Software Requirements Specification

for

Supermarket Automation System

Version 1.0 approved

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17th March, 2021

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

The main objective of the Supermarket Automation System (SAS) is to automate the billing and maintain the inventory system in an efficient manner. It can also print out the statistics of the sales of Supermarket. The Software Requirements Specification (SRS) document specifies the requirements for the Supermarket Automation Software (SAS). It contains both the functional and the non functional requirements.

1.2 Document Conventions

- *The document is written in Times New Roman Font*
- *Main headings (size 18) and subheadings (size 14) are written in bold*
- *Remainder of the document is written out in Italics. (size 11)*
- *Since all the requirements in this application are disjoint and independent, they have their own priority and are not inherited from each other.*

1.3 Intended Audience and Reading Suggestions

This document is intended for developers, technicians at the supermarket (so that they are aware of the dependencies of the application and how it works) and for the manager of the supermarket (so that he / she knows what all features this application is having).

This SRS contains the structure of the application as well as the required hardware and software dependencies of the application, which must be present for the application to function smoothly. For reading this SRS, the reader must have a basic knowledge of Object Oriented Programming, Web Development Frameworks and Database Management. The reader must also have some knowledge about UML diagrams.

1.4 Product Scope

- *SAS should, at the end of a sales transaction print the bill containing the serial number of the sales transaction, the name of the item, code number, quantity, unit price, and item price. The bill should indicate the total amount payable.*
- *SAS should maintain the inventory of the various items of the supermarket. The manager upon query should be able to see the inventory details. In order to support inventory management, the inventory of an item should be decreased whenever an item is sold. SAS should also supports an option by which the manager can update the inventory when a new supply of items arrive.*
- *SAS should support printing the sales statistics for every item the supermarket deals with for any particular day or any particular period. The sales statistics should indicate the quantity of an item sold, the price realized, and the profit.*
- *The manager of the supermarket should be able to change the price at which an item is sold as the prices of the different items vary on a day-to-day basis.*

1.5 References

Although the basic outline of the SRS was provided, another website was referred to while the making of this document

- *https://krazytech.com/projects/sample-software-requirements-specificationsrs-report-airline-database1*

2. Overall Description

2.1 Product Perspective

This application is useful for the supermarket for automating its daily tasks and freeing up its employees from the mundane and repetitive task, all the while eliminating the chances of human error. This also decreases the customer wait time, thus enriching the customer interaction and experience.
SAS makers it easier to keep track of transactions and records and gives detailed statistics of the previous transactions, that can help in keeping track of the sales of the supermarket and help in devising new strategies for better sales.

2.2 Product Functions

The functions of this software include different features for automating the billing process that occurs daily in a supermarket.

- *Maintaining Inventory: It supports inventory management by decreasing an item whenever it's sold by the sales clerk and the manager can update the inventory when a new supply arrives. The manager is also able to change the price of the items on a day to day basis.*
- *Multiple Logins: It supports both, admin login as well as sales clerk login, since there may be multiple cashiers. Sales clerk can only decrease the quantity of item whenever it's sold but the manager can fully manipulate the inventory by increasing or decreasing the quantity and changing the price of items.*
- *Plot support for sales statistics: It supports printing of the sales statistics for every item the supermarket deals with for any particular day or any particular period. The sales statistics also indicate the quantity of an item sold, the price realised, and the profit.*
- *Printing the bill: At the end of the transaction, it prints a bill containing the serial number of the transaction, the names of items sold, id numbers of the items, quantity of the items sold, unit price and item price.*

2.3 User Classes and Characteristics

There are two types of users intended for using the Supermarket Automation Software (SAS).

- *Sales Clerk: These are the employees who are responsible for carrying out the transaction with the customers and creating and printing bills for the transactions.*
- *Manager: The Manager oversees the supermarket and manipulates the inventory according to the supply and demand and reviews the sales through the statistics option provided by the software. The manager can also change the price of the items sold.*

2.4 Operating Environment

Operating environment for the Supermarket Automation Software is as listed below.

- *Operating system: Windows, Linux and MacOS.*
- *Platform: The website will be hosted on Heroku / or on a local server.*
- *Database: SQLite*
- *Client / Server system*
- *The hardware requirements are a bar-code reader and weighing machine*

2.5 Design and Implementation Constraints

The current constraints on the project are related to provision of the database resources. The more robust and fast the database, the better the performance of the software. On the hardware side ,the barcode reader and the weighing machine should be compatible in order to operate seamlessly.

2.6 User Documentation

Brief description and hands - on tutorial would be sufficient for understanding the workings of the Supermarket Automation Software. Along with this, a user's manual would be handy for quick references to the various features that the software has.

2.7 Assumptions and Dependencies

- *The users are supposed to know the basics of using computers, like typing on a keyboard, clicking using a mouse.*
- *The inventory of an item can only be decreased when it's sold to a customer, or if the manager wishes to decrease it.*
- *Once the final bill is printed, the transaction is finalised and the sold items cannot be returned.*
- *Transactions that were done before the implementation of this software cannot be brought up in the statistics that are shown to the manager.*
- *Since the whole software is implemented in the English Language, the users of this software are expected to be comfortable with the English Language*

3. External Interface Requirements

3.1 User Interfaces

Manager Interface: The SAS screen will have a manager Interface through which one can

- *View the current inventory*
- *Change the prices of the products*
- *Change the quantity of the product.*
- *This Interface also allows to have a view on the plot of statistics of the previous purchases made and can also be regarded as the superuser of the whole system.*

Sales Clerk Interface:The SAS screen will have a Sales Clerk Interface through which

- *A transaction can be completed and a bill is generated for the same.*
- *This transaction decreases the amount of product bought from the original inventory.*

3.2 Hardware Interfaces

The Hardware Requirements are as follows:

- *Bar-code Reader and Bill Printer*
- *This reads the product ID from the Bar code given in the item and stores it in the file which will be used at the time of the final bill confirmation and then it will print the bill.*
- *A Computer Data Base and Local Network*
- *This is to join the various clerk computers present at different counters which will be in turn connected to the same database by a local network so that they update the same inventory in order to avoid the confusion and their Bill Information is saved in the same Database.*

3.3 Software Interfaces

Inventory Query: The Manager through his interface will be able to look into products of which he/she wants to know about including its current stock, buying cost, profit margin, and will be able to modify these items in the inventory.

Statistics Query: The Manager can query about the statistics related to previous sales made, quantity sold, price realised, and net profit for a single day, or for a specific period of time.

Adding to the inventory: The SAS will also support the addition of products on the basis of supply. The SAS database can also be edited by the Manager Interface. This will update the product's current stock.

New Transaction: The sales clerk scans the product and the details are stored in a temporary class object. On pressing the Generate the Bill button the final bill including all the taxes is generated and the required changes are made from the inventory and in the Sales Database, and a Bill is printed with a confirmation message.

3.4 Communications Interfaces

- *After a transaction is executed, a copy of the bill is stored in the Sales Database which will be used for the Statistics Query.*
- *Changes made by new transactions, addition to inventory and changes made by the manager are directly done on the inventory so that they are changed synchronously.*
- *The software is implemented using the HTTP protocol.*
- *The software will follow secure logins using password encryption to protect its user's information*

4. System Features

4.1 Maintaining Inventory

4.1.1 Description and Priority

The Supermarket Automation System maintains the inventory of all the products that are sold. This feature is high priority because without an inventory, a supermarket cannot function.

4.1.2 Stimulus/Response Sequences

- *The manager can access the inventory and increase and decreases the quantity of the products.*
- *He / She can also change the price of the corresponding products.*

4.1.3 Functional Requirements

Django: If no database is present, then the inventory cannot be handled. Thus it is necessary to have a database at hand. Django implements the database internally by using SQLite.
Python: The programming language required to run the application

REQ-1: django_req
REQ-2: py_req

4.2 Admin and Sales Clerk Login

4.2.1 Description and Priority

The Supermarket Automation System handles logins for Admin and Clerk such that they can operate without any interference from the each other.
Admin Login allows the user to access the database and change the price and quantity of any item.
Sales Clerk Login allows the user to access the database and sell any product.
This feature is high priority, because without it, the database cannot be managed during the runtime of the software.

4.2.2 Stimulus/Response Sequences

- *The manager can use Admin Login for using the software*
- *The cashiers can use Sales Clerk Login for using the software*

4.2.3 Functional Requirements

Django: Without Django, we cannot use the Login feature, which is used for Logging in a user.
Python: The programming language required to run the application

REQ-1: django_req
REQ-2: py_req

4.3 Plot Support for Sales Statistics

4.3.1 Description and Priority

The Supermarket Automation System provides the ability to view graphs that plot out the sales statistics of the supermarket for any particular day or period. The sales statistics indicate the quantity of an item sold, the price realised and the profit made. Since this is just for visualisation purposes, it is low priority

4.3.2 Stimulus/Response Sequences

- *The manager can decide the time frame for which the statistics are to be plotted. Upon clicking the plot button, a graph comes up that shows the desired statistics.*

4.3.3 Functional Requirements

Django: If no database is present, then the inventory cannot be handled. Thus it is necessary to have a database at hand. Django implements the database internally by using SQLite.
Matplotlib: Matplotlib is required to build graphs
Python: The programming language required to run the application

REQ-1: django_req
REQ-2: py_req
REQ-3: plt_req

4.4 Printing Bill

4.4.1 Description and Priority

The Supermarket Automation System provides the feature to print the bill of a transaction. It contains the serial number of the sales transaction, the name of the item, code number, quantity, unit price, and item price. The bill also indicates the total amount payable.

4.4.2 Stimulus/Response Sequences

- *Upon successfully a transaction, the bill is displayed for the customer.*

4.4.3 Functional Requirements

Python: The programming language required to run the application

REQ-1: py_req

5. Other Nonfunctional Requirements

5.1 Performance Requirements

- *For better performance high speed Internet connection is preferred.*
- *Any browser with a recent version would work fine.*

5.2 Safety Requirements

- *The users must remember their login credentials, as the feature for resetting the credentials has not been implemented yet.*

5.3 Security Requirements

- *The passwords are encrypted for protecting the user's information.*
- *Since there are separate logins for manager and sales clerk, only managers can modify the inventory of the supermarket. No clerks are allowed to modify the prices of the items.*

5.4 Software Quality Attributes

- *RELIABILITY: The SAS can be used by multiple users (clerks and managers) on multiple devices at the same time.*
- *AVAILABILITY: The system would be available for 24 hours a day.*
- *MAINTAINABILITY: The Admin/Manager will be able to see the inventory and accordingly make any changes.*
- *PORTABILTY: The software can be used on any platform on any device (Although, PCs or laptops are preferred).*
- *ROBUSTNESS: The system would be tested before deployment and thus the occurrence of bugs would be a rare phenomenon. In any case, the bugs won't break down the system.*

5.5 Business Rules

The SAS can be used by managers and sales clerks of the supermarket to which the software is sold.

6. Other Requirements

6.1 Database

Since the database stores a lot of data in it, like the transaction and the items in the inventory, it is suggested that the platform on which this software is to be deployed must have sufficient reserve memory in it.

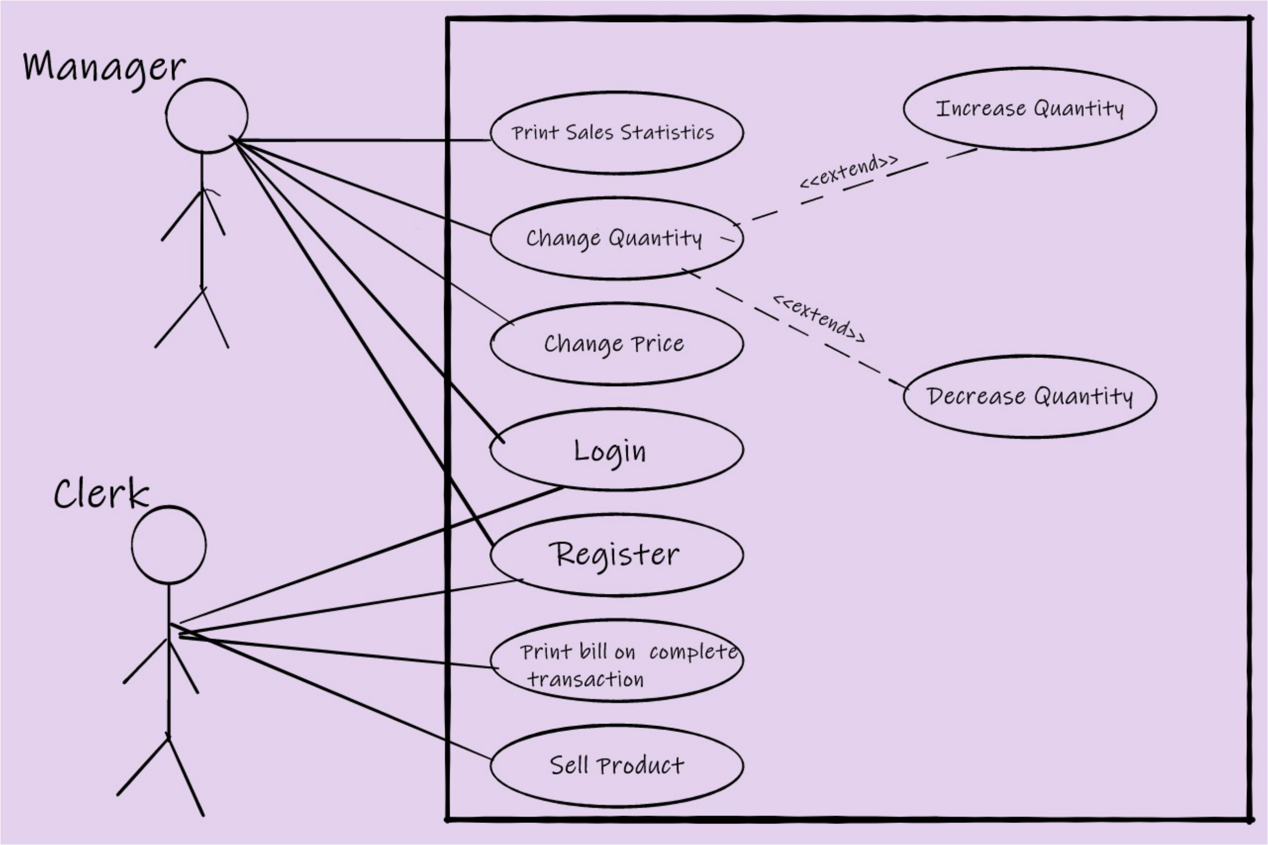
Appendix A: Glossary

- *py_req: Python Required*
- *django_req: Django Required*
- *plt_req: Matplotlib Required*

More terms to be added as and when required or requested by the client.

Appendix B: Analysis Models

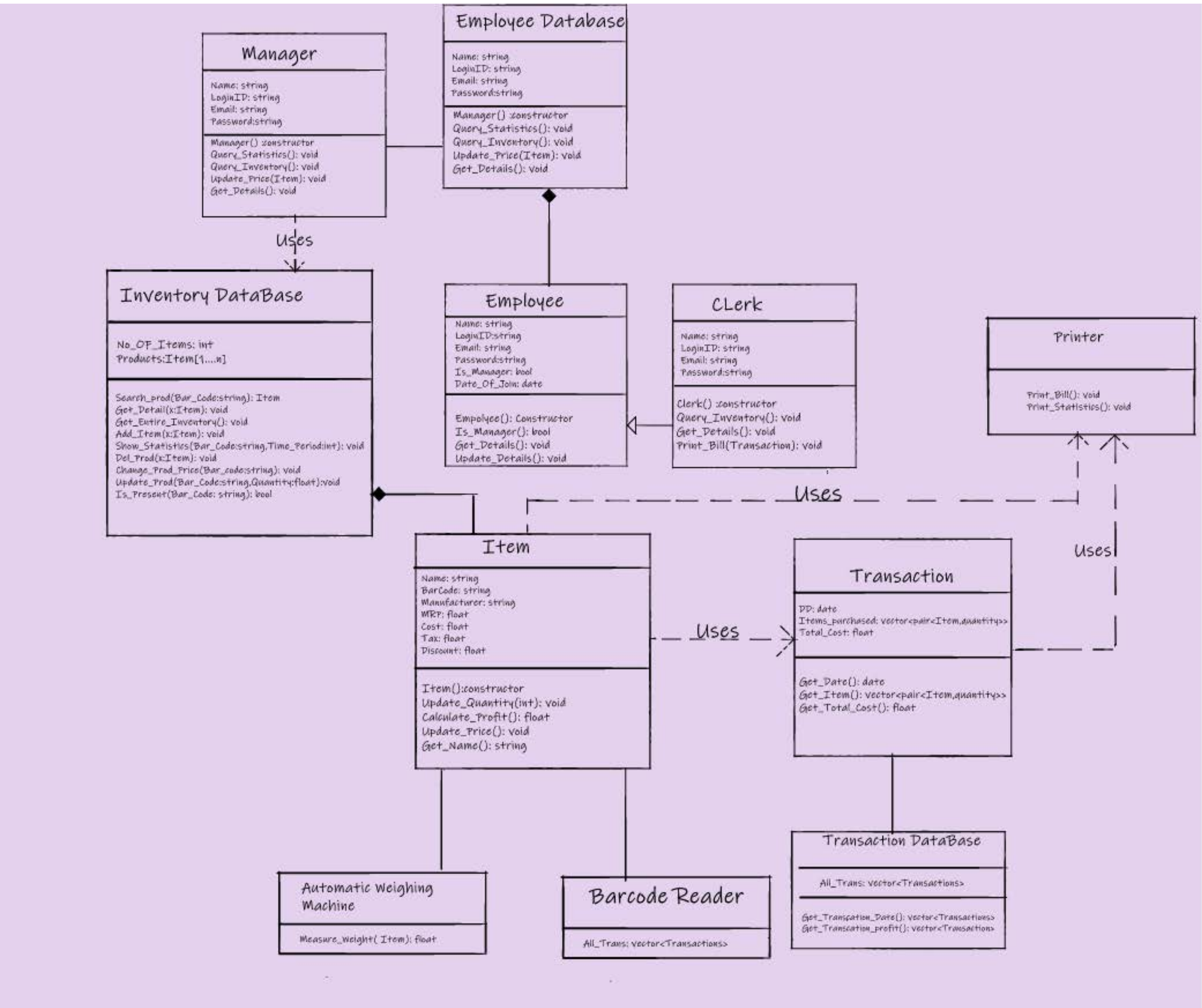
Use Case Diagram



Class Diagram

The class diagram is the one of the most important part of object oriented modelling.It can be used for both conceptual as well as systematics application
for detailed modelling translating the models into programming code.Class reprensent both the main elements,interactions in the application and the classes to be programmed

There are 11 classes in the project -
Employee
Manager
Clerk
EmployeeDataBase
Item
InventoryDataBase
Transaction
TransactionDataBase
AWM(auto matic weighing machine)
BCR(barcode reader)
Printer



Appendix C: To Be Determined List