

Part 2: Relational Data Model

Domain: Restaurant and Cafe chain - 11 tables, 57 attributes, normalized (3NF).

Natural keys: menu_categories.category_code, customer_health_profiles.customer_id. All other primary keys are surrogate keys.

Entity-relationship diagram

Part 2 - Relational Data Model (11 tables, 57 attributes, 3NF)

PK = primary key (natural/surrogate labeled); FK = foreign key

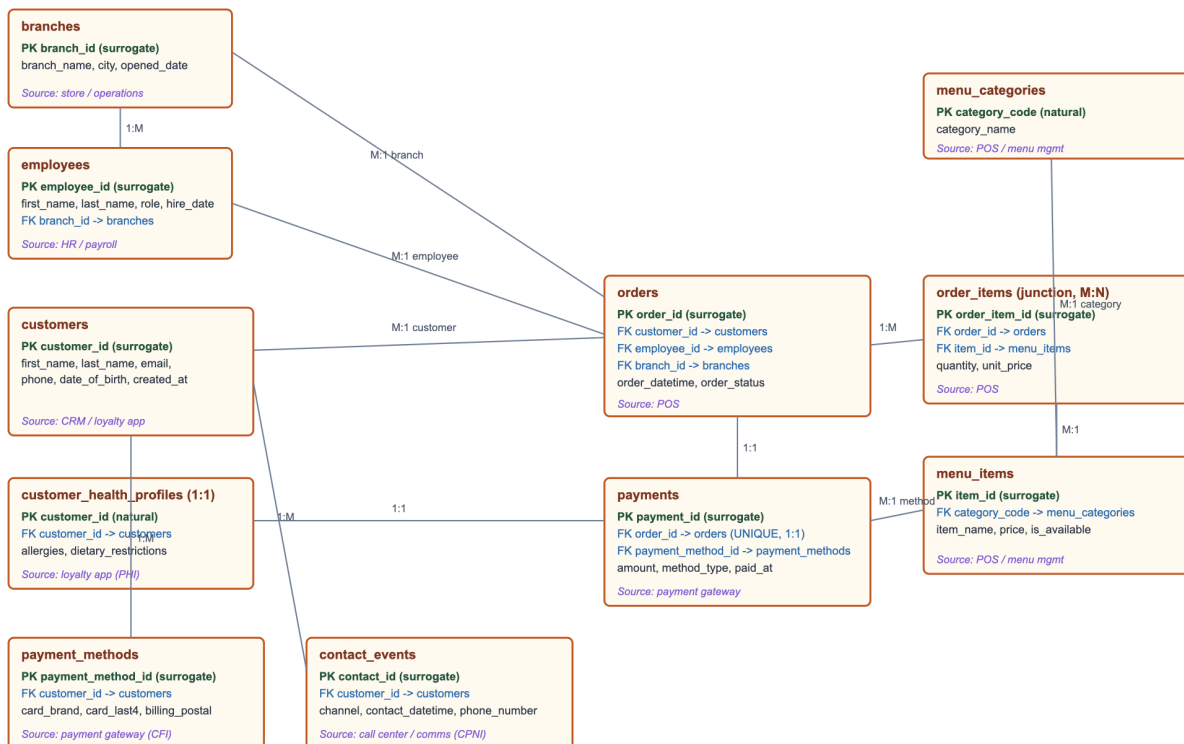


Table definitions (detailed)

1. branches

PK: branch_id (surrogate) | Source: store / operations system

Field	Type	Key	Null	Sens.	Description
branch_id	INTEGER	PK	No	-	Unique branch identifier
branch_name	TEXT	-	No	-	Display name of the branch
city	TEXT	-	No	-	City where the branch operates
opened_date	TEXT (DATE)	-	No	-	Date the branch opened

2. employees

PK: employee_id (surrogate) | Source: HR / payroll

Field	Type	Key	Null	Sens.	Description
employee_id	INTEGER	PK	No	-	Unique employee identifier
first_name	TEXT	-	No	PII	Employee first name
last_name	TEXT	-	No	PII	Employee last name
role	TEXT	-	No	-	server / cashier / kitchen
hire_date	TEXT (DATE)	-	No	-	Date the employee was hired
branch_id	INTEGER	FK -> branches	No	-	Branch the employee works at

3. customers

PK: customer_id (surrogate; email is a natural-key candidate) | Source: CRM / loyalty app

Field	Type	Key	Null	Sens.	Description
customer_id	INTEGER	PK	No	-	Unique customer identifier
first_name	TEXT	-	No	PII	Customer first name
last_name	TEXT	-	No	PII	Customer last name
email	TEXT	UNIQUE	No	PII	Login / contact email (natural-key candidate)
phone	TEXT	-	Yes	PII	Contact phone number
date_of_birth	TEXT (DATE)	-	Yes	PII	Birthday offers / age checks
created_at	TEXT (DATETIME)	-	No	-	When the record was created

4. customer_health_profiles

PK: customer_id (natural, enforces 1:1) | Source: loyalty app

Field	Type	Key	Null	Sens.	Description
customer_id	INTEGER	PK, FK -> customers	No	-	Same id as customer (1:1 link)
allergies	TEXT	-	Yes	PHI	Free-text allergy notes
dietary_restrictions	TEXT	-	Yes	PHI	Free-text dietary needs
updated_at	TEXT (DATETIME)	-	No	-	Last update timestamp

5. payment_methods

PK: payment_method_id (surrogate) | Source: payment gateway

Field	Type	Key	Null	Sens.	Description
payment_method_id	INTEGER	PK	No	-	Unique saved-payment identifier
customer_id	INTEGER	FK -> customers	No	-	Owner of the payment method
card_brand	TEXT	-	Yes	CFI	Visa / Mastercard / etc.
card_last4	TEXT	-	Yes	CFI	Last 4 digits of the card
billing_postal_code	TEXT	-	Yes	CFI/PII	Billing postal code
is_default	INTEGER (BOOL)	-	No	-	Whether this is the default method

6. contact_events

PK: contact_id (surrogate) | Source: call center / comms platform

Field	Type	Key	Null	Sens.	Description
contact_id	INTEGER	PK	No	-	Unique contact-event identifier
customer_id	INTEGER	FK -> customers	No	-	Customer contacted
channel	TEXT	-	No	CPNI	call / sms / app_push
contact_datetime	TEXT (DATETIME)	-	No	CPNI	When the contact occurred
phone_number	TEXT	-	Yes	CPNI/PII	Number used for the contact
marketing_consent	INTEGER (BOOL)	-	No	CPNI	Whether the customer opted in

7. menu_categories

PK: category_code (natural) | Source: POS / menu management

Field	Type	Key	Null	Sens.	Description
category_code	TEXT	PK	No	-	Short code, e.g. MAIN, DRINK
category_name	TEXT	-	No	-	Human-readable category name

8. menu_items

PK: item_id (surrogate) | Source: POS / menu management

Field	Type	Key	Null	Sens.	Description
item_id	INTEGER	PK	No	-	Unique menu-item identifier
item_name	TEXT	-	No	-	Name of the dish / drink
category_code	TEXT	FK -> menu_categories	No	-	Category this item belongs to
price	REAL	-	No	-	Current selling price
is_available	INTEGER (BOOL)	-	No	-	Whether the item is on sale

9. orders

PK: order_id (surrogate) | Source: POS

Field	Type	Key	Null	Sens.	Description
order_id	INTEGER	PK	No	-	Unique order identifier
customer_id	INTEGER	FK -> customers	No	-	Customer who placed the order
employee_id	INTEGER	FK -> employees	No	-	Employee who served the order
branch_id	INTEGER	FK -> branches	No	-	Branch where order was placed
order_datetime	TEXT (DATETIME)	-	No	-	When the order was created
order_status	TEXT	-	No	-	placed / completed / cancelled

10. order_items

PK: order_item_id (surrogate) -- junction resolving orders <-> menu_items (M:N) | Source: POS

Field	Type	Key	Null	Sens.	Description
order_item_id	INTEGER	PK	No	-	Unique line-item identifier
order_id	INTEGER	FK -> orders	No	-	Order this line belongs to
item_id	INTEGER	FK -> menu_items	No	-	Menu item ordered
quantity	INTEGER	-	No	-	Number of units ordered
unit_price	REAL	-	No	-	Price per unit, frozen at order time

11. payments

PK: payment_id (surrogate) | Source: payment gateway

Field	Type	Key	Null	Sens.	Description
payment_id	INTEGER	PK	No	-	Unique payment identifier
order_id	INTEGER	FK -> orders, UNIQUE	No	-	Order paid for (UNIQUE = 1:1)
payment_method_id	INTEGER	FK -> payment_methods	Yes	-	Saved method (null for cash)
amount	REAL	-	No	CFI	Amount paid
method_type	TEXT	-	No	-	cash / card / e-wallet
paid_at	TEXT (DATETIME)	-	No	-	When the payment was made

Foreign keys (all relationships)

From table	Field	References	Cardinality
employees	branch_id	branches.branch_id	M:1
customer_health_profiles	customer_id	customers.customer_id	1:1
payment_methods	customer_id	customers.customer_id	M:1
contact_events	customer_id	customers.customer_id	M:1
menu_items	category_code	menu_categories.category_code	M:1
orders	customer_id	customers.customer_id	M:1
orders	employee_id	employees.employee_id	M:1
orders	branch_id	branches.branch_id	M:1
order_items	order_id	orders.order_id	M:1
order_items	item_id	menu_items.item_id	M:1
payments	order_id	orders.order_id (UNIQUE)	1:1
payments	payment_method_id	payment_methods.payment_method_id	M:1

Normalization (3NF)

- M:N Order <-> Menu Item resolved by the order_items junction table.
- Every non-key attribute depends on the whole primary key (no partial/transitive dependency).
- unit_price stored in order_items (not derived from menu_items.price) to keep history correct.
- customer_health_profiles separated from customers (optional, sensitive PHI, different source).