SOFTWARE BLUEPRINT | VERSION 1.0

Stationery Inventory Management System

Architecture, data model, workflows, screens and build plan for tracking every stock activity in a stationery business

October 2026

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How to read this blueprint
Sections 1 to 3 explain what is being built and how. Sections 4 to 7 define the data and the rules. Sections 8 to 10 show screens, reports and the API. Sections 11 to 15 cover security, schedule, testing, risks and the future.

1. Vision and scope

A single system that knows exactly what is on every shelf, what came in, what went out, and why. It replaces notebooks and spreadsheets with a reliable record of all inventory activity in a stationery shop, from the first purchase order to the last sale of a pen.

Goals

- Know the true stock of every item at any moment, by location and by variant.
- Record every movement (purchase, sale, return, damage, transfer, count) with who, when and why.
- Prevent stock-outs with reorder alerts, and prevent over-buying with slow-mover reports.
- Make billing fast at the counter using barcode scanning and keyboard shortcuts.
- Show owners their profit, margin and stock value without manual calculation.

Not in version 1

- Full accounting (ledgers, payroll). The system exports data to accounting tools instead.
- Online store and delivery tracking (planned for a later phase, see Section 15).
- Manufacturing or bill of materials (not needed for a retail or wholesale stationery shop).

Success measures

Measure	Target after 3 months
Stock accuracy (system vs physical count)	98% or better of items match
Time to bill a 5-item sale	Under 45 seconds
Stock-outs on top 50 items	Fewer than 2 per month
Time to produce month-end stock value	Under 1 minute (was hours)

2. Users and permissions

Three roles cover most shops. An owner can add more roles later.

Capability	Owner	Manager	Cashier
Make sales, take payment, print receipts	Yes	Yes	Yes
Process returns	Yes	Yes	With approval
Add or edit products and prices	Yes	Yes	No
See cost price and profit	Yes	Limited	No
Receive stock, raise purchase orders	Yes	Yes	No
Stock adjustments and write-offs	Yes	Yes (limit)	No
Run stock counts	Yes	Yes	View only
Reports (sales, stock, profit)	All	Most	Own sales
Manage users, settings, backups	Yes	No	No
View audit log	Yes	Yes	No

3. System architecture

The system has three layers. Screens talk to one API, the API runs the business rules, and everything is stored in one database. This keeps the counter, the office and the phone always in agreement.

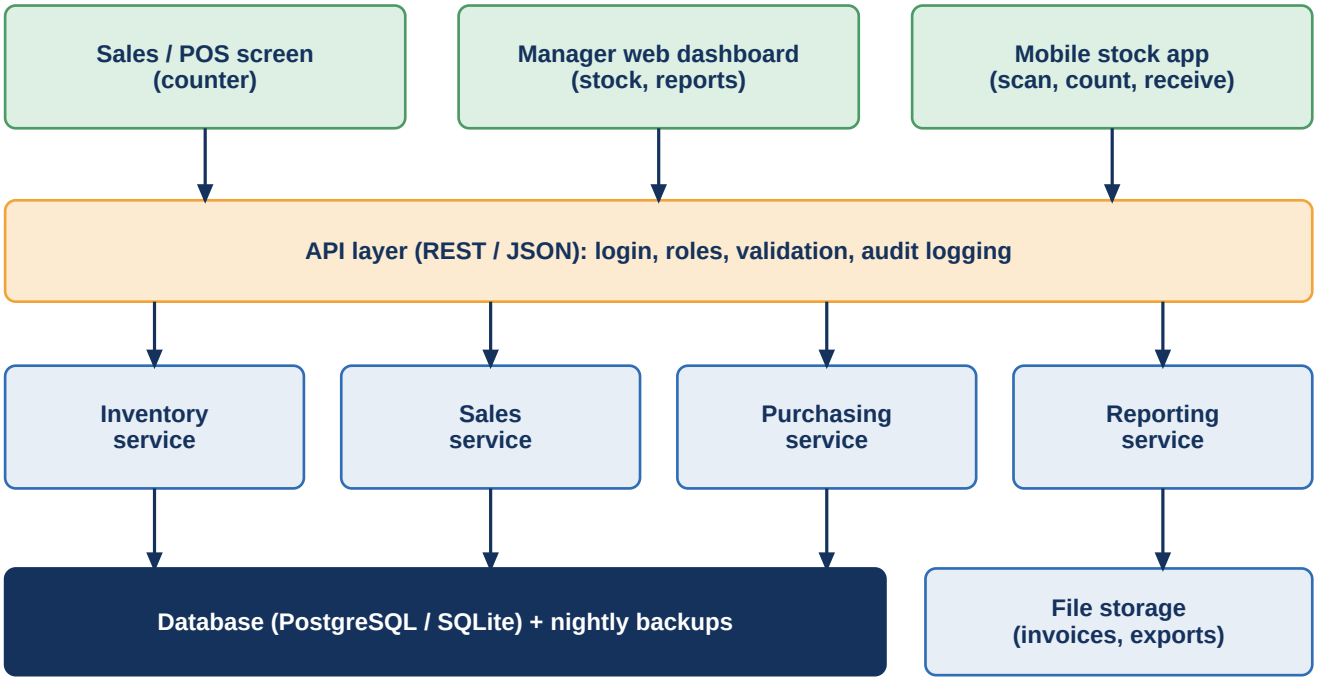


Figure 1. Layers of the system

Technology options

Option	Best for	Stack
A. Single-shop desktop	One counter, simple setup, works offline	Web app served locally, SQLite database, runs in the browser
B. Cloud multi-device	Several counters, several staff, owner checks from home	Web app + REST API, PostgreSQL, hosted server, mobile-friendly screens
C. Multi-branch	Two or more shops sharing a catalogue	Option B plus branch codes, transfers and central reports

Recommendation
Start with Option B built so it can also run on one local machine. Use a modern web framework (for example React or Vue for screens, Node.js or Python for the API) and PostgreSQL. The data model in Section 5 works for all three options.

4. Modules in detail

4.1 Product catalogue

- Product with variants (colour, size, pack size) each with its own SKU and barcode.
- Units and pack conversion: piece, dozen, box, ream, carton (1 carton = 10 boxes = 120 pieces).
- Category tree: Writing, Paper, Files and Folders, Art and Craft, Office, School, Gifts.
- Photos, brand, default supplier, tax rate, active or discontinued flag.
- Bulk import and export through CSV.

4.2 Stock and locations

- Live quantity per variant per location (shop floor, back store, godown).
- Reorder level, reorder quantity and maximum stock per variant.
- Optional batch and expiry for items such as glue, ink and correction fluid.
- Stock movements shown as a timeline for any item.

4.3 Purchasing

- Suppliers with contact, payment terms and balance.
- Purchase orders with statuses: Draft, Sent, Partly received, Received, Cancelled.
- Goods receipt against an order, with quantity differences recorded.
- Purchase returns and supplier credit notes.
- Cost updates through weighted average costing.

4.4 Sales and POS

- Barcode scan or name search, quantity, discount, tax, payment split (cash, UPI, card, credit).
- Hold and resume bills, sales returns, exchanges, price override with permission.
- Customer records for regular and credit customers, with outstanding balance.
- Printed and shareable receipts and invoices.

4.5 Adjustments, transfers and counts

- Adjustment reasons: damaged, expired, lost, found, sample, own use.
- Transfers between locations with out and in records.
- Stock count sessions by category or shelf, variance report, approval before correction.

4.6 Reports and alerts

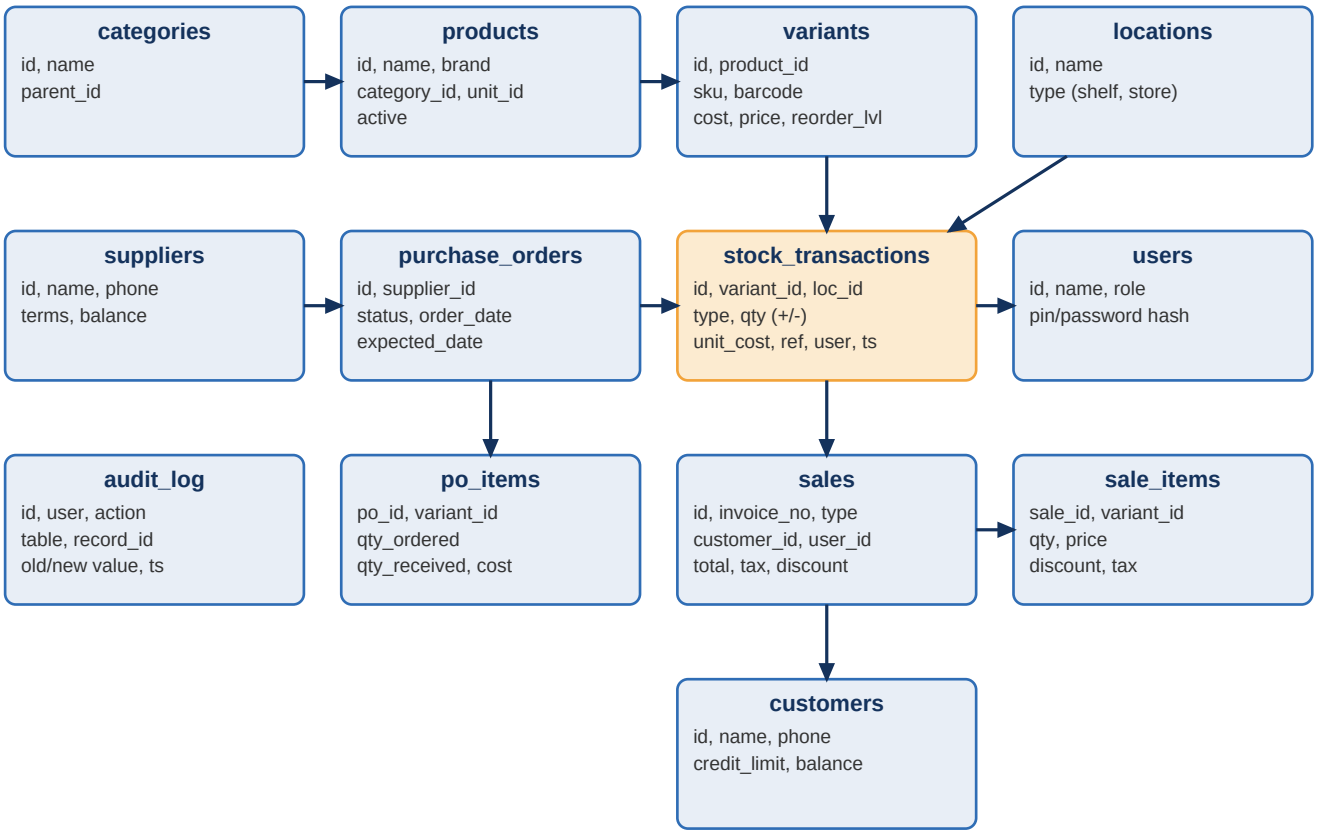
- Dashboards for owner and manager.
- Low stock, dead stock, fast movers, margin and stock value reports.
- Alerts on screen and optionally by SMS, WhatsApp or email.

4.7 Administration

- Users, roles, PIN login for cashiers, shop details, tax settings, receipt design.
- Automatic daily backup and restore.
- Audit log of every sensitive action.

5. Data model

The key design choice: **stock on hand is never typed in. It is the sum of all rows in stock_transactions.** Every purchase, sale, return and correction adds a row. Nothing is overwritten, so the history can always explain the number.



Arrows point from the parent record to the records that depend on it. Every stock change is a row in stock_transactions.

Figure 2. Main tables and how they connect

Field specification of the core tables

Table	Important fields	Notes
products	id, name, brand, category_id, unit_id, tax_rate, default_supplier_id, active	One row per item family, for example "Gel pen 0.5".
variants	id, product_id, sku, barcode, attributes (colour, size), cost, price, mrp, reorder_level, reorder_qty, max_stock	One row per sellable version. SKU and barcode must be unique.
stock_transactions	id, variant_id, location_id, type, qty (signed), unit_cost, ref_type, ref_id, reason, user_id, created_at, batch_no	Append-only. Corrections are new rows, never edits.
purchase_orders / po_items	po_no, supplier_id, status, expected_date; variant_id, qty_ordered, qty_received, cost	Receiving creates PURCHASE_RECEIPT transactions.
sales / sale_items	invoice_no, type (sale or return), customer_id, user_id, subtotal, discount, tax, total, payment_mode; variant_id, qty, price	Saving a sale creates SALE transactions in the same database step.
customers / suppliers	name, phone, address, tax_id, credit_limit, balance	Balance changes with credit sales, payments and credit notes.
audit_log	user_id, action, table_name, record_id, old_value, new_value, created_at	Written automatically on price edits, deletions, adjustments, logins.

SKU naming scheme

Part	Example	Meaning
Category code	WR	Writing
Brand code	CLS	Classmate
Item code	GEL	Gel pen
Variant code	BLK05	Black, 0.5 mm
Full SKU	WR-CLS-GEL-BLK05	Readable and unique

6. Stock logic and formulas

Transaction types

Type	Effect	Created by
OPENING	+	Opening stock entry when you start using the system
PURCHASE_RECEIPT	+	Goods received from a supplier
SALE	-	Billing at the counter
SALE_RETURN	+	Customer returns an item in saleable condition
PURCHASE_RETURN	-	Goods sent back to a supplier
ADJUST_IN / ADJUST_OUT	+ / -	Manual correction with a reason
TRANSFER_OUT / TRANSFER_IN	- / +	Move between two locations (always created as a pair)
COUNT_CORRECTION	+ or -	Approved difference from a stock count
WRITE_OFF	-	Damaged, expired or lost items removed from stock

Formulas the system uses

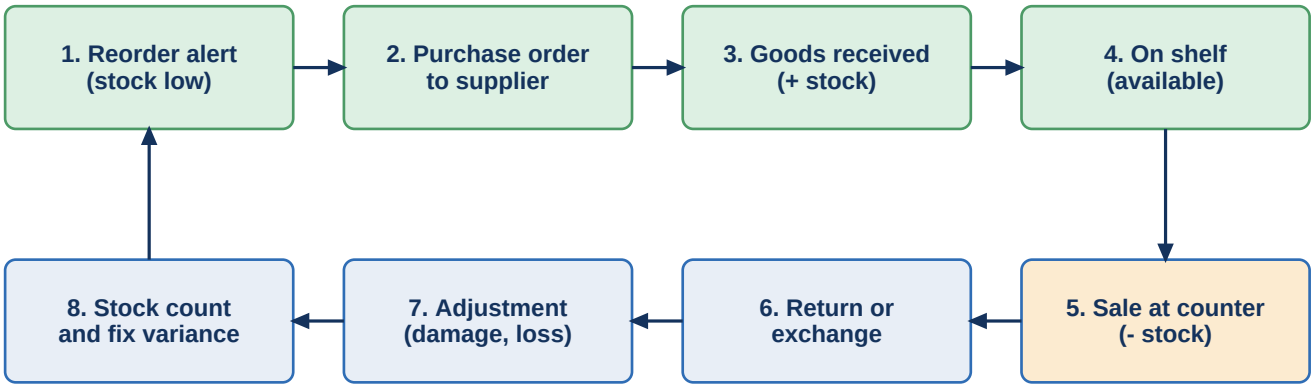
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Stock on hand = sum of qty of all transactions for the variant and location
New average cost = (old qty x old cost + received qty x received cost) / (old qty +
received qty)
Stock value = stock on hand x average cost
Gross margin % = (selling price - cost) / selling price x 100
Reorder level = average daily sales x supplier lead time (days) + safety stock
Suggested order qty = maximum stock - stock on hand - quantity already on order
Days of stock left = stock on hand / average daily sales
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Worked example

You hold 40 pens at cost 8. You receive 60 more at cost 9. New average cost = (40 x 8 + 60 x 9) / 100 = 8.60. Stock value = 100 x 8.60 = 860.

7. Workflows

7.1 Stock lifecycle



The cycle repeats: counts and sales feed the next reorder alert.

Figure 3. How stock moves through the business

7.2 Making a sale

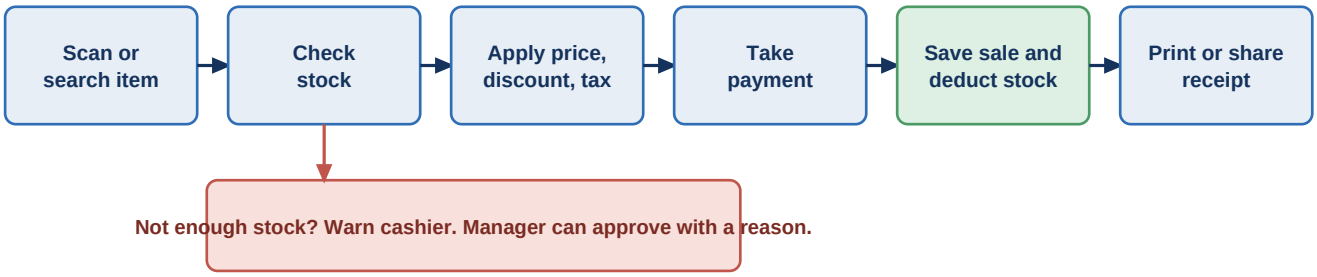


Figure 4. Sales flow at the counter

7.3 Receiving stock

- Open the purchase order (or start a direct receipt) and scan or select each item.
- Enter the received quantity and the cost on the supplier invoice. Differences from the order are flagged.
- Confirm. The system creates PURCHASE_RECEIPT rows, updates average cost and marks the order Received or Partly received.
- Print barcode labels for new items if needed.

7.4 Stock count (audit)

- Manager starts a count session for a category or shelf. The system freezes the expected quantities (a snapshot).
- Staff scan items and enter counted quantities on the mobile app. Items can be recounted.
- The system shows variance per item (counted minus expected) and its value.
- Manager reviews, adds a reason, and approves. COUNT_CORRECTION rows are created. The session is locked.

7.5 Returns and exchanges

- Find the original invoice by number, phone or scan. The system limits the return to what was sold.
- Choose condition: resaleable (goes back to stock) or damaged (goes to write-off).
- Refund by cash, credit note or exchange. A manager approval is requested above a set value.

8. Screens and wireframes

The counter screen must be fast and keyboard friendly. The dashboard must answer three questions at a glance: how are sales, what needs ordering, and how much stock do I hold.

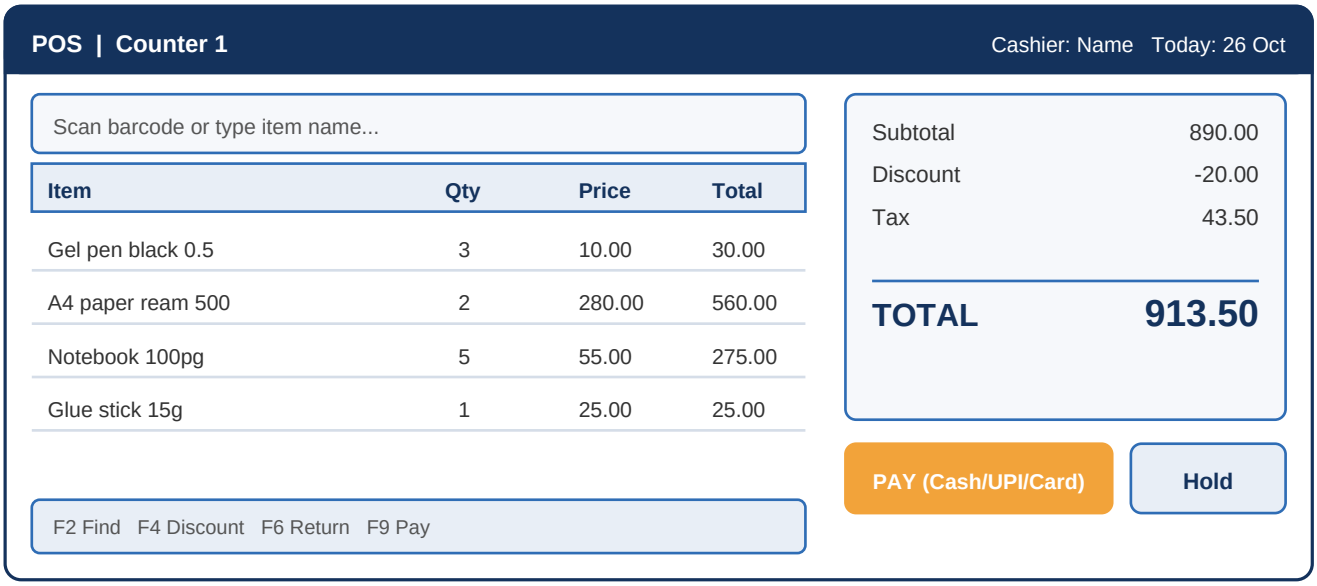


Figure 5. Counter (POS) screen

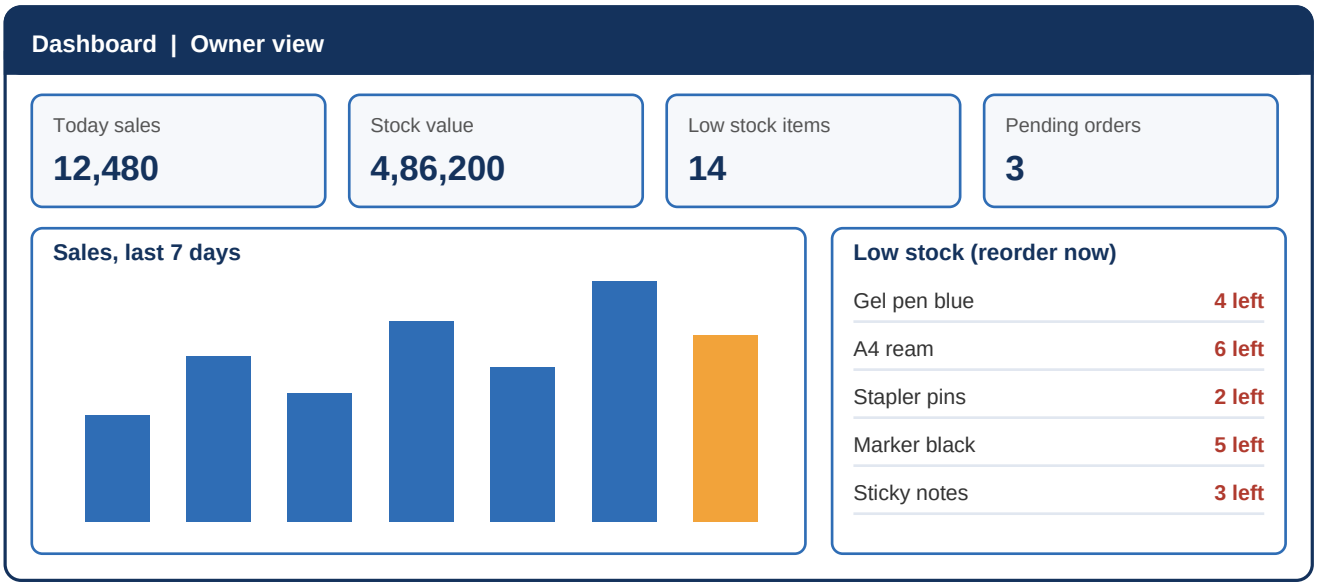


Figure 6. Owner dashboard

Screen list

Screen	Main user	Purpose
Login and PIN	All	Fast cashier switch with a PIN, password for owner
Counter (POS)	Cashier	Billing, returns, hold and resume
Products and variants	Manager	Add, edit, import, print barcodes
Stock overview	Manager	Search stock by item, location, status
Item history	Manager	Timeline of every movement for one item
Purchase orders and receiving	Manager	Order, receive, return
Adjustments and transfers	Manager	Corrections with reasons

Screen	Main user	Purpose
Stock count	Manager, staff	Count sessions and variance approval
Customers and suppliers	Manager	Records, balances, payments
Reports	Owner, Manager	All reports with filters and export
Settings and users	Owner	Shop details, roles, tax, backup

9. Business rules and alerts

Validation rules

- Stock cannot go below zero unless a manager allows it, and the reason is recorded.
- SKU and barcode must be unique. A barcode similar to an existing one triggers a warning.
- Selling price below cost needs manager approval.
- Adjustments above a set quantity or value (for example 50 units or 10 percent of stock) need approval.
- Closed stock counts, saved invoices and received orders cannot be edited. They can only be corrected by new entries.
- Deleting a product with history is not allowed. It is marked inactive.

Alerts

Alert	Trigger	Sent to
Low stock	Quantity at or below reorder level	Manager, owner dashboard
Out of stock	Quantity is zero for an active item	Manager
Dead stock	No sale in 90 days (adjustable)	Owner weekly
Large adjustment	Above approval limit	Owner
Negative margin	Price below cost	Manager
Supplier due	Payment due date reached	Owner
Backup failed	Nightly backup did not complete	Owner

10. Reports catalogue

Report	Shows	Filters
Current stock	Quantity, cost, value per item	Category, location, supplier
Stock movement	Every transaction for an item or period	Item, type, user, dates
Low stock and reorder	Items to order, grouped by supplier	Supplier, category
Sales summary	Sales by day, week, month, cashier, payment mode	Dates, cashier
Profit and margin	Profit by item, category, brand	Dates, category
Fast and slow movers	Top and bottom sellers, days of stock left	Period, category
Purchase history	Purchases and cost changes	Supplier, dates
Supplier and customer balances	Amounts owed and due	Party, age of debt
Stock count variance	Differences, value lost or gained	Session
Tax summary	Tax collected and paid	Dates
Audit log	Who changed what and when	User, action, dates

All reports can be exported to PDF and Excel and scheduled by email.

11. API design (main endpoints)

Method and path	Purpose
POST /auth/login	Sign in, returns a token
GET /variants?q=&barcode;=	Search items by name, SKU or barcode
POST /products PUT /products/{id}	Create and update products with variants
GET /stock?location=&category;=	Current stock levels
GET /stock/{variantId}/history	Movement timeline for one item
POST /purchase-orders POST /purchase-orders/{id}/receive	Order and receive stock
POST /sales POST /sales/{id}/return	Create a sale, process a return
POST /adjustments POST /transfers	Corrections and location transfers
POST /counts POST /counts/{id}/approve	Start and approve a stock count
GET /reports/{name}?from=&to;=	Run a report
GET /alerts	Active alerts for the dashboard
POST /backup POST /restore	Manual backup and restore (owner only)

All write calls run in a database transaction, so a sale and its stock deduction either both succeed or both fail.

12. Security, backup and offline use

- Passwords stored as salted hashes. Cashiers use short PINs limited to the counter device.
- Every request checks the user role. Cost and profit fields are hidden from roles without permission.
- Encrypted connection (HTTPS) for cloud setups. Daily automatic backups kept for 30 days, plus a weekly copy off-site.
- Restore test every quarter so backups are proven to work.
- Offline mode for the counter: sales are saved on the device and synced when the connection returns. Conflicts are resolved by transaction order, which is safe because stock is a ledger.
- Audit log cannot be edited or deleted from the application.

13. Build roadmap

A sixteen-week plan for one small team. Each phase ends with something the shop can already use.

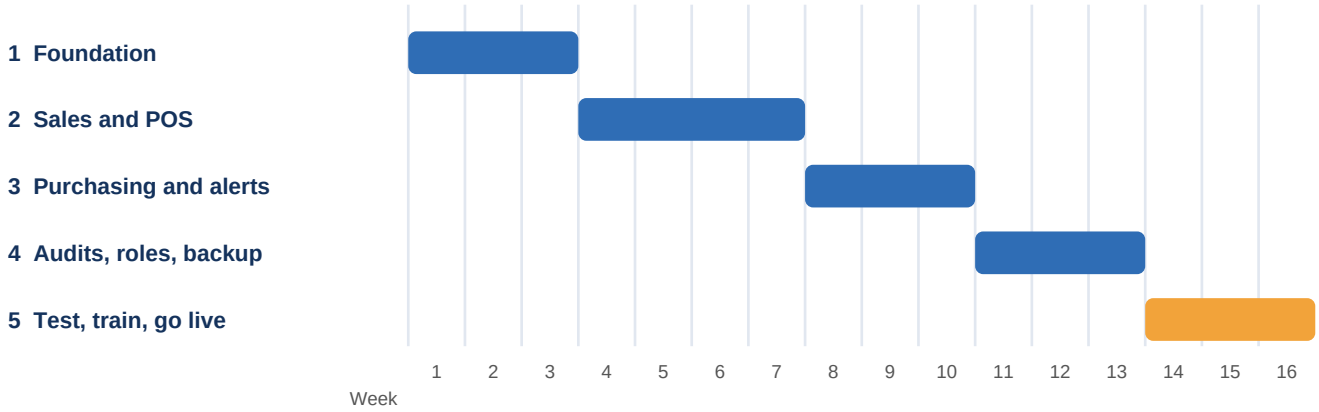


Figure 7. Phased schedule

Phase	Deliverables	Done when
1. Foundation	Login, products, variants, barcodes, opening stock, stock overview, item history	All current items are loaded and stock matches the shelves
2. Sales and POS	Counter screen, bills, payments, returns, receipts, customers, daily sales report	Shop runs billing on the system for one full week
3. Purchasing and alerts	Suppliers, purchase orders, receiving, average cost, low stock alerts, reorder list	First purchase cycle completed end to end
4. Audits, roles, backup	Adjustments, transfers, stock counts, roles, audit log, nightly backup, full reports	First full stock count approved with variance below target
5. Test, train, go live	Testing, data clean-up, staff training, printed quick guide, support plan	Old method is switched off

14. Testing and go-live plan

Testing

- Unit tests for formulas (average cost, stock on hand, margin).
- Scenario tests: sale then return, partial receipt, transfer in and out, negative stock block, count with variance.
- Load test: 5 counters billing at the same time.
- Role tests: every role tried against every screen.
- Backup and restore drill.

Go-live checklist

Step	Detail	Owner
Clean item list	Remove duplicates, fix names, assign SKUs and units	Manager
Print barcodes	Label items that have no barcode	Staff
Physical count	Count everything once. This becomes opening stock	Owner and staff
Import	Load products, suppliers, customers, opening stock	Developer
Parallel run	Bill on paper and on system for 3 to 7 days, compare totals	Manager
Train	Cashier, manager and owner sessions	Developer
Switch	Stop the old method, keep it for reference for one month	Owner

15. Risks and future enhancements

Risk	Impact	Mitigation
Staff skip entering receipts or adjustments	Stock drifts from reality	Make receiving the only way to add stock, run monthly cycle counts
Poor item data (duplicates, no barcodes)	Slow billing, wrong reports	Clean-up before import, duplicate checks, label printing
Internet or power failure	Counter stops	Offline mode, battery backup for the counter
Wrong prices entered	Losses	Below-cost warning, price change log, approval rule
Data loss	Business interruption	Automatic backups, restore drills, off-site copy
Team resistance to change	Low adoption	Parallel run, short training, simple screens

Future enhancements

- Multi-branch with central catalogue and inter-branch transfers.
- Online catalogue and order-taking, with stock synced to the shop.
- Supplier portal and automatic purchase orders by email or WhatsApp.
- Demand forecasting for the school season (June and July) and exam season.
- Integration with accounting software and GST or tax filing exports.
- Customer loyalty points and bulk-order quotations for schools and offices.
- AI assistant: ask questions such as "which items will run out before next week?" (the prompt document supplied earlier plugs in here).

Next step
Confirm the shop size (counters, staff, branches), whether billing and tax invoices are needed from day one, and whether internet is reliable at the counter. These three answers decide the technology option in Section 3 and can shorten the roadmap.