**Dairy Management System Case Study**

**Aim:**

To design an efficient and user-friendly system for managing and storing records related to dairy production, inventory, distribution, and associated operations within the factory and warehouse environments.

**Current System:**

Traditional dairy factories and warehouses often rely on manual processes and outdated systems for managing daily operations such as milk processing, product packaging, inventory tracking, and distribution logistics. These methods can lead to inefficiencies, data inaccuracies, and delays in decision-making. The proposed Dairy Management System seeks to modernize these operations by implementing a comprehensive database management solution that ensures real-time data accessibility, improved accuracy, and streamlined workflows across all departments.

**Entities and their attributes:**

**1. RawMilkIntake (Strong)**

**-** SupplierID (Primary Key)

- Quantity

- FatContent

- PurityLevel

- DeliveryDateTime

- SourceLocation

**2. ProcessedProducts (Strong)**

- ProductID (Primary Key)

- ProductName

- Category

- ProductionDate

- ExpiryDate

- BatchNumber

- QuantityProduced

**3. InventoryManagement (Strong)**

- ProductID (Primary Key)

- StockLevel

- ReorderThreshold

- StorageCondition

- WarehouseLocation

- DispatchRecord

**4. Employees (Strong)**

- EmployeeID (Primary Key)

- FirstName

- LastName

- ContactNumber

- EmailID

- Position

- Department

- ShiftTiming

- YearsExperience

- Salary

- Location

**5. ProcessingEquipment (Strong)**

- MachineID (Primary Key)

- EquipmentName

- ModelNumber

- Manufacturer

- ManufacturingYear

- PurchaseDate

- MaintenanceSchedule

- Status

- CapacitySpecification

**6. PackagingEquipment (Strong)**

- MachineID (Primary Key)

- EquipmentName

- ModelNumber

- Manufacturer

- ManufacturingYear

- PurchaseDate

- MaintenanceSchedule

- PackagingCapacityPerHour

**7. LogisticsEquipment (Strong)**

- VehicleID (Primary Key)

- VehicleType

- ModelNumber

- Manufacturer

- PurchaseDate

- MaintenanceRecords

- LoadCapacity

- RegistrationDetails

**8. Supplier (Strong)**

- SupplierID (Primary Key)

- SupplierName

- ContactNumber

- EmailID

- Address

**9. Warehouse (Strong)**

- WarehouseID (Primary Key)

- WarehouseName

- Location

- StorageCapacity

- TemperatureControlled

- SecuritySystem

- ManagerID

**10. StockMovement (Weak)**

- MovementID (Primary Key)

- ProductID (Primary Key)

- MovementType

- MovementDateTime

- QuantityMoved

**11. ShiftDetails (Weak)**

- ShiftID (Primary Key)

- EmployeeID (Primary Key)

- ShiftStart

- ShiftEnd

**12. MaintenanceRecords (Weak)**

- RecordID (Primary Key)

- MachineID (Primary Key)

- MaintenanceDate

- TechnicianName

- IssueReported

- ActionTaken

**13. VehicleMaintenance (Weak)**

- MaintenanceID (Primary Key)

- VehicleID (Primary Key)

- MaintenanceDate

- IssueReported

- MaintenanceCost

**Changes and Use Cases:**

The Dairy Management System will implement role-based access controls to ensure that users can access information pertinent to their responsibilities:

* Management: Full access to all modules, including raw milk intake, processed products, inventory, employee data, and machinery maintenance records for strategic planning and decision-making.
* Production Staff: Access to real-time data on raw milk intake, processing schedules, and quality control metrics to optimize production workflows.
* Warehouse Staff: Ability to monitor inventory levels, manage stock movements, and coordinate product distribution logistics efficiently.
* Quality Control Team: Access to detailed reports on product quality, compliance standards, and testing results to ensure adherence to industry regulations.
* Maintenance Crew: Access to machinery logs, maintenance schedules, and equipment performance data to ensure all systems operate smoothly with minimal downtime.

**Benefits:**

1. Enhanced Operational Efficiency:
   * Automation of routine tasks reduces manual workload and minimizes errors.
   * Real-time data tracking allows for swift responses to operational issues and demand fluctuations.
2. Improved Data Accuracy and Accessibility:
   * A centralized database ensures all departments have access to consistent and up-to-date information.
   * Streamlined reporting facilitates better monitoring and evaluation of processes.
3. Cost Savings and Resource Optimization:
   * Effective inventory management reduces waste and prevents overstocking or shortages.
   * Predictive maintenance scheduling for machinery minimizes repair costs and prolongs equipment lifespan.
4. Better Compliance and Quality Assurance:
   * Detailed record-keeping supports adherence to food safety and industry regulations.
   * Comprehensive quality control data enhances product standards and customer satisfaction.
5. Strategic Decision Making:
   * Analytical insights from data reports enable informed decisions regarding production scaling, market expansion, and resource allocation.
   * Tracking of supply chain metrics improves vendor management and distribution efficiency.