**P2. DATABASE DESIGN, INITIAL ERD**

**Inventory Management Database System**

**Business Problem:**

An often business challenge in supplying goods to the grocery stores is to make sure to predict how much the need, minimize wastage and manage the inventory stock efficiently. If the predictions are inaccurate, it can lead to overstocking and understocking which directly impact on the customer satisfaction and operational costs. If this problem is not addressed, it can lead to financial losses and negatively impacting the overall profitability of the businesses. To fix this business problem, we make use of the database system, which helps in improving demand predictions, real time inventory tracking. The goal is to establish a reliable and efficient supply chain for the grocery stores.

**Entities:**

1. **Inventory**

* This entity helps in managing stock levels and avoiding overstocking or understocking.

1. **Supplier**

* This entity is included o manage the relationships with suppliers who provide products to the grocery stores.

1. **Customer**

* This entity helps us manage the customer information for order processing and billing information.

1. **Employee**

* This entity is used to track the employees involved in order processing, shipment, and inventory management.

1. **Product**

* This entity represents various items available in the store.

1. **Category**

* This entity is important for effective product organizations. By categorizing items into distinct groups helps in enhancing the overall management of diverse products.

1. **Order**

* This entity helps in tracking and managing the customer orders within the Inventory by enabling the systematic record of customers purchase requests.

1. **Billing Info**

* This entity helps to store and manage customers billing information by ensuring accurate and secure billing process.

1. **Shipment**

* This entity helps in keeping a track of where the product come from. Basically, it ensures transparency in product sourcing and accountability in handling of shipments.

1. **Batches**

* This entity allows us to efficiently manage and trace different batches of products, contributing to a well-organized and effective inventory system.

**Relationships between the entities:**

* **Inventory - Batches**

A batch may be associated with zero, one, or more inventory items. This means that not every batch necessarily has to be linked to inventory, but if it is, it can have multiple associations.

Each inventory item is associated with exactly one batch, representing a one-to-one relationship between Inventory and Batches entities.

The relationship enables complete inventory item traceability to their corresponding batches and vice versa. Each inventory item can be traced directly back to the batch from which it came.

* **Inventory - Product**

Each inventory item must be associated with exactly one product. This means that every inventory item in the system is linked to a specific product.

A product may have zero, one, or more associated inventory items. Not every product necessarily has to be in the inventory, but if it is, it can be associated with multiple inventory items.

The relationship makes inventory tracking easier for each product. It allows you to keep track of the quantity, status, and other important details for each product in your inventory.

* **Product - Batches**

A batch can have one or more products, indicating a many-to-one relationship between Product and Batches entities.

Each Product must be associated with exactly one Batch.

* **Product - Category**

One category can have multiple products, indicating a one-to-many relationship between Category and Product entities.

Each product must be assigned to only one category. This means that each product in the system is assigned to a particular category.

A category may be associated with zero, one, or more products. Not every category must be associated with products, but if it is, it can be associated with multiple products.

* **Supplier – Product**

A supplier can supply many products, but a product comes from one supplier. This relationship represents the source of products and helps manage the supply chain.

* **Order – Product**

An order can have multiple products, similarly a product can be a part of multiple orders which helps in flexibility where the customers can order different combination of products according to their choice or necessity.

* **Customer – Order**

A customer can be associated with multiple orders, but each order is placed by one and only one customer. This relationship helps us keep a track of order history of a customer.

* **Employee – Order**

An employee can manage multiple orders, but an order can be processed by one and only one employee. This relationship is helpful to monitor activities of an employee.

* **Billing - Customer**

A billing entity is associated with one-to-one relationship with customer as it depends for single purchase.

This will have direct access to customer to get their billing info after transaction.

* **Employee - Shipment**

An employee can be associated with zero or more Shipments. That means an employee can be working with one or more Shipments or employee cannot be working for any Shipment.

**Initial ER Diagram:**

**A black screen with white text

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