King Saud University
College of Computer and Information Sciences
Computer Science Department

CSC380:
Fundamentals Of Database Systems

Second Semester
1443

Project: Restaurant Management System

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Glossary of terms

Database (DB)	A collection of related data. [1, p4] A database is designed, built, and populated with data for a specific purpose. It has an intended group of users and some preconceived applications in which these users are interested. [1, p:5]
Database management system (DBMS)	a computerized system that enables users to create and maintain a database. [1, p:6]
supervisee	“One who is supervised, who works under a supervisor.” [2]

Description

Our restaurant management system is simple to use, and various users can view it differently depending on their needs. The restaurant manager has access to the entire restaurant management system and can perform any operation, such as adding or removing a staff. Customers can reserve a table by contacting the branch or using the restaurant app. The cashier and the waiter are both capable of performing various operations on the orders, such that, when a customer wants to place an order, he can either do that through the cashier or by calling the waiter to take his order. Also, a customer can request a delivery for his order through the restaurant app, this type of orders is the responsibility of the delivery staff. When an order is placed, the kitchen staff is responsible for preparing it. lastly, customers can review the provided service by leaving feedback through the app.

Requirements

The restaurant has many branches each has a unique branch number, contact information, and an address. A branch should be managed by a manager.

All staffs' information should be stored. A staff member has a name, date of birth, role, staff department, id, and phone number.

There is a contract between the restaurant and a supplier which has a unique contract id, start date, end date for the contract, and cost.

The supplier shall have a contacting number, name, and an address.

If somehow, a shortage in food resources happened; the kitchen staff should inform the managerial staff to dissolve such issues.

The customer's id, name, address, and phone are also stored. A customer should be able to reserve a table, cancel a reservation, view the menu, make an order, and request a delivery for the order. Also, they can review the service provided, all this can be done through the database management system (DBMS).
A reservation information should include customer's name, email, number, and number of guests and table number. Along with date and time of the reservation.

Each table has a unique number, number of seats. The status of tables should be updated by waiter once a table available, reserved or available.

The restaurant has different types of menus, such as breakfast menu, etc. Each menu has different options of items. Every menu item has a name, description, and price. Once a new menu item is launched, it should be added to a menu based on its type (for instance, a breakfast meal will be added to the breakfast menu).

When a customer orders from the menu; the requested menu items must exist within the menu items.

A waiter shall be able to place an order.

Each order has a unique order number–which shall keep orders well-arranged–, and item quantity.

Each order should have a receipt. The receipt should contain order details such as: order number, receipt number, date and time of order, type of order (pick up or delivery or dine in) total price of the order, taxes (if any), and payment option, either cash or card, and shall be presented to customers.

The kitchen staff should be able to access the order details and prepare it. The wait staff should be able to bring the order to the table.

If the customer requested a delivery, the delivery staff shall be able to take charge of all delivery process which includes the number of the delivery, the status of delivery, cost of delivery, date, and time of delivery.

The floor staff should inform the wait staff if the table is ready for the customers.

The managerial staff has access to the whole database and can perform different operations such as adding or removing a staff.

Entity relation diagram

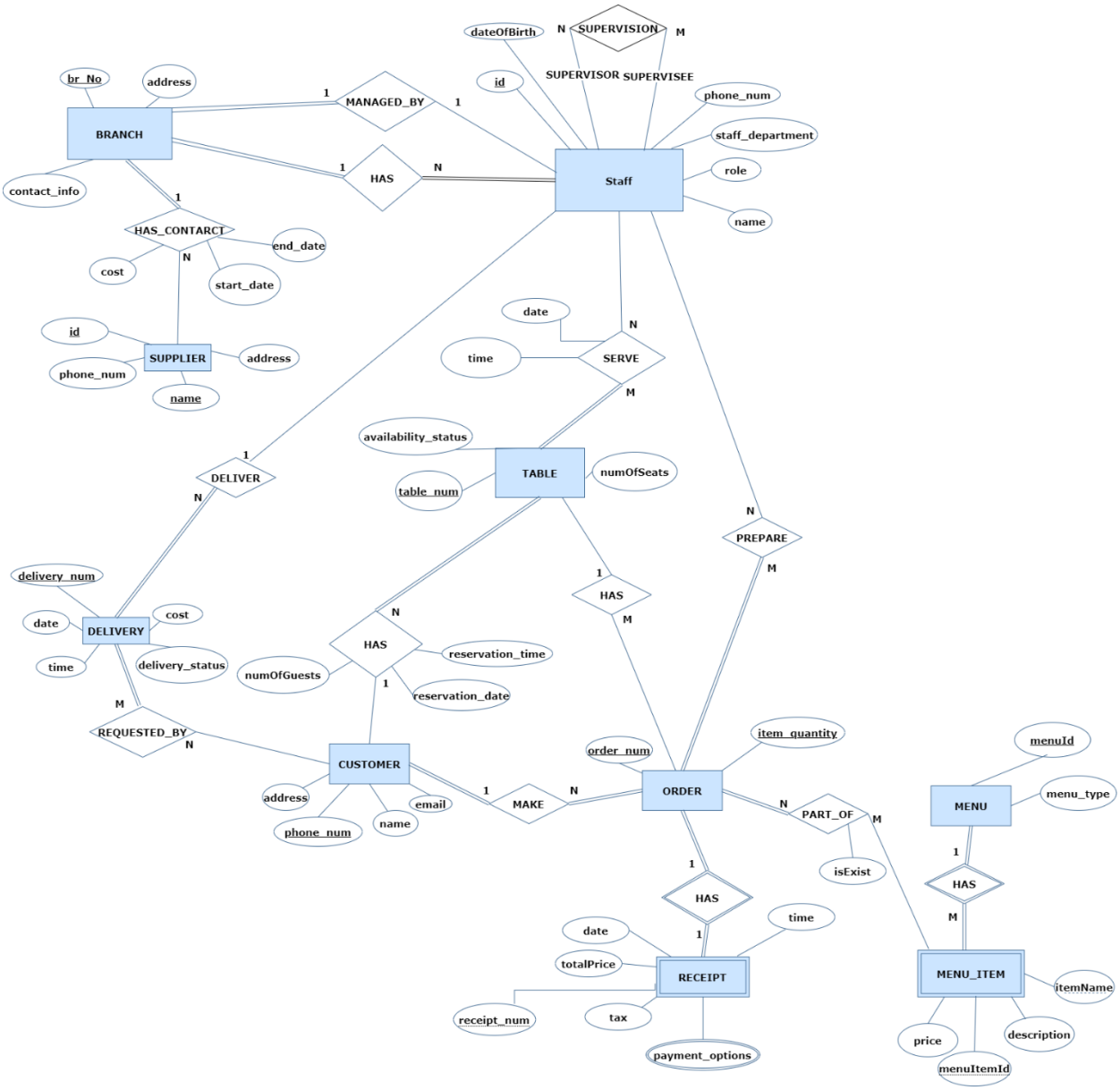


Figure 1: made by drow.io [3]

Mapping

Figure 2: made by drow.io [3]

User Group: Manager

This user group is responsible for overseeing all business and administrative aspects of a restaurant. Hiring, training, and evaluating the functioning processes are some of the management tasks. Managers must also stay abreast of the restaurant industry and pricing changes. In addition to managing personnel, a manager handles the business side of the operation. Marketing and setting business goals are important responsibilities of this position. Special offers and initiatives to retain customers are a creative responsibility of the manager. The most important part of this job is customer services.

The view

The manager has access to the whole database.

STAFF

name	id	phone_num	dateOfBirth	role	staff_department	br_No
Sami	1110002222	0555556678	1999-04-24	waiter	wait Staff	5
Reem	1112223333	0505019180	1990-02-22	chef	Chef staff	5
Yousef	1112222899	0542815665	1980-01-30	manager	Managerial staff	2
Sara	1112341660	0540568560	1999-11-21	manager	Managerial staff	5

SUPPLIER

name	id	phone_num	address	cost	start_date	end_date	br_No
Al Sharq food supplies Company	12345	0560000123	Riyadh, east, ibn Sina district, street 1289	500 000	2022-01-01	2023-01-01	2

CUSTOMER

name	phone_num	address	email
Rana	0566667578	Riyadh,west,irqah district	rana@gmail.com

BRANCH

br_No	address	contact_info	st_id
5	Riyadh, west,diryiah district, Turki Alwal street	0112345679	1112341660
2	Riyadh, east, Ar rymal ditrict, 40 street	0111111110	1112222899

TABLE

table_num	numOfseats	availability_status	phone_num
23	5	Reserved	0566667578

ORDER

order_num	item_quantity	itemName	phone_num	table_num
1	2	Green salad	0566667578	23
1	2	White sauce pasta	0566667578	4

*(*Note: means the customer took two adjacent tables; thus, the same order number make sense!)*

PREPARE

st_id	order_num
1112223333	1

Different operations that can be performed:

- **Insert:**

1- Insert a staff:

```
INSERT INTO STAFF
VALUES ('Ahmad', '1122736422','0550055327',
‘1995-01-14’,'Waiter', 'Wait staff', 2);
```

2- Insert a supplier:

```
INSERT INTO 'SUPPLIER'
VALUES ('Sanah food supply company' ,
'1012345678', '0553283212', 'Riyadh, east, An
nahdah district, Salman Alfarsi Street',
100000, 2022-01-01', '2023-01-01', 5);
```

- **Delete:**

1- Delete a staff:

```
DELETE FROM STAFF WHERE ID='1110002222';
```

2- Delete a supplier:

```
DELETE FROM SUPPLIER WHERE ID='12345';
```

- **Update:**

1 - Update the role of staff whose ID ='1112223333'

```
UPDATE STAFF

SET role ='Cashier'

WHERE ID ='1112223333';
```

2- Update the contact info of Branch with br_No =5

```
UPDATE BRANCH
SET Contact_info='0112374650' WHERE Br_no = 5;
```

- **Retrieve from one table:**

1- Retrieve the number of all staff:

```
SELECT COUNT(*)  FROM STAFF;
```

2- Retrieve phone number of staff whom id is = 1112223333 :

```
SELECT phone_num
FROM STAFF WHERE id = '1112223333'
```

- **Retrieve from more than two tables:**

1- Retrieve name of customer who ordered order number = 1 and staff id who prepared it:

```
SELECT CUSTOMER.name, PREPARE.st_id
FROM CUSTOMER
JOIN ORDER
ON CUSTOMER.phone_num = ORDER.phone_num AND
ORDER.order_num = 1
JOIN PREPARE
ON PREPARE.order_num = ORDER.order_num ;
```

2- Retrieve name of staff who prepared order number = 1 and the contact info of the branch they are working at:

```
SELECT STAFF.name, BRANCH.contact_info
FROM STAFF
JOIN PREPARE
ON STAFF.id = PREPARE.st_id AND
PREPARE.order_num = 1
JOIN BRANCH
ON BRANCH.br_No = STAFF.br_No ;
```

User Group: Waiter

This user is responsible for serving the customers, guiding them to their table and take their order and adding it to the database. One of their responsibilities is to help the customer find the best food choices that suit the customer's taste and issue the bill to the customer.

The view

TABLE

table_num	numOfseats	availability_status	phone_num
23	5	Reserved	0566667578

CUSTOMER

name	phone_num	address	email
Rana	0566667578	Riyadh,west,irqah district	rana@gmail.com

ORDER

order_num	item_quantity	itemName	phone_num	table_num
1	2	Green salad	0566667578	23

Different operations that can be performed:

• Insert:

1- Insert a table:

```
INSERT INTO TABLE
VALUES (5, 6, 'available', null);
```

2- Insert an order:

```
INSERT INTO ORDER
VALUES (3,5,'orange juice',‘0566667578’, 5);
```

3- Insert a costumer:

```
INSERT INTO CUSTOMER
VALUES (‘Majid’ , '0523456950', 'Riyadh, south,
alshifaa district', 'Majid@gmail.com');
```

• Delete:

1- Delete the customer whose phone number is 0566667578:

```
DELETE FROM COSTUMER
WHERE phone_num = ‘0566667578’;
```

2- Delete the table whose table number is 23:

```
DELETE FROM TABLE
WHERE table_num = 23;
```

3- Delete the order whose number is 1:

```
DELETE FROM ORDER
WHERE order_num = 1;
```

• Update:

1- Update the table availability status for the table which number is 23 to 'Available':

```
UPDATE TABLE
SET availability_status = 'Available';
WHERE table_num =23;
```

2- Update the customer's phone number for the customer whose phone number is 0566667578 *to 0577777777 :*

```
UPDATE COSTUMER
SET phone_num = '0577777777'
WHERE phone_num = '0566667578';
```

• Retrieve from one table:

1- Retrieve all the customers phone numbers whose address is 'Riyadh, west':

```
SELECT phone_num
FROM COSTUMER
WHERE address = 'Riyadh, west';
```

2- Retrieve all the tables numbers which number of seats is 8:

```
SELECT table_num
FROM TABLE
WHERE numOfSeats = 8;
```

• Retrieve from more than two tables:

1- Retrieve customer's phone number, their name, and order number:

```
SELECT ORDER.order_num , CUSTOMER.name  ,
TABLE.phone_num
FROM ORDER
JOIN CUSTOMER
ON ORDER.phone_num = CUSTOMER.phone_num
JOIN TABLE
ON CUSTOMER.phone_num = TABLE.phone_num ;
```

2- Retrieve customer's name, table number and requested item name*:*

```
SELECT CUSTOMER.name , TABLE.table_num ,
ORDER.itemName
FROM TABLE
JOIN CUSTOMER
ON TABLE.phone_num = CUSTOMER.phone_num
JOIN ORDER ON CUSTOMER.phone_num =
ORDER.phone_num ;
```

User Group: Chef

This user is responsible of preparing the order and organizing the menu.

The view

ORDER

order_num	Item_quantity	itemName	phone_num	table_num
1	2	Green salad	0566667578	23
1	2	White sauce pasta	0566667578	4

*(*Note: means the customer took two adjacent tables; thus, the same order number make sense!)*

MENU_ITEM

menuItemId	itemName	description	price	menuId
20	White sauce pasta	Creamy garlic penne pastas	35	3
37	Green salad	Consist of lettuce, cherry tomato, cucumber, and corn.	28	2

MENU

menuId	menu_type
1	Breakfast
2	lunch
3	dinner

Different operations that can be performed:

• Insert:

1- Insert a menu:

```
INSERT INTO MENU
VALUES (4, 'Lunch');
```

2- Insert a menu item:

```
INSERT INTO MENU_ITEM
VALUES (29, 'Caesar salad', ‘contains lettuce chicken breast, mayonnaise’, 20, 3);
```

• Delete:

1- Delete the order which number is 1:

```
DELETE FROM ORDER
WHERE order_num = 1;
```

2- Delete the menu which id is 1:

```
DELETE FROM MENU
WHERE menuId= 1;
```

3- Delete the all the menu items which menu id is 2:

```
DELETE FROM MENU_ITEM
WHERE menuId = 2;
```

• Update:

1- Update the price for the menu item which id is 37 to 25:

```
UPDATE MENU_ITEM
SET price = 25 WHERE menuItemId = 37;
```

2- Update menu item name for the menu item which id is 37 to Healthy Salad:

```
UPDATE MENU_ITEM
SET itemName = 'Healthy Salad' WHERE menuItemId = 37;
```

• Retrieve from one table:

1- Retrieve all the menu items id which menu id is 3:

```
SELECT menuItemId
FROM MENU_ITEM
WHERE menuId = 3;
```

2- Retrieve all the order numbers which number of table is 23:

```
SELECT Order_num
FROM ORDER
WHERE table_num = 23;
```

• Retrieve from more than two tables

1- Retrieve order number, item name, and menu type of which item name is green salad and menu Id is 2:

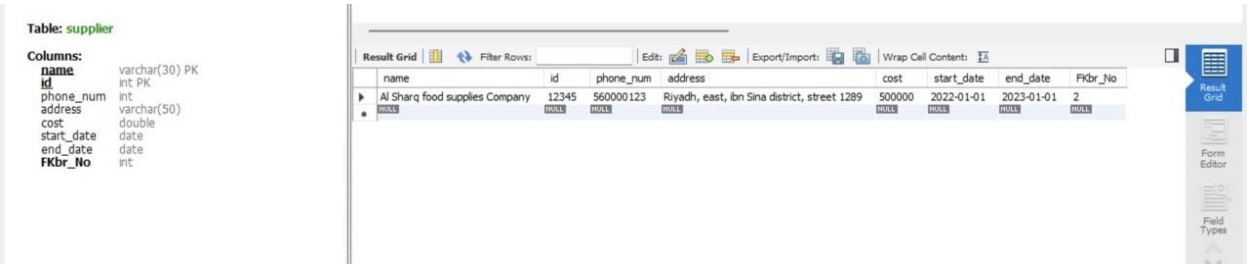
```
SELECT ORDER.order_num , MENU_ITEM.itemName,
MENU.menu_type

FROM MENU_ITEM

JOIN ORDER

ON ORDER.itemName = MENU_ITEM.itemName AND
MENU_ITEM.itemName = ‘Green Salad‘

JOIN MENU

ON MENU.menuId = MENU_ITEM.menuId AND
MENU_ITEM.menuId = 2;
```

2- Retrieve table number, description, menu type of which item name is green salad:

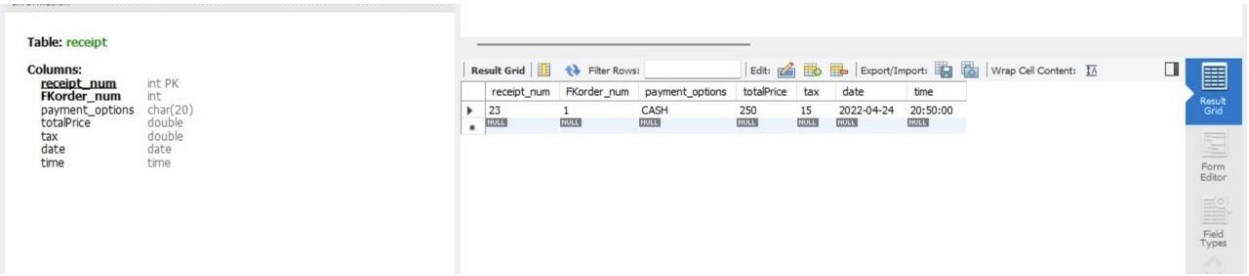
```
SELECT ORDER.table_num, MENU_ITEM.decription,
MENU.menu_type

FROM MENU_ITEM

JOIN ORDER

ON ORDER.itemName = MENU_ITEM.itemName AND
MENU_ITEM.itemName = ‘Green Salad‘

JOIN MENU

ON MENU.menuId = MENU_ITEM.menuId;
```

Implementing The Database using a DBMS (MySQL)

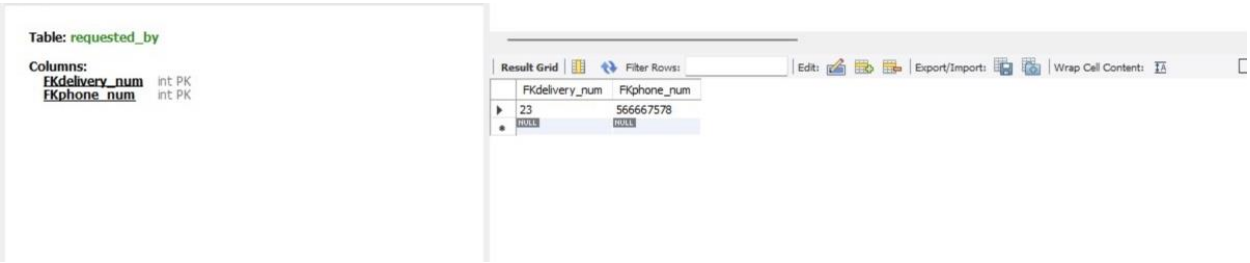
Supplier



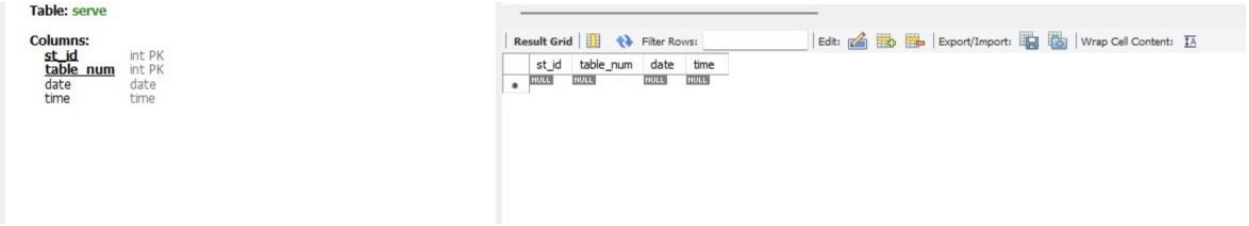
Receipt



Requested_by



Serve

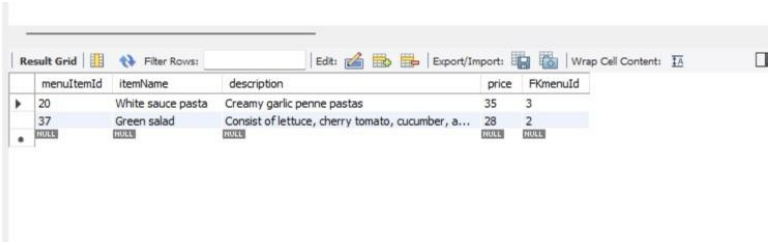


Menu_item

Table: menu_item

Columns:

menuItemId	int PK
itemName	varchar(45) PK
description	varchar(100)
price	double
FKmenuId	int PK



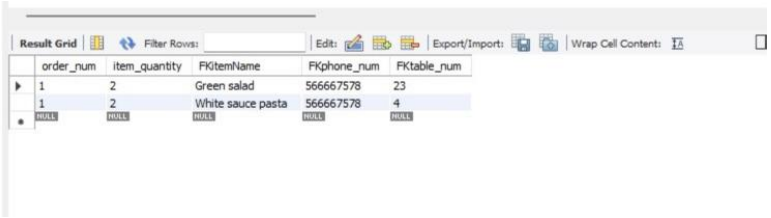
menuItemId	itemName	description	price	FKmenuId
20	White sauce pasta	Creamy garlic penne pastas	35	3
37	Green salad	Consist of lettuce, cherry tomato, cucumber, a...	28	2

Order

Table: order

Columns:

order_num	int PK
item_quantity	int
FKitemName	varchar(45) PK
FKphone_num	int
FKtable_num	int



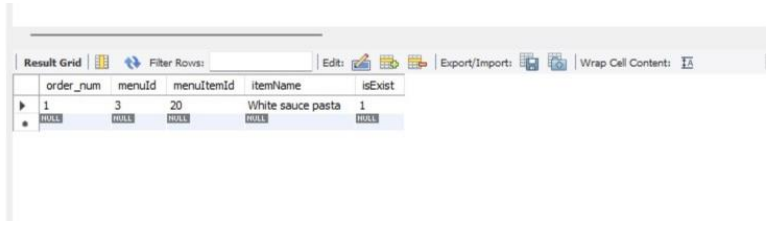
order_num	item_quantity	FKitemName	FKphone_num	FKtable_num
1	2	Green salad	566667578	23
1	2	White sauce pasta	566667578	4

Part_of

Table: part_of

Columns:

order_num	int PK
menuId	int PK
menuItemId	int PK
itemName	varchar(45) PK
isExist	tinyint



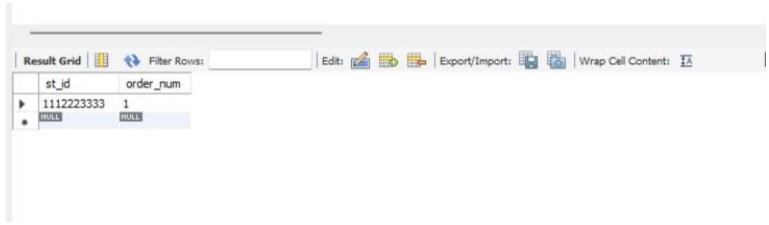
order_num	menuId	menuItemId	itemName	isExist
1	3	20	White sauce pasta	1

prepare

Table: prepare

Columns:

st_id	int PK
order_num	int PK



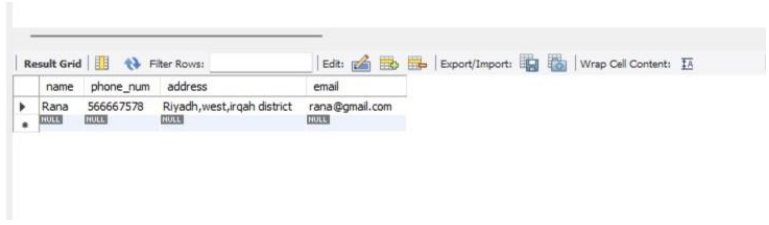
st_id	order_num
1112223333	1

customer

Table: customer

Columns:

name	char(50)
phone_num	int PK
address	varchar(50)
email	varchar(50)



name	phone_num	address	email
Rana	566667578	Riyadh,west,irqah district	rana@gmail.com

delivery

Table: delivery

Columns:

delivery_num	int PK
delivery_status	varchar(45)
cost	double
date	date
time	time
FKst_id	int

delivery_num	delivery_status	cost	date	time	FKst_id
23	Delivered	20	2022-04-20	02:50:00	1003578020

Menu

Table: menu

Columns:

menuId	int PK
menu_type	char(30)

menuId	menu_type
1	Breakfast
2	lunch
3	dinner

Branch

Table: branch

Columns:

br_No	int PK
address	varchar(50)
contact_info	int
FKst_id	int

br_No	address	contact_info	FKst_id
2	Riyadh, east, Ar rymal ditrict, 40 street	111111110	1112341660
5	Riyadh, west,diryiah district, Turki Alwal street	112345679	1112222899

table

Table: table

Columns:

table_num	int PK
numOfSeats	int
availability_status	char(55)
FKphone_num	int

table_num	numOfSeats	availability_status	FKphone_num
4	4	Reserved	566667578
23	5	Reserved	566667578

staff

Table: staff

Columns:

name	varchar(45)
id	int PK
phoneNo	int
dateofBirth	date
role	varchar(30)
staff_department	varchar(45)
FKbr_No	int

name	id	phoneNo	dateofBirth	role	staff_department	FKbr_No
Ali	1003578020	50844941	1990-05-21	driver	delivery staff	2
Sami	1110002222	555556678	1999-12-24	waiter	wait Staff	5
Yousef	1112222899	542815665	1980-01-30	manager	Managerial staff	2
Reem	1112223333	505019180	1990-02-22	chef	Chef staff	5
Sara	1112341660	540568560	1999-11-21	manager	Managerial staff	5

References

[1] Ramez Elmasri, H. B. N. (2015). Fundamentals of Database Systems Pearson. Pearson. https://iran-lms.com/images/images/Books/PDF/Fundamentals-of-Database-Systems-Pearson-2015-Ramez-Elmasri-Shamkant-B.-Navathe.pdf

[2] Supervisee. (n.d.). Wiktionary.Org. Retrieved May 21, 2022, from https://en.wiktionary.org/wiki/supervisee

[3] https://drawio-app.com/