1. Problem

In order to reduce operational cost and increase productivity automated application that manages restaurant business is required especially restaurants are spread all over the country nowadays also the number of customers is in increase and choices of products are getting more and more, eventually, staff can focus more on costumes which will make them happy and motivate them to come back.

Usually, restaurants have branches in different locations and each of these is considered as a separate unit so they have there own employees and budget, one customer visit many branches and many customers may visit one branch, each customer make order or orders

Restaurant has information (id, country, name).

Each restaurant has many branches, Branch has information (id, address(city, street, building number), name, phone numbers).

For each Branch there are many Staff, Staff has information (id, name(last name, first name, middle name), address(street, city, building number), phone numbers, date of birth, salary, over time, nationality, email, position).

Restaurant has many Customers, Customer may visit many branches, each customer has information (id, name(first name, middle name, last name), phone numbers, address(street, city, building number), email).

The restaurant provides multiple types of Item. each Item has (id, name, price).

customer can make many orders, each Order_table has information (number, date, remark, branch id), each Order has many Items, while the Item can be found in multiple Orders.

2- Business needs and user groups:

Management needs to see the Customers, Branches Staff and Orders.

Finance needs to see the Order and Item to get invoices.

Kitchen staff need to see the Order and Item to prepare ordered items.

Floor staff need to see Order and Item to enter and follow orders until delivered to the customer.

3- Mapping

1. Restaurant (id, country, name).
2. Branch (id, city, street, building number, name, restaurant_id).
3. Branch_phone (branch_id, phone)
4. Branch-customer(Branch-id, customer-id,id)
5. Staff (id, last name, first name, middle name, street, city, building number, date of birth, salary, over time, nationality, email, position, branch_id).
6. Staff_phone(staff_id, phone,Branch_id)
7. Customer (id, first name, middle name, last name, street, city, building number, email, restaurant_id).
8. Customer_phone(customer_id, phone)
9. Item (id, name, price, restaurant_id)
10. Item-Order_table (id, number, price, quantity)
11. Order_table (number, date, remark, Customer_id, branch_id)

4. **User functionality**

Each user has a role in the application, user should copy the statement according to functionality and past it in the SQL section in XAMMP-server then edit or change the variables int the statement according to the required the press go, following are the responsibilities of each user according to there business function

1. **Owner**
    a. defines the items
    b. Define branch
    c. Report customer with most orders
    d. Report list of all staff per branch
    e. Report list of all items
2. **Branch manager**
    a. Define staff details of his branch
    b. Report the customer with most orders for his own branch
    c. Report list of all staff per branch for his own branch
3. **Chief**
    a. need to see order and item to prepare the order per date in his branch ,user need to change the needed date as in red bellow
4. **Cashier/waitress**
    a. define customer details
    b. Define customer phone
    c. Define order details
    d. Report of the list of orders per date in his branch to pick the order number that he needs to get the invoice for it later on, in his branch, user should enter the date as in red below
    e. Invoice for a specific order number in his branch, the user must enter the order number as in red below

5. User privileges

Tables	**Owner**	**Manager**	**Chief**	**Waitress**	**Cashier**
Restaurant	Full	Select			
Branch	Full	Select			
Branch phone	Full	Select			
Staff	Full	Insert, select	Select	Select	Select
Staff phone	Full	Insert, select			
Customer	Full	Select		Insert, select	Insert, select
Customer phone	Full	Select		Insert, select	Insert, select

Branch customer	Full	Select		Insert, select	Insert, select
Order_table	Full	Select	Update,select	Insert, select	Insert, select
Item_order_table	Full	Select	Select	Insert, select	Insert, select
Item	Full	Select	Select	Select	Select

Software minimum requirements

1. Linux arch/debian based is preferred but windows is okay
2. 32 GB of ram
3. 8 core Intel i7 h editions
4. 2TB storage
5. ups
6. 1Gb network card

system requirements

7. terminal (bash)
8. c compiler gcc is preferred
9. system drivers fully installed
10. *ammp program to deal with SQL database when required

base for c to interact as db

structs is used as a table implementer in c to able to create table like.

pointer it plcaes the address to another variable

malloc is it books the size of bytes that’s been requested and points to the first byte in the booked place.

Calloc is allocate physical memory and return the pointer

free() it dislocates the places that's been booked in the memory

realloc (relocate) change the size of the place that’s been booked before

buffer is the place that contains data that is not located or assigned

tree is used usually for sorting data that comes in or inserted as an input it may also be used for other purposes.

Data structure
query compiler its a tool set that was made for inspecting the query compilation process

transaction manager is logical unit of processing that determines which executions are allowed or not allowed to do their change/modification in the tables of data base.

DDL Compiler: Data Description Language compiler it defines the schema processes specifically in DDL and it has metadata such as mapping.

execution engine is a software that is place over a database machine/ server and it executes the queries data in the database, it is responsible for providing a answers for applications that use sql query and it is considered a high level software.

Concurrency Control is a system that is capable of managing a lot of operations at the same time with having any operation interfering with the other one.

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