Supermarket Automation Software | 2022

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A Software Requirement Specification on the implementation of a Supermarket Automation Software

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Introduction

1.Purpose

This SRS describes the software functional and non-functional requirements for release of the supermarket automation system (SAS). This software is designed to automate the billing and inventory system in a supermarket. Unless otherwise stated, all requirements specified here are high priority and committed for release.

2.Scope

The Supermarket automation software consists of the following major functions:

- Maintaining and updating the inventory of the various commodities of the supermarket.
- Creating and printing sales transaction bills.
- Displaying and printing the sales statistics of various commodities for any particular period.
- Allowing manager to update inventory and selling prices of the commodities based on day-to-day changes.

3.Environmental Characteristics

The various components of the environment with which the software will interact are as shown below as entities.

Bill Receipt

A bill is a commercial document issued by a seller to the buyer indicating the products, quantities and agreed prices for products or services the seller has provided the buyer. It can indicate a sales transaction only.

Inventory

It is a collection of the goods and materials that a business holds for the purpose of sales and profit. It may range from a variety of raw materials to finished products.

Bar Code

A bar code is an optical machine-readable representation of data related to the object to which it is attached. It is unique for every item in the inventory

Automated weighing machine

An electronic device which can measure the weight of an object kept on it, and the weight is displayed on an LED display with a high level of accuracy.

Sales Clerk

A Sales clerk is an employee who is responsible for carrying out transactions with the customers for the different items in the supermarket.

Supermarket Staff

Supermarket staff is the set of employees responsible for maintenance of the supermarket inventory and day-to-day activities.

Manager

A Manager is an employee who is responsible for supervising the supermarket including its staffs, clerks and items analyzing the sales statistics in a given period of time and planning business strategies/goals accordingly.

Overall Description

This section will describe the entire software that is will be implemented to realize the SAS (Supermarket Automation Software). The product perspective, features, design, constraints etc. Will be extensively discussed in this section.

1. Product Perspective

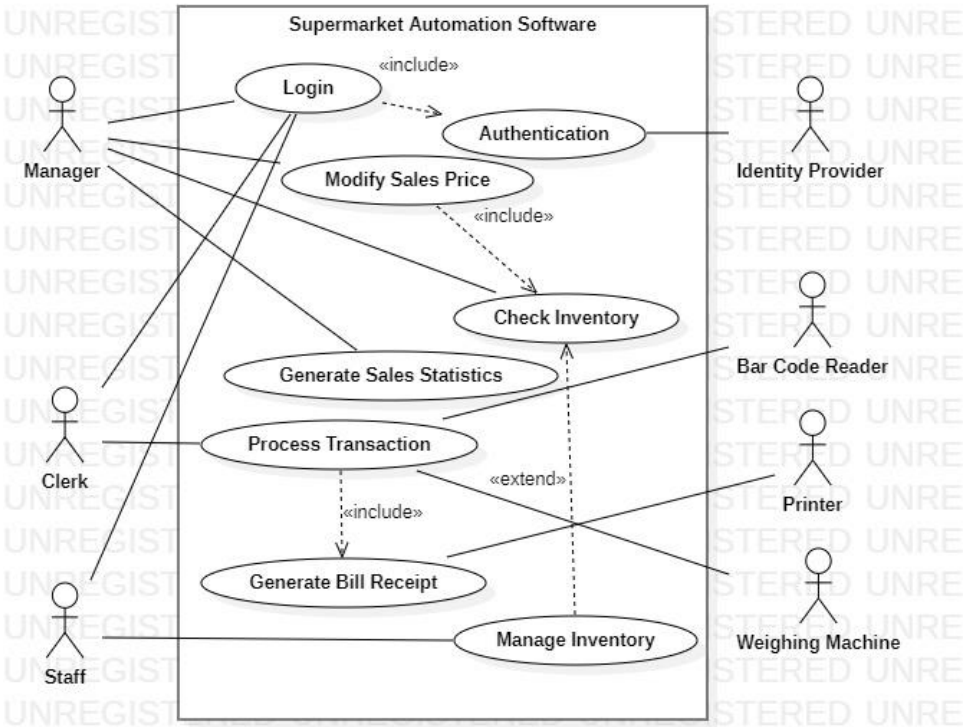

Figure 1: Use Case Diagram for SAS

The supermarket automation system is a new system that will automate the current manual processes of billing and inventory management in a supermarket. The above use case diagram illustrates the external entities and system interfaces for the first release. The system is expected to evolve over several releases.

2. Product Features

The set of features and functionalities implemented by the system is documented below:

Sales Transaction

Whenever any item is sold from the sales stock of the supermarket, this function prompts the clerk to pass the item over a bar code reader and an automatic weighing scale, the data regarding the item type and the quantity get automatically registered then. During the sales transaction, the name of the item, code number, quantity, unit price, and item price are entered into the bill and a receipt is generated. The bill indicates the total amount payable. The inventory is then suitably updated.

Read Bar Code

The sold items are passed over to the reader by the staff. The bar code is scanned and the item is registered for billing.

Weighing Item

Sold items are weighed over the automatic weighing scale. After weighing, the weight of the sold item is automatically registered.

Bill Receipt Generation

A transaction bill containing the serial number of the sales transaction, the name of the items, quantity, unit price, item price and the total amount payable after adding the taxes is printed.

Inventory Management

In order to support inventory management, this function updates the inventory whenever an item is sold. Again, when there is a new supply arrival, an employee updates the inventory level by this function.

Check Inventory and Trends

The manager upon invoking this function issues query to view the inventory details and statistics of the items over a period of time.

Modify prices

The manager changes the price of an item by exercising this option.

4. User Classes

Sales Clerk

The supermarket employs many sales clerks who are responsible for carrying out the transaction with the customers and creating and printing bills for the transactions.

Supermarket Staff

They are responsible for maintenance of the products in the supermarket and addition of newly arrived products to the inventory.

Manager

A manager oversees the supermarket's revenue and sales functions. They view the inventory, and review and print the sales statistics.

5. Operating Environment

Hardware Requirements

All staff members need to be provided with proper hardware facilities like bar code readers and automated weighing machine.

Software Requirements

The software to be developed will be independent of any OS and will be hosted as a web-based application implemented through HTML, CSS and JavaScript. A database (possibly Microsoft SQL Server) will be required to store the item details and inventory data.

Operating System Requirements

There is will be no dependency on the underlying OS of the system as the software will be hosted as a web-based application.

Database Requirements

The following data are required to be stored and readily available in the database

- Employee details
- Inventory item details
- Sales and Transaction Details

The database must be cohesive to the ACID properties for efficient data reliability and management.

Assumptions and Dependencies

- Bar code readers are provided to the supermarket staff
- Automated weighing machine is readily available
- Printers are available to print bill receipt
- Software Interface is dependent on the underlying hosted database server

6. Design and Implementation Constraints

The class diagram below captures a static model for the Supermarket Automation Software. The initial planning and design are captured in the UML diagram and is subject to further updates/modifications following the agile methodology of software engineering.

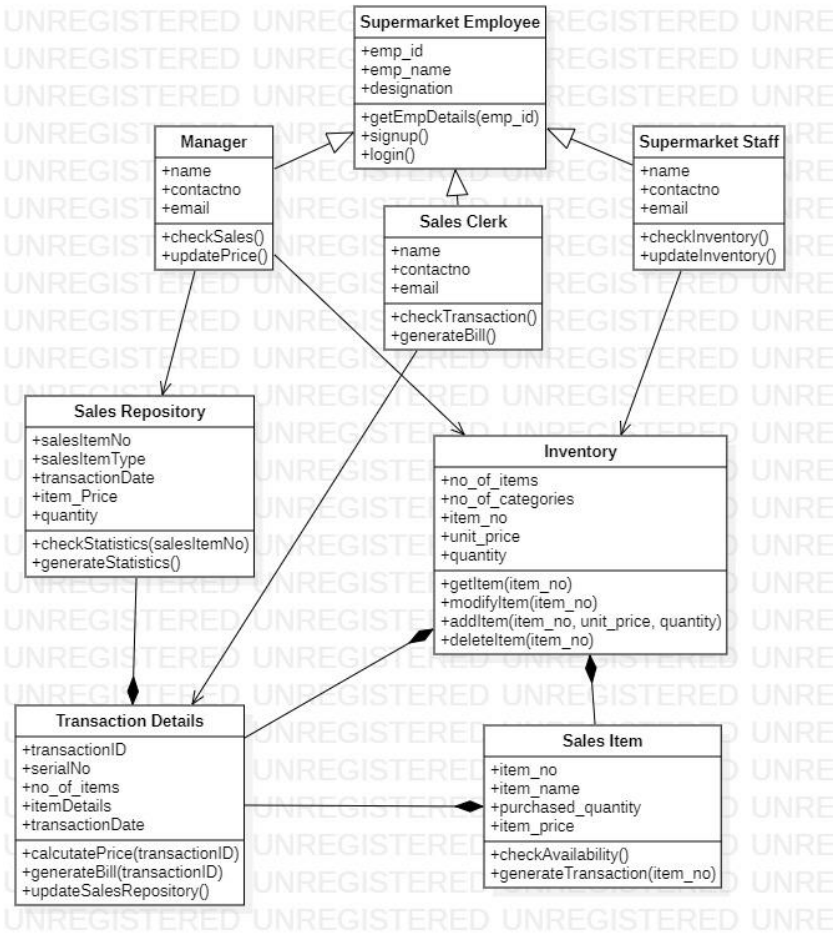

Figure 2: Class Diagram for Supermarket Automation Software

Hardware and Software Constraints

- No particular design constraints are observed in the software at present
- For hardware components, the weighing machine in use has a certain limitation for the maximum level of weight which can be measured by it.

External Interface Requirements

1. User Interfaces

Management Interface

The SAS screen displays interfaces to view the inventory, change the prices of the products, view and print sales statistics.

Clerical Interfere

The SAS screen displays an interface to commute a transaction with a customer, and produces and prints a bill for the transaction.

Supermarket General Interface

The SAS screen displays an interface to update the inventory for the supermarket with each arrival of new supplies.

2. Hardware Interfaces

For the software to function properly, the bar code reader scans the bar code from a product and sends the product ID to the software and the weighing machine sends the weight of the product.

3. Software and Database Interfaces

Inventory Query

- The manager queries the product whose details he/she wishes to view.
- The SAS programmatically determines the details of the product.
- The SAS displays information about the product.
- The manager selects the option to change the price of the product which updates the corresponding price in the database.

Update Inventory

• The supermarket staff requests for the addition of the product and subsequently enters the details of the product.

• The SAS updates the product in its database and gives a confirmation message.

Record Transaction

• The sales clerk provides the details of the product ready to be purchased.

• On pressing the print button, the details of the inventory are updated and a bill is produced and printed along with a confirmation message.

4. Communication Interface

- Any changes made to the inventory of the supermarket is automatically updated in the database present in the supermarket server
- Any communication between the user and software interfaces and the database interface is done over TCP/IP protocols following HTTP/HTTPS
- Underlying RESTful APIs can be used add a layer of security and modularity to the communication

Functional Requirements

1. Sales Transactions

Introduction

A sale transaction both authorizes and settles the requested amount against the paymentmethod indicated. Through authorizing, the Transaction request confirms that thepayment method exists and that funds are available at the time of Authorization to coverthe transaction amount.

Inputs

• Products IDs scanned from the bar code reader

• Weight reading from the automatic weighing scale.

Processing

• The SAS queries the database for the product information and calculates the total amount payable after inclusion of taxes.

• A bill is created in a printable format.

Outputs

• A formatted bill is printed for the customer.

Error Handling

• The SAS may not be able to connect to the server due to error in networkconnection, in the case of which transaction is not possible.

2. Viewing Sales Statistics

Introduction

• The manager views the sales statistics and prints them in various formats such as pie charts, bar graphs, tabular format, etc.

Input

• Item identification parameter such as product ID or name.

• Time period or duration.

Processing

• The SAS looks into the database, the cost and selling price of the particular product for every transaction in that period and generates the profit statistics in the requested format.

Outputs

• The profit statistics are displayed in the requested format for the manager, which they print for their convenience.

3. Updating prices for different commodities

Introduction

• The manager easily updates the prices for all the items available in the supermarket according to the changing prices in the market.

Inputs

• The product identification parameter such as product ID or name.

• New Price for the product.

Processing

• The SAS looks into the database and shows the product information.

• It updates the database with the new price.

Outputs

• The product information with updated price is shown.

4. Updating the Inventory

Introduction

• The supermarket staff adds new items to the inventory which have newly arrived.

Inputs

• The product ID and quantity of the product arrived.

Processing

• The SAS looks into the database, if the product ID already exists in the inventory database, the quantity is updated otherwise new product information has to be added to the database.

Outputs

• A message is displayed confirming the update regarding the product ID and amount.

Non-Functional Requirements

Performance

High level of performance requires high speed network and high level of connectivity.

Reliability

The available server must be reliable and the network connectivity in the supermarket should be proper for smooth flow of all operations and data.

Availability

The software is available for use from the supermarket opening time to the closing time.