Laboratory 5

Data flow diagram and E-R diagram

1. **Introduction and Purpose of Experiment**

    Students will apply data flow and E-R diagram for given scenario

2. Aim and Objectives

    Aim: To develop data flow diagram and ER diagram for a given requirements specification using Structured analysis and Design Technique

    Objectives: At the end of this lab, the student will be able to

    – Identify functions in modules

    – Identify Inputs, Outputs and Data dependencies for functions

    – Create ER and data flow diagram

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3. **Experimental Procedure**

    • Work in teams of 4 students

    • Each team should read the problem statement and identify requirements as a group

    • Each team will then confirm the requirements and document the requirements in a low-level design document

    • Each individual will then write their lab manual, documenting their observations

4. **Presentation of Results**

    Process Specification Table:

Requirement tag ID	RS_1	
Source/trigger	--------	
Description	Input	Customer wants to change interface language
	Process	This is the level 2 DFD for hotel management. In this process, the customer can choose his own language in the smart table assistant to understand the menu given by the table assistant.
	Output	Customer gets the required information
Validation Method	The language selected by the customer will be taken as an interface language.	

Requirement tag ID	RS_2	
Source/trigger	-------	
Description	Input	Customer wants to show menu in the chosen language
	Process	In this process, whenever the customer changes the language interface in the smart table assistant, the menu in the smart table automatically changes to the language interface given by the customer.
	Output	Customer gets the menu in the chosen language
Validation Method	The menu gets changed to the language interface given by the customer.	

Requirement tag ID	RS_3	
Source/trigger	---------	
Description	Input	Customer wants to select the food items from the menu
	Process	In this process, the customer looks up for the food items to order, then he selects the food items he prefer from the menu in the smart table assistant.
	Output	Customer gets the conformation of the selected food items
Validation Method	The food items that are selected by the customer will be the items that are sent to the chef for further process.	

Requirement tag ID	RS_4	
Source/trigger	---------	
Description	Input	The table assistant wants to calculate the price for the selected items.
	Process	In this process, after the customer selects the items from the menu, the smart table assistant calculates the price of the selected items and confirms the order.
	Output	Table assistant calculates the price and confirms the order of the customer.
Validation Method	The calculated price of selected items is notified to the customer by the smart table assistant and notifies the chef.	

Requirement tag ID	RS_5	
Source/trigger	-------	
Description	Input	Chef wants to notify the waiting time to the customer
	Process	In this process, after the order is placed, the chef look up the items in the order and prepares the food and in meanwhile he notifies the waiting time of preparing food to the customer via smart table assistant.
	Output	The customer gets the notification of the waiting time from the Chef
Validation Method	The customer waits for the food until the waiting time given by the chef.	

Requirement tag ID	RS_6	
Source/trigger	--------	
Description	Input	Chef wants to prepare the selected food items for the customer
	Process	In this process, the Chef prepares the selected food items after he notifies the waiting time for the preparation of food.
	Output	Chef prepares the food items for the customer
Validation Method	Chef completes the preparation of food before the waiting time given by him to the customer.	

Requirement tag ID	RS_7	
Source/trigger	--------	
Description	Input	Chef wants to notify the prepared food to the serving team.
	Process	In this process, the chef prepares the food and notifies the serving team to serve the food items to the customer of the respective unique table id
	Output	Chef notifies the prepared food items to the serving team to serve the customer.
Validation Method	The Chef notifies the food prepared to the serving team before the waiting time.	

Requirement tag ID	RS_8	
Source/trigger	--------	
Description	Input	Serving team wants to serve the food to the customer.
	Process	In this process, the serving team gets the food from the chef and then serves it to the customer of the respective unique table id.
	Output	The serving team serves the food to the customer of the respective unique table id.
Validation Method	The serving team serves the food to the customer of the respective unique table id before the waiting time.	

Requirement tag ID	RS_9	
Source/trigger	--------	
Description	Input	Customer wants to enter the feedback of the food items eaten.
	Process	In this process, the customer after completion of food, gives the feedback of the food items, serving, hotel managing etc in the feedback list given by the smart table assistant.
	Output	Customer enters the feedback of the food items in the smart table assistant.
Validation Method	The feedback given by the customer is send to the respective departments of the hotel.	

Requirement tag ID	RS_10.1	
Source/trigger	---------	
Description	Input	Customer wants to pay the bill using online payment
	Process	In this process, customer enters into the payment section. It consists of two sections one is online bill payment and other is offline bill payment. Her, customer chooses the online payment from the smart table assistant by entering the bank details.
	Output	Customer pays the bill using online payment by entering the bank details.
Validation Method	The payment details of the customer once completed get notified to the cashier and the manager.	

| Requirement tag ID	RS_10.2	
Source/trigger	----------	
Description	Input	Customer wants to pay the bill using offline payment
	Process	In this process, after entering into the payment section, the customer chooses the offline bill payment and pays the amount to the cashier.
	Output	Customer pays the bill using offline payment to the cashier
Validation Method	The payment details of the customer once completed get notified to the cashier and the manager.	

Requirement tag ID	RS_11	
Source/trigger	----------	
Description	Input	The smart table assistant/cashier wants to generate the payment receipt
	Process	In this process, one payment receipt that is generated by smart table through online payment and the other payment receipt generated by cashier through offline payment.
	Output	The smart table assistant/cashier generates the payment receipt
Validation Method	The generated payment receipts once formed get notified to the manager.	

| Requirement tag ID	RS_12.1	
Source/trigger	---------	
Description	Input	The system needs to send the transaction report summary to cashier and manager
	Process	In this process, the transactions that have been done in the smart table assistant should be sent to the cashier and the manager in the regular intervals of time.
	Output	The system sends the transaction summary to cashier and manager
Validation Method	The manager needs to check all the transaction reports that are sent to him/her by the smart table assistant.	

Requirement tag ID	RS_12.2	
Source/trigger	---------	
Description	Input	The database(system) needs to send the hotel feedback given by the customer to manager.
	Process	In this process, the system sends the hotel feedback which consists of serving, hotel managing etc by the customer to the manager in regular intervals of time.
	Output	The database sends the hotel feedback given by the customer to the Manager.
Validation Method	The manager needs to check all the feedbacks of the hotel sent by the customers to improvise his management in hotel.	

| Requirement tag ID	RS_12.3	
Source/trigger	----------	
Description	Input	The database(system) needs to send the food feedback given by the customer to the Chef.
	Process	In this process, the system sends the feedback of the food to the chef in regular intervals of time.
	Output	The system sends the food feedback given by the customers to the Chef.
Validation Method	The Chef needs to check all the feedbacks of the food sent by the customers to improvise his food skills in hotel	

Context Diagram Level-0
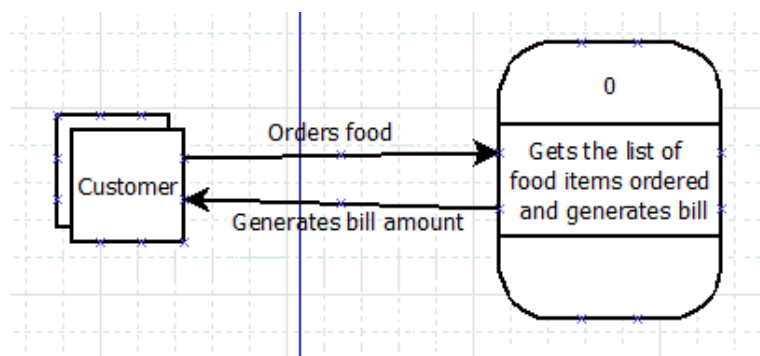
Data-Flow Diagram Level 1 :
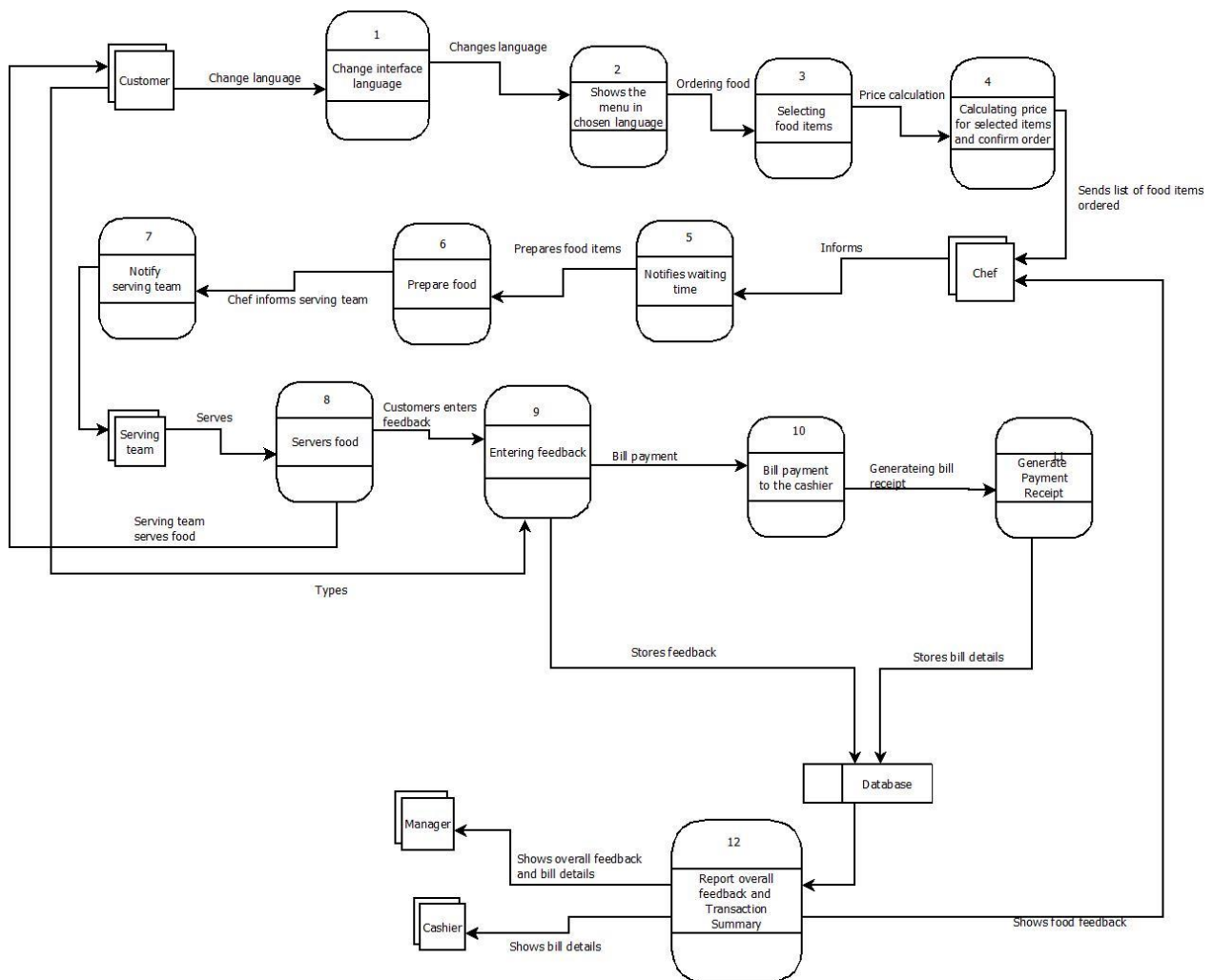
E-R (Entity Relation) Diagram
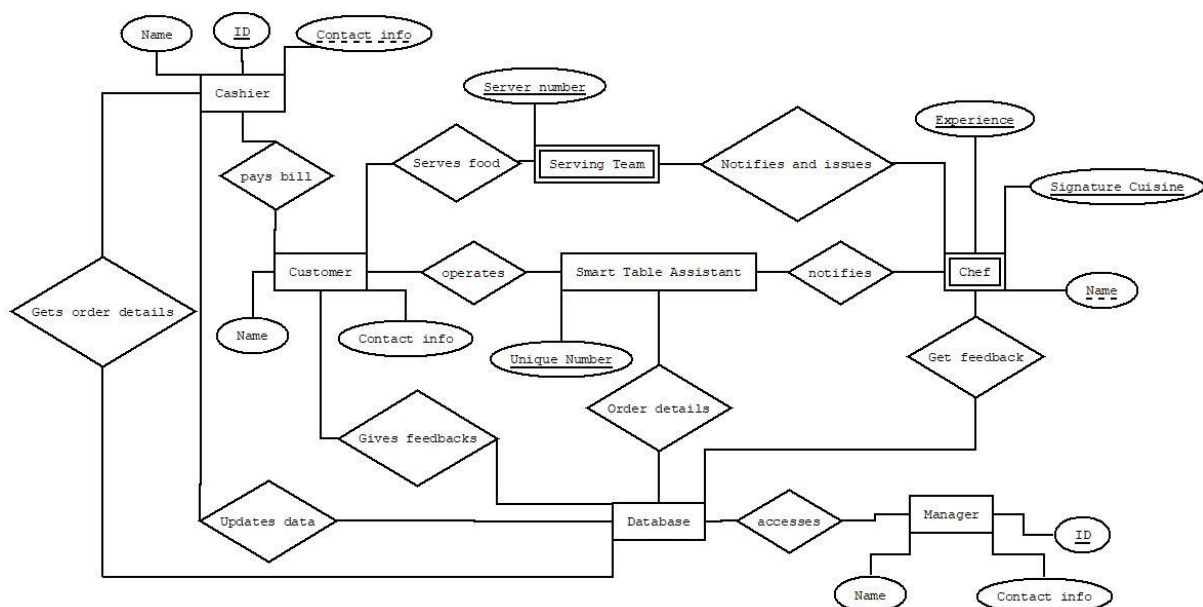
Data-Flow Diagram Level-2:
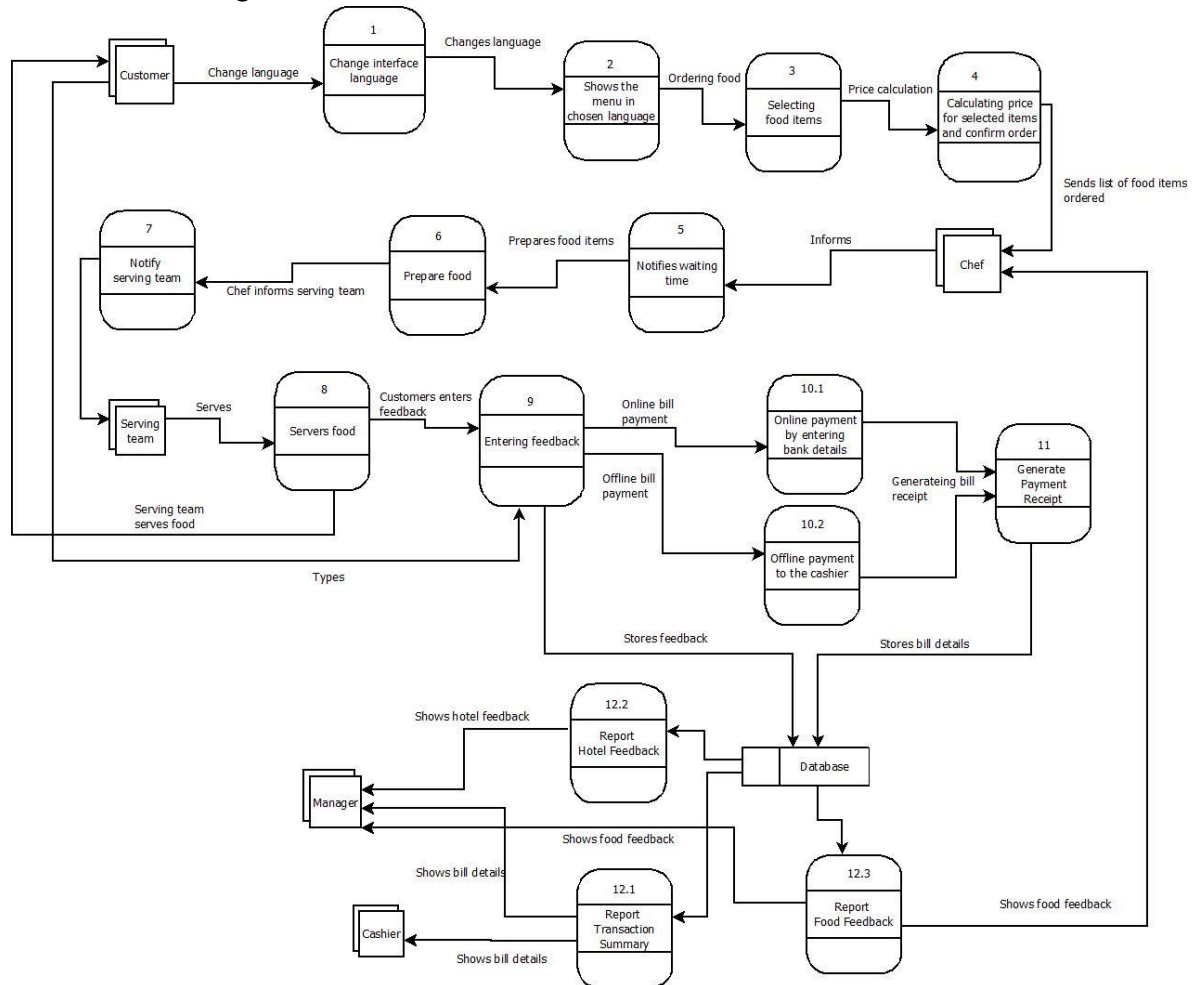
5. **Analysis and Discussions**

The **ER Diagrams stands for Entity-Relationship Diagram** are a structural approach to design a system. In this diagram, different entities and its relationships are identified. There are different styles of drawing this diagram namely:

- Information Engineering Style
- Chen Style
- Bachman Style
- Martin Style

By looking at ER Diagrams, one can get to know different aspects of the system attach as Entities, their attributes, how they are related, their cardinality etc.

A **DFD or Data Flow Diagram** is the visual representation of the flow of information within a system. By looking at these diagrams, the system requirements can be easily identified.

It **shows how the data enters the system**, who are all the people/actors involved in manipulating the data, where is it stored and whom does it get delivered to. It begins with Context Diagram as level 0. Then there are DFD's at **level 1, level 2 etc** depending upon the depth and designers.

6. Conclusions

It can be concluded that structural design possesses a important role in the design of a system. Defining various entities in ER diagram helps the developer to implement the system as a software easily.

7. Comments

1. Limitations of Experiments

None.

2. Limitations of Results

None.

3. Learning happened

In the current lab, following points were learnt:

- Identify entities, their relations and draw ER diagram
- Identify data flowing in and out of the system and draw DFD for the same
- Design Process Specification Table

4. Recommendations

None.

Component	Max Marks	Marks Obtained
Viva	6	
Results	7	
Documentation	7	
Total	20	