



R.M.D. ENGINEERING COLLEGE

(An Autonomous Institution)

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DEPARTMENT OF INFORMATION TECHNOLOGY

21IT413 INTERNSHIP

POS - POINT OF SALE TERMINAL

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21IT413 INTERNSHIP

OBJECTIVES:

- To understand the software engineering methodologies for project development.
- To gain knowledge about open source tools for Computer Aided Software Engineering.
- To develop an efficient software using case tools.

SOFTWARE REQUIRED:

Open source Tools: Star UML / UML Graph / Top cased

Prepare the following documents for each experiment and develop the software using software engineering methodology.

1. Problem Analysis and Project Planning -Thorough study of the problem – Identify Project scope, Objectives and Infrastructure.

2. Software Requirement Analysis - Describe the individual Phases/modules of the project and Identify deliverables.

3. Data Modelling - Use work products – data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.

4. Software Development and Debugging – implement the design by coding

5. Software Testing - Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

INDEX

SL.NO	NAME OF THE EXPERIMENT
	POINT OF SALE SYSTEM
1	Problem Analysis 1(a)Problem Statement 1(b)Project Planning
2	Software Requirement Analysis
3	Modeling 3(a)Design 3(b)Data Dictionary
4	Implementation
5	Testing - Test Cases
6	Documentation

Ex.No 1(a)**PROBLEM ANALYSIS****Problem Statement**

POS - Point of Sale Terminal

- 1) Sale Receipt
- 2) Add Item
- 3) Calculate Cost based on purchased Quantity
- 4) Calculate GST on Final Bit
- 5) Generation of Bill Receipt & Payment
- 6) The final bill has shop name with address in the header, and customer details with points earned in the footer.

Analysis

System analysis is a process of gathering and interpreting facts, diagnosing problems and the information about the Point Of Sale System to recommend improvements on the system. It is a problem solving activity that requires intensive communication between the system users and system consumers. System Analysis or study is an important phase of any system development process. The system is studied to the minutest detailed and analyzed.

The Outputs from the organizations are traced to the various processes. System analysis is concerned with becoming aware of the problem, identifying the relevant and decisional variables, analyzing and synthesizing the various factors and determining an optimal or at least a satisfactory solution or program of action.

A detailed study of the processes must be made by various techniques like interviews, questionnaires, etc., The data is allocated by these sources must be scrutinized to arrive to a conclusion. The conclusion is an understanding of how the system functions. This system is called the existing System. Now the existing system is subjected to close study and problem areas are identified. The designer now functions as a problem solver and tries to get a sort out.

Feasibility study

Technical feasibility

The Point Of Sale System (POS) runs with a minimum system resources:

- Apache NetBeans IDE
- LUCID CHART
- JAVA

Above said system resources are available as open source. Hence it is feasible to develop POS in this environment.

Operational feasibility

As the system has based on GUI no special skill set is required for working with the system, hence it is operationally feasible.

Economic feasibility

As the POS requires minimum system resources, hence it is economically feasible.

Ex.No 1(b)

PROJECT PLANNING

1. Overview

A point of sale (POS) is a place where a customer executes the payment for goods or services and where sales taxes may become payable.

A POS transaction may occur in person or online, with receipts generated either in print or electronically. Cloud-based POS systems are becoming increasingly popular among merchants.

POS systems are increasingly interactive, particularly in the hospitality industry, and allow customers to place orders and reservations and pay bills electronically.

2. Goals and Scope

Goal : To automate the Point Of Sale System with the following functional goals

- 1) Sale Receipt
- 2) Add Item
- 3) Calculate Cost based on purchased Quantity
- 4) Calculate GST on Final Bill
- 5) Generation of Bill Receipt & Payment
- 6) The final bill has shop name with address in the header, and customer details with points earned in the footer.

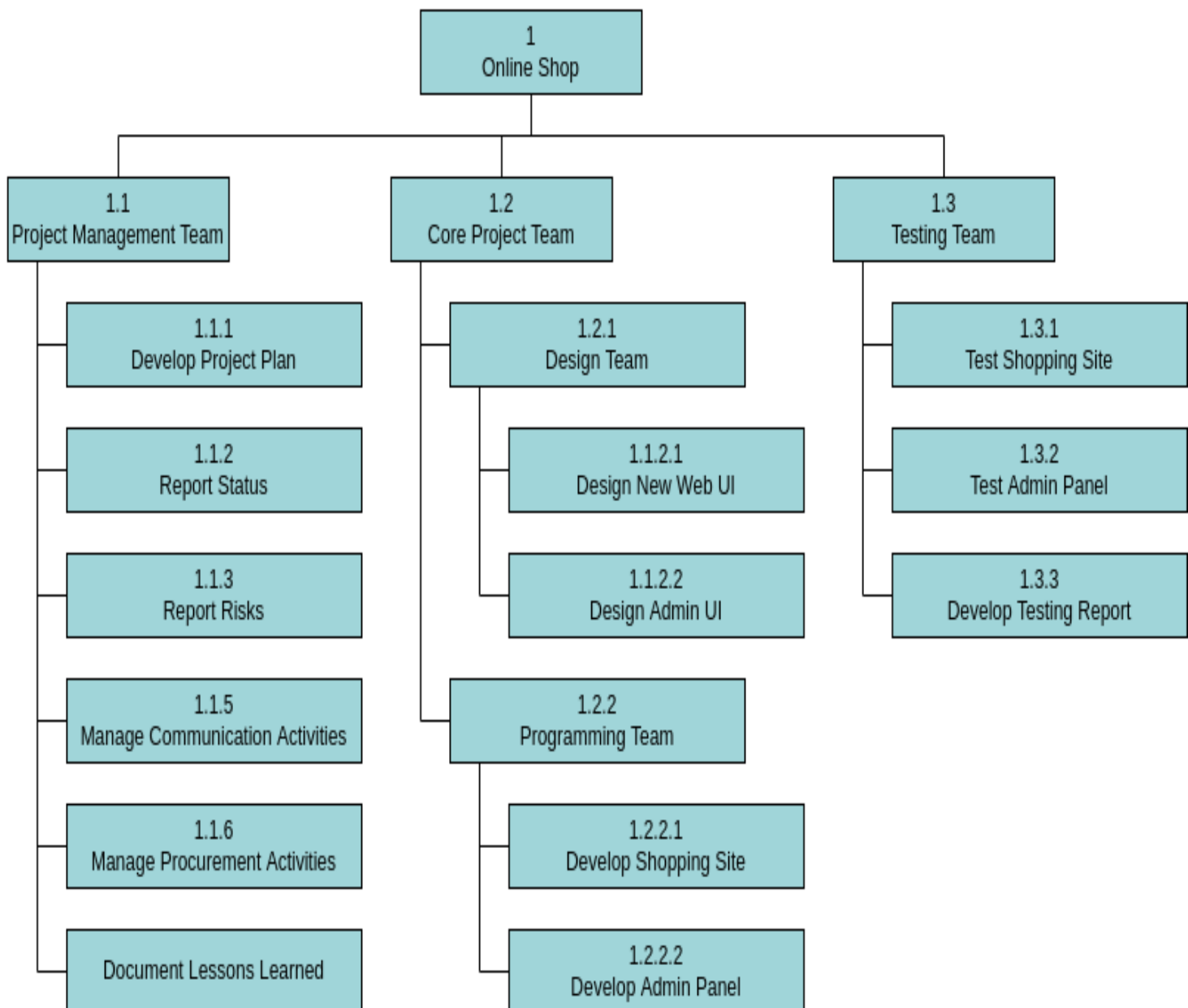
Scope : A point-of-sale system used to refer to the cash register at a store. Today, modern POS systems are entirely digital, which means you can check out a customer wherever you are. Different areas where we can use these applications are:

1. Your POS system calculates the price of the item, including any sales tax.

2. The sounds simple enough, but the setup can work in different ways, depending on whether you sell online, have a physical storefront, or both. A point-of-sale system used to refer to the cash register at a

1. Schedule and Budget

Work Breakdown Structure



Schedule and Milestones

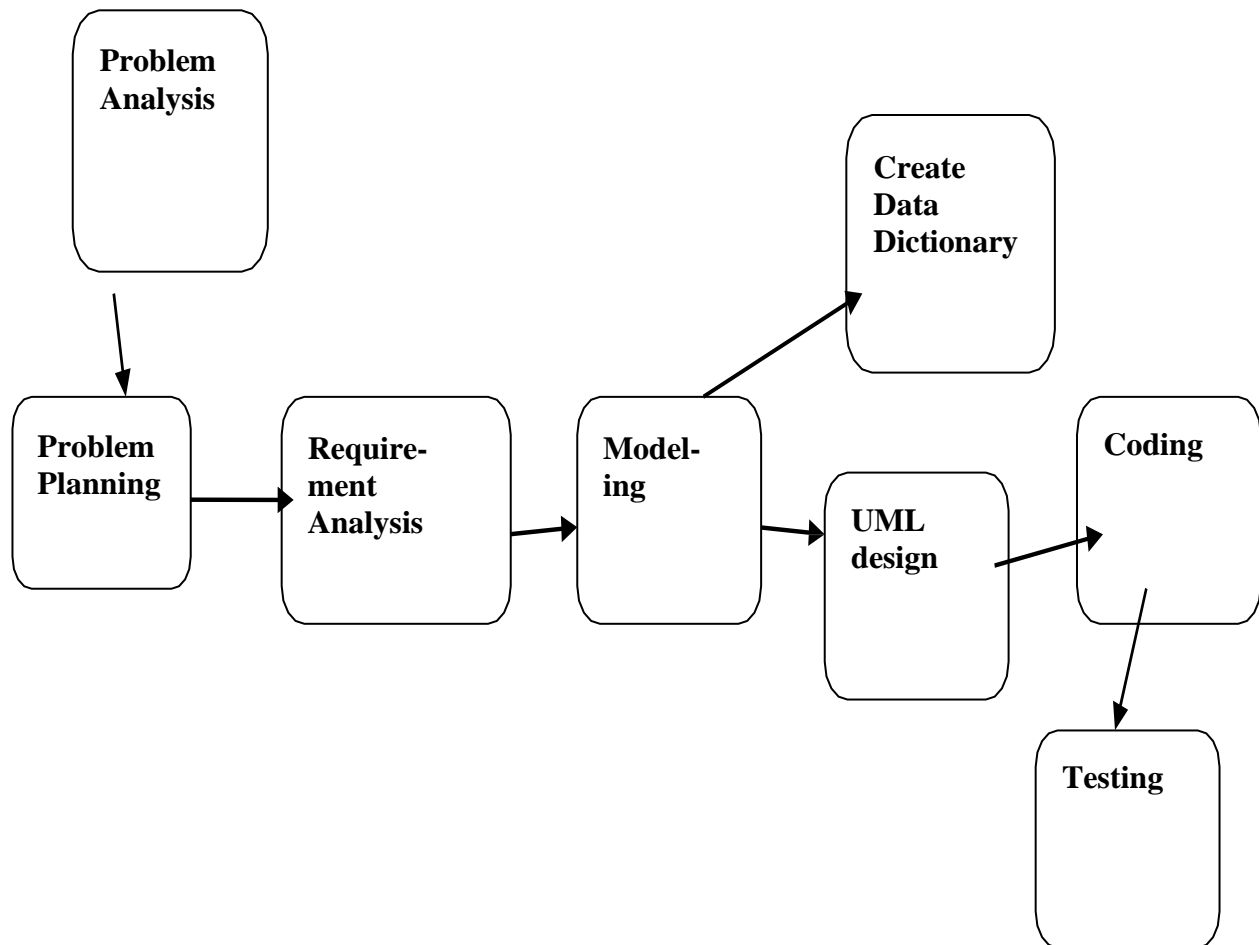
Milestones	Description	Milestone Criteria	Planned week
M0	Problem Analysis		1 st week
		Problem statement, Analysis, Feasibility Study	
M1	Project Planning		2 nd week
		Scope and concept described	
M2	Requirement Analysis		2 nd and 3 rd week
		Draft SRS, Design Specification, Test Plan, Requirement Analysis (Final)	
M3	Study of UML Notations		3 rd week
		Architecture reviewed and stable	
M4	Modeling		4 th week
		Software Design, Data Dictionary	

Budget

Category	Budget for Period in kUS\$					
	M0-M1	M1-M2	M2-M3	M3-M4	M4-M5	M5-M6
Human Resources (internal)						
Human Resources (external)						
Purchases (COTS)						
Equipment						
Premises						
Tools						
Travel costs						
Training						
Review activities						
Other						
Total	1	1	2	5	2	1
Total cumulated	1	2	4	9	11	12

For a detailed list of costs of all resources see <document> [x].

Development Process



Risk Management

Unexpected Holidays, Non availability of computer resources, Absence of Human Resource are the identified risks for not meeting the deadlines. Additional efforts need to put in by the human resources to complete the work within the deadline by the way of working after working hours.

Delivery Plan

Ident.	Deliverable	Planned Date	Receiver
D1	Analysis and Feasibility Report	1 st week	Client
D2	Project Plan	2 nd week	Client
D3	SRS	3 rd week	Client
D4	Design	4 th week	Client
D5	Test Plan	5 th week	Client
D6	Code	6 th week	Client
D7	Test Report	6 th week	Client

Ex.No.2 SOFTWARE REQUIREMENT ANALYSIS**Software Requirement Specification (SRS)****1. Introduction**

The “ POS System” has been developed to override the problems prevailing the Practicing manual system. This software is supported to eliminate and in some cases reduce the hardships faced by this existing system. Moreover this system is designed for the particular need of the company to carry out operations in a smooth and effective manner.

The application is reduced as much as possible to avoid errors while entering the data.It also provides error message while entering invalid data. No formal knowledge is needed for the user to use this system.Thus by this all it proves it is user friendly.It can assist the user to concentrate on the record keeping.Thus it will help organization in better utilization of resources.

Purpose of the requirements document

The purpose of this Software Requirement Specification(SRS) is to provide the descriptions about the point of sale in terms of its functional and non functional requirements.This document will be applicable in guiding the developers users and the testing engineers of Point Of Sale to ensure that the point of sale functionalities and requirements are met.

This document defines and describes the operations, interfaces, performance, and quality assurance requirements of the Point Of Sale System. The document also describes the nonfunctional requirements such as the user interfaces. It also describes the design constraints that are to be considered when the system is to be designed, and other factors necessary to provide a complete and comprehensive description of the requirements for the software.

Scope of the product

The Software Requirements Specification captures all the requirements in a single document. The Point Of Sale System will be designed in the way that is going to provide a computerized management and control over business taking place within a shop located in certain locations.

The Product type may be snacks or Groceries ,the system shall be able to store the unique product name,product type,the price the item was brought,and the selling price of that item.

Definitions, acronyms and abbreviations

SRS-Software Requirement Specification
OUCD-Overall Use Case Diagram
POS-Point Of Sale
UCS-Use Case Specification

References

- (i) ANSI/IEEE std 830-1998, IEEE Recommended Practice for Software Requirements Specifications.
- (ii) ANSI/IEEE std 1233-1996, IEEE Guide for Developing System Requirements Specification.
- (iii) <http://www.softwareengineering-9.com/>

1.5. Overview of the remainder of the document

The SRS will provide a detailed description of the Point Of Sale System. This document will provide the outline of the requirements, overview of the characteristics and constraints of the system.

Section 2 of this document provides the General description such as Product perspective, Product functions and the characteristics of the user's of this product. Section 3 describes the Specific requirements which cover the functional, non-functional and interface requirements. This is obviously the most substantial part of the document but because of the wide variability in organizational practice, it is not appropriate to define a standard structure for this section. The requirements may document external interfaces, describe system functionality and performance, specify logical database requirements, design constraints, emergent system properties and quality characteristics.

2. General description

Product perspective

The Point Of Sale will have two main parts which are:

1)A DataBase Sytem which will be keeping the records such as item names in the inventory, quantity of items remained in the inventory, buying prices of items, selling prices of items, transaction and sale records as well as records for users of the Point Of Sale. This will be the place where all records are stored to retrived from it.

2)End Users are employees who will be the running the business in the working environment of Point Of Sale System.

Product functions

The Functional Requirements are those business functions which will be included in this software

under development. Functional requirements describe the features of the product and what the system must do so as to fulfill the intended user requirements.

The following are functional requirements which will be provided by the Point Of Sale:

- 1) POS will enable users(employees working at the) to be registered into the system by the owner of the shop.
- 2) POS will enable to shop the items which is required.
- 3) POS will allow the customers only to view the day sales.
- 4) POS will provide functionality for both shop owner and customers to print sales at specific test.

User characteristics

Administrator:

The Administrator is one of the two users of the system. In this case the Administrator is the operations manager of the . However there can be more than one Administrations.

Administrators can access the administration module and the report module. The administrators of the system to have more knowledge of the internals of the system and is able to rectify the small problems that may arise due to disk crashes, power failures and other catastrophes to maintain the system.

Cashier:

The cashier is the second user of the system. The Cashiers are responsible for the transactions made with the customers. Thus, they are limited to accessing transaction module only. They can view, add, edit and cancel products. They use the system for every transaction created.

General constraints

- The information of all the users must be stored in a database that is accessible by the Point Of Sale System.
- The Point Of Sale System is connected to the server computer and is running all 24 hours a day.

Assumptions and dependencies

- The users have sufficient knowledge of computers.
- The users know the English language, as the user interface will be provided in English
- The product can access anyone.

3. Specific requirements

Functional Requirements

Functionality:

Selection between cash and management system area:

The User has the possibility to choose between cash Area for selling processes and the Management.

Area to manage the master data ,depending upon user rights.

Management System:

Employee Management, customer Management, Product Group Management.

Statistics:

Sales,Cashier,Product Groups.

.

Cash:

Cash opening Entry, Enter Customer Name, Enter Customer Phone Number, Enter Product Group, Sales Discount, Cash Check.

Non- Functional Requirements

Usability

- The system is user friendly and self-explanatory.

Reliability

The system has to be very reliable due to the importance of data and the damages incorrect or incomplete data can do.

Availability

The system is available 100% for the user and is used 24 hrs a day and 365 days a year.
The system shall be operational 24 hours a day and 7 days a week.

Mean Time Between Failures (MTBF)

The system will be developed in such a way that it *may* fail once in a year.

Mean Time to Repair (MTTR)

Even if the system fails, the system will be recovered back up within an hour or less.

Accuracy

The accuracy of the system is limited by the accuracy of the speed at which the employees of the and users of the use the system.

Maximum Bugs or Defect Rate

Not specified.

Access Reliability

The system shall provide 100% access reliability.

Performance

Response Time

The system shall respond to the member in not less than two seconds from the time of the request submittal. The system shall be allowed to take more time when doing large processing jobs.

The requirements may document external interfaces, describe system functionality and performance, specify logical database requirements, design constraints, emergent system properties and quality characteristics.

Hardware and software requirements

Hardware Interfaces

- ☐ Processor: Pentium or Higher.
- ☐ RAM: 312MB or Higher.

3.3..2. Software Interfaces

- ☐ Operating System: Unix, Linux, Mac, Windows etc..
- ☐ Development tool: Apache NetBeans IDE
- ☐ Data Base: Local Root.

3.4 External Interfaces

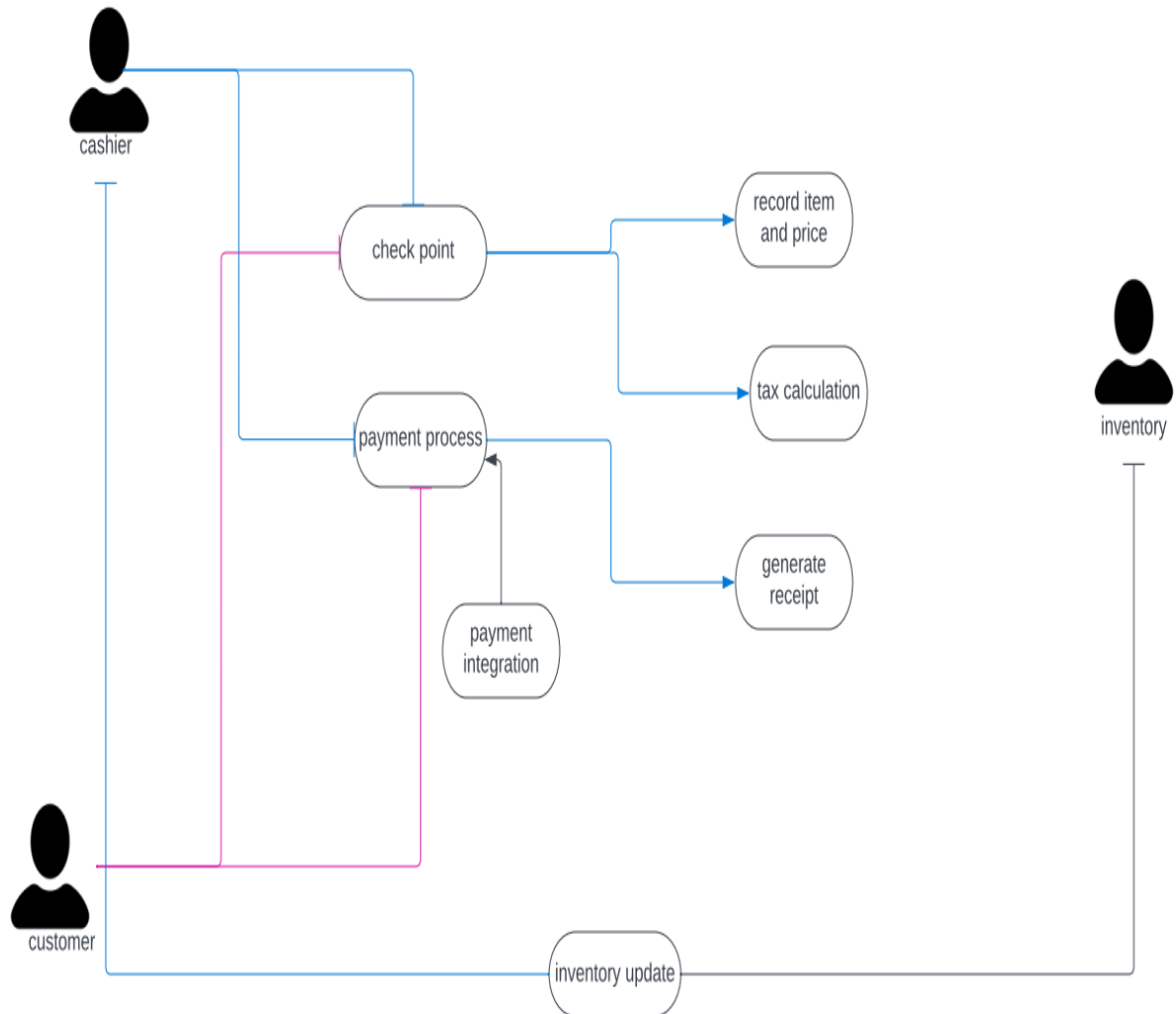
User Interfaces

The user-interface of the system shall be designed as shown in the user-interface prototypes.

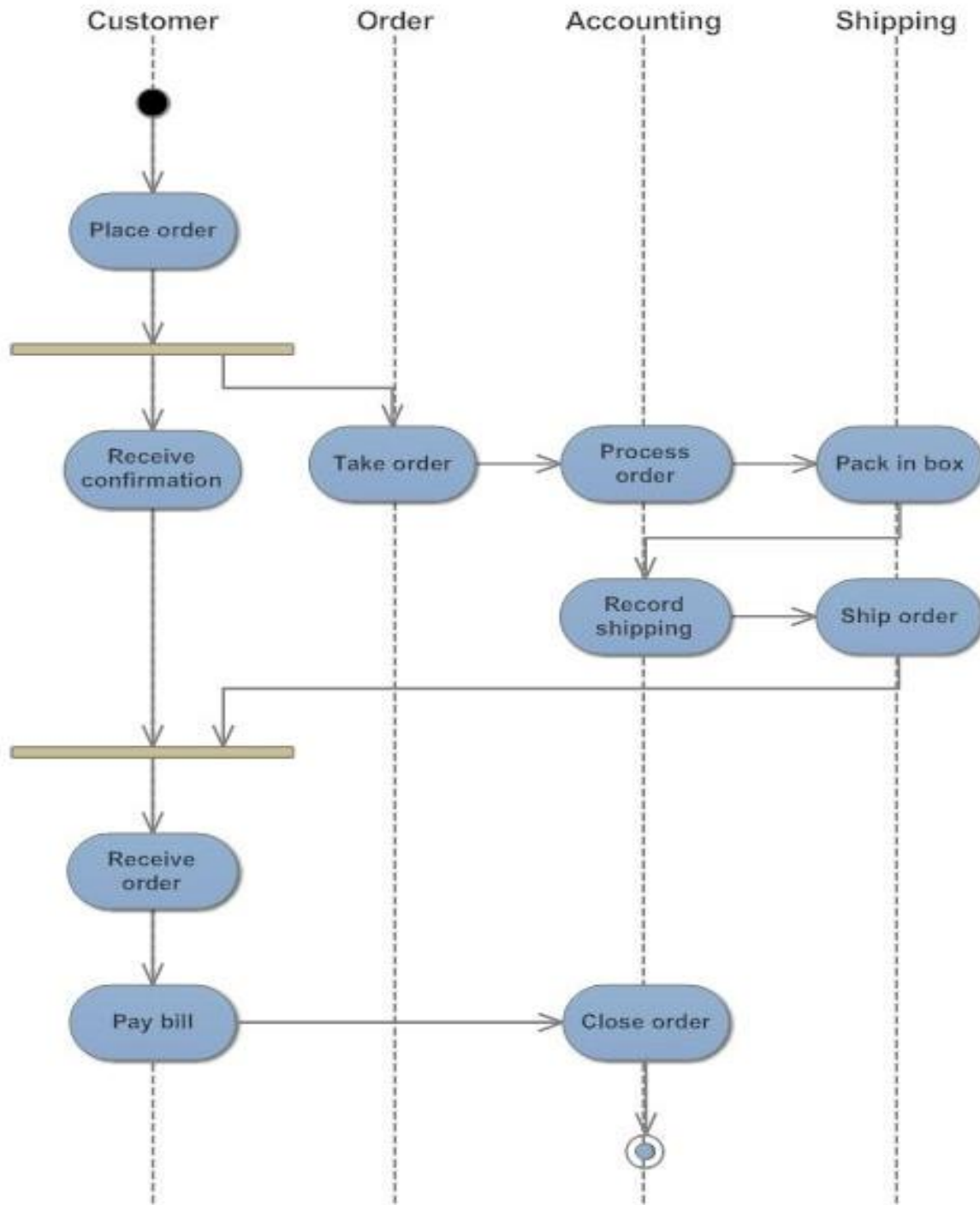
4. Appendices

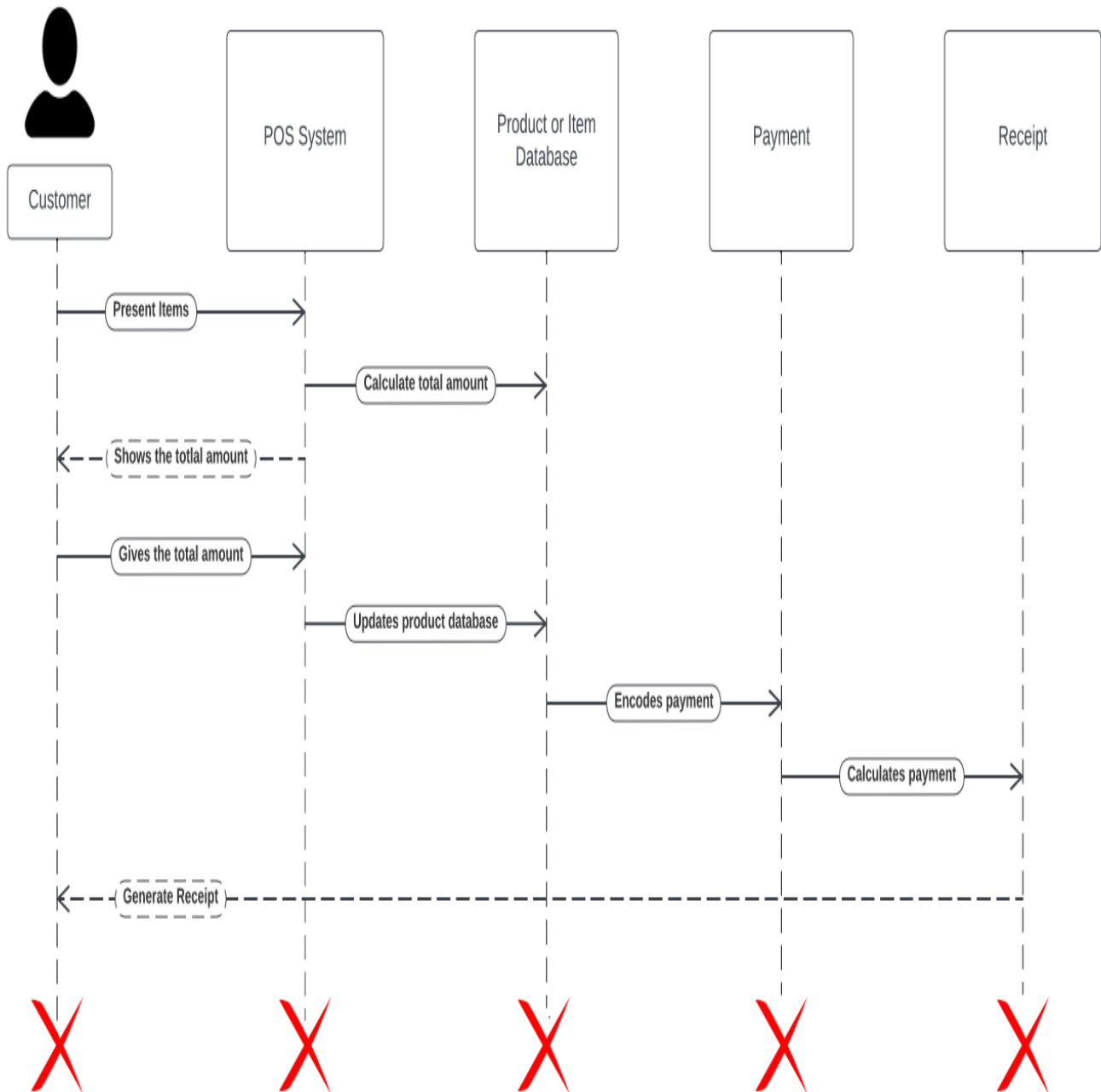
5. Index

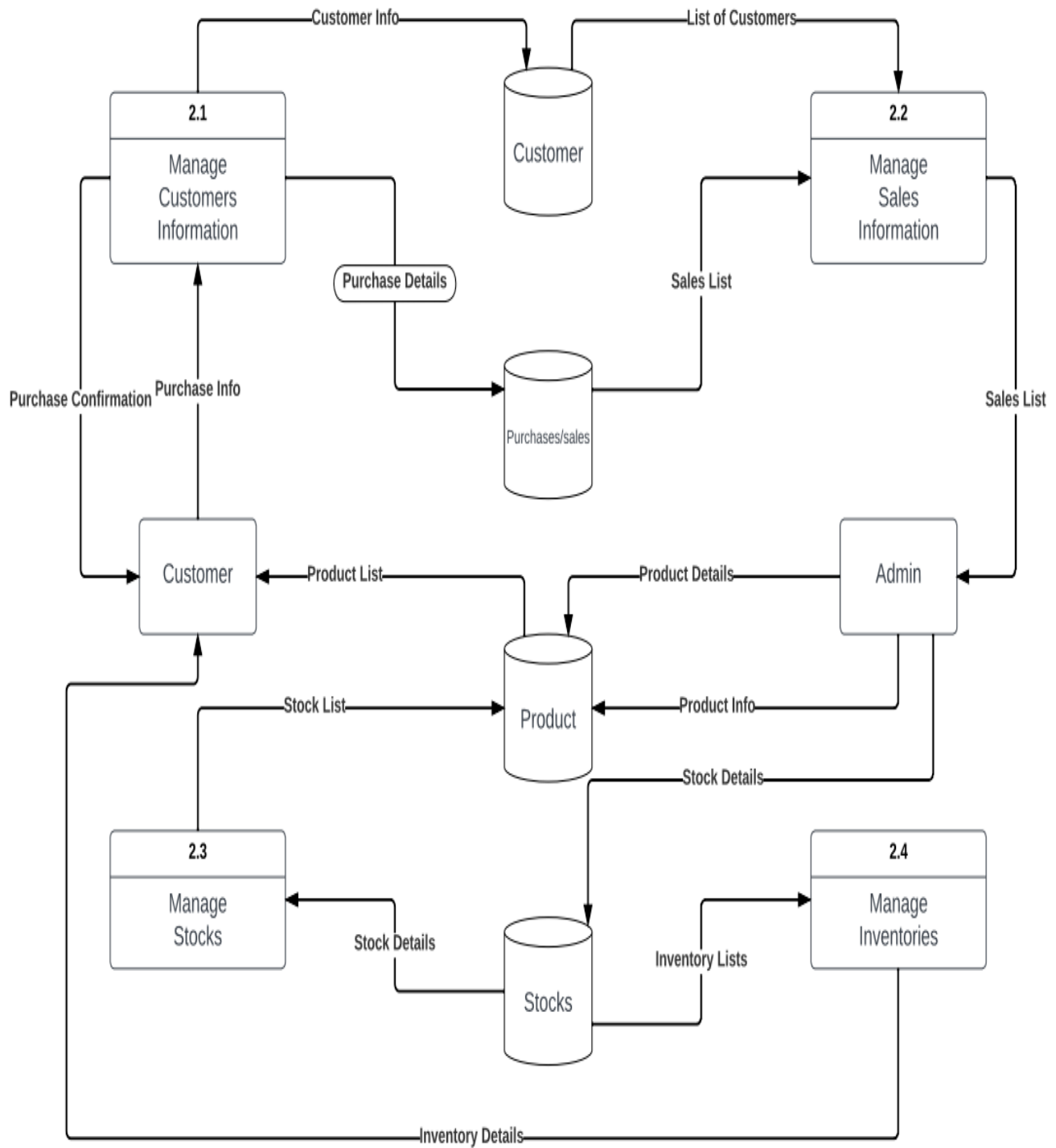
Result: Thus the Software Requirement Specification Document for Point Of Sale System has been completed.

Ex.No. 3**MODELING****(i) Design model –UML diagrams****Use case diagram****Step 1:start LUCID CHART->Create-> Use Case Diagram**

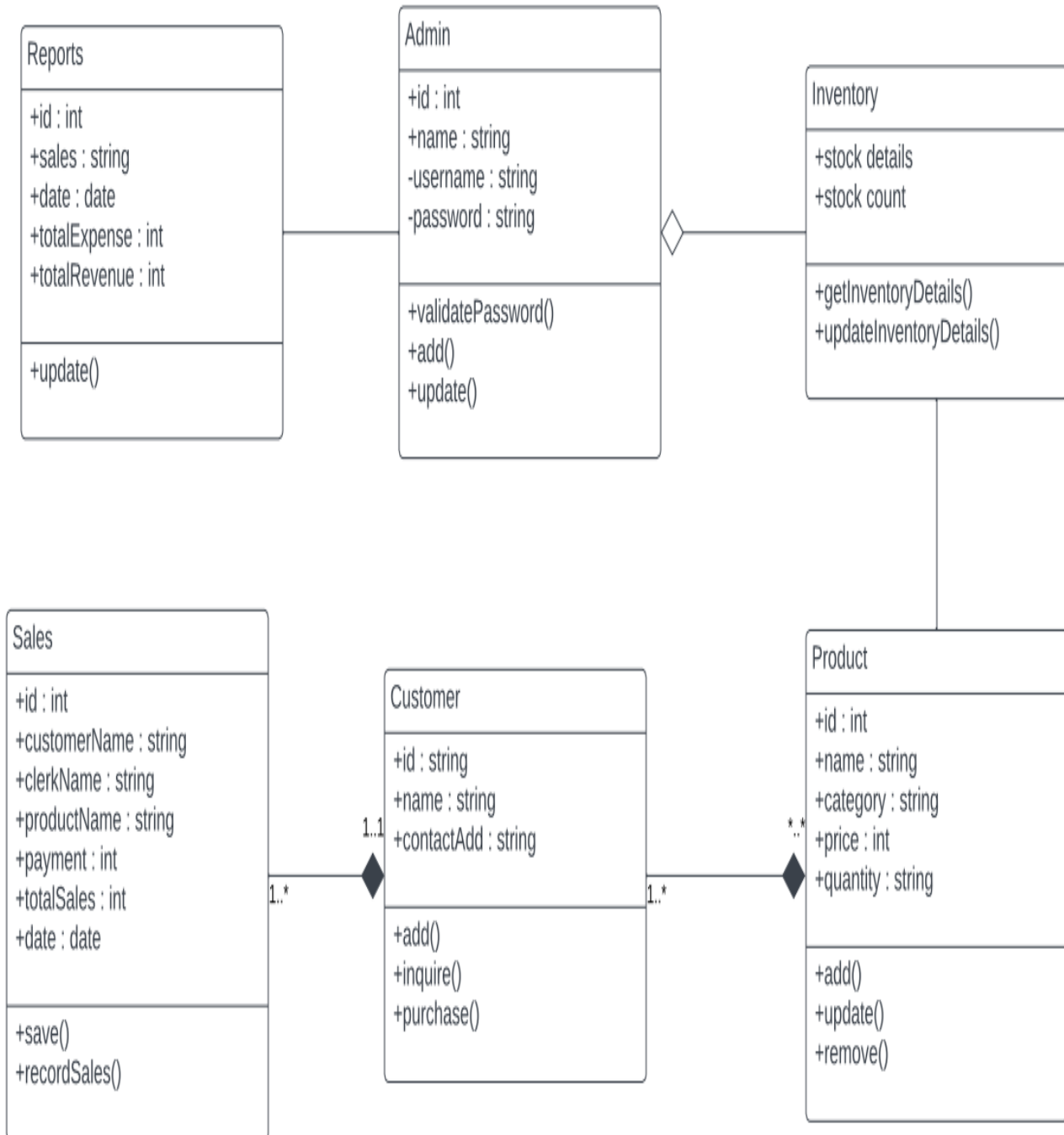
Activity Diagram for Point Of Sale



Sequence diagram for Point Of Sale

Data Flow Diagram (Level 2)

Class Diagram



Ex.No.3 (b) DATA DICTIONARY**Details**

S.No	Name	Alias Name	How Used	Supplementary Data	
				Data Type	Limitations
1	Product name	Title	Buy	string	Up to 20 char
2	Product Price	Price	Pay	integer	Up to 16 digit

User Details

S.No	Name	Alias Name	HowUsed	Supplementary Data	
				Data Type	Limitations
1	User name	Name	For Printing Purpose	string	Up to 20 char
2	Phone Number	Number	For Printing Purpose	string	Up to 10 char

Ex.No.4**IMPLEMENTATION**

```

import java.text.MessageFormat;
import javax.swing.JFrame;
import javax.swing.JOptionPane;
import javax.swing.JTable;
import javax.swing.table.DefaultTableModel;
import java.util.regex.Pattern;
public class POS extends javax.swing.JFrame {
    public POS() {
        initComponents();
    }
    public void ItemCost()
    {
        double sum = 0;
        for(int i = 0; i < jTable1.getRowCount();i++)
        {
            sum = sum + Double.parseDouble(jTable1.getValueAt(i,2).toString());
        }
        jtextSubTotal.setText(Double.toString(sum));
        double cTotal1 = Double.parseDouble(jtextSubTotal.getText());
        points = cTotal1;

        double cTax = (cTotal1 * 0.12);
        String iTaxTotal = String.format("₹ %.2f", cTax);
        jtextGST.setText(iTaxTotal);

        String iSubTotal = String.format("₹ %.2f", cTotal1);
        jtextSubTotal.setText(iSubTotal);

        String iTotal = String.format("₹ %.2f", cTotal1 + cTax);
        jtextTotal.setText(iTotal);
    }
    private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
        String Enternumber = jtextDisplay.getText();

        if("").equals(Enternumber))
        {
            jtextDisplay.setText(jButton1.getText());
        }
        else
        {
            Enternumber = jtextDisplay.getText() + jButton1.getText();
            jtextDisplay.setText(Enternumber);
        }
    }
}

```

}

```

public double Change()
{
    double sum = 0;
    double tax = 12;

    if(!"".equals(jtextDisplay.getText())) {
        double cash = Double.parseDouble(jtextDisplay.getText());

        for(int i = 0; i < jTable1.getRowCount();i++)
        {
            sum = sum + Double.parseDouble(jTable1.getValueAt(i,2).toString());
        }

        double cTax = (sum * tax)/100;
        double cChange = (cash - (sum + cTax));

        return cChange;
    }
    return 0;
}

```

```

private void jbtnPrintActionPerformed(java.awt.event.ActionEvent evt) {

    if("").equals(jtextCName.getText()) && "".equals(jtextCNum.getText())
    {
        JOptionPane.showMessageDialog(frame,"Customer Name and Contact Number is
required","Warning",JOptionPane.WARNING_MESSAGE);
    }
    else if("").equals(jtextCName.getText())
    {
        JOptionPane.showMessageDialog(frame,"Customer Name is
required","Warning",JOptionPane.WARNING_MESSAGE);
    }
    else if(jtextCName.getText().contains(" "))
    {
        String[] arr = jtextCName.getText().split(" ");
        boolean warning = false;
        for(String str:arr)
        {
            if(!Pattern.matches("[a-zA-Z]+",str))
            {
                warning = true;
                break;
            }
        }
    }
}

```

```


        if(warning)
        {
            JOptionPane.showMessageDialog(frame,"Customer Name is should contain only
alphabets","Warning",JOptionPane.WARNING_MESSAGE);
        }
    }
    else if(!Pattern.matches("[a-zA-Z]+",jtextCName.getText()))
    {
        JOptionPane.showMessageDialog(frame,"Customer Name is should contain only
alphabets","Warning",JOptionPane.WARNING_MESSAGE);
    }
    if("").equals(jtextCNum.getText())
    {

        JOptionPane.showMessageDialog(frame,"Customer Contact number is
required","Warning",JOptionPane.WARNING_MESSAGE);
    }
    else if(jtextCNum.getText().length() != 10)
    {
        JOptionPane.showMessageDialog(frame,"Customer Contact number should be 10
digits","Warning",JOptionPane.WARNING_MESSAGE);
    }
    else
    {
        points = points*(0.1);


        MessageFormat header = new MessageFormat("S.R.S.T Shop No 48 Main Road Anna Nagar Chennai");
        MessageFormat footer = new MessageFormat("Customer Name : "+jtextCName.getText()+" Contact Number:
"+jtextCNum.getText()+" Points Earned: "
+Double.toString(points));

        try
        {
            jTable1.print(JTable.PrintMode.NORMAL,header,footer);
        }
        catch(java.awt.print.PrinterException e)
        {
            System.err.format("No Printer Found", e.getMessage());
        }
    }
}


```


₹ 15




₹ 50




₹ 35




₹ 50




₹ 80




₹ 35



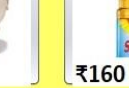
₹ 160




₹ 255




₹ 60



₹ 110



₹ 70



₹ 200

Product	Quantity	Amount

Name

Contact Number

7

8

9

4

5

6

1

2

3

.

0

C

SubTotal

G.S.T

Total

Payment Method

Cash

Amount

Change

Pay

Reset

Print

Remove

Exit

BILL RECEIPT:**S.R.S.T Shop No 48 Main Road Anna Nagar Chennai**

Product	Quantity	Amount
Cooking Oil	1 Litre Bottle	160.0
Shampoo	1 75ml Bottle	70.0
Potato Chips	1 90g Packet	50.0
CocaCola	1 600ml Bottle	50.0
Horlicks	1 100g Bottle	255.0
Axe Body Spray	1 300ml Bottle	200.0
Eggs	1 Pack of 6	35.0
Biscuits	1 75g packet	15.0
Gross Total		₹835.00
G.S.T Added		₹100.20
Net Total		₹935.20
Mode of Payment		Cash
Received		₹1000
Balance returned		₹64.80

Customer Name : RAKSHAN Contact Number: 9345876062 Points Earned: 83.5

Ex.No 5**TESTING****Test cases:**

Name	Requirement	Description	Input	Expected O/P	Actual O/P
Pay	Cash should be selected & Amount entered should be greater than or equal to the bill Amount.	Used to Pay the bill Amount.	Amount, Name, Contact Number.	Valid input	Valid input
Pay	Cash should be selected & Amount entered should be lesser than the bill Amount.	Used to Pay the bill Amount.	Amount, Name, Contact Number.	Invalid input	Invalid input
Print	User Name and Contact Number has to be entered	To print the receipt with User Name and Contact Number	User Name and Contact Number	Valid input	Valid input
Print	User Name must be entered	To print the receipt with User Name and Contact Number	User Name	Invalid input	Invalid input
Print	Contact Number should be 10 digits	To print the receipt with User Name and Contact Number	Contact Number	Valid input	Valid input
Print	Contact Number should not be 10 digits	To print the receipt with User Name and Contact Number	Contact Number	Invalid input	Invalid Input