User Requirement Specification Document

PREPARED FOR

GetFreshFood

SA4101 - Prof. Esther

PREPARED BY

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1 Briefing of Solution

GetFreshFood (GFF) is a supermarket that operates in a very traditional way, and its employees rely on extremely manual processes to manage their daily tasks. Detailed interviews with GFF's customers, branch managers, cashiers, promoters, and storemen provided our team with key insights into the challenges faced by the employees and users alike with the current GFF system.

These challenges include manual and repetitive tasks, including manual entry of product information during customer checkouts and customer refunds, manual generation of reports and handwriting of price tags, to data inaccuracies resulting from a lack of centralized product database and official communication workflow. The limitation of the current workflow also prevents real-time visibility to sales insights, only allowing tallying and reconciliation of sales figures to be done at the end of the day, further worsening efficiency and extending work hours. These problems with the internal system indirectly impact the customer's experience negatively, as it slows down checkouts and causes stock discrepancies.

Our proposed solution aims to address these challenges faced by GFF, while also introducing online services that will keep GFF competitive.

1.1 Goals and Objectives

Our primary objectives are as follows:

- To automate and streamline supermarket operations for improved efficiency.
- To eliminate manual and repetitive tasks across cashier, promoter, and storeman roles.
- To ensure data accuracy in product data, inventory, pricing, and sales transactions.
- To improve communication workflows among store employees through a formal request/approval system.
- Provide real-time dashboards and automated reports for faster consolidation of records.

- To enhance customer experience by enabling faster checkout, accurate pricing, and online shopping.

1.2 Scoping

1.2.1 In Scope

Our proposed solution will include the following features:

i. Centralized Product Information System

A centralized product information system will be implemented through a unified database for all product-related information, including pricing, stock levels (shelves and warehouse), and location. This information is synchronised throughout the whole system, ensuring that all information is consistent across cashier, storeman, promoter and branch manager's terminals.

ii. Digital Checkout (Barcode Scanning) and Digital Shelf Label Integration

The manual entry of product information during customer checkout will now be replaced with barcode-based scanning. This, coupled with the synchronized product information in the product database, makes the transactions more efficient and accurate. Past transaction records are also digitalized and allow for automatic receipt generation, simplified refunds and automatic end-of-day sales tallying and reconciliation.

Handwritten shelf labels are also now replaced with Digital E-ink labels, which automatically retrieve the latest product information from the centralized system, ensuring accuracy throughout. This also relieves the workload on promoters, who have to update each shelf label manually before.

iii. Approval Workflows

Approval workflow within our proposed solution eliminates the need for seeking approvals through informal communication channels such as WhatsApp or verbal communication. The approval workflow functionality ensures trackability within the system itself. Employees can send and approve requests for stock replenishment,

damaged goods, and expired goods collection. Email notifications will be received by the approving personnel, such as storeman and branch manager for approvals, while event logs will be generated for all relevant store activities, including stock withdrawals, damaged goods and exchanges, providing the branch manager better visibility and accountability.

iv. Real-Time Dashboards and Automated Reports

Real-time dashboard and automated reporting provide updated and targeted insights for all employees. For instance, a storeman will be able to view key insights related to low stock products on the dashboard in real time so that he can take actionable steps for such critical tasks. Employees such as the branch manager and cashiers will be able to generate reports with a click of a button, while sales information will also be automatically calculated and tallied by the system.

v. Online Shop and Home Delivery Website

Our solution will also include a website which allows customers to purchase products from GFF for online delivery or self-pickup. This product information will also be using synchronized data from the centralized product information system. Customers will also be able to use this website as a product shelf locator in physical stores if they have difficulties locating the product they want to purchase. This aims to improve the customer reach to the whole of Singapore, as well as enhance the customer experience in physical stores through value-added services.

1.2.2 Out of Scope

The following sections are not included in our proposed solution. These implementations can be considered for future reference to further enhance the capabilities of the proposed solution.

i. Supplier-Side System Integration

While our proposed solution automates and synchronizes product information and inventory details internally, the project will not cover direct supplier-side system integration. Storemen will have to update the warehouse stock count internally when the suppliers deliver the products that are approved by the branch manager.

ii. Dedicated Mobile Application for Online Shop

As GFF already has an existing domain for their website, our proposed solution builds upon this and extends the features to include an online shop and home delivery website. A dedicated mobile application will be more versatile in terms of features, such as in-app notifications.

iii. Human Resource Allocation and Training for the Web Platform

The management of the online platform would require a considerable amount of dedicated manpower, such as web administrators and deliverymen. These would also require a training programme for the staff assigned. These manpower allocation and training needs to be internally discussed within the GFF management executives.

iv. Vouchers and Loyalty programmes

Vouchers and loyalty programmes, such as a points exchange system and exclusive discounts, are commonplace in other E-Commerce and supermarket applications. These are features that can be explored in further iterations of the online platform.

2 User Persona

Anna is a cashier at GFF who values efficiency and accuracy. Her role highlights the challenges in the current system, such as manual checkout, end-of-day sales reconciliation and the need for a new intuitive system.

Anna

Cashier

INFO

"I just want the checkout to run smoothly without mistakes piling up so that I can end my day on time."

Anna is a cashier at GetFreshFood. Her daily routine involves recording quantities and prices of items bought by customers, processing payments, managing refunds and providing receipts.

At the end of the day, she is also directly involved in tallying up and reconciling daily sales with the branch manager.

Although diligent in her work, the current manual system slows her down and often causes errors in her day to day work.

Anna values efficiency and accuracy in her work, and hopes for improvements that can reduce human error and improve customer experience.

METRICS

Experience	●●●●●
Customer Interaction	●●●●○
Patience	●●●○○
Adaptabiliy	●●●○○
Accuracy	●●○○○

PRIMARY USE

- Scan and record products purchased by customers during checkout.
- Collect payments through cash or digital methods and provide receipts.
- Tally end-of-day sales records and reconcile with actual cash on hand.
- Handle refunds, exchanges, or damaged goods from the customer front.

FRUSTRATIONS & PAIN POINTS

- Manual entry of item prices and quantities often leads to errors and slows down checkout.
- End-of-day tallying is time-consuming, inaccurate, and creates disputes with the branch manager.
- Confusion arises when prices on item labels and product forms do not match.
- Refunds and exchanges require retyping receipts, making the process repetitive and frustrating.
- Discrepancies in sales can only be corrected after closing, which delays resolution and extends working hours.

GOALS

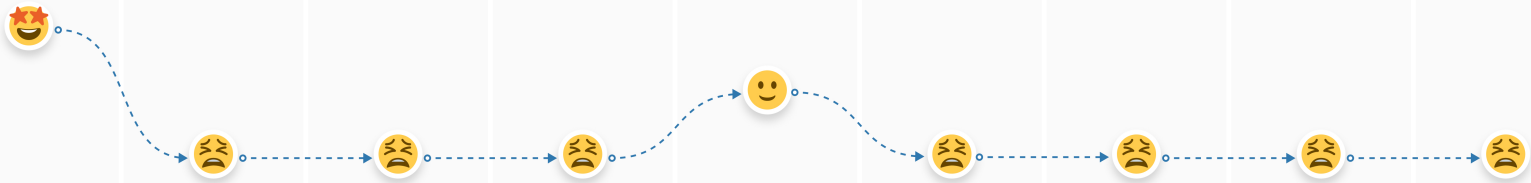
- Complete transactions quickly and accurately.
- Complete end-of-day sales reconciliation quickly and accurately.
- Work with up-to-date product prices to reduce confusion and mistakes.
- Process refunds and exchanges quickly so customers remain satisfied.

INFLUENCERS

- Simple and intuitive system for entering prices and quantities during checkout.
- Automatic tallying of prices and quantities for end of day report.
- Consistent prices on label and on the product form.
- Reduce retyping of receipts during refunds and exchanges.

3 Customer Journey Map

We have mapped Anna's journey map into four stages, which helps us to capture her daily activities and challenges. This helps us identify pain points in manual processes and highlight opportunities for improvement to enhance efficiency, accuracy and overall job satisfaction.

Stages of Journey	Start of Shift		Handles Customer at checkout				Handles Customer After Sale	Consolidates End-of-day sales	
Activities	Prepares for the shift, checks workstation	Receives and reads product form from branch manager	Cross-checks prices on product label and product form	Records quantity and prices of products bought	Tallies total price of items bought	Receives Payment and Prints Receipt	Processes return of products previously bought	Tallies daily sales and quantity	Reconciles and report daily sales to branch manager
Feelings Very Happy Overall Satisfied Unhappy									
Experiences	• Excited and eager to start the day serving customers.	• Received the printed product form and checked the product prices. • Confused that she is not able to clearly identify the updated prices on the product form.	• Annoyed with the price inconsistencies in the product form vs product label. • Irritated with the frequent need to cross check the product form and labels. • Forced to rely on prices from product label to save time, risking inconsistencies in daily sales record.	• Frustrated that she needs to enter each product quantity and price manually in the system, which could result in many errors. • Exhausted due to the long hours and eye strain resulting from manual entry.	• Relieved that the total price for items bought for each customer is automatically summed up.	• Frustrated when credit card payment fails sometimes. • Counts and returns the change correctly. • Displeased that she has to print an extra receipt for end of day tallying.	• Stressed when customers add/ remove items after printing the final bill as she has to redo the entire item list and tallying of the bill, creating long queues. • Displeased that she has to print a new receipt and wait for the end of the day for reconciliation of sales for the refunded transaction.	• Worn out by the repetitive process of manually going through each receipts to calculate daily prices and quantity. • Frustrated at the large amount of time required to manually check for errors in calculation.	• Worried about getting blamed by branch manager if there is an error in tallying. • Frustrated when sales number do not add up, leading long reconciliation time and overtime work. • Overwhelmed by the manual re-tracing of every customer transaction.
Expectations	• Smooth working day with accuracy in quantity and prices recorded. • Able to serve the customers well.	• A digital or clearly highlighted product form that real-time updates.	• Accurate/Synchronised product database to record and retrieve accurate product prices.	• A barcode-based system for fast and accurate entry of product quantities and prices	• Automatic summing up of customer's payment amount.	• Quick and accurate payment process with proper receipt given to the customer.	• Expects a system that can manage addition and removal of items while preserving the existing items list. • Ability to retrieve past transactions and correct items refunded/returned for accurate end of day sales tallying.	• Automatic tallying of end of day sales numbers, which includes daily quantity and prices. • Efficient and accurate system for tallying sales.	• Expects a system that can automatically reconcile and share a accountability log.

4 User stories

After analysing the interviews and use cases provided by GetFreshFood, we were able to identify key user stories for the GetFreshFood supermarket automation system. These capture the needs and expectations of different stakeholders, including customers, cashiers, store managers and store assistants. They describe the essential interactions users will have with the system and the business value each feature brings.

By documenting these stories, we ensure that the system supports smooth supermarket operations such as product browsing, price visibility, stock monitoring, replenishment and checkout.

The following section outlines the key user stories that define the automation process, ensuring efficiency in store management and an enhanced shopping experience for customers.

No	Category	Information Source	User story
1	Transaction	User Persona > Painpoints: Manual entry of item prices and quantities often leads to errors and slows down checkout.	As a cashier, I would like to add item prices and quantities to transactions automatically by scanning product barcodes so that I can process transactions quickly and accurately.
2	Return/Refund	User Persona > Painpoints: Refunds and exchanges require retyping receipts, making the process repetitive and frustrating.	As a cashier, I would like to maintain past transaction records so that I can process refunds and exchanges without re-entering the entire sale.

No	Category	Information Source	User story
3	End-of-day report	User Persona > Painpoints: End-of-day tallying is time-consuming, inaccurate, and creates disputes with the branch manager.	As a cashier, I would like to generate automatic end-of-day sales reports consisting of total sales and quantity of items sold so that I can provide accurate figures to the branch manager and close my shift without extra manual work.
4	Stock Count	Interview Minutes > Problems managing inventory due to manual process (Store cards, SKU, etc). (Uses stock cards, time-consuming, error-prone.)	As a storeman, I would like to receive real-time notification alerts when stock falls below a threshold so that I can place supplier orders before products run out.
5	Stock Count	Interview Minutes > Problems managing inventory due to manual process (Store cards, SKU, etc). (Uses stock cards, time-consuming, error-prone.)	As a storeman, I would like to maintain stock levels in real time so that customers can get updated stock availability from promoters and cashiers.
6	Handling damaged or expired goods	Interview Minutes > Problems in handling expired or damaged items.	As a promoter, I would like to submit a request for the collection of damaged or expired items to the storeman so that I can ensure the stock quantity of goods is accurately updated.
7	Product Replenishment	Interview Minutes > Requesting product replenishment	As a promoter, I would like to request product replenishment so that I can ensure the products are stocked and avoid disruption in sales.

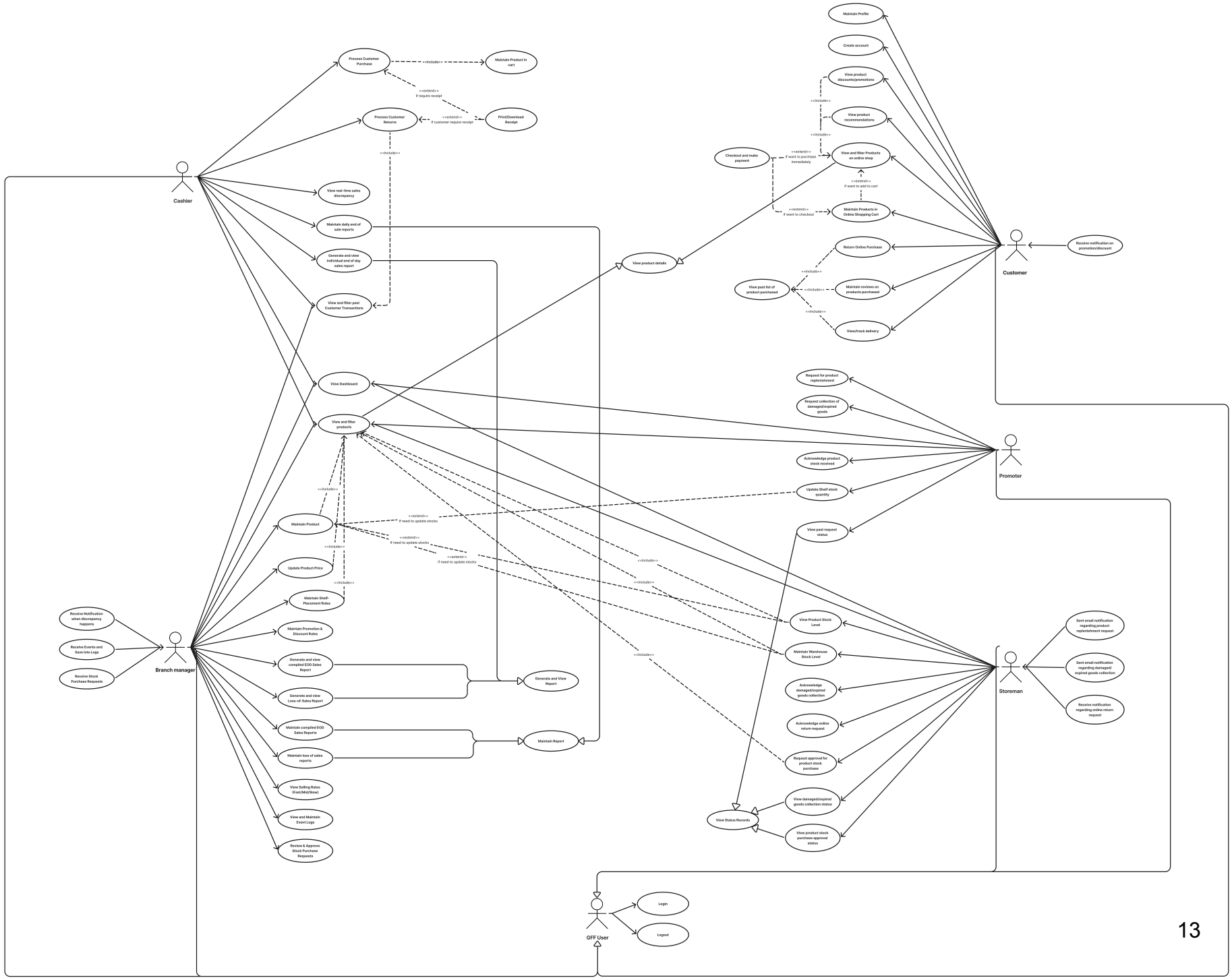
No	Category	Information Source	User story
8	Online Shopping & delivery	Interview Minutes > Painpoints: Long checkout queues at the store.	As a customer, I would like to browse and purchase products online so that I can conveniently shop without needing to visit a physical store.
9	Internal communication	Interview Minutes > To improve communications among the storemen, promoter and cashier	As a Branch Manager, I would like to access a real-time dashboard with key metrics such as sales performance, trends, and alerts so that I can quickly identify issues and take immediate action.
10	Weekly report	Interview Minutes > The branch manager needs to create reports daily and weekly using Excel. This process is time-consuming.	As a Branch Manager, I would like to automatically generate the loss of sales report, so that I can save time and provide accurate information to the owner.

5 Use Case Model

The use case model for the GetFreshFood supermarket automation system is designed to capture the interactions between different user roles and the system, ensuring that their operational needs are fully supported. These actors include customers, cashiers, branch managers, promoters, and storemen. All of these rely on the system to carry out essential daily activities.

The use case model describes how users interact with the system to perform tasks such as processing transactions, updating product and pricing information, managing stock levels, requesting replenishments, generating reports, and shopping online. By documenting these interactions, these use cases provide a clear and structured view of how the system supports end-to-end supermarket operations. This approach ensures that all critical workflows are captured, inefficiencies in manual processes are addressed, and the system delivers intuitive value such as improved accuracy, faster processing, and better communication between staff.

[User case model shown on next page]


Cashier
Process Customer Purchase
<<include>>
Maintain Product in cart
<<extend>>
If require receipt
Process Customer Returns
<<extend>>
If customer require receipt
Print/Download Receipt
<<include>>
View real-time sales discrepancy
Maintain daily end of sale reports
Generate and view individual end of day sales report
View and filter past Customer Transactions
View Dashboard
View and filter products
Maintain Product
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If need to update stocks
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Update Product Price
<<include>>
Maintain Shelf-Placement Rules
Maintain Promotion & Discount Rules
Generate and view compiled EOD Sales Report
Generate and view Loss-of-Sales Report
Maintain compiled EOD Sales Reports
Maintain loss of sales reports
View Selling Rates (Fast/Mid/Slow)
View and Maintain Event Logs
Review & Approve Stock Purchase Requests
Generate and View Report
Maintain Report
Receive Notification when discrepancy happens
Receive Events and Save into Logs
Receive Stock Purchase Requests
Branch manager
View product details
Maintain Profile
Create account
View product discounts/promotions
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Checkout and make payment
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If want to purchase immediately
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Return Online Purchase
View past list of product purchased
Maintain reviews on products purchased
View/track delivery
Receive notification on promotion/discount
Customer
Request for product replenishment
Request collection of damaged/expired goods
Acknowledge product stock received
Update Shelf stock quantity
View past request status
Promoter
View Product Stock Level
Maintain Warehouse Stock Level
Acknowledge damaged/expired goods collection
Acknowledge online return request
Request approval for product stock purchase
View damaged/expired goods collection status
View product stock purchase approval status
Sent email notification regarding product replenishment request
Sent email notification regarding damaged/ expired goods collection
Receive notification regarding online return request
Storeman
View Status Records
GFF User
Login
Logout

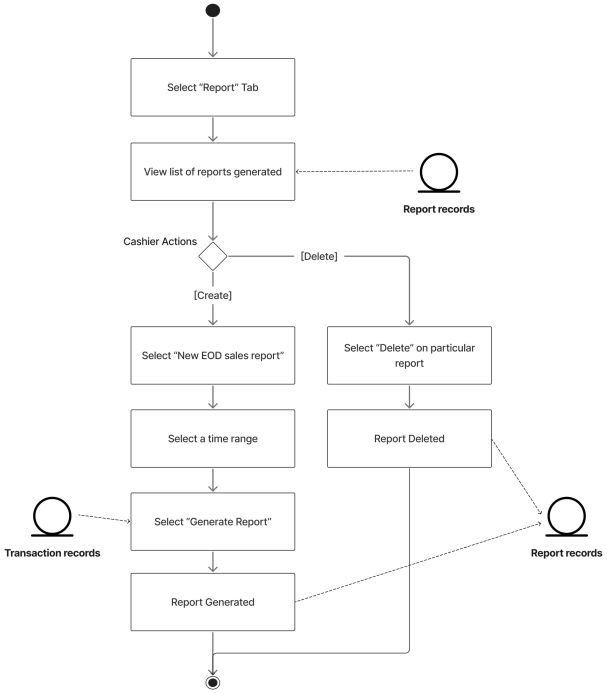
6 Functional Requirement

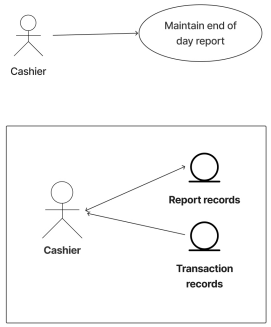
6.1 Activity Diagram

The activity diagrams present the functional workflows of our proposed system from the perspectives of different user roles, showing how each role accomplishes its daily tasks in an automated way. We selected some representative use cases to demonstrate parts of our system's functionalities: cashier handling purchases, returns, and daily reports; branch manager maintaining product information; storeman updating warehouse stock levels; promoter viewing product details; and customer completing checkout and payment.

Activity Flow for use case model

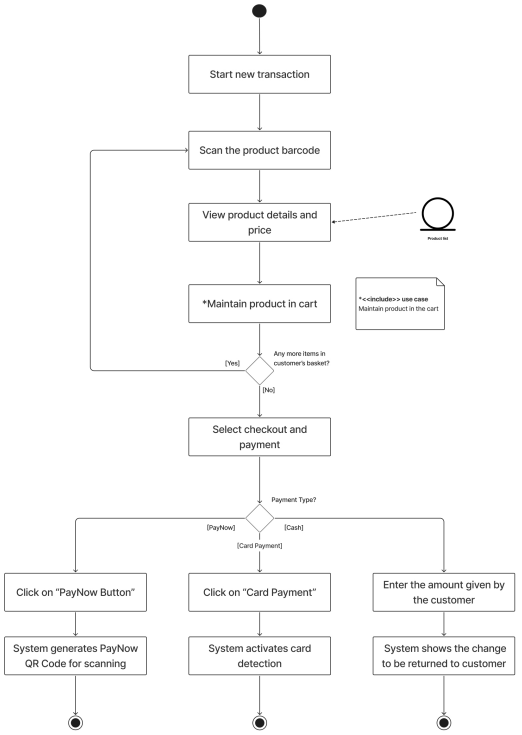
Cashier: Maintain daily end of day sales report

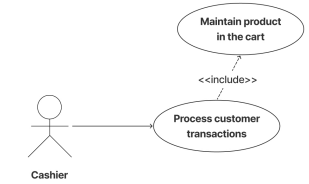


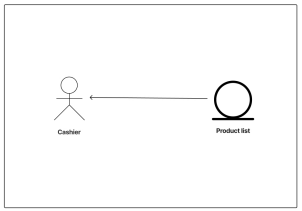


Activity Flow for use case model

Cashier: Process customer transaction

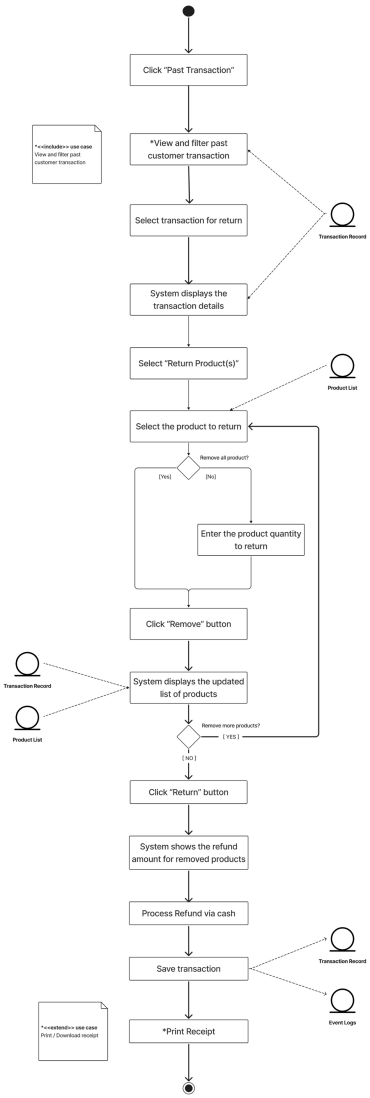


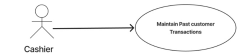


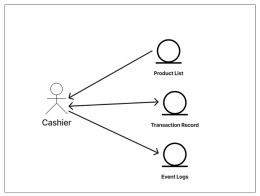


Activity Flow for use case model

Cashier: Process Customer Returns

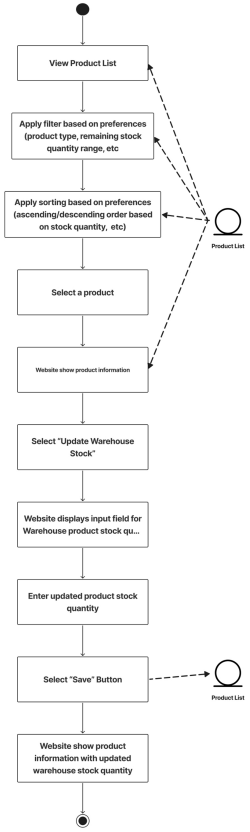


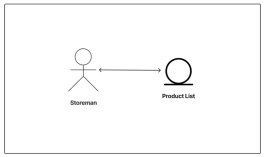




Activity Flow for use case model

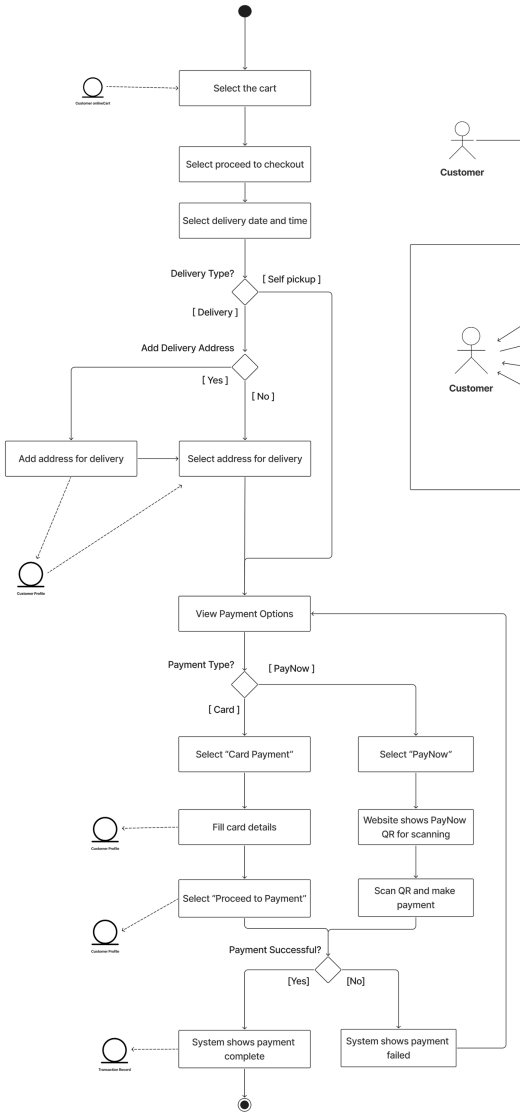
Storeman: Maintain Warehouse Stock Level

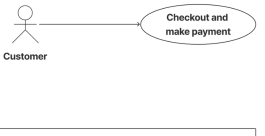


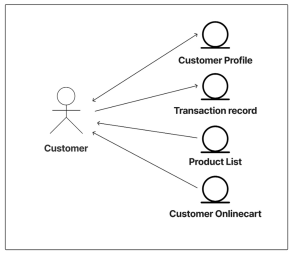


Activity Flow for use case model

Customer: Wants to checkout and make payment

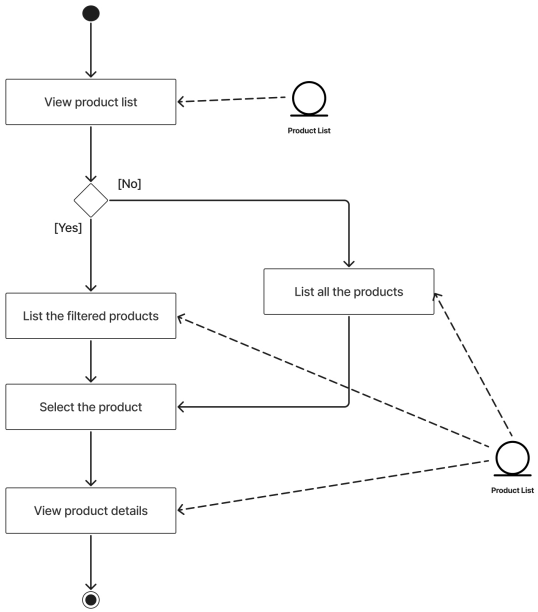


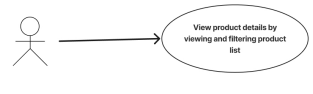


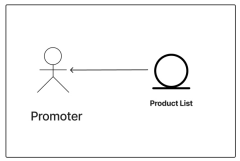


Activity Flow for use case model

Promoter: View and filter product list

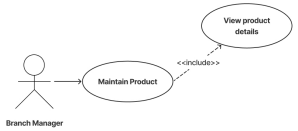


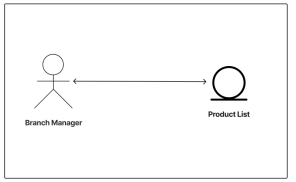


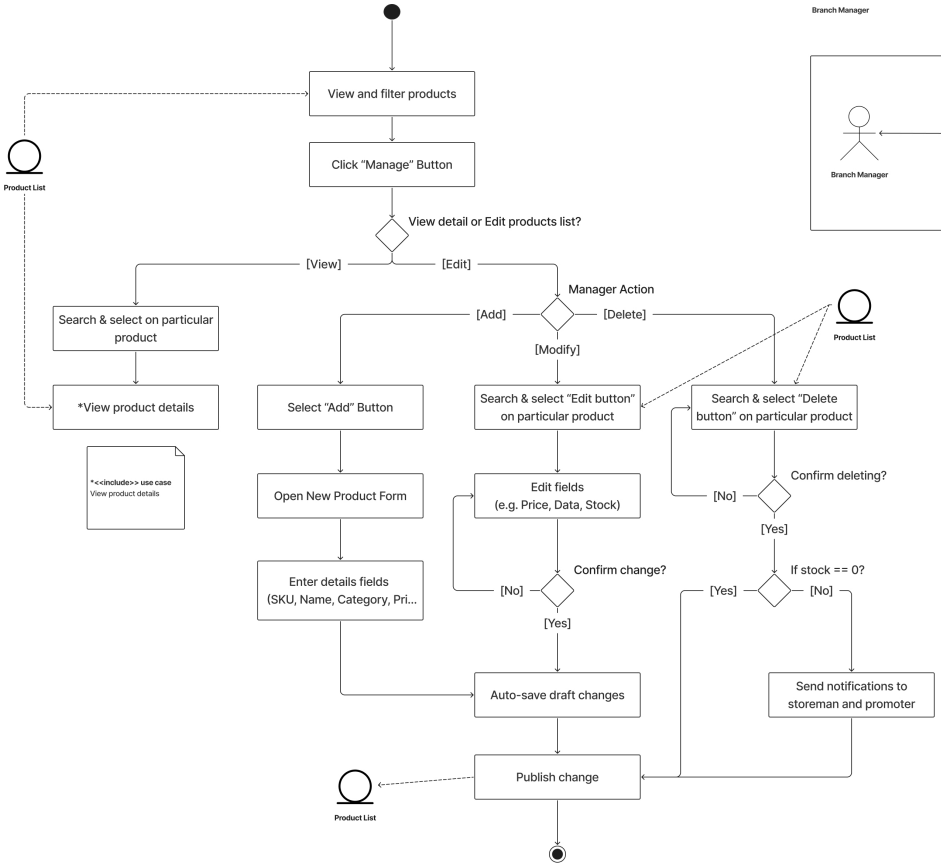


Activity Flow for use case model

Branch Manager: Maintain Product

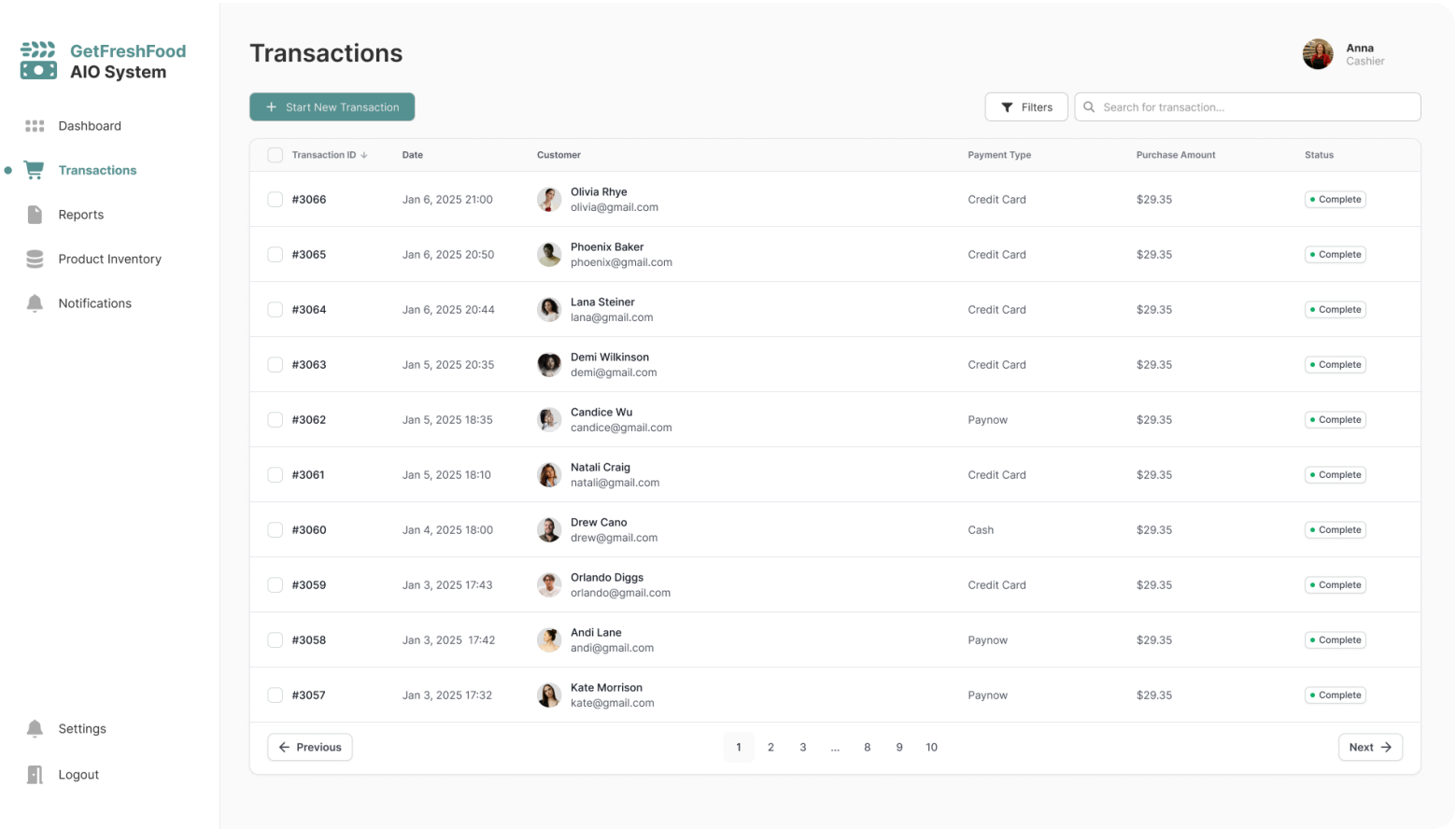




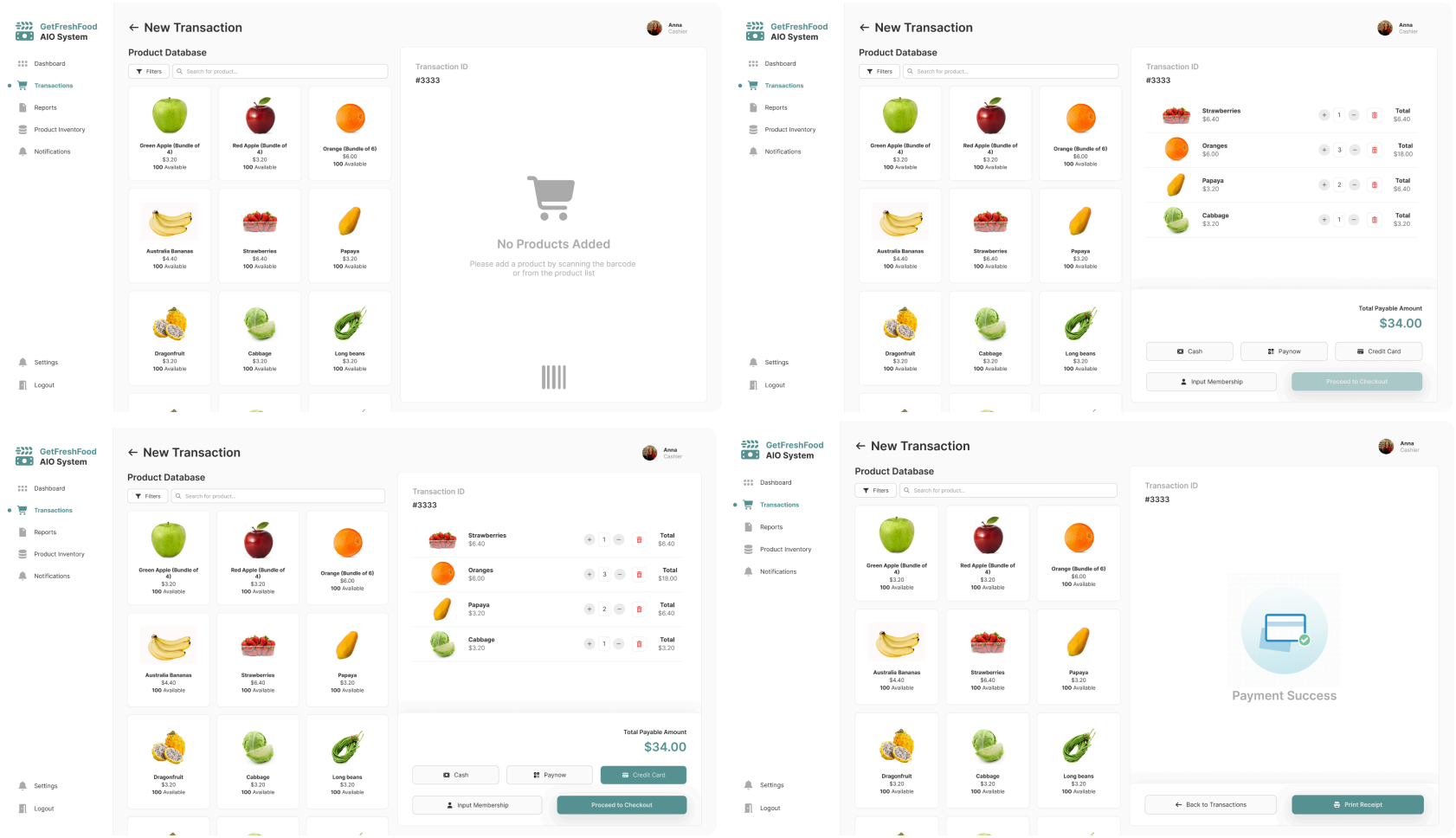


6.2 Screen/Print out design

The following screen demonstrates how our proposed system supports daily cashier operations through a new intuitive interface. Shown below is the new transaction page. Cashiers can search, filter and maintain past transactions to handle refunds, returns or exchanges from past transactions, or start a new transaction for checkout.



The following user interfaces show the activities of a use case: Start A New Transaction. Cashiers can easily initiate a new transaction, maintain the cart by scanning product barcodes or selecting products from the product list, and manage payment methods for in-store customers in a streamlined system.



7 Non-Functional Requirement

As part of our proposed solution for GetFreshFood, we have defined the six key non-functional requirements which provide a foundation for designing a system with improved performance, reliability and security.

7.1 User Volume Table

The user volume table outlines the key user groups, their locations, usage patterns, and specific operational contexts, which provides critical input for system capacity planning and also supports the target user groups at the required locations.

User Group	Country/Location/Count	Remarks
Branch Manager	Singapore/ GetFreshFood/ 1	The branch manager needs to use the systems every day in the store; they are not store-bound, so they should be able to use the systems from home locations.
Cashier	Singapore/ GetFreshFood/ 6 (3 per shift)	Use the system continuously throughout the day. Stationed at checkout counters.
Storemen	Singapore/ GetFreshFood/ Warehouse & Shop floor/ 4 (2 per shift)	Primarily, the storeman uses the system in the warehouse and sometimes from the shop floor when delivering goods or picking expired/damaged products.
Promoter	Singapore/ GetFreshFood/ 20 (10 per shift)	Uses the system every day on the shop floor.
Customer	Singapore/ Online/ (50-100 daily)	Uses the system indirectly during checkout in the shop. Uses the system online to order products for self-pickup or delivery.

7.2 Business Transaction Volume Table

The Business Transaction Volume Table outlines the expected transaction throughput handled by the users, including normal and peak activity levels for each use case. These data guide key system design decisions around performance, scalability, and fault tolerance, ensuring the solution remains responsive and resilient even under heavy load.

Biz Transaction (use Case)	**Business Criticality**	**No of user**	**Transaction information**	**Concurrent Important Activities**
Process Customer Purchase	Critical	Cashiers: 6 (3/shift)	**Normal:** 800–1000 / day; **Peak:** 1600-2000 / day; **Long-term**: ×2–5 with store expansion	**Normal**: 20-30 / hr / counter; **Peak**: 60-80 / hr / counter;
Process Customer Returns	Critical	Cashiers: 6; Manager: 1	**Normal**: 5-10 / day; **Peak**: ~15 / day	1-2 / hr / counter
Maintain Product in cart	Critical	Cashiers: 6	**Normal:** 800–1000 / day; **Peak:** 1600-2000 / day; **Long-term**: ×2–5 with store expansion	**Normal**: 20-30 / hr / counter; **Peak**: 60-80 / hr / counter;
Print/ Download Receipt	Critical	Cashiers: 6	0.7 * volume of **Process Customer Purchase**	

Biz Transaction (use Case)	**Business Criticality**	**No of user**	**Transaction information**	**Concurrent Important Activities**
View real-time sales discrepancy	Moderate	Cashiers: 6	0-1 / cashier / day	
Generate and view individual end-of-day sales reports	Critical	Cashiers: 6	6–12 / day	**Peak:** 3 / hr
Maintain daily end-of-day sales reports	Moderate	Cashiers: 6	~3 / day	
View and filter past Customer Transactions	Critical	Cashiers: 6	**Normal**: ~60 / week;	
View Dashboard	Moderate	Manager: 1; Cashiers: 6; Storemen: 4; Promoters: 20;	100 refreshes / day	
View and filter products	Critical	Cashiers: 6; Storemen: 4; Promoters: 20;	1500–2000 lookups / day	**Peak**: 400–600 / hr (18:00–20:00)
Maintain Product	Critical	Manager: 1	**Normal**: 15-30 edits / week	**Peak:** 15-30 edits / hr (7:00-8:00)
Update Product Price	Critical	Manager: 1	**Normal**: 15-30 edits / week	**Peak:** 15-30 edits/ hr (7:00-8:00)

Biz Transaction (use Case)	**Business Criticality**	**No of user**	**Transaction information**	**Concurrent Important Activities**
Maintain Shelf-Placement Rules	Moderate	Manager: 1	~5 updates / month;	
Maintain Promotion & Discount Rules	Moderate	Manager: 1	1–2 / week;	**Peak:** 1-2 edits / hr
Generate and view Loss-of-Sales Report	Moderate	Manager: 1	0-1 report / day	
Generate and view compiled end-of-day Sales Report	Critical	Manager: 1	1–2 / day	**Peak hour**: ~22:30
View Selling Rates (Fast/Mid/Slow)	Moderate	Manager: 1	1-3 sessions / week	
View and Maintain Event Logs	Critical	Manager: 1	10–30 queries / day	
Review & Approve Stock Purchase Requests	Moderate	Manager: 1	4-8 approvals / day	
Create account	Critical	Customers: 3k	**Normal**: 15–30 sign-ups / day; **Peak**: ~50 / day	

Biz Transaction (use Case)	**Business Criticality**	**No of user**	**Transaction information**	**Concurrent Important Activities**
Maintain profile	Moderate	Customers: 3k	100 / month	
View product discounts/promotions	Critical	Customers: 3k	**Page views**: 1500 views / day	
View product recommendations	Moderate	Customers: 3k	**Page views**: 1500 views / day	
Checkout and make payment	Critical	Customers: 3k	~100 orders / day	**Peak: ~**20 / hr
View and filter Products on online shop	Critical	Customers: 3k	2000 views / day	
Maintain Products in Online Shopping Cart	Critical	Customers: 3k	3–5 cart actions / user / week	
Return Online Purchase	Critical	Customers: 3k	~30 / week	**Peak**: ~10 / day
View past list of product purchased	Moderate	Customers: 3k	1-3 / user / week	
Maintain reviews on products purchased	Low	Customers: 3k	30-40 reviews / week;	**Peak**: 15-30 / day

Biz Transaction (use Case)	**Business Criticality**	**No of user**	**Transaction information**	**Concurrent Important Activities**
View/ track delivery	Moderate	Customers: 3k	100-150 / day	
Request for product replenishment	Critical	Promoters: 20	**Normal**: ~3 requests / promoter / day; **Peak**: 5-10 / promoter / day	**Peak:** ~3 / promoter / hr (7:00-8:00)
Request collection of damaged/expired goods	Moderate	Promoters: 20	1-3 / promoter / day	**Peak:** 1-3 / promoter / hr (7:00-8:00)
Acknowledge product stock received	Moderate	Promoter: 20	**Normal**: ~3 requests / promoter / day; **Peak**: 5-10 / promoter / day	**Peak:** ~3 / promoter / hr (7:00-8:00)
Update Shelf stock quantity	Critical	Promoters: 20	**Normal**: 5 / week	
View past request status	Moderate	Promoters: 20	~6 / promoter / day	
View Product Stock Level	Critical	Storemen: 4	~3 / storeman / hr	
Maintain Warehouse Stock Level	Critical	Storemen: 4	120–150 records / week	

Biz Transaction (use Case)	**Business Criticality**	**No of user**	**Transaction information**	**Concurrent Important Activities**
Acknowledge damaged/expired goods collection	Moderate	Storemen: 4	5–15 / storeman / day	
Request approval for product stock purchase	Moderate	Storemen: 4	4-8 requests / day	
View damaged/expired goods collection status	Moderate	Storemen: 4	5–15 / storeman / day	
View product stock purchase approval status	Moderate	Storemen: 4	4-8 / day	
Login / Logout	Critical	All Staff: 31 Customers: 3k	60-80 sessions / day for staff 50 / day for customers	

7.3 Data Volume Table

The Data Volume Table provides a detailed overview of key data entities, their origin, retention policies, and projected volume over time. By analyzing the source documents, retention periods, and target volumes, we can anticipate storage requirements and ensure the system remains responsive under growing demand.

Data (Entity class)/ User (Actor)	**Source Document**	**Retention Period**	**Target Volume**
Product list	Product Form	3 years For trend analysis, so that we can identify product categories that are trending for certain time periods and recommend them to customers.	3 years x 365 days = 1095 product forms Each product form consists of ~200 products.
Customer Profile	Customer Info	Keep all records of customer profiles who have shopped in GFF within a 1-year time frame.	-
Transaction Record	Receipt	2 years For trend analysis, so that we can identify product categories that each customer is interested in and recommend them similar products.	2 years x 365 days x (1000 in store + 100 online) transactions = 803,000 records
Report Record	Report files	3 years	3 years x 365 days = 1095 reports

Data (Entity class)/ User (Actor)	**Source Document**	**Retention Period**	**Target Volume**
Customer Online Cart	No source document - New online delivery system	Keep all cart records of customers who have shopped in GFF within a 1-year time frame.	Maximum latest 300 unique product listings for each customer.
Event Logs	No source document - New history/accountability logging feature	1 year	1 year x 365 days x 50 internal events = 18,250 events
Store Return Record	Receipt	1 year	1 year x 365 days x 10 returns = 3650 records
Online Return Record	No source document - New online delivery system	Keep all online return records of customers who have shopped in GFF online within a 1-year time frame.	Maximum latest 50 records for each customer.
Request Record	WhatsApp chat logs between promoters, storeman and branch manager	1 year	1 year x 365 days x 20 = 7300 records
Product Replenishment list	Product replenishment forms	1 year	1 year x 365 days x 10 = 3650 records
Damaged/expired product list	Damaged/expired product forms	1 year	1 year x 365 days x 10 = 3650 records

7.4 Security Requirement - From a data point of view

The Security Requirements from a data point of view outlines how different data entities must be protected based on the roles that interact with them. This table maps each data class to its associated user group and identifies the level of access and protection required. By analyzing data exposure across actors, we can implement targeted security controls that ensure confidentiality, integrity, and accountability throughout the system.

Data(Entity class)/ User(Actor)	**Cashier**	**Promoter**	**Storeman**	**Branch Manager**	**Customer**
Product list	r	r	r,u	c,r,u,d	r
Customer Profile	r			r	c,r,u,d
Transaction Record	c,r,u			r	r
Report Record	c,r,u,d			c,r,u,d	
Customer Online Cart					c,r,u,d
Event Logs				r,d	
Store Return Record	c,r,u,d				
Online Return Record					c,r,u,d

Data(Entity class)/ User(Actor)	Cashier	Promoter	Storeman	Branch Manager	Customer
Request Record		c,r,u	c,r,u	r,u,d	
Product Replenishment list		c,r,u,d	c,r,u,d	r	
Damaged/expired product list		c,r,u,d	c,r,u,d	r	

7.5 Security Requirement - From the use case point of view

The Security Requirement from a use case point of view outlines how specific business activities must be protected based on the roles that perform them. By mapping each business transaction to its corresponding user group, this table identifies the security controls needed to ensure proper access, accountability, and data protection. It highlights where risks are highest and where safeguards such as authentication and role-based permissions must be enforced.

Biz Transaction (use Case) \ User Role (actor)	Cashier	Promoter	Storeman	Branch Manager	Customer
Process Customer Purchase	X (Main User)				
Process Customer Returns	X (Main User)				

Biz Transaction (use Case) \ User Role (actor)	**Cashier**	**Promoter**	**Storeman**	**Branch Manager**	**Customer**
Maintain Product in cart	X (Main User)				
Print/Download Receipt	X (Main User)				
View real-time sales discrepancy	X (Main User)				
Maintain daily end-of-day sale reports	X (Main User)				
Generate and view individual end-of-day sales reports	X (Main User)				
View and filter past Customer Transactions	X (Main User)				
View Dashboard	x	x	x	X (Main User) The highest ranking, and needs to view critical information in real time.	

Biz Transaction (use Case) \ User Role (actor)	**Cashier**	**Promoter**	**Storeman**	**Branch Manager**	**Customer**
View and filter products	x	X (Main User) Promoter uses the product list the most to check product locations, stocks, information (for customer enquiries), etc.	x	x	
Maintain Product				X (Main User)	
Update Product Price				X (Main User)	
Maintain Shelf-Placement Rules				X (Main User)	
Maintain Promotion & Discount Rules				X (Main User)	
Generate and view Loss-of-Sales Report				X (Main User)	
Generate and view compiled end-of-day Sales Report				X (Main User)	
View Selling Rates (Fast/Mid/Slow)				X (Main User)	

Biz Transaction (use Case) \ User Role (actor)	**Cashier**	**Promoter**	**Storeman**	**Branch Manager**	**Customer**
View and Maintain Event Logs				X (Main User)	
Review & Approve Stock Purchase Requests				X (Main User)	
Create account					X (Main User)
Maintain profile					X (Main User)
View product discounts/promotions					X (Main User)
View product recommendations					X (Main User)
Checkout and make payment					X (Main User)
View and filter Products on online shop					X (Main User)
Maintain Products in Online Shopping Cart					X (Main User)
Return Online Purchase					X (Main User)

Biz Transaction (use Case) \ User Role (actor)	**Cashier**	**Promoter**	**Storeman**	**Branch Manager**	**Customer**
View past list of product purchased					X (Main User)
Maintain reviews on products purchased					X (Main User)
View/track delivery					X (Main User)
Request for product replenishment		X (Main User)			
Request collection of damaged/expire d goods		X (Main User)			
Acknowledge product stock received		X (Main User)			
Update Shelf stock quantity		X (Main User)			
View past request status		X (Main User)			
View Product Stock Level			X (Main User)		
Maintain Warehouse Stock Level			X (Main User)		

Biz Transaction (use Case) \ User Role (actor)	Cashier	Promoter	Storeman	Branch Manager	Customer
Acknowledge damaged/expired goods collection			X (Main User)		
Acknowledge online return request			X (Main User)		
Request approval for product stock purchase			X (Main User)		
View damaged/expired goods collection status			X (Main User)		
View product stock purchase approval status			X (Main User)		
Login/Logout	x	x	x	x	x

Remarks for Login/Logout: All users need to log in and log out of the system. Customers have the highest number of users, but the branch manager is the highest ranking internally.

7.6 Reliability Requirement

This section outlines the Reliability Requirements for both internal and external systems, including defined operation windows, acceptable downtime thresholds, and recovery expectations in the event of hardware failure or disaster. These data ensure

that GFF's digital infrastructure remains resilient, responsive, and aligned with the pace of retail operations.

7.6.1 System Availability Requirement

Operation Time:

Category	Operation Time
Internal System	5 am to 12 midnight, Monday to Sunday
Online Users	24/7, Monday to Sunday

Downtime Limits:

- Maximum duration per incident: 10 minutes
- Maximum frequency per day: 2 times
- Maximum frequency per month: 6 times

7.6.2 Hardware failure (servers, network)

- Recovery duration: No more than 1 hour

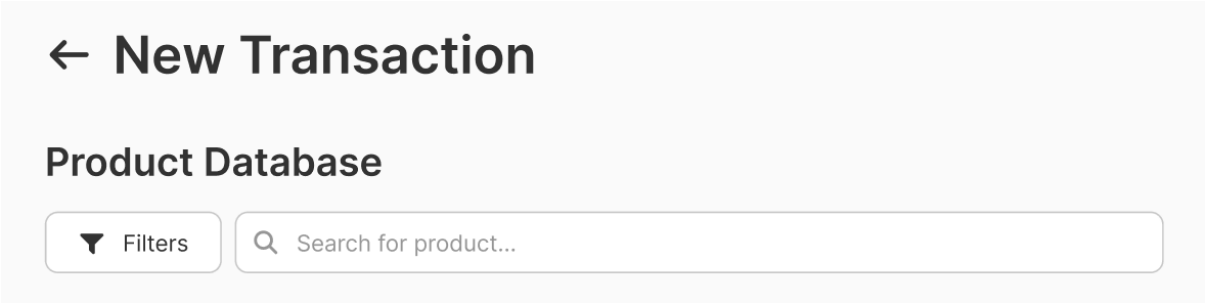
7.6.3 Disaster Recovery

- Maximum downtime: 24 hours
- Data currency: one day back

8 Test cases and Test data

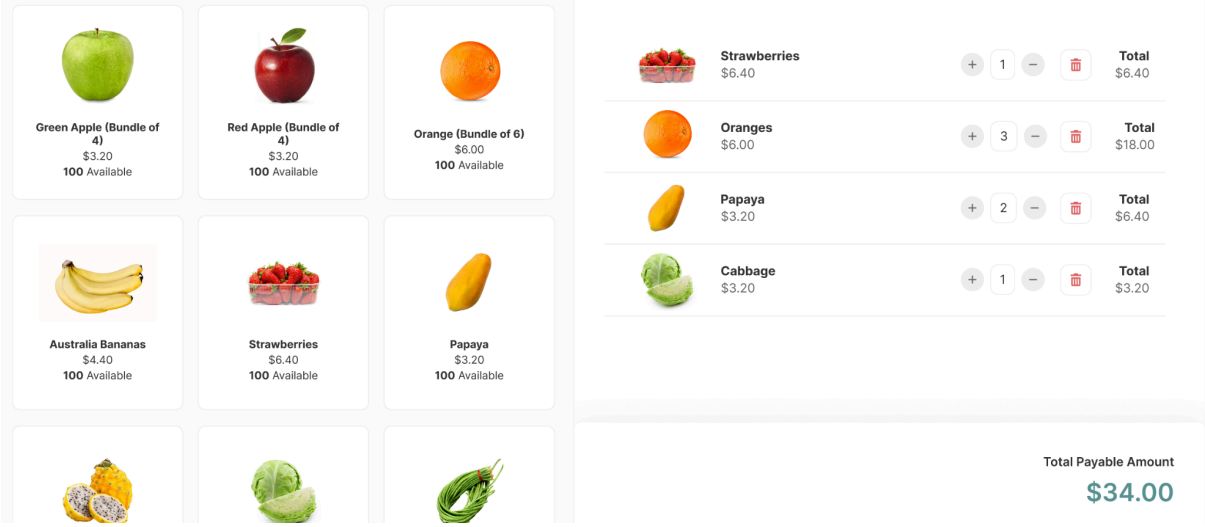
In the context of GFF Supermarket's cashier checkout system, the ability to reliably start a new transaction is a foundational use case that directly impacts customer experience and operational flow. To ensure this function performs consistently under various conditions, we have developed a set of targeted test cases and test data scenarios.

8.1 Use Case: Start a new transaction



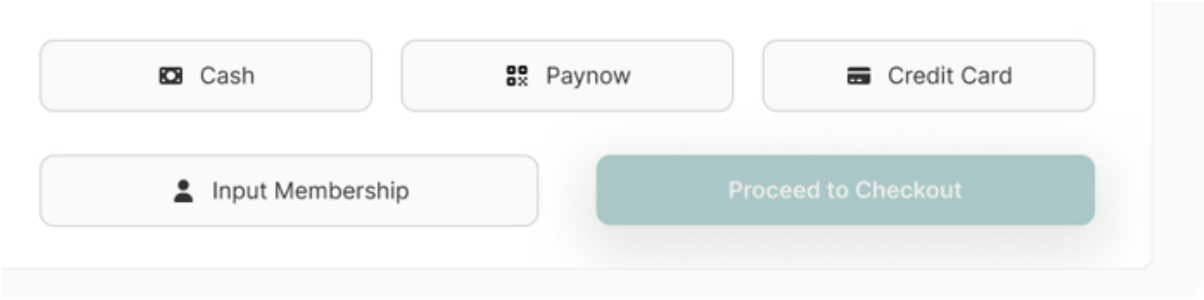
S No	Test Scenario	Expected Output
1	Enter the full product name of a product that is currently available in the product database.	The product should appear on the screen
2	Enter a keyword or the name of a product that is currently available in the product database.	The system should auto-suggest/display search results matching the entered letters
3	Enter the product code of a product that is currently available in the product database.	The product should appear on the screen
4	Enter characters that do not match any product	The system should display "No Product found"
5	Enter the product name in lowercase/ uppercase	The system should behave case-insensitively, and the product should appear on the screen
6	Enter a keyword of the product in	The system should display "Please

S No	Test Scenario	Expected Output
	the empty search bar	enter any product ”.
7	Click the <Filters> button	The system should show a list of product categories to select.
8	Click the back arrow when there are product/products added in the transaction	The system should show a warning message, “Do you want to cancel the transaction?” for user confirmation before exiting
9	Click the back arrow button when there is no product/products in the transaction	The system should navigate back to the dashboard without any warning message.



S No	Test Scenario	Expected Output
1	Click on the product listed on the recommendation screen that shows an available quantity greater than zero.	The selected product appears in the cart with the correct name, price, and quantity = 1 by default.
2	Click on the greyed-out product listed on the screen that shows an available quantity of zero.	The system should pop up “Product Out of Stock”.
3	Click on a product that is already present in the transaction	The selected product quantity should increase by one.
4	Scan the product barcode of a product that has not been scanned before.	The selected product appears in the cart with the correct name, price, and quantity = 1 by default.
5	Scan the product that is already present in the transaction.	The selected product quantity should increase by one.
6	Enter a positive number in the product quantity field in the cart.	The product quantity should increase by the given number
7	Enter a negative number in the quantity field.	The system should show “Invalid quantity”
8	Enter an alphabet in the quantity field.	The system should show “Invalid quantity”
9	Enter a quantity more than the available stock quantity.	The system should display a warning message, "Product quantity should not exceed current stock count”.
10	Click the add (+) button	The quantity of the product should increase by one.
11	Click the minus (-) button	The quantity of the product should decrease by one.
12	Click the minus(-) button when the quantity is 1	The product should be removed from the transaction

S No	Test Scenario	Expected Output
13	Click the ‘Delete’ button of a particular product	The product should be removed from the transaction
14	Verify the total product price for a particular product in the cart	The total product price should be calculated based on the quantity of the product multiplied by the product count.
15	Check the total payable amount when no product is added to the transaction	The total payable amount should be zero when no product is added to the transaction
16	Add single/multiple products to the transaction	The system should show the updated total payable amount, which is the sum of all total product prices.
17	Remove single/multiple products from the transaction	The system should show the updated total payable amount.
18	Check the total payable amount after deleting all the products from the transaction	The total payable amount should reduce to zero when all the products are removed from the transaction.



S No	Test Scenario	Expected Output
1	Verify payment options are disabled when the cart is empty	The system should grey out payment options

S No	Test Scenario	Expected Output
2	Click the cash button after adding products to the cart	“Proceed to checkout” button should get enabled
3	Click the “Proceed to Checkout” button after clicking the cash payment option	System navigates to the cash payment collection window
4	Click the Paynow button after adding products to the cart	“Proceed to checkout” button should get enabled
5	Click the “Proceed to Checkout” button after clicking paynow payment option	System navigates to paynow payment collection window
6	Click the credit card button after adding products to the cart	“Proceed to checkout” button should get enabled
7	Click the “Proceed to Checkout” button after clicking the Credit card payment option.	System navigates to the credit card payment collection window
8	Click the “Input Membership” button	The system should display a pop-up window for collecting customer membership details

Test Data

Product ID	Product Name	Product Category	Product Stock	Product Price
167489	Strawberries	Fruits	100	$6.40
167547	Green Apple (Bundle of 4)	Fruits	45	$3.20
167548	Red apple (Bundle of 4)	Fruits	100	$3.20
287678	Cabbage	Vegetables	60	$3.20