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ERD Detailed Documentation

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1. Introduction

The goal of this system is to manage interactions among farmers, buyers, quality inspectors, logistics partners, weather warnings, and disputes. The Entity-Relationship Diagram (ERD) clarifies where each piece of data is stored and how the various entities relate to one another.

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2. Entities and Attributes

2.1 Farmer

- **Description:** A farmer who lists produce for sale.

Attributes:

Attribute	Type	Key	Description
farmer_id	Integer	PK	Unique identifier for each farmer
name	Varchar(100)		Farmer's name
contact_info	Varchar(150)		Phone number, email, etc.

2.2 Produce

- **Description:** An item (fruit or vegetable) that a farmer wants to sell.

Attributes:

Attribute	Type	Key	Description

produce_id	Integer	PK	Unique identifier for each lot of produce
farmer_id	Integer	FK	Reference to Farmer.farmer_id
name	Varchar(100)		Name of the produce (e.g., Tomato, Mango)
quantity	Integer		Quantity available (kg, tons, etc.)
expected_price	Decimal(10,2)		Farmer's expected price per unit
harvest_date	Date		Scheduled harvest date

2.3 Buyer

- **Description:** A user who places bids or makes direct purchases.

Attributes:

Attribute	Type	Key	Description
buyer_id	Integer	PK	Unique identifier for each buyer
name	Varchar(100)		Buyer's name
contact_info	Varchar(150)		Phone number, email, etc.

2.4 Bid_Purchase

- **Description:** Records of buyer bids and direct purchases.

Attributes:

Attribute	Type	Key	Description
bid_id	Integer	PK	Unique identifier for each bid/purchase record
produce_id	Integer	FK	Reference to Produce.produce_id
buyer_id	Integer	FK	Reference to Buyer.buyer_id
bid_price	Decimal(10,2)		Offered price by the buyer
purchase_type	Varchar(10)		Either 'bid' or 'direct'

bid_date	DateTime	Date and time when the bid or purchase occurred

2.5 Quality_Inspector

- **Description:** A person who evaluates and grades the produce.

Attributes:

Attribute	Type	Key	Description
inspector_id	Integer	PK	Unique identifier for each inspector
name	Varchar(100)		Inspector’s name

2.6 Produce_Grade

- **Description:** Stores the grade assigned to each lot of produce.

Attributes:

Attribute	Type	Key	Description
grade_id	Integer	PK	Unique identifier for each grade record
produce_id	Integer	FK	Reference to Produce.produce_id
inspector_id	Integer	FK	Reference to Quality_Inspector.inspector_id
grade	Char(1)		Grade value: 'A', 'B', or 'C'
grade_date	DateTime		Date and time when the grading took place

2.7 Logistics_Partner

- **Description:** A company or individual responsible for delivering produce.

Attributes:

Attribute	Type	Key	Description
logistics_id	Integer	PK	Unique identifier for each partner
name	Varchar(100)		Partner’s name
contact_info	Varchar(150)		Phone number, email, etc.

2.8 Delivery

- **Description:** Records of produce pickups and drop-offs.

Attributes:

Attribute	Type	Key	Description
delivery_id	Integer	PK	Unique identifier for each delivery record
produce_id	Integer	FK	Reference to Produce.produce_id
logistics_id	Integer	FK	Reference to Logistics_Partner.logistics_id
delivery_date	DateTime		Scheduled or actual delivery date and time
status	Varchar(20)		Status: 'pending', 'in_transit', 'delivered', etc.

2.9 Weather_Warning

- **Description:** Weather alerts that may cause shipment delays.

Attributes:

Attribute	Type	Key	Description
warning_id	Integer	PK	Unique identifier for each warning
location	Varchar(100)		Area affected by the warning
warning_date	DateTime		Date and time when the warning was issued
details	Text		Detailed description of the warning

2.10 Dispute

- **Description:** Records of customer complaints regarding quality mismatches or late deliveries.

Attributes:

Attribute	Type	Key	Description
dispute_id	Integer	PK	Unique identifier for each dispute record
buyer_id	Integer	FK	Reference to Buyer.buyer_id

produce_id	Integer	FK	Reference to Produce.produce_id
reason	Varchar(50)		'quality mismatch' or 'late delivery'
raised_date	DateTime		Date and time when the dispute was raised
status	Varchar(20)		Status: 'open', 'resolved', 'closed', etc.

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3. Relationships and Cardinalities

Relationship	Entities Involved	Type	Cardinality	Description
Farmer lists Produce	Farmer → Produce	One-to-Many	1 Farmer : N Produce	A single farmer can list multiple produce items
Buyer bids/purchases Produce	Buyer ↔ Bid_Purchase ↔ Produce	Many-to-Many via join	N Buyer : N Produce	Buyers can place multiple bids on many produce items
Inspector grades Produce	Quality_Inspector ↔ Produce_Grade ↔ Produce	One-to-Many via join	1 Inspector : N Grades; 1 Produce : 1 Grade	Inspectors can grade multiple items; each produce lot has one grade record
Logistics Partner delivers Produce	Logistics_Partner ↔ Delivery ↔ Produce	One-to-Many via join	1 Partner : N Deliveries; 1 Produce : 1 Delivery	Partners handle multiple deliveries; each produce lot has one delivery record
Weather Warning delays Delivery	Weather_Warning → Delivery	One-to-Many	1 Warning : N Delays	A single weather warning can delay multiple deliveries
Dispute raised for Produce	Dispute → Buyer; Dispute → Produce	Many-to-One	N Disputes : 1 Buyer; N Disputes : 1 Produce	Buyers can raise multiple disputes; each produce lot can have multiple disputes