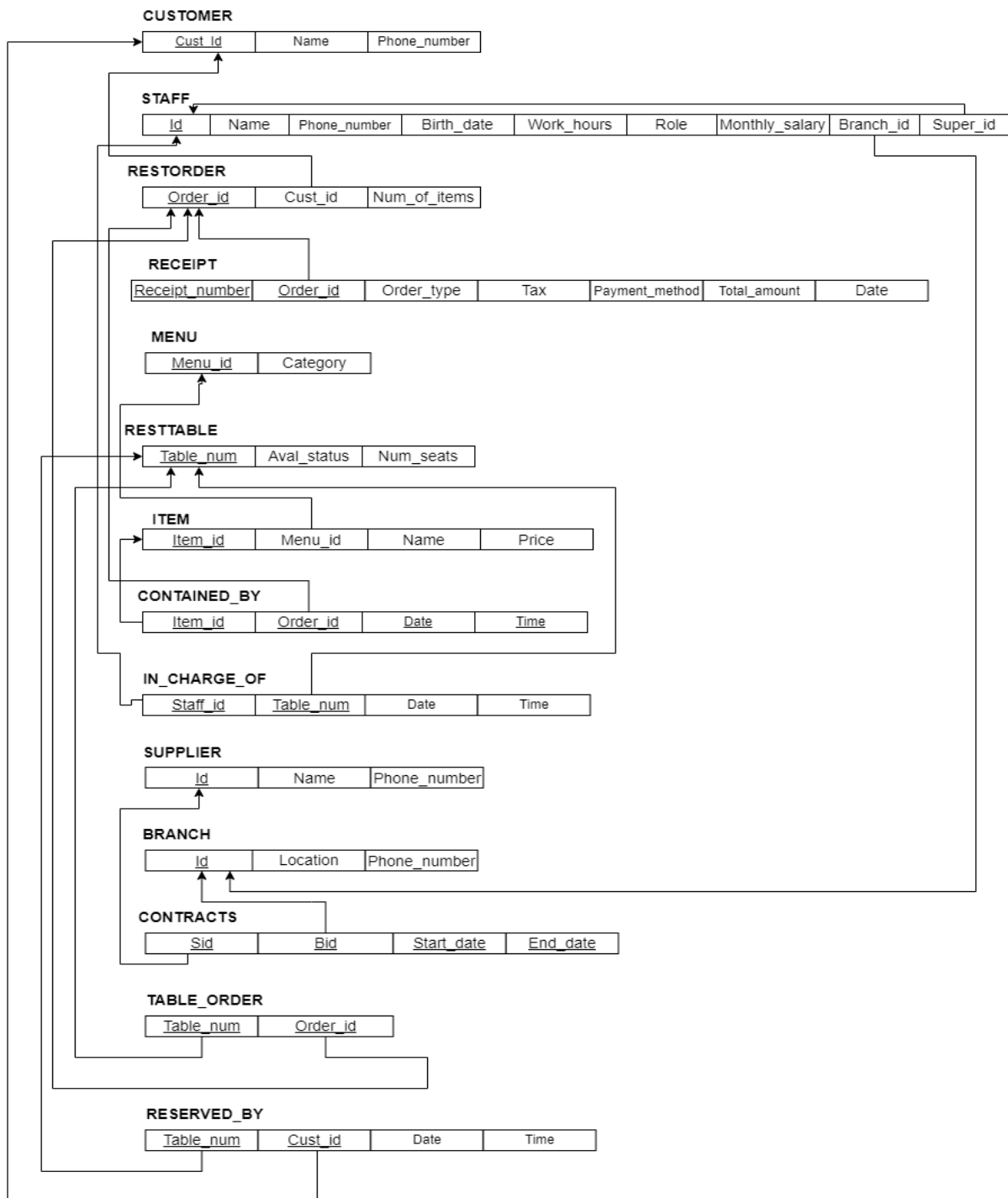


Figure 2: made by draw.io [1]

## System users:

### User group : Manager

This user has a broad view of the database and is responsible for commercial, financial, and administrative matters. They are also responsible for overseeing the daily operations of a restaurant. Their duties include hiring and training restaurant staff, dealing with suppliers solving problems, and creating work schedules for restaurant staff. and they can do their job by performing several operations such as inserting, updating, retrieving, and deleting to manage and maintain the system. **The manager can access the whole database.**

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### The view :

STAFF

Id	Name	Phone_number	Birth_date	Work_hours	Role	Monthly_salary	Branch_id	Super_id
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

SUPPLIER

Id	Name	Phone_number
NULL	NULL	NULL

CUSTOMER

Cust_id	Name	Phone_number
NULL	NULL	NULL

BRANCH

Id	Location	Phone_number
NULL	NULL	NULL

CONTRACTS

Sid	Bid	Start_date	End_date
NULL	NULL	NULL	NULL

RESTTABLE

Table_num	Aval_status	Num_seats
NULL	NULL	NULL

### 1/Inserting staff

INSERT INTO STAFF

VALUES('123498756','omer','966555555554','2002-09-13',8,'waiter',5000,1236,'678954321');

### 2/Inserting supplier

INSERT INTO SUPPLIER

VALUES('200000001','noura','966555555553');

### 3/Retrieve staff info

SELECT \*

FROM STAFF

WHERE id='123498756';

**4/ Retrieve average monthly salary**

```
SELECT AVG(Monthly_salary)
FROM STAFF
WHERE Role='chef';
```

**5/ Updating a particular staff salary**

```
UPDATE STAFF
SET Monthly_salary=7000
WHERE id=' 987654321';
```

**6/ Updating a particular staff phone number**

```
UPDATE STAFF
SET Phone_number='966554455111'
WHERE id=' 123498756';
```

**7/ Deleting a staff**

```
DELETE FROM STAFF
WHERE Id = '123498765';
```

**8/ Deleting a supplier**

```
DELETE FROM SUPPLIER
WHERE Id = '200000001';
```

**9/Retrieving every staff branch location**

```
SELECT S.Id, Location
FROM STAFF AS S , BRANCH AS B
WHERE S.Branch_id = B.Id;
```

**10/ Retrieving every suppliers name corresponding to the branch they supplied**

```
SELECT S.Id AS Supplier_Id, B.Id AS Branch_id, Name AS Supplier_name
FROM CONTRACTS, BRANCH AS B, SUPPLIER AS S
WHERE B.Id = Bid AND S.Id = Sid;
```

## User group: CHEF

The user is responsible for preparing the order and organizing the menu. So, **he can view the order.**

### The view:

#### ITEM

	item_id	Menu_id	Name	Price
--	---------	---------	------	-------

#### MENU

	Menu_id	Category
--	---------	----------

#### 1/Insert a category in menu

```
INSERT INTO MENU VALUES ('987655321','main');
```

#### 2/Insert new item

```
INSERT INTO ITEM VALUES('123453780','987655321','burger',100);
```

#### 3/Update: change item name

```
UPDATE ITEM  
SET Name = 'white chocolate'  
WHERE item_id = '123456780';
```

#### 4/Update the item price

```
UPDATE ITEM  
SET price = 40  
WHERE item_id = '123456780';
```

#### 5/ Retrieving every items price

```
SELECT Name as item_name , price  
FROM ITEM;
```

#### 6/Retrieve menus category

```
2/ SELECT Category  
FROM Menu;
```

#### 7/Retrieve number of items in one category

```
SELECT Category,COUNT(*) as count_items_inmenu FROM ITEM NATURAL JOIN  
MENU GROUP BY Category;
```

#### 8/Retrieve items category

```
SELECT Category, Name as item_name FROM ITEM NATURAL JOIN MENU;
```

### 1/Delete an item

```
1/ DELETE FROM ITEM  
WHERE item_id = '123456780';
```

### 2/ Delete a MENU

```
DELETE FROM MENU  
WHERE Menu_id = '987654322';
```

## Implementation:

Implementing The Database using a DBMS (MySQL)

### Staff

Object Info	Session
Table: <b>STAFF</b>	
Columns:	
<b>Id</b>	char(9) PK
Name	varchar(15)
Phone_number	char(12)
Birth_date	date
Work_hours	decimal(3,1)
Role	varchar(15)
Monthly_salary	decimal(10,2)
Branch_id	char(9)
<b>Super_id</b>	char(9)
Query Completed	

### Branch

Object Info	Session
Table: <b>BRANCH</b>	
Columns:	
<b>Id</b>	char(9) PK
Location	varchar(25)
Phone_number	char(12)
Query Completed	

### Supplier

Object Info	Session
Table: <b>SUPPLIER</b>	
Columns:	
<b>Id</b>	char(9) PK
Name	varchar(15)
Phone_number	char(12)
Query Completed	

### RestTable

Object Info	Session
Table: <b>RESTTABLE</b>	
Columns:	
<b>Table_num</b>	int PK
Aval_status	tinyint(1)
Num_seats	int
Query Completed	



## Table\_order

Object Info	Session
Table: <b>TABLE_ORDER</b>	
Columns:	
<u>Table_num</u>	int PK
<u>Order_id</u>	char(9) PK
Query Completed	

## Reserved\_by

Object Info	Session
Table: <b>RESERVED_BY</b>	
Columns:	
<u>Table_num</u>	int PK
<u>Cust_id</u>	char(9) PK
Date	date
Time	time
Query Completed	

## Menu

Object Info	Session
Table: <b>MENU</b>	
Columns:	
<u>Menu_id</u>	char(9) PK
Category	varchar(10)
Query Completed	

## Item

Object Info	Session
Table: <b>ITEM</b>	
Columns:	
<u>item_id</u>	char(9) PK
<u>Menu_id</u>	char(9)
Name	varchar(15)
Price	decimal(5,2)
Query Completed	

## Customer

Object Info	Session
Table: <b>CUSTOMER</b>	
Columns:	
<u>Cust_id</u>	char(9) PK
Name	varchar(15)
Phone_number	char(12)
Query Completed	

## RestOrder

Object Info	Session
Table: <b>RESTORDER</b>	
Columns:	
<u>Order_id</u>	char(9) PK
Cust_id	char(9)
Num_of_items	int
Query Completed	

## Receipt

Object Info	Session
Table: <b>RECEIPT</b>	
Columns:	
<u>Receipt_number</u>	char(15) PK
<u>Order_id</u>	char(9) PK
Order_type	char(8)
Tax	decimal(5,2)
Payment_method	varchar(10)
Total_amount	decimal(10,2)
Date	date
Query Completed	

## Contained\_by

Object Info	Session
Table: <b>CONTAINED_BY</b>	
Columns:	
<u>Item_id</u>	char(9) PK
<u>Order_id</u>	char(9) PK
<u>Date</u>	date PK
<u>Time</u>	time PK
Query Completed	

## Contracts

Table: **contracts**

Columns:

<u>Sid</u>	char(9) PK
<u>Bid</u>	char(9) PK
<u>Start_date</u>	date PK
<u>End_date</u>	date PK

## In\_chage\_of

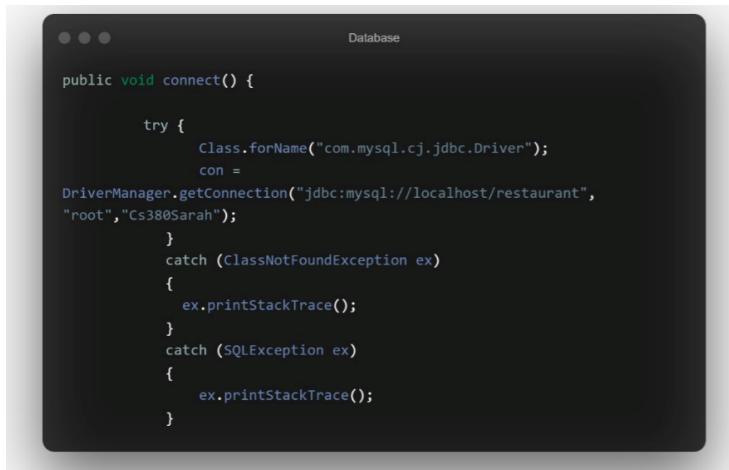
Table: **in\_charge\_of**

Columns:

<u>Staff_id</u>	char(9) PK
<u>Table_num</u>	int PK
Date	date
Time	time

## Connection part:

In this code, we have linked the database to eclipse



```
Database

public void connect() {

    try {
        Class.forName("com.mysql.cj.jdbc.Driver");
        con =
        DriverManager.getConnection("jdbc:mysql://localhost/restaurant",
        "root","Cs380Sarah");
    }
    catch (ClassNotFoundException ex)
    {
        ex.printStackTrace();
    }
    catch (SQLException ex)
    {
        ex.printStackTrace();
    }
}
```

## Some parts of code :

We showed some basic parts of the code that we created to be the Chef interface, which is repeated in the manager interface code.

```
Database

try {

    String item_id = txtsidretrieve.getText();

    pst = con.prepareStatement("select item_id, Menu_id,
Name, Price from ITEM where item_id = ?");
    pst.setString(1, item_id);
    ResultSet rs = pst.executeQuery();

    if(rs.next()!=true)
    {
        String id = rs.getString(1);
        String menu_id = rs.getString(2);
        String name = rs.getString(3);
        String price = rs.getString(4);
        ;

        txtitem.setText(id);
        txtsmenu.setText(menu_id);
        txtsname.setText(name);
        txtsprice.setText(price);

    }
    else
    {
        txtitem.setText("");
        txtsmenu.setText("");
        txtsname.setText("");
        txtsprice.setText("");
    }

}

catch (SQLException ex) {

}
```

In this part, we did the data retrieval process using the prepareStatment method which in turn executes query.

```

public void table_load_MENU()
{
    try
    {
        pst = con.prepareStatement("select * from MENU");
        rs = pst.executeQuery();
        table.setModel(DbUtils.resultSetToTableModel(rs));
    }
    catch (SQLException e)
    {
        e.printStackTrace();
    }
}

public void table_load_ITEM()
{
    try
    {
        pst = con.prepareStatement("select * from ITEM");
        rs = pst.executeQuery();
        table_1.setModel(DbUtils.resultSetToTableModel(rs));
    }
    catch (SQLException e)
    {
        e.printStackTrace();
    }
}

public void table_load_JOIN()
{
    try
    {
        pst = con.prepareStatement("select Name as item_name , price from
ITEM;");
        rs = pst.executeQuery();
        table_2.setModel(DbUtils.resultSetToTableModel(rs));
    }
    catch (SQLException e)
    {
        e.printStackTrace();
    }
}

public void table_load_JOIN2()
{
    try
    {
        pst = con.prepareStatement("select Category from MENU;");
        rs = pst.executeQuery();
        table_3.setModel(DbUtils.resultSetToTableModel(rs));
    }
    catch (SQLException e)
    {
        e.printStackTrace();
    }
}

public void table_load_JOIN3()
{
    try
    {
        pst = con.prepareStatement("select Category, COUNT(*) AS
count_items_inmenu from ITEM NATURAL JOIN MENU GROUP BY Category;");
        rs = pst.executeQuery();
        table_4.setModel(DbUtils.resultSetToTableModel(rs));
    }
    catch (SQLException e)
    {
        e.printStackTrace();
    }
}

public void table_load_JOIN4()
{
    try
    {
        pst = con.prepareStatement("select Category, Name AS item_name
from ITEM NATURAL JOIN MENU;");
        rs = pst.executeQuery();
        table_5.setModel(DbUtils.resultSetToTableModel(rs));
    }
    catch (SQLException e)
    {
        e.printStackTrace();
    }
}

```

In this part we have loaded the item and menu tables by  
table\_load\_ITEM()  
table\_load\_MENU()  
this methods used the  
prepareStatment method  
to execute the queries  
and this is what we did with  
the rest of the tables .

```

Database

sid = txtitem.getText();
smenu_id = txtsmenu.getText();
sname = txtsname.getText();
sprice = txtsprice.getText();

try {
    pst = con.prepareStatement("insert into ITEM(item_id ,
Menu_id, Name , Price)values(?,?,?,?)");
    pst.setString(1, sid);
    pst.setString(2, smenu_id);
    pst.setString(3, sname);
    pst.setString(4, sprice);

    pst.executeUpdate();
    JOptionPane.showMessageDialog(null, "insertion is done
successfully");
    table_load_ITEM();

    txtitem.setText("");
    txtsmenu.setText("");
    txtsname.setText("");
    txtsprice.setText("");

    txtitem.requestFocus();
}

catch (SQLException e1)
{
    e1.printStackTrace();
}

```

In this part, we did the insertion process and showed a message if the operation was successfully completed by  
JOptionPane.showMessageDialog()

```

Database

sid = txtsidretrieve .getText();

try {
    pst = con.prepareStatement("delete from ITEM where
item_id=?");

    pst.setString(1, sid);

    pst.executeUpdate();
    JOptionPane.showMessageDialog(null, "Deletion is
done successfully");
    table_load_ITEM();

    txtitem.setText("");
    txtsmenu.setText("");
    txtsname.setText("");
    txtsprice.setText("");

    txtsidretrieve.setText("");
    txtitem.requestFocus();
}

catch (SQLException e1)
{
    e1.printStackTrace();
}

```

In this part, we did the deletion process and showed a message if the operation was successfully completed by  
JOptionPane.showMessageDialog()

```

Database

smenu_id = txtsmenu.getText();
sname = txtsname.getText();
sprice = txtsprice.getText();
sid = txtsidretrieve.getText();

try {
    pst = con.prepareStatement("update ITEM set Menu_id =
    ?,Name = ? ,Price = ? WHERE Item_id = ?");

    pst.setString(1, smenu_id);
    pst.setString(2, sname);
    pst.setString(3, sprice);
    pst.setString(4, sid);

    pst.executeUpdate();
    JOptionPane.showMessageDialog(null, "update is done
    successfully");
    table_load_ITEM();

    txtitem.setText("");
    txtsmenu.setText("");
    txtsname.setText("");
    txtsprice.setText("");

    txtsidretrieve.setText("");
    txtitem.requestFocus();
}

catch (SQLException e1)
{
    e1.printStackTrace();
}

```

In this part, we did the update process and showed a message if the operation was successfully completed by `JOptionPane.showMessageDialog()`

## Manager interface:

Inserting chef:

The screenshot shows the 'welcome manager' application with the 'STAFF' tab selected. The 'Insert' button is highlighted. A dialog box with the message 'insertion is done successfully' is displayed over the staff table. The staff table has columns: Id, Name, Phone\_no, Birth\_date, Work\_hours, Role, Monthly\_sal, Branch\_id, Super\_id. The data row shows a chef with Id 123456789, Name 'chef', Phone\_no 9065555554, Birth\_date 2002-02-10, Work\_hours 12.0, Role 'chef', Monthly\_sal 6000.00, Branch\_id 1234, and Super\_id 123456789.

After insertion:

The screenshot shows the 'welcome manager' application with the 'STAFF' tab selected. The 'Insert' button is highlighted. The staff table now includes a new tuple (highlighted in red): Id 123456789, Name 'chef', Phone\_no 9065555554, Birth\_date 2002-02-10, Work\_hours 12.0, Role 'chef', Monthly\_sal 6000.00, Branch\_id 1234, and Super\_id 123456789.

Inserting supplier:

The screenshot shows the 'welcome manager' application with the 'SUPPLIER' tab selected. The 'Insert' button is highlighted. A dialog box with the message 'insertion is done successfully' is displayed over the supplier table. The supplier table has columns: Id, Name, Phone\_number. The data row shows a supplier with Id 200000001, Name 'nour', and Phone\_number 9065555553.

After insertion:

The screenshot shows the 'welcome manager' application with the 'SUPPLIER' tab selected. The 'Insert' button is highlighted. The supplier table now includes a new tuple (highlighted in red): Id 200000001, Name 'nour', and Phone\_number 9065555553.

## Updating a particular staff salary:

Id: 987654321

Name: nouf

Phone number: 986123456789

Birth date: 1991-01-05

work hours: 8.0

Role: chef

Salary: 7000.00 **New value**

Branch id: 1234

Supervisor id: 123456789

Id: 987654321

Update

Message: update is done successfully

Id	Name	Phone_nu.	Birth_date	Work_hours	Role	Monthly_sa.	Branch_id	Super_id
123456789	sara	9065555555	2002-02-10	12.0	chef	5000.00		
123486765	Sami	966	1997-06-07	8.0	chef	7000.00	1236	123456789
678954321	Mohamed	986123456	1990-08-08	8.0	manager	20000.00	1234	123456789
987654321	nouf	986123456	1991-01-05	8.0	chef	7000.00	1234	123456789

## After the update:

Id:

Name:

Phone number:

Birth date:

work hours:

Role:

Salary:

Branch id:

Supervisor id:

Id:

Update

Id	Name	Phone_nu.	Birth_date	Work_hours	Role	Monthly_sa.	Branch_id	Super_id
123456789	sara	9065555555	2002-02-10	12.0	chef	5000.00		
123486765	Sami	966	1997-06-07	8.0	chef	7000.00	1236	123456789
678954321	Mohamed	986123456	1990-08-08	8.0	manager	20000.00	1234	123456789
987654321	nouf	986123456	1991-01-05	8.0	chef	7000.00	1234	123456789

## Updating a particular staff phone number :

Id: 123486756

Name: omr

Phone number: 98654455111 **New value**

Birth date: 2002-09-13

work hours: 8.0

Role: water

Salary: 3000.00

Branch id: 1236

Supervisor id: 678954321

Id: 123486756

Update

Message: update is done successfully

Id	Name	Phone_nu.	Birth_date	Work_hours	Role	Monthly_sa.	Branch_id	Super_id
123456789	sara	9065555555	2002-02-10	12.0	chef	5000.00		
123486756	omer	9865445511	2002-09-13	8.0	water	3000.00	1236	678954321
678954321	Mohamed	986123456	1990-08-08	8.0	manager	20000.00	1234	123456789
987654321	nouf	986123456	1991-01-05	8.0	chef	7000.00	1234	123456789

## After the update:

Id:

Name:

Phone number:

Birth date:

work hours:

Role:

Salary:

Branch id:

Supervisor id:

Id:

Update

Id	Name	Phone_nu.	Birth_date	Work_hours	Role	Monthly_sa.	Branch_id	Super_id
123456789	sara	9065555555	2002-02-10	12.0	chef	5000.00		
123486756	omer	9865445511	2002-09-13	8.0	water	3000.00	1236	678954321
678954321	Mohamed	986123456	1990-08-08	8.0	manager	20000.00	1234	123456789
987654321	nouf	986123456	1991-01-05	8.0	chef	7000.00	1234	123456789

## Deleting a supplier:

## After Deletion:

Id: 30000001

Name: nouf

Phone number: 90655555554

Id: 30000001

Update

Message: deletion is done successfully

Id	Name	Phone_number
20000001	noura	90655555553
20000003	sara	906888888882
30000001	nouf	90655555554

Id:

Name:

Phone number:

Id: 30000001

Update

Id	Name	Phone_number
20000001	noura	90655555553
20000003	sara	906888888882



## Deleting a staff:

The screenshot shows the 'welcome manager' application with the 'STAFF' tab selected. The 'Delete' button is clicked, and a modal dialog box appears with the message 'Deletion is done successfully' and an 'OK' button.

## After Deletion:

The screenshot shows the 'welcome manager' application with the 'STAFF' tab selected. The staff member's information is no longer visible in the table, indicating successful deletion.

## Retrieve staff info:

The screenshot shows the 'welcome manager' application with the 'RETRIEVE' tab selected. The staff member's information is displayed in the table, and the 'Update' button is visible.

By entering the id, the employee's information is automatically output on the other side.

## Retrieve average monthly salary

## Retrieving every staff branch location

## Retrieving every suppliers name corresponding to the branch they supplied:

The screenshot shows the 'welcome manager' application with the 'RETRIEVE' tab selected. The table displays the following data:

Supplier_id	Branch_id	Supplier_name
200000003	1234	sara
200000001	1235	noura

Staff_id	Location
123498765	dammam
987654321	riyadh

Retrieving every staff branch location:

Role	Average salary
chef	8000.000000

Retrieve average monthly salary:

## Chef interface:

## Insert a category in menu:

## After insertion:

Menu id: 987655321  
Category: main

Id:  Update

Menu_id	Category
987655321	main

Id: 123456789 Update

### Insert new item:

Item id: 123456789  
Menu id: 987655321  
Name: burger  
price: 100

Id:  Update

### After insertion:

Item_id	Menu_id	Name	Price
123456789	987655321	burger	100.00

Id:  Update

### Update the item price:

Item id: 123456789  
Menu id: 987655321  
Name: burger  
price: 100.00

Id: 123456789 Update

### After the update:

Item_id	Menu_id	Name	Price
123456789	987655321	burger	100.00

Id:  Update

Update: change item name:

After the update:

Message: update is done successfully

Item id: 123453780

Menu id: 867665321

Name: white chocolate

price: 40.00

Id: 123453780

Update

Item id: 123453780

Menu id: 867665321

Name: white chocolate

price: 40.00

Id: 123453780

Update

Retrieving every items price:

item_name	price
orange juice	15.00
pasta	45.00
chocolate	25.00

Retrieve items category:

Category	item_name
Drinks	orange juice
main	pasta
sweet	chocolate

Retrieve number of items in one category:

Category		count_items_inmenu
sweet	Drinks	1
main		2

Retrieve menus category:

Category	
sweet	
Drinks	
main	

Delete an item :

Insert

Delete

Item id

Menu id

Name

price

Item id	Menu id	Name	Price
123456789	987654321	burger	40.00
551234567	331234567	orange juice	15.00
771234567	987654321	pasta	45.00
987654321	123456789	chocolate	25.00

Id

123456789

Update

Message

Deletion is done successfully

OK

After deletion:

Insert

Delete

Item id

Menu id

Name

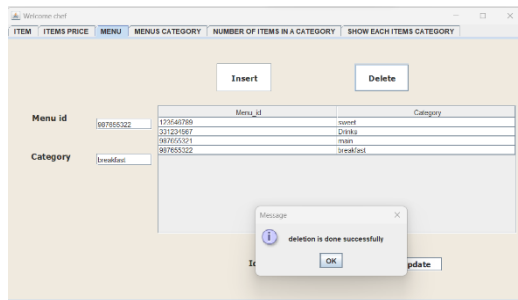
price

Item id	Menu id	Name	Price
551234567	331234567	orange juice	15.00
771234567	987654321	pasta	45.00
987654321	123456789	chocolate	25.00

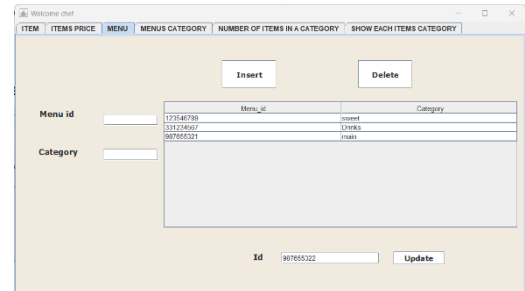
Id

Update

### Delete a menu:



### After deletion:



## Difficulties:

We faced some difficulties such as lack of time and self-learning in creating interfaces, but we did the work in the end.

## References:

[1] <https://drawio-app.com/>