

**TEAM 03: REBEL FORCE**

**IS – 636 (Sec-02): Structured Systems Analysis and Design**

**Deliverable 3: Modeling**

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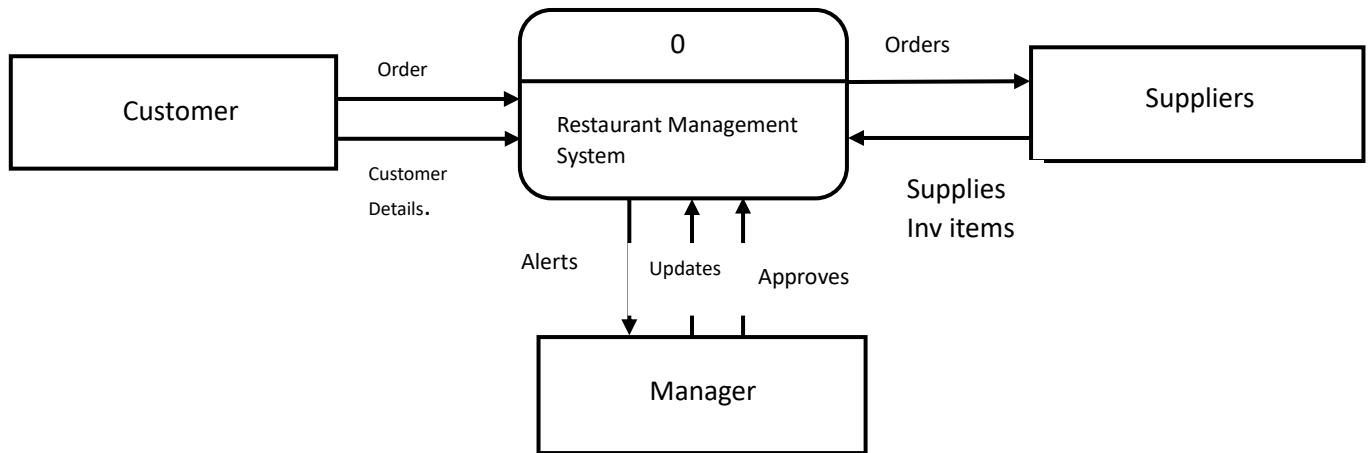
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**Table of content:**

<b>1. CONTEXT LEVEL DIAGRAM</b>	<b>3</b>
<b>2. LEVEL 0 DATAFLOW DIAGRAM</b>	<b>4</b>
<b>3. LEVEL 1 DFD</b>	
<u>a)</u> Order Management System	6
<u>b)</u> Customer Relationship Management	7
<u>c)</u> Inventory management system	8
<u>d)</u> Leadership and management system	9
<b>4. ENTITY RELATIONSHIP DIAGRAM</b>	<b>10</b>
<b>5. DEFINITIONS</b>	<b>11</b>

## 1) CONTEXT LEVEL DIAGRAM:



The context diagram shows how the Order Management System, Customer Relationship Management System, Leadership and Approval System, and Inventory Management System work together to form the overall Restaurant Management System for the Chopathi Indian Restaurant.

The external entities are the

1. Customers
2. Supplier
3. Manager

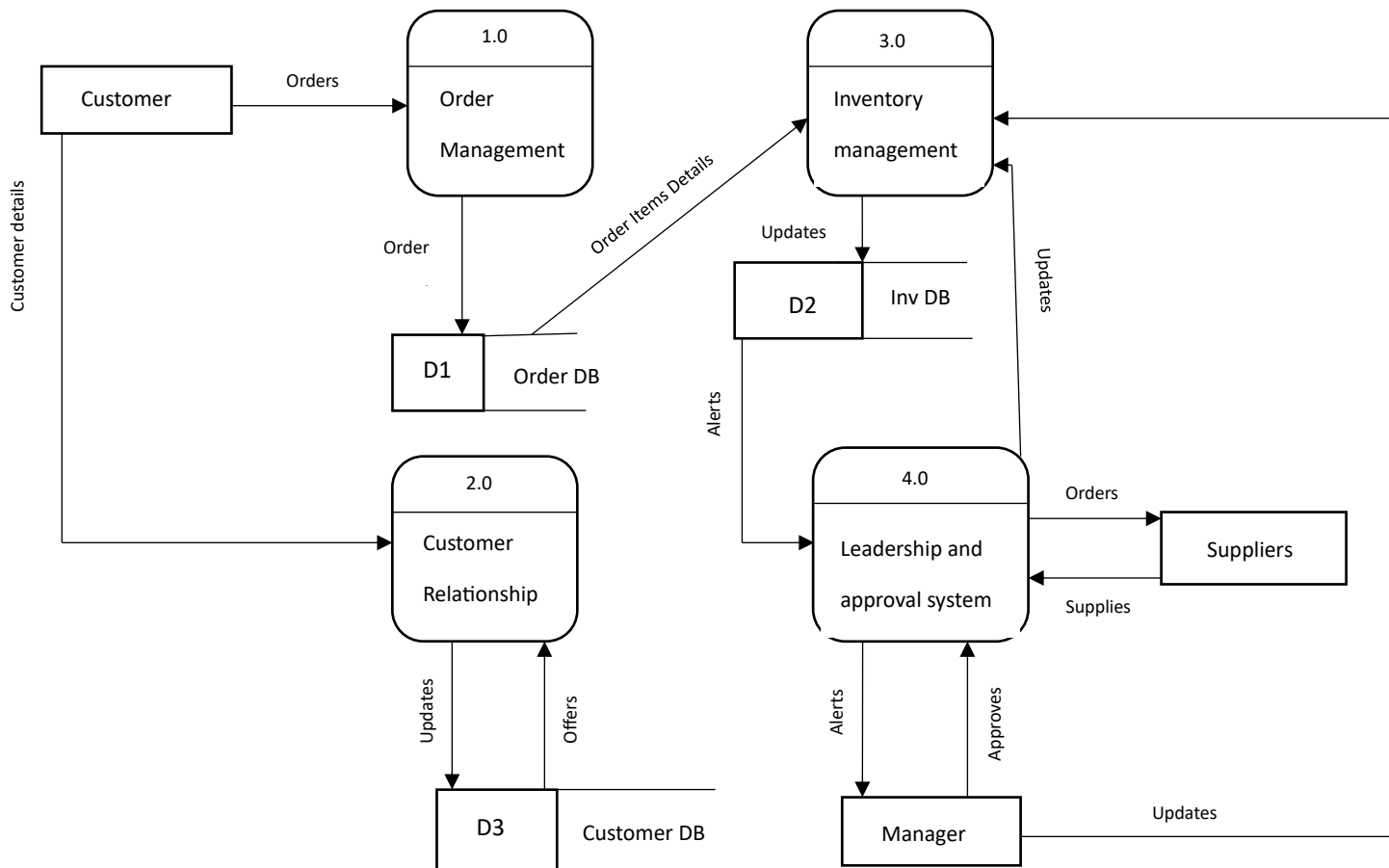
The 'Orders' arrows represent the data flow from the customer to the restaurant management system, demonstrating that customers place orders through the system. The restaurant management system stores and manages customer data, as shown by the arrows labeled "Customer Details," which show the flow of customer data from the customer to the system.

The arrows labelled 'Approves' show the flow of data from the manager to the restaurant management system, indicating that the manager is responsible for approving orders. The arrows labelled 'Alerts' represent the flow of alerts from the restaurant management system to the manager, indicating that the system sends alerts to the manager once orders are approved. The manager also updates the inventory database

The arrows labelled 'Orders' depict the flow of data from the restaurant management system to the suppliers, indicating that the system sends orders to the suppliers. The arrows labelled 'Supplies' represent the flow of data from the suppliers to the restaurant management system, indicating that the suppliers supply inventory items to the system.

Overall, this context diagram provides an overview of the Restaurant Management System, including the interactions between the external entities and the processes.

## 2) LEVEL 0 DATAFLOW DIAGRAM:



**Fig:** Level 0 diagram of proposed solution

The level 0 diagram depicts the information flow and processes involved in the operation of the Chopathi Indian Restaurant. The external entities in the diagram are the customers, managers, and suppliers, who interact with the various processes to achieve specific goals.

The restaurant has three main data stores, namely the Order Database, Inventory Database, and Customer Database, which serve as repositories for various information required by the processes. The Order Database holds order details, the Inventory Database holds inventory-related data, and the Customer Database holds customer-related information, such as their orders, preferences, and contact details.

There are several processes involved in the restaurant's operation, including the order management system, inventory management system, customer relationship management system, and leadership and approval system.

The arrows in the diagram represent the data flow between the external entities and the processes. The arrow from the customer's external entity to the order management system is labeled "Orders," which indicates that the customer can place an order through the order management system. The arrow from the customer's external entity to the customer relationship management system is labeled "Customer Details," which indicates that the customer's information is stored in the customer relationship management system.

The arrow from the manager external entity to the leadership and approval system is labeled "Approves," which suggests that the manager can approve orders through the leadership and approval system. The arrow from the leadership and approval system to the manager external entity is labeled "Alerts," which indicates that the leadership and approval system can notify the manager of any updates.

The arrow from the leadership and approval system to the suppliers external entity is labeled "Orders," which indicates that the leadership and approval system can place orders with suppliers. The arrow from the suppliers external entity to the leadership and approval system is labeled "Supplies," which indicates that the supplier can deliver supplies to the restaurant through the leadership and approval system.

The arrow from the manager external entity to the inventory management system is labeled "Updates," which suggests that the manager can update inventory through the inventory management system. The arrow from the order management system to the database "order DB" is labeled "Order Details," which indicates that the order management system can store order details in the database.

The arrow from the database "order DB" to the inventory management system is labeled "Order Items Details," which suggests that the inventory management system can retrieve order items from the database. The arrow from the inventory management system to the database "inventory DB" is labeled "Updates," which indicates that the inventory management system can update inventory in the database.

The arrow from the database "inventory DB" to the leadership and approval system is labeled "Alerts," which suggests that the leadership and approval system can receive alerts about inventory updates. The arrow from the leadership and approval system to the inventory management system is labeled "Updates," which indicates that the leadership and approval system can update inventory through the inventory management system.

The arrow from the customer relationship management system to the database "customer DB" is labeled "Updates," which suggests that the customer relationship management system can store customer information in the database. The arrow from the database "customer DB" to the

customer relationship management system is labeled "Offers," which indicates that the customer relationship management system can offer promotions to customers based on their information in the database.

### 3) A) Level 1 DFD: Order Management System:

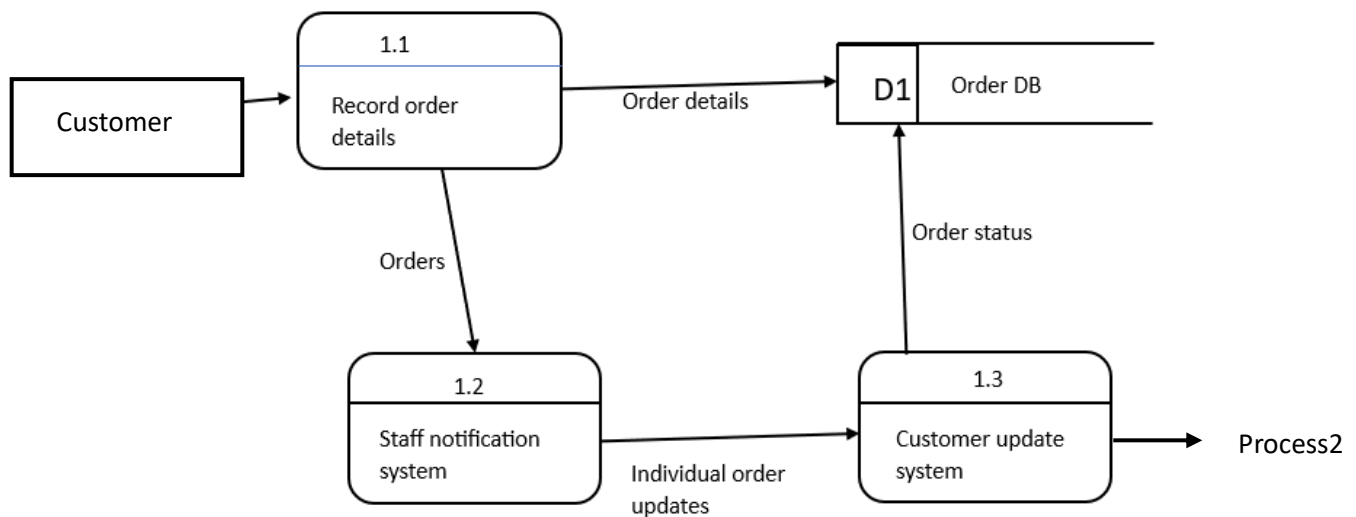


FIG. level 1 order management system

The level 1 diagram for the Order Management System process provides a detailed view of how the system works. The process is decomposed into three subprocesses, namely Record Order Details Process, Staff Notification System Process, and Customer Update System Process. The Record Order Details Process is responsible for recording the order details, such as the item ordered, quantity, and total price. The Staff Notification System Process receives the order details and notifies the staff about the order. The Customer Update System Process is responsible for updating the customer about the status of their order.

The data flow between the Record Order Details Process and Staff Notification System Process is labeled as 'Orders.' This flow represents the order information that is sent from the Record Order Details Process to the Staff Notification System Process. The data flow between the Staff Notification System Process and Customer Update System Process is labeled as 'Individual Order Updates.' This flow represents the updates about the status of the order that are sent from the Staff Notification System Process to the Customer Update System Process. The data flow

between the Customer Update System Process and Order Database Data Store is labeled as 'Order Status.' This flow represents the updated order status that is stored in the Order Database Data Store. Finally, the data flow between the Record Order Details Process and Order Database Data Store is labeled as 'Order Details.' This flow represents the order details that are stored in the Order Database Data Store.

## B) Level 1 DFD: Customer Relationship Management

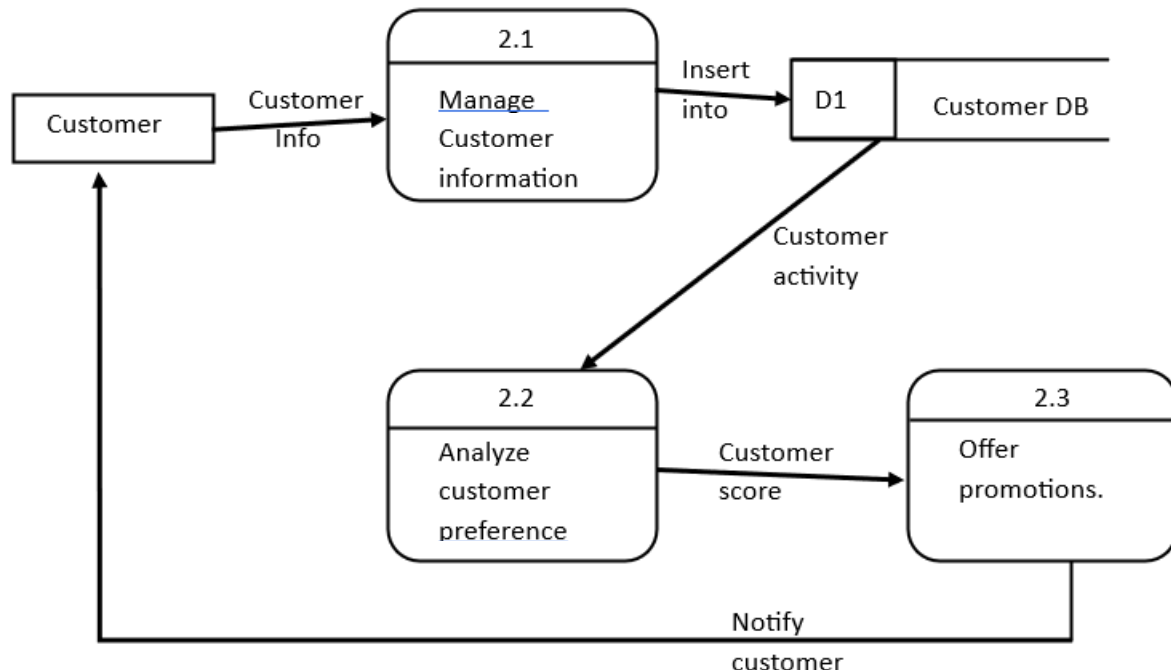


FIG. level 1 Customer Relationship management system

The Level 1 diagram provides a detailed view of the Customer Relationship Management System (CRM) and its sub-processes. The CRM system manages customer information, analyzes their preferences, and offers promotions to them based on their preferences.

The diagram identifies three sub-processes within the CRM system, namely Manage Customer Information, Analyze Customer Preferences, and Offer Promotions. The Manage Customer Information sub-process involves the receptionist updating customer information based on inputs provided by the customer. The Analyze Customer Preferences sub-process involves the manager analyzing the customer's preferences based on their information and the history of their orders. Finally, the Offer Promotions sub-process involves the receptionist offering promotions to the customer based on their preferences.

The diagram also identifies two external entities, namely the customer and the manager. The customer provides their information to the receptionist, who then updates the customer

database. The manager analyzes the customer's preferences and manages their information to provide more personalized promotions.

The data flow in the diagram involves the customer providing their information to the receptionist, who then updates the customer database. The receptionist sends the updated customer information to the manager, who analyzes the customer's preferences. The manager then offers promotions to the customer, which the receptionist communicates to them.

### C) LEVEL 1 DFD:

#### Inventory Management System:

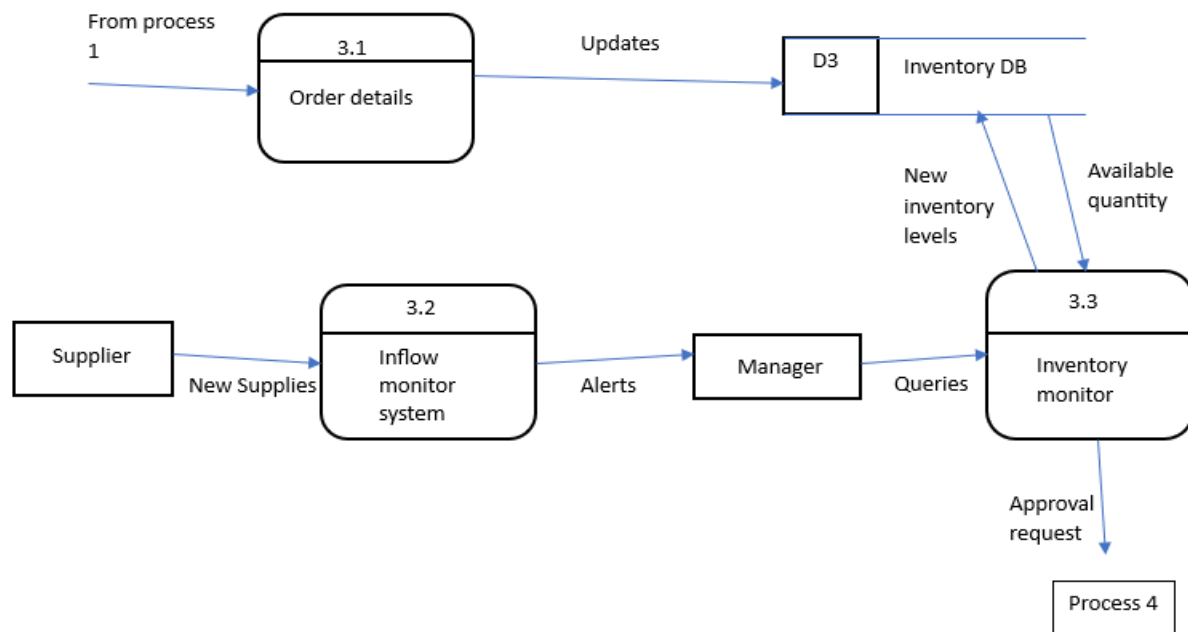


FIG. level 1 Inventory management system

The level 1 diagram for the inventory management system process shows how the process is decomposed into three key subprocesses: the order details process, the inflow monitor system process, and the inventory monitor process. The data flows between these processes are also shown in the diagram.

The order details process is responsible for updating the inventory database data store with the ingredients that are required to fulfill an order. This data flow is labeled as "Updates". The supplier external entity sends new supplies to the inflow monitor system process, which then alerts the store manager through a data flow labeled as "New Supplies". The manager external



entity queries the inventory monitor process about the available inventory levels through a data flow labeled as "Queries". The inventory monitor process responds with the available quantity of each ingredient through a data flow labeled as "available quantity". The inventory monitor process updates the inventory database data store with the new inventory levels through a data flow labeled as "New Inventory levels".

If any ingredient falls below the threshold limit, the inflow monitor system process generates an alert to the store manager, which is labeled as "Alerts". The manager checks the authenticity of the alert, and if needed, sends an approval request to the leadership and approval management system process through a data flow labeled as "Approval Request". Once the higher management approves the request, the manager places an order with the supplier and waits for the new supplies to arrive.

#### D) LEVEL 1 DFD: Leadership and approval management system

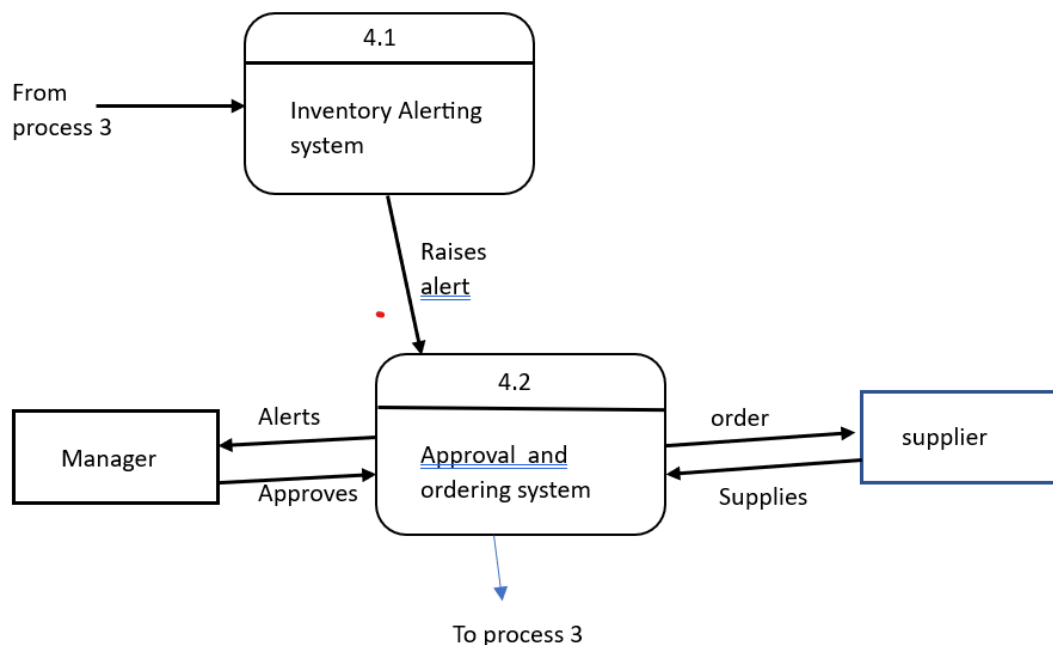


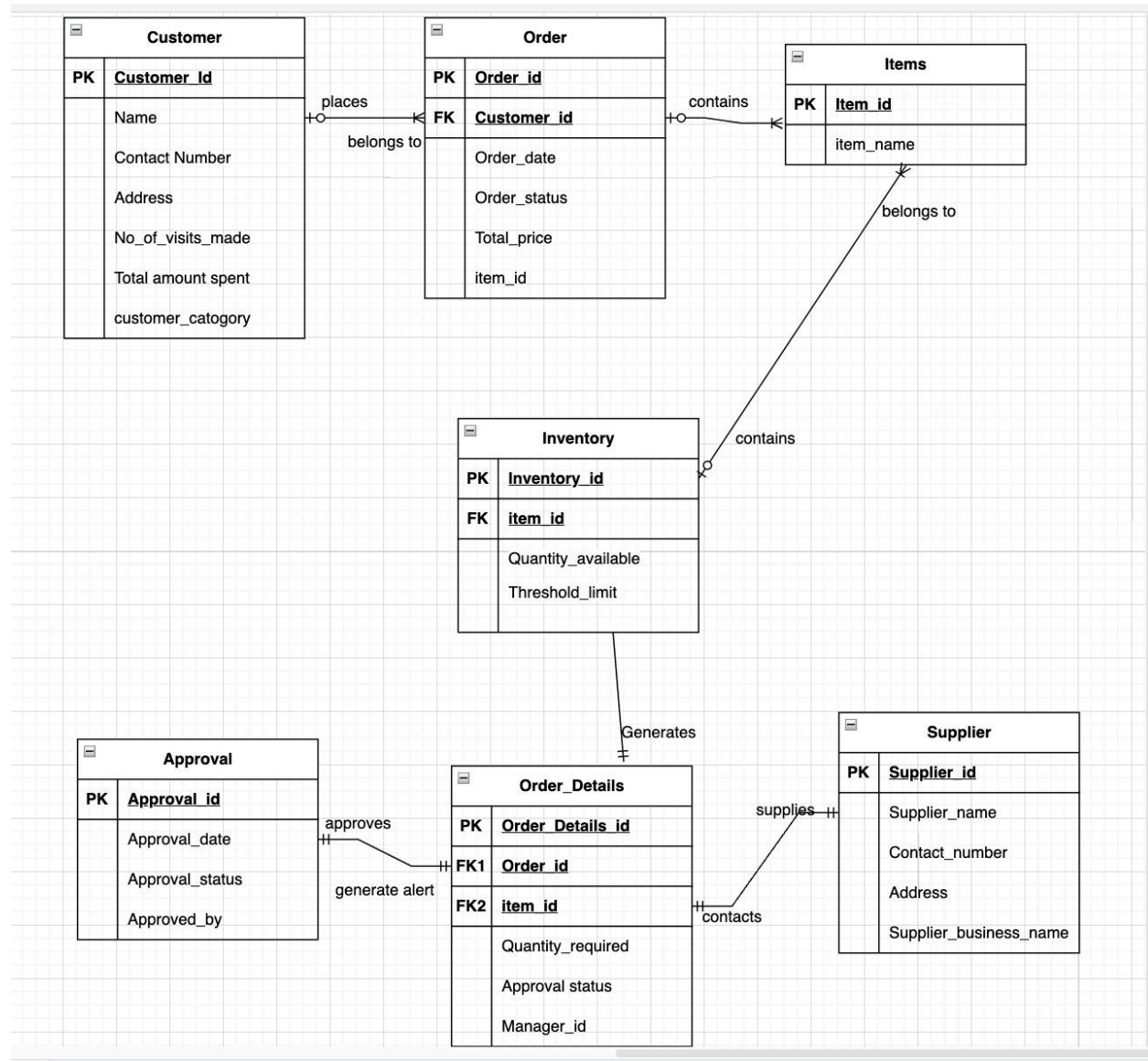
FIG. level 1 Leadership and approval management system

The level 1 diagram of the Inventory management system shows how the main process is divided into 2 sub-processes: Inventory alerting system and approval system.

This process gets input from the Inventory management system which monitors the real time inventory levels order by order. Then updates the inventory database, in case if the available quantity of any resource falls below the threshold which is set before then an alert is raised to approval and ordering system which intern alerts manager once the manager approves the order the approval and ordering system places the order with supplier and the supplier deliver

the goods to the restaurant. Again, the manager verifies the goods quantity and updates the inventory database.

#### 4) ENTITY RELATIONSHIP DIAGRAM:



**Fig:** Entity relationship diagram

The ERD is a developed representation of Data flow diagram, this includes several entities and their attributes, which represent the different components restaurant DFD which helps in designing a database. The meaning of reaching this step is that it implies advancement of project from design and analysis to implementation stage. The entities include Customer, Order, Item, Inventory, Supplier, Order\_Details, and Approval.

## **5) DEFINATIONS:**

**Approval Entity:** The Approval entity represents the approval history for each alerted request. Each approval has a unique Approval\_ID, along with attributes such as Approval\_Date, Approval\_Status, and Approved\_By. This entity has a relationship with order details table and the relationship is a one-to-one relationship with a meaning that manager approves order details and order detail table generates an alert.

**Customer Database:** This database holds records of the customer and has attributes like customer name, contact number, address, total number of visits made, total amount spent by them, customer category. This is used to provide incentives to customer based on their category like student, veteran, old aged and regular customer.

**Customer Entity:** The Customer entity represents the customers who place orders with restaurant. Each customer has a unique Customer\_ID, along with attributes such as Name, Contact number, and Address, total number of visits made, total amount spent by them, customer category. A customer can place multiple orders, which are represented by the "places" arrow. An order is placed by only one customer, as indicated by the "is placed by" arrow.

**Customer Relationship Management System:** This is a process defined in level 0 diagram of proposed solution, this process basically deals with updating or adding customer details into customer table to that this data can be used in identify orders of a customer and in providing incentives to the customer.

**Inventory database:** Inventory database stores data related to inventory items and quantity available and thresholds of each item, item names.

**Inventory Entity:** The Inventory entity represents the inventory records for the Items and ingredients. Each inventory record has a unique Inventory\_ID, along with attributes such as Quantity\_available, and threshold limit. If an order is placed, then the quantity available in inventory is updated accordingly to monitor the inventory levels. An inventory record can be updated by multiple order updates, as represented by the "contains" notation beside that block. An alert is generated when the available quantity is less than the threshold limit for that item.

**Item Entity:** The Item entity represents the menu. Each Item has a unique Item\_ID, along with attributes such as Item\_Name. This entity has a relationship with orders table the fig explains an order can 'contain' multiple items and an item may or maynot belong to an order.

**Inventory Management System:** This is a process defined in level 0 diagram of proposed solution, this process basically deals with managing the inventory by monitoring the orders table and notifying the management once the inventory is hitting thresholds.

**Leadership and Approval System:** This is a process defined in level 0 diagram of proposed solution, this process basically deals with how actions that management can perform to refilling the inventory before it runs out completely.

**Order database:** This table stores data related to order placed like items in the order and the customer who placed it and the date of the order.

**Order details entity:** The Order\_Details entity represents the details of each order, including the corresponding Item and quantity that needs to be ordered this is initially generated by system and then updated by manger or owners before placing an order with suppliers. Each order detail has a unique Order\_Details\_ID and corresponds to only one Item and one order.

**Order Entity:** The Order entity represents the orders placed by the customers. Each order has a unique Order\_ID, along with attributes such as Order\_Date, Order\_Status, item ids in order and Total\_Price. An order can contain multiple order details (i.e., the Items ordered in that order), which are represented by the "contains" arrow. An order is placed by only one customer, as indicated by the "belongs to" arrow. If a customer places a multiple item order, then each item will have a unique order id but the same customer id and date so we can uniquely identify the order.

**Order Management System:** This is a process defined in level 0 diagram of proposed solution, this process basically deals with taking orders from customers and notifying the staff.

**Supplier entity:** The Supplier entity represents the suppliers who supply the Items to the restaurant. Each supplier has a unique Supplier\_ID, along with attributes such as Supplier\_Name, Contact\_Number, supplier\_bussiness\_name and Address. A supplier can supply multiple Items, as represented by the "supplies" arrow and business used contacts representation in ERD to contact supplier.