SUPERMARKET AUTOMATION

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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SUBMITTED BY:

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INTRODUCTION:

The Project Supermarket Management System deals with the automation of supermarket. It includes both sales and purchase of items. There is a lot of reason for the introduction of this project. In the manual System, there are number of inefficiencies that a sales person faces. Large records-books have to be maintained where relevant and irrelevant information has to be stored which is very untidy and clumsy process. On the other hand, there are many inherent problems that exist in any manual system. Usually, they lack efficiency. Less efficiency has a great impact on the productivity of any human being keeping the data up-to-date. But our System reduces paper works. It also reduces manpower requirement, and increases the productivity of the supermarket.

The project supermarket management system aims at full automation of big, medium, and mini supermarkets with the objective of making the system reliable, user-friendly, fast, and more informative. Using this application, one can add, modify, update, save, delete, and print details. There's also a search feature to find products available in the supermarket.

TYPES OF USERS:

1. SUPERMARKET STAFF:

These are the people who are working in the supermarket. Their work includes adding and updating the details of customers, the details of products available, the details of discount available, newly purchased product details to the database, collecting price, exchange products details etc.

I. MANAGER:

They are senior authority of the supermarket who are not directly involved in selling the products, but are concerned with the smooth running of the store. They have access to all the essential information including employee details which helps to smooth running of the supermarket.

Have access to:

- Employee Management
- Product Management
- Security

II. Employee:

They are technical staff concerned with smooth running of the supermarket. They have access to all the details of customer and products.

Have access to:

- Billing of products
- Bill Transaction

Do not have access to:

- Product Management
- Employee Management

2. CUSTOMER:

The customers have the functionalities like accessing the products, searching for a product, buying the products etc. The supermarket automation provides exact information about the number of products available for customer, out of stock products etc and it also check the discount availability and calculates the final amount of purchasing products for customer.

Have access to:

- Product Purchase / Return

3. SELLER:

The seller has a functionality to check which product will need to the supermarket according to that he will sell products to supermarket.

Have access to:

- Local Product Management

LIST OF FEATURES OF THE SOFTWARE:

- **ADMIN LOGIN:**

  This feature will be used by the manager to access all the information about employee, seller, customer and products.

- **REGISTER NEW SELLER:**

  This feature will be used by the manager to add new seller to the database system.

- **SELLER LOGIN:**

  This feature will be used by the seller to access the details of the product available on the store and for sell.

- **REGISTER NEW EMPLOYEE:**

  This feature will be used by the manager to add new employee to the database system.

- **VIEW EMPLOYEE DETAILS:**

  This feature will be used by the manager to check all the details of employee.

- **UPDATE EMPLOYEE DETAILS:**

  This feature will be used by the manager to change or add some details of employee.

- **EMPLOYEE LOGIN:**

  This feature will be used by the employee to access the details of customer and product.

- **REGISTER NEW CUSTOMER:**

  This feature will be used by the employee to add new customer, It will also be used by the customer to register himself.

- **QUANTITY OF PRODUCT:**

  This feature will be used by the employee and customer to check the available quantity present in the store.

- **PRICE OF PRODUCT:**

  This feature will be used by the employee and customer to check the current price of the product.

- **PRINT THE BILL:**

This feature will be used by the employee and customer to print the total purchase amount.

- **TRENDS IN BUYING:**

This feature will be used by the employee and seller to check which product will sell mostly. It will also used by customer to check which product is mostly preference by other customers.

- **CATALOGUE MANAGEMENT:**

This feature will be used by the employee to check the current stock of the product according to that the store bill buy product from seller.

- **CUSTOMER LOGIN:**

This feature will be used by the customer to check the product details and for buy products.

- **SEARCH PRODUCT:**

This feature will be used by the customer and seller to check the product is available or not.

- **VIEW PRODUCT DETAILS:**

This feature will be used by the customer and to check the products validity, price, quantity, manufactured company etc.

- **BUY PRODUCT:**

This feature will be used by the customer for purchasing the product,with an option for home delivery is available .

- **VIEW PRODUCT DISCOUNT:**

This feature will be used by the customer to check the discount available on the product.

- **BILL PAYMENT:**

This feature will be used by the customer to pay the bill amount.

- **VIEW THE BILL:**

This feature will be used by the customer for payment, check the frequency of purchasing product, date of purchasing, products name etc.

- **PRINT BILL:**

This feature will be used by the customer to print out his bill.

- **SEND DETAILS:**

This feature will occur automatically, it will send the bill details to the customer after purchasing the product.

- **CUSTOMER FEEDBACK:**

  This feature allows a customer to give a feedback about any item which he/she purchased from the supermarket

- **NOTIFICATION OF NEW / WANTED/ ESSENTIAL PRODUCTS:**

  While purchasing the products from the supermarket the customer gives his/her mobile number so as to get notified about any new product in the market or any essential product.

FEASIBILITY ANALYSIS

FEATURES	TECHNICAL FEASIBILITY	OPERATIONAL FEASIBILITY	REMARKS
ADMIN LOGIN	YES	YES	-
REGISTER NEW SELLER	YES	YES	-
SELLER LOGIN	YES	YES	-
REGISTER NEW EMPLOYEE	YES	YES	-
VIEW EMPLOYEE DETAILS	YES	YES	-
UPDATE EMPLOYEE DETAILS	YES	YES	-
EMPLOYEE LOGIN	YES	YES	-
REGISTER NEW CUSTOMER	YES	YES	-
QUANTITY OF PRODUCT	YES	YES	-
PRICE OF PRODUCT	YES	YES	-
PRINT THE BILL	YES	YES	-
TRENDS IN BUYING	YES	YES	-
CATALOGUE MANAGEMENT	YES	YES	-
CUSTOMER LOGIN	YES	YES	-
SEARCH PRODUCT	YES	YES	-

VIEW PRODUCT DETAILS	YES	YES	-
BUY PRODUCTS	YES	NO	This is possible technically but if the supermarket does not have enough manpower to take the items to the customer's place it shall be complex for the supermarket to implement this.
VIEW PRODUCT DISCOUNT	YES	YES	-
VIEW THE BILL	YES	YES	-
BILL PAYMENT	YES	YES	-
SEND DETAILS	YES	YES	-
CUSTOMER FEEDBACK	YES	YES	-
NOTIFICATION OF NEW / WANTED/ ESSENTIAL PRODUCTS	YES	NO	This is technically possible but if the customer is reluctant to give his/her phone number then it will be impossible because we have to have the mobile number to send sms using our software.

Life Cycle model: Iterative waterfall

This is the better version of the waterfall model and it overcomes all the shortcomings of the waterfall model while maintaining all it's benefits. Unlike the waterfall model, this model has more efficient error handling for building quality products. In this model, after each step in the sequence we go back to debug the previous steps ensuring the efficiency and authenticity of the software. It is based on the fact that errors should be detected in the same phase in which they are introduced. That is why this model is ideal for our project.

Cost Estimation

We have used the Basic Constructive Cost Model (COCOMO) for estimating the effort and development time for developing this software.

- Admin Login – 0.125KLOC
- Register New Seller – 0.115 KLOC
- Seller Login – 0.010 KLOC
- Register New Employee – 0.145 KLOC
- View Employee Details – 0.135 KLOC
- Update Employee Details – 0.080 KLOC
- Employee Login – 0.090 KLOC
- Register New Customer – 0.080 KLOC
- Quantity of Product – 0.100 KLOC
- Quantity of Product – 0.200 KLOC
- Price of Product – 0.120 KLOC
- Print the Bill – 0.050 KLOC
- Trends in Buying – 0.120 KLOC
- Catalogue Management – 0.200 KLOC
- Customer Login – 0.280 KLOC
- Search Product – 0.150 KLOC
- View Product Details – 0.250 KLOC
- Buy Products – 0.130 KLOC
- View Product Discount – 0.120 KLOC
- View the Bill – 0.250 KLOC
- Bill Payment – 0.050 KLOC

- Send Details – 0.130 KLOC
- Customer Feedback – 0.350 KLOC
- Notification of New / wanted Essential Products – 0.250 KLOC

Cost and development time calculation:

We use the cocomo model to estimate effort and developers required to develop the software. We estimate lines of code and then calculate cost and effort using the basic cocomo model.

Basic Cocomo Model:

- E = Total effort required for the project in Person-Months(PM).
- D = Total time required for project development months(M).
- KLOC = The size of the code in kilo lines of code.
- A,b,c,d = Constants

Our estimation for KLOC is 5 Kloc, which is less than 50KLOC so it belongs to the organic model. The values of constant parameters for organic model are:

- a = 2.4
- b = 1.05
- c = 2.5
- d = 0.38

Effort(E) = $a * (KLOC)^b$ PM

= $2.4 * (5)^{1.05}$ PM

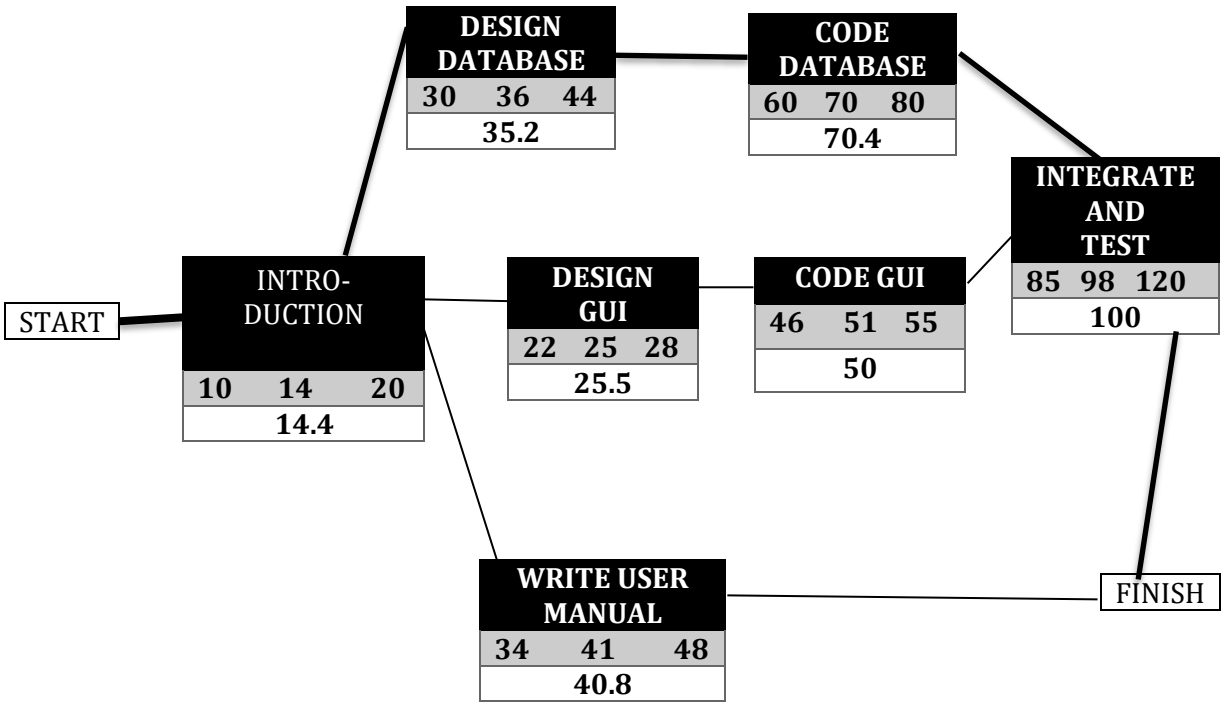
= 13.00 PM

Development Time(D) = $c * E^d$ M

= $2.5 * 13^{0.38}$ M

= 6.62 M

PERT ANALYSIS:



CRITICAL PATH:

START—INTRODUCTION—DESIGN DATABASE—CODE DATABASE—INTEGRATE AND TEST—FINISH

Total Time = 14.4+35.2+70.4+100
= 220 days

S.R.S (Software Requirement Specification)

Introduction

PURPOSE

This SRS describes the software functional and non-functional requirements for release of the supermarket automation system 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 1.0.

OVERVIEW

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.

ENVIRONMENT CHARECTERISTICS

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

Inventory
It describes the goods and materials that a business holds for the ultimate purpose of sale.

Bar Code
A bar code is an optical machine-readable representation of data related to the objects to which it is attached.

Automatic 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.

Manager
A Manager is an employee who is responsible for supervising the supermarket staff and sales clerks and analysing the sales statistics in a given period of time.

Goals of Implementation

The Supermarket automation system is a new system that replaces the current manual processes of billing and inventory management in a supermarket.

Functional Requirements

Functional Requirements:

1. Login
    1. Admin
    2. Seller
    3. Employee
2. Purchase of product (/print the bill)
3. Catalogue Management
4. Search Product

R1.

Name: Login
Description: Allows staff/sellers and customers to login.
I/P: Login ID and Password
O/P: Login Successful

R2.

Name: Purchase of product
Description: Allows customers to purchase multiple numbers of products
I/P: Barcode Scan of the desired product(s)
O/P: Bill containing the details of total purchase
process: In case of multiple products, each product has to be scanned so that after scanning, the entire list of products to be purchased are stored on the application. Total price is calculated and bill is printed after the levy of discounts.

R3.

Name: Catalogue Management
Description: Shows the entire details of products available in the mall
I/P: Clicks the product details page
O/P: Table containing all the product records

R4.

Name: Search Product
Description: It shows the availability and other details of a single product.
I/P: Name of the product
O/P: Details of the product.

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.

Security
Every user of the software is provided a unique ID and a password which is stored in the database hashed by SHA2 algorithm.

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