



# **Daffodil** *International* **University**

## **Assignment**

Course Code: CSE414

Course Title: Web Engineering

Assignment Topic: Supermarket and Convenience Store Inventory Management and Customer Experience

## **Submitted to**

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# Supermarket and Convenience Store Inventory and Customer Experience

## Abstract

The Supermarket and Convenience Store Inventory and Customer Experience project analyzes inventory management and customer satisfaction in both large-scale supermarkets and small convenience stores. By collecting data from store managers, cashiers, and customers, this study identifies key challenges and possible improvements in stock management, checkout speed, and online ordering. Supermarkets manage large inventories with automated systems, while convenience stores face frequent stock outs due to limited storage. Additionally, digital payments and self-checkout systems are becoming more common in both settings. The findings will help optimize inventory tracking, enhance customer satisfaction, and integrate modern technologies for better business efficiency.

## 1. Introduction

### 1.1 Overview of the Project

Supermarkets and convenience stores operate differently in terms of inventory scale, stock management, and customer service. Supermarkets handle a large variety of products with advanced tracking systems, while convenience stores operate with a limited stock range and manual restocking. Customers expect quick service in both settings, making checkout efficiency crucial. This project explores how both store types manage inventory and how digital solutions can improve their customer experience.

### 1.2 Purpose and Significance

- Compare inventory management between supermarkets and convenience stores.
- Enhance customer satisfaction through faster checkouts and better stock management.
- Understand the growing demand for digital shopping solutions and analyze the impact of digital payments and self-checkout on customer experience.

### 1.3 Intended Users and Stakeholders

- **Supermarket and Convenience Store Managers:** Handle inventory tracking and supplier coordination.
- **Cashiers:** Manage checkout transactions and customer interactions.
- **Customers:** Experience the effects of stock availability and checkout efficiency.

## 2. Data Collection Process (Emphasized Section)

### 2.1 Methods Used

- **Interviews:** Conducted with store managers to understand inventory challenges.
- **Surveys:** Distributed to customers to gather feedback on shopping experience.

### 2.2 Target Audience

- **Store Managers (Supermarket & Convenience Store):** Insight into stock replenishment and supplier issues.
- **Cashiers:** Understanding transaction delays and customer complaints.
- **Customers:** Feedback on checkout wait times, product availability, and shopping preferences.

### 2.3 Key Findings

- **Stock Management:** Supermarkets use automated tracking, while convenience stores rely on manual restocking.
- **Checkout Speed:** Supermarkets implement self-checkout systems; convenience stores often have longer lines due to limited staff.
- **Digital Payments:** Increasingly preferred by customers, but many convenience stores still rely on cash transactions.

## 3. System Requirements

### Functional Requirements

1. **Inventory Management:**
  - Automated stock tracking for supermarkets.
  - Manual and semi-automated tracking for convenience stores.
  - Low-stock alerts to prevent shortages.
2. **Checkout and Sales Management:**
  - Fast checkout process using barcode scanners.
  - Self-checkout options in supermarkets.
  - Digital payment integration for both store types.
3. **Store Manager Dashboard:**
  - Sales tracking and reporting tools.
  - Order management for restocking items.
  - Supplier coordination and inventory monitoring.
4. **Customer Interaction System:**
  - Customer feedback collection on shopping experience.
  - Discount and loyalty programs.
  - Automated promotions and notifications.

5. **Security and Access Control:**
  - Role-based access for store employees.
  - Secure authentication for digital transactions.
  - Fraud prevention measures.
6. **Online and Mobile Ordering:**
  - Online product catalog with livestock updates.
  - Click-and-collect feature for convenience stores.

## **Non-Functional Requirements**

1. **Scalability:**
  - System should support both large supermarkets and small convenience stores.
2. **Performance:**
  - Fast response time for inventory updates and checkout processes.
3. **Availability:**
  - System should be operational 24/7 with cloud-based backups.
4. **Usability:**
  - User-friendly dashboard for store employees.
5. **Security:**
  - Data encryption for customer and sales data.
  - Secure authentication to prevent unauthorized access.
6. **Cloud-Based Infrastructure:**
  - Web and mobile accessibility.
7. **Interoperability:**
  - Integration with POS (Point of Sale) and accounting tools.
8. **Reliability:**
  - Consistent performance with minimal system failures.
9. **Maintainability:**
  - Easy system updates and feature enhancements.

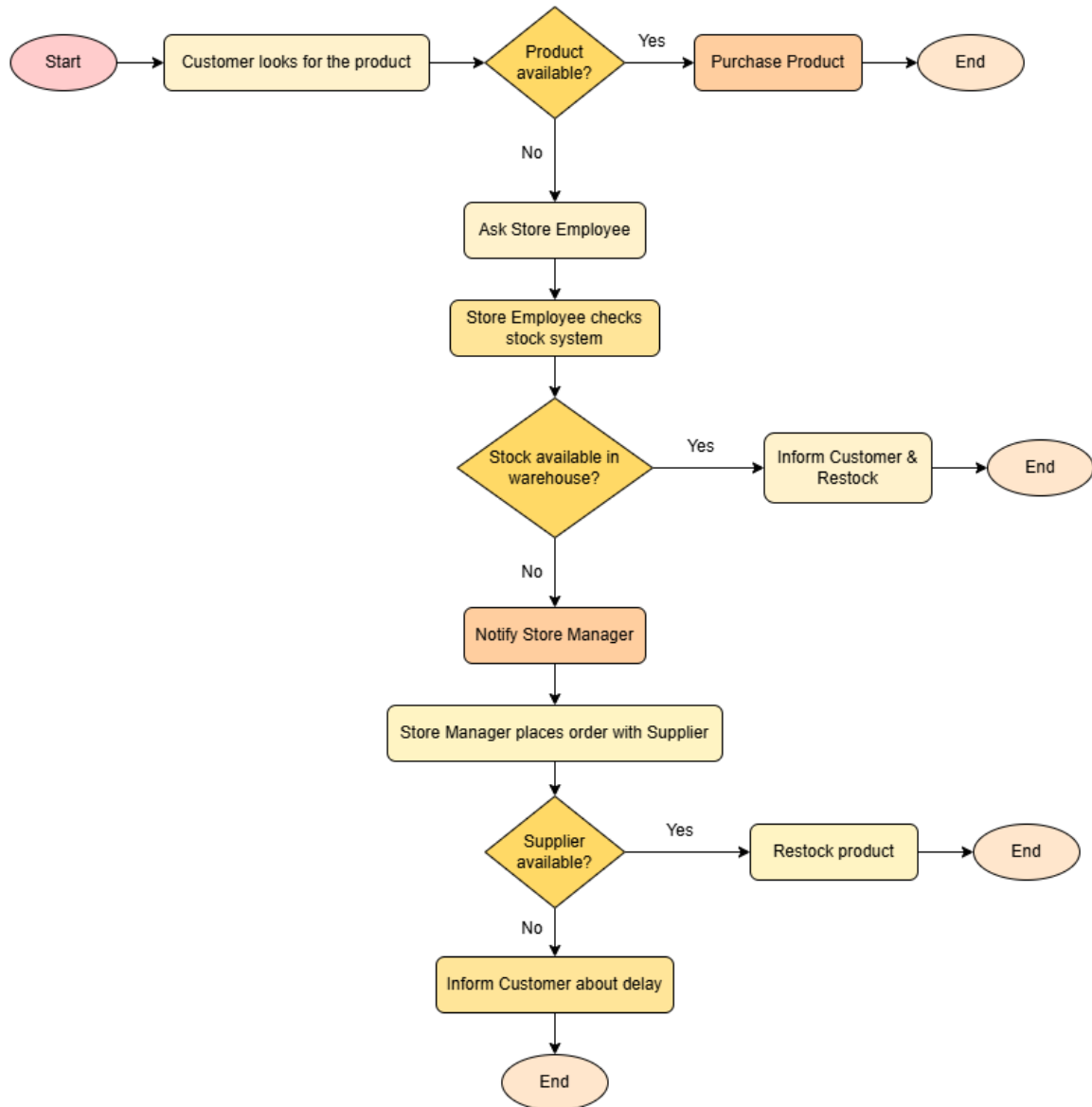
## **4. Use Case Analysis**

### **4.1 Real-world Scenarios**

- **Scenario 1:** A customer wants a product that is out of stock in a convenience store.
- **Scenario 2:** A cashier experiences system slowdowns during peak hours in a supermarket.
- **Scenario 3:** A store manager updates inventory but finds discrepancies between actual stock and system records.

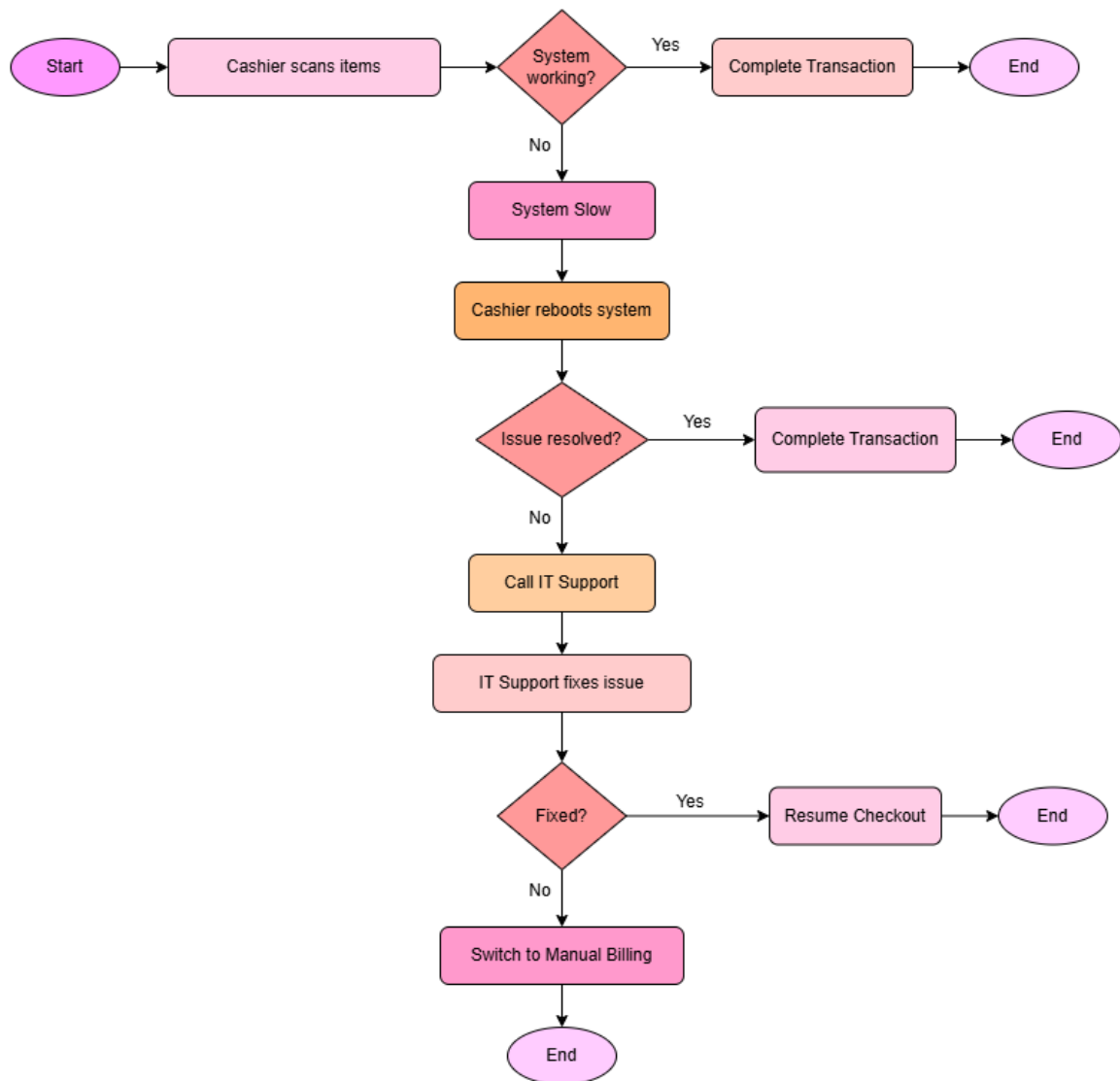
## 4.2 Flow Diagrams

### Scenario 1:



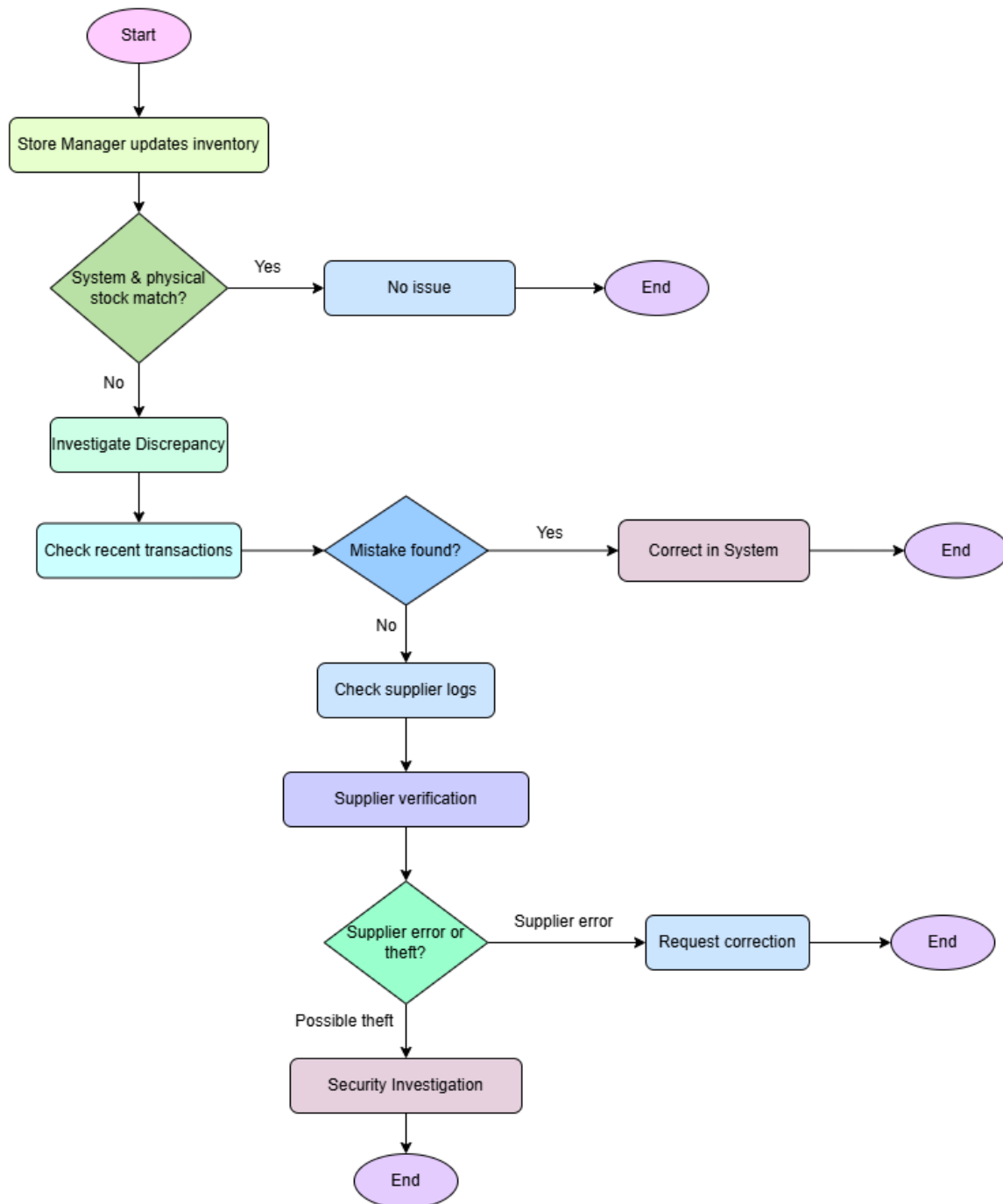
**Fig 01:** Customer wants a product that is out of stock

**Scenario 2:**



**Fig 02:** Cashier experiences system slowdowns during peak hours

### Scenario 3:



**Fig 03:** Store Manager finds discrepancies in inventory

## **5. Data Utilization in Design**

### **5.1 Influence on UI/UX Decisions**

- Simple dashboards for inventory tracking.
- Barcode scanning for faster product management.

### **5.2 Database Structure**

- **Tables:** Products, Sales, Orders, Customers.
- **Relationships:** Each product is linked to suppliers and sales data.

### **5.3 System Architecture Considerations**

- Cloud-based inventory management for scalability.
- POS system integration for real-time stock updates.

## **6. Challenges & Limitations**

### **6.1 Data Collection Challenges**

- Restricted access to internal supermarket inventory systems.
- Inconsistent customer response rates and engagement.
- Difficulty in obtaining accurate stock data from manual tracking methods.

### **6.2 Potential Biases**

- Customers may not accurately recall past shopping experiences.
- Store managers might withhold full details on inventory issues.
- Resistance to digital inventory and payment solutions in smaller convenience stores.

### **6.3 Implementation Barriers**

- High costs associated with self-checkout and digital payment systems, especially for small stores.
- Challenges in integrating real-time inventory updates with legacy POS systems.
- Staff training and adaptation difficulties when implementing new inventory technologies.



## 7. Conclusion & Future Considerations

### 7.1 Summary of Findings

This study highlights key insights into inventory management and customer experience in supermarkets and convenience stores:

- **Inventory tracking methods vary** significantly between store types. Supermarkets tend to rely on automated POS-integrated systems, whereas many convenience stores still use manual tracking, leading to discrepancies in stock accuracy.
- **Faster checkout methods**, such as self-checkout and contactless payments, contribute to improved customer satisfaction by reducing wait times and enhancing convenience.
- **Digital payment adoption is on the rise**, particularly in supermarkets. However, many convenience stores face challenges such as infrastructure limitations, cost concerns, and customer hesitation toward digital solutions.

### 7.2 Future Enhancements

To further improve inventory management and customer experience, businesses can explore the following advancements:

- **AI-driven demand forecasting for supermarkets** – Implementing machine learning models to predict demand trends, reduce waste, and optimize stock levels.
- **Mobile-friendly checkout solutions for convenience stores** – Introducing QR code payments, mobile POS systems, and tap-to-pay options to streamline transactions and attract tech-savvy customers.
- **Expansion of online ordering and delivery services** – Supermarkets and larger convenience stores can enhance their e-commerce presence, integrating real-time stock updates and flexible delivery options to meet growing consumer demand for digital shopping.

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**Development Site:** <https://nurjahan-mim.github.io/WebFinalAssignment/>

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## Appendix

### Appendix A: Survey Questionnaire

#### Customer Shopping Experience Survey

Dear Shopper, We appreciate your time in sharing your shopping experience. Your feedback helps improve services in various stores. This survey will take just a few minutes.

**1. Where do you usually shop? (Select all that apply)**

- Supermarkets
- Small convenience stores
- Street markets
- Online stores

**2. How often do you shop for groceries and essentials?**

- Daily
- A few times a week
- Weekly
- Monthly

**3. How would you rate your overall shopping experience?**

- Excellent
- Good
- Average
- Poor

**4. Availability of Products**

- Yes, always
- Most of the time
- Sometimes
- Rarely

**5. Pricing & Value for Money**

- Very Affordable
- Fair
- Slightly Expensive
- Too Expensive

**6. Store/Market Environment**

- Very Satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very Dissatisfied

**7. Customer Service & Staff Assistance**

- Yes, always
- Sometimes
- No, not helpful
- Did not need assistance

## **8. Checkout & Payment Process**

- Very Quick and Convenient
- Reasonably Fast
- A Bit Slow
- Very Slow

## **9. What is the most important factor when choosing where to shop? (Select up to two)**

- Product Prices
- Product Availability
- Customer Service
- Cleanliness & Organization
- Location & Convenience
- Payment Options

## **10. Areas for Improvement (Optional)**

### **Appendix B: Survey Responses Summary**

#### **1. Shopping Preferences**

- 3 respondents shop at supermarkets, small convenience stores, street markets, and online stores.
- 2 respondents shop only at small convenience stores.
- 2 respondents shop only at supermarkets.
- 1 respondent shops at supermarkets and small convenience stores.
- 1 respondent shops at supermarkets, small convenience stores, and online stores.
- 1 respondent shops at small convenience stores, street markets, and online stores.

#### **2. Shopping Frequency**

- 6 respondents shop a few times a week.
- 2 respondents shop weekly.
- 1 respondent shops monthly.
- 1 respondent shops daily.

#### **3. Overall Shopping Experience Rating**

- 7 respondents rated their experience as Good.
- 2 respondents rated their experience as Excellent.
- 1 respondent rated their experience as Average.

#### **4. Product Availability**

- 7 respondents find products most of the time.
- 2 respondents find products sometimes.
- 1 respondent always finds the products they need.

## **5. Pricing Perception**

- 6 respondents feel prices are slightly expensive.
- 3 respondents feel prices are fair.
- 1 respondent feels prices are too expensive.

## **6. Store Cleanliness and Organization**

- 6 respondents are satisfied.
- 4 respondents are neutral.

## **7. Customer Service Helpfulness**

- 7 respondents received assistance sometimes.
- 2 respondents always received helpful assistance.
- 1 respondent found the assistance not helpful.

## **8. Checkout & Payment Experience**

- 7 respondents found the checkout process a bit slow.
- 3 respondents found it reasonably fast.

## **Appendix C: Interview Transcripts**

### **Interview with Store 1 Manager**

**Interviewer:** [Nurjahan Mim, Rima Akter, Farjana Nasrin]

**Interviewee:** Store Manager – Store 1

**Date:** [15 March, 2025]

#### **Q1: How do you track inventory?**

A: We track inventory every day using notes on paper. There is no software used.

#### **Q2: How do you manage restocking?**

A: High-demand and popular items are restocked frequently.

#### **Q3: What are the main challenges in managing the store?**

A: Everything is done manually, making tracking difficult. No software support.

### **Interview with Store 1 Cashier**

#### **Q1: How long does the checkout process take?**

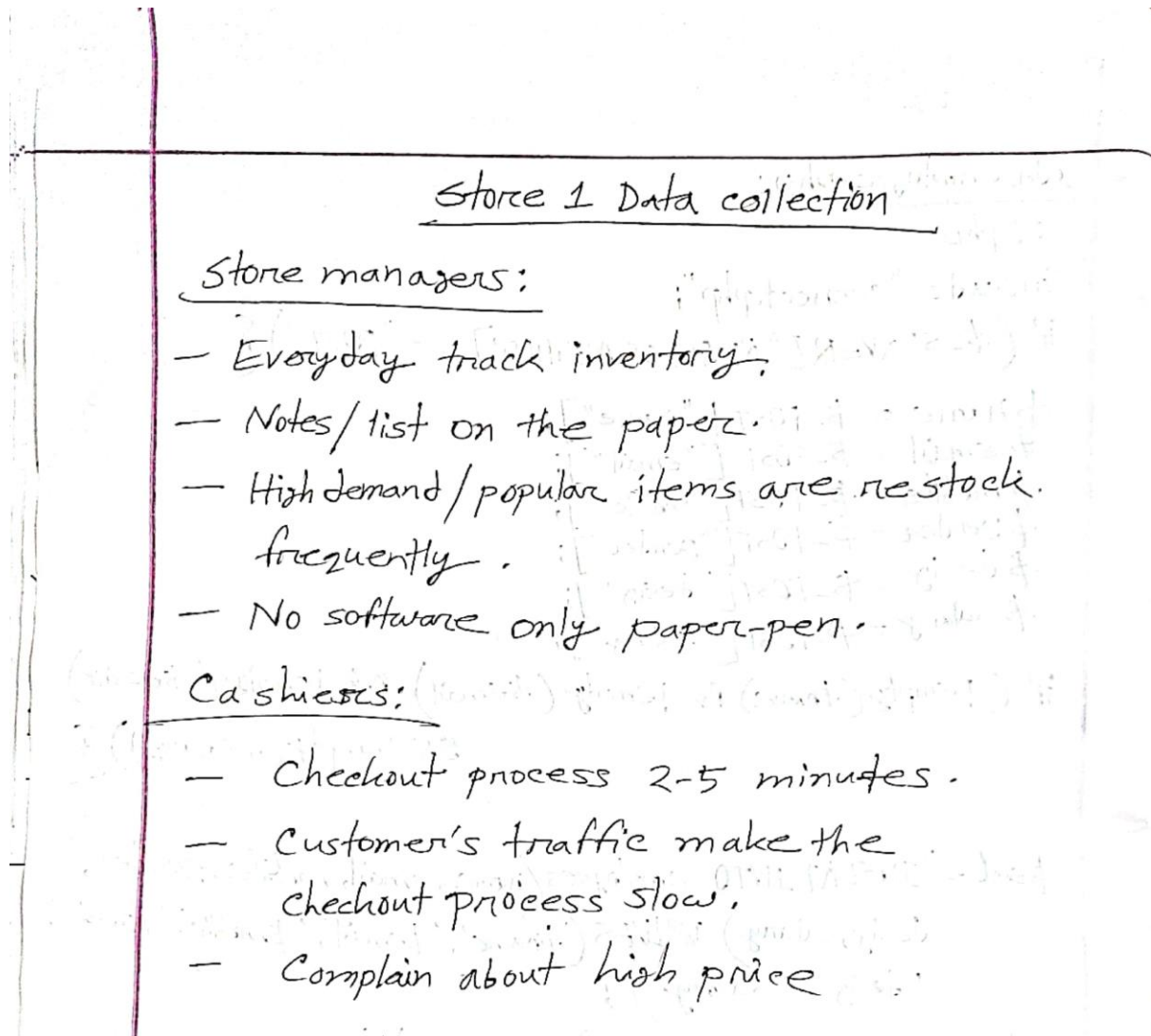
A: It usually takes 2-5 minutes per customer.

#### **Q2: What slows down the checkout process?**

A: High customer traffic makes checkout slow.

**Q3: What do customers complain about the most?**

A: Many customers complain about high prices.



**Interview with Store 2 Manager**

**Q1: How often do you manage inventory?**

A: Almost every day before closing shop, we check inventory and update it in a notebook.

**Q2: How frequently do vendors deliver products?**

A: Vendors deliver products 3 to 7 days per week.

**Q3: How do you handle product restocking?**

A: It depends on the situation. Some products are restocked very frequently.

**Q4: What is the most common complaint from customers?**

A: There aren't many complaints, just concerns about high prices.

## Interview with Store 2 Cashier

### Q1: How do you handle the checkout process?

A: I handle individual checkouts and manually add the total payment.

### Q2: How long does each checkout take?

A: It takes around 2 to 5 minutes per checkout.

### Q3: What challenges do you face?

A: High prices are a concern, but product availability is usually good. Also, there's usually only one cashier managing interactions.

<u>Store 2</u>	
<u>Store managers:</u>	
<ul style="list-style-type: none"><li>- Almost every day before closing shop</li><li>- Notebook to list the products for inventory.</li><li>- Vendors deliver products 3/7 days per week.</li><li>- Depending on the situation some products are restock very frequently.</li><li>- Not much complain just the high price.</li></ul>	
<u>Cashiers</u>	
<ul style="list-style-type: none"><li>- Handles individual checkout</li><li>- Manually adds the total payment</li><li>- 2-5 minutes per checkout</li><li>- High price and enough availability.</li><li>- Mostly one person to interact.</li></ul>	

## Interview with Supermarket Manager

### Q1: How do you track inventory?

A: We track inventory every day and use apps and unit tracking systems.

### Q2: How do you manage product restocking?

A: We order limited products as needed and use software for stock management. Products are constantly displayed for easier restocking.

## Interview with Supermarket Cashier

### Q1: How do you handle the checkout process?

A: Multiple cashiers manage checkouts at the desk, and we use barcode scanning for quick payments.

### Q2: What payment methods do customers use?

A: Many customers use mobile banking or online payment.

### Q3: What issues do you face during checkout?

A: Sometimes the computers are slow due to network or IT issues, which delays the process.

### Q4: How long does checkout take on average?

A: Usually around 2 to 3 minutes per customer.

	<u>Supermarkets</u>
	<ul style="list-style-type: none"><li>- Everyday tracking inventory.</li><li>- Uses apps and list.</li><li>- Order products that are limited</li><li>- Some use software</li><li>- Products are constantly displayed so it is easier to restock the selves.</li></ul>
	<u>Cashiers:</u>
	<ul style="list-style-type: none"><li>- Handles checkout process.</li><li>- Multiple cashiers at the desk to manage checkouts.</li><li>- Uses mobile banking / online payment.</li><li>- Uses barcode to add payment.</li><li>- Sometimes the computers are slow because of network or it issues.</li><li>- 2-3 minutes per customer.</li></ul>







