

## Tables

### **APP\_USER**

Purpose: Registered account (buyer/seller roles not separated here; any user may sell).

Attributes:

- id (PK)
- email (unique)
- full\_name
- address
- password
- balance\_cents (default 0)
- created\_at, updated\_at

Keys & constraints:

- PK: id
- AK: email unique
- balance\_cents  $\geq 0$

### **BALANCES**

Purpose: Immutable audit trail of balance changes.

Attributes:

- id (PK)
- user\_id  $\rightarrow$  APP\_USER.id
- delta\_cents (positive credit / negative debit)
- reason (e.g., top\_up, withdraw, order\_debit, seller\_credit)
- order\_id (nullable)  $\rightarrow$  ORDER.id
- created\_at

Keys & constraints:

- PK: id
- FK: (user\_id) to APP\_USER

### **CATEGORY**

Purpose: Product taxonomy.

Attributes:

- id (PK, small integer ok)
- name (unique)
- description

Keys & constraints:

- PK: id
- AK: name unique

### **PRODUCT**

Purpose: Product catalog entry (not seller-specific).

Attributes:

- id (PK)
- name
- description
- base\_price\_cents (non-negative; display/default only)
- category\_id → CATEGORY.id
- created\_by → APP\_USER.id
- created\_at, updated\_at

Keys & constraints:

- PK: id
- FK: (category\_id) to CATEGORY
- FK: (created\_by) to APP\_USER
- base\_price\_cents  $\geq 0$

## **INVENTORY**

Purpose: A seller's listing of a given product.

Attributes:

- id (PK)
- seller\_id → APP\_USER.id
- product\_id → PRODUCT.id
- quantity ( $\geq 0$ )
- unit\_price\_cents ( $\geq 0$ )
- updated\_at

Keys & constraints:

- PK: id
- Natural uniqueness: (seller\_id, product\_id) unique
- FKs: to APP\_USER and PRODUCT

## **CART**

Purpose: Persistent shopping cart, one per user.

Attributes:

- id (PK)
- user\_id (unique) → APP\_USER.id
- created\_at, updated\_at

Keys & constraints:

- PK: id
- AK: user\_id unique

## **CART\_ITEM**

Purpose: Items in a user's cart, tied to a specific seller's inventory.

Attributes:

- id (PK)
- cart\_id → CART.id
- inventory\_id → INVENTORY.id

- quantity ( $> 0$ )
- snapshot\_price\_cents
- added\_at

Keys & constraints:

- PK: id
- FK: (cart\_id) to CART
- FK: (inventory\_id) to INVENTORY
- Uniqueness: (cart\_id, inventory\_id) unique (no duplicates for same seller-product)

## **ORDER**

Purpose: A purchase event by a buyer; totals and lifecycle at the order level.

Attributes:

- id (PK)
- buyer\_id  $\rightarrow$  APP\_USER.id
- submitted\_at
- total\_cents ( $\geq 0$ )
- status: {placed, partially\_fulfilled, fulfilled, cancelled}

Keys & constraints:

- PK: id
- FK: (buyer\_id) to APP\_USER

## **ORDER\_LINE**

Purpose: Purchased item from a specific seller for a specific product.

Attributes:

- id (PK)
- order\_id  $\rightarrow$  ORDER.id unique
- product\_id  $\rightarrow$  PRODUCT.id unique
- seller\_id  $\rightarrow$  APP\_USER.id unique
- quantity ( $> 0$ )
- unit\_price\_cents ( $\geq 0$ ; final snapshot at purchase)
- fulfilled\_at (nullable until fulfilled)

Keys & constraints:

- PK: id
- FKs: (order\_id), (product\_id), (seller\_id)

## **PRODUCT\_REVIEW**

Purpose: One rating per user per product.

Attributes:

- id (PK)
- user\_id  $\rightarrow$  APP\_USER.id
- product\_id  $\rightarrow$  PRODUCT.id
- rating: {1..5}
- body

- created\_at, updated\_at

Keys & constraints:

- PK: id
- Uniqueness: (user\_id, product\_id) unique
- FKs: to APP\_USER, PRODUCT

## **SELLER\_REVIEW**

Purpose: One rating per user per seller (only if the user has purchased from that seller).

Attributes:

- id (PK)
- user\_id → APP\_USER.id
- seller\_id → APP\_USER.id
- rating: {1..5}
- body
- created\_at, updated\_at

Keys & constraints:

- PK: id
- Uniqueness: (user\_id, seller\_id) unique
- FK: (user\_id), (seller\_id) to APP\_USER
- user\_id ≠ seller\_id
- Eligibility: Exists an ORDER\_LINE with ORDER.buyer\_id = user\_id and ORDER\_LINE.seller\_id = seller\_id.

## **MESSAGE\_THREAD**

Purpose: Private conversation between the buyer and the relevant seller for a given order.

Attributes:

- id (PK)
- order\_id → ORDER.id
- buyer\_id → APP\_USER.id
- seller\_id → APP\_USER.id
- created\_at

Keys & constraints:

- PK: id
- Uniqueness: (order\_id, buyer\_id, seller\_id) unique
- FKs: to ORDER and APP\_USER

## **MESSAGE**

Purpose: Individual messages within a thread.

Attributes:

- id (PK)
- thread\_id → MESSAGE\_THREAD.id
- sender\_id → APP\_USER.id
- body
- created\_at

### Keys & constraints:

- PK: id
- FKs: (thread\_id) to MESSAGE\_THREAD, (sender\_id) to APP\_USER
- Non-empty body
- Eligibility: sender\_id must be either the thread's buyer\_id or seller\_id.

### Relationships

- APP\_USER (1) — (N) INVENTORY (by seller\_id)
- PRODUCT (1) — (N) INVENTORY
- APP\_USER (1) — (1) CART
- CART (1) — (N) CART\_ITEM — (M:1) INVENTORY
- APP\_USER (buyer) (1) — (N) ORDER
- ORDER (1) — (N) ORDER\_LINE
- APP\_USER (seller) (1) — (N) ORDER\_LINE
- PRODUCT (1) — (N) ORDER\_LINE
- APP\_USER (1) — (N) BALANCES
- ORDER (0..1) — (N) BALANCES (via optional link)
- APP\_USER (1) — (N) PRODUCT\_REVIEW; uniqueness per (user\_id, product\_id)
- APP\_USER (1) — (N) SELLER\_REVIEW; uniqueness per (user\_id, seller\_id) + eligibility rule
- ORDER (1) — (N) MESSAGE\_THREAD (but practically at most one per buyer–seller)
- MESSAGE\_THREAD (1) — (N) MESSAGE