



London Metropolitan University

Department of Computing, Communication Technology and Maths

MSc Financial Markets and Information Systems

Object-Oriented Analysis and Design Assignment

ECP038C

Title: "Clothing Department Store" - Object-Oriented Analysis and Design using the Unified Modelling Language and the Unified Process

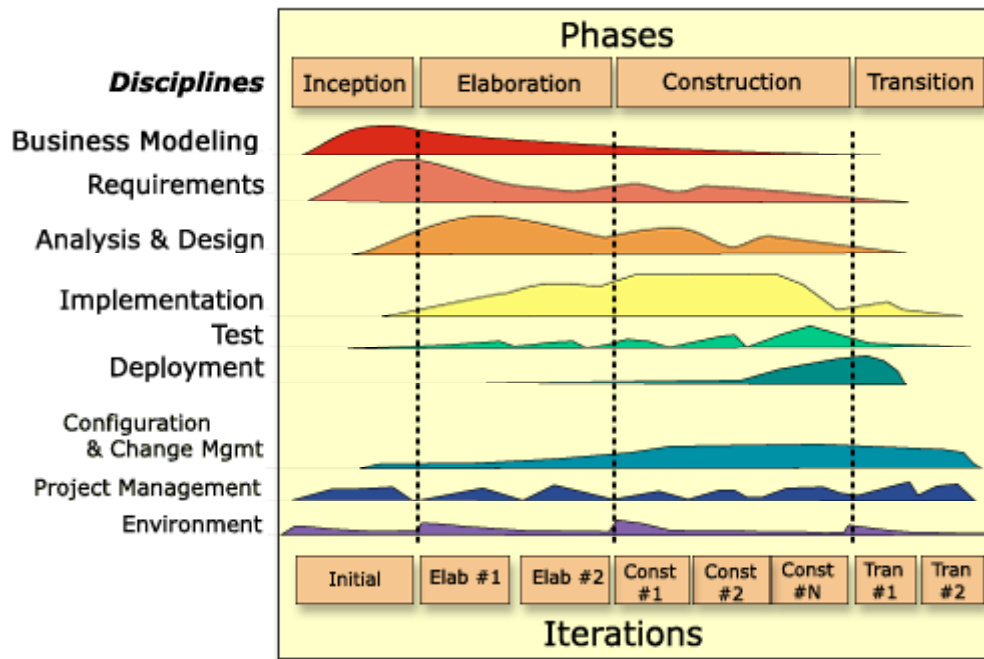
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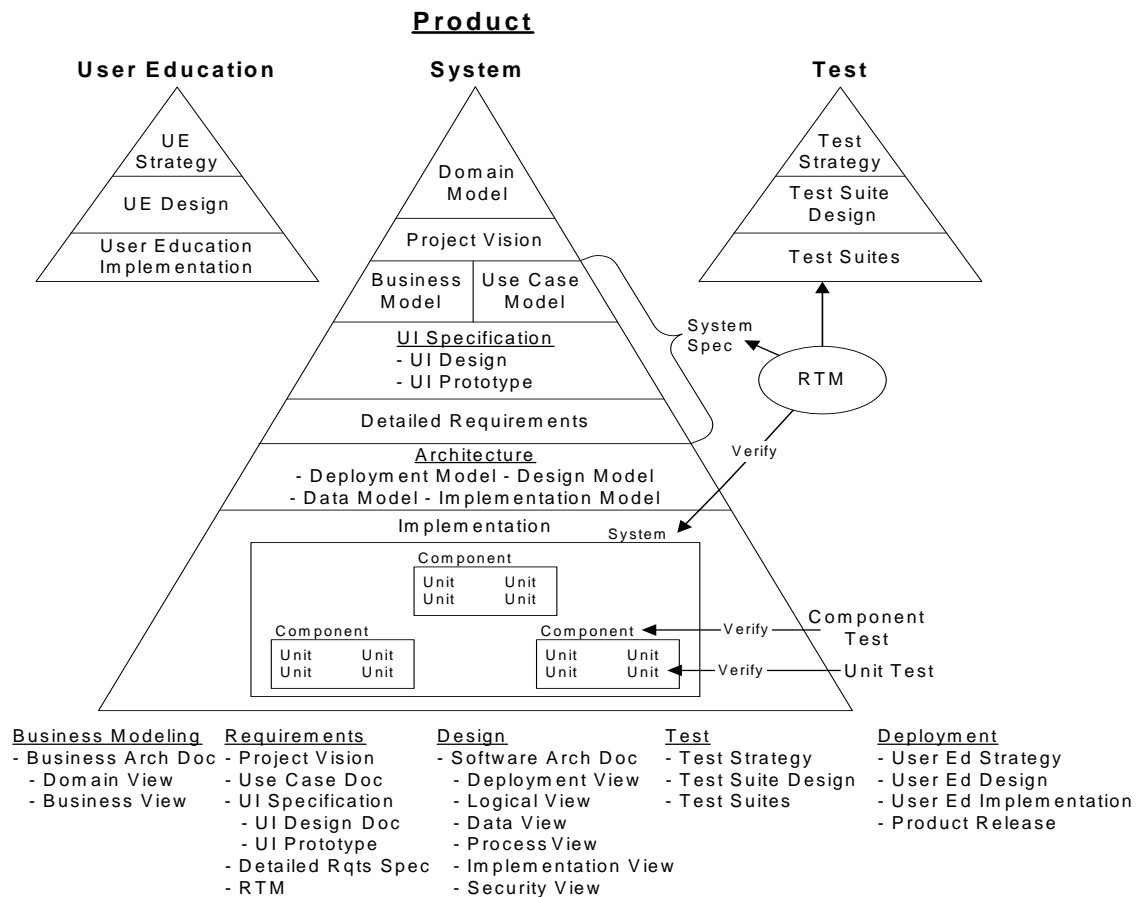
1 **Introduction**

The Clothing Department Store (**CDS**) is a sample application that uses the Rational Unified Process (RUP) and Rational Rose to develop the de-facto standard blueprint IT application. This sample application readdresses the same store problem domain and develops the solution by applying the Rational Unified Process (RUP) for business modelling, requirements, analysis & design, implementation and test. This initial version of Clothing Department Store offers two implementations – C++ for Point of Sale System and - J2EE for On-Line Sales System (not implemented yet).

Note: *Within this document has been discussed only the **Point of Sale System** model of the Clothing Department Store, for the reference to the TeleSales System and the On-Line Sales System models please see the attached CD with the mdl files.*

1.1 RUP Development Case - IT StorePlan





Our development case for RUP, called IT StorePlan, organizes the RUP model artifacts into levels of detail as follows:

The product consists of three types of artifacts – User Education, System and Test artifacts.

User Education – All levels of representation of the user education materials, including strategy, design and the materials themselves. Users are usually grouped into three categories – business users, system operations, system maintainers.

System - All levels of representation of the deployed system starting at the highest level with the problem definition (captured in the Domain Model) through requirements, design and implementation.

Test – All levels of representation of the tests that verify the system – system test, component test and unit test. System tests are represented in three levels of detail – Test Strategy, Test Suite Design and the actual Test Suites.

1.2 Classified Artifacts

The following artifacts have been revealed with the Store's sample application:

- ✓ Business Architecture
 - Domain Model
 - Business Model
 - ✓ Requirements
 - Project Vision
 - Project Mission
 - Business & Technical Objectives
 - Financial Business Case
 - Use Cases
 - Use Case Model
 - Use Case Object Model
 - UI Specification
 - UI Design
 - UI Prototype
 - Detailed Requirements
 - Requirement Traceability Matrix
 - ✓ Software Architecture
 - Deployment View
 - Logical View
 - Data View
 - Process View
 - Implementation View
 - Security View
 - ✓ Test Plan
 - Test Strategy
 - Test Suite Design
- Two Implementations
- ✓ C++ , SQL Server
 - ✓ Implementation (Future)
 - ✓ J2EE, JBoss, Oracle
- ✓ Because of the volume restrictions in this project it will be dealt with only two artifacts Business Architecture and Software Architecture.

2 Business Architecture

The Business Architecture contains two major sections -

- Domain View:** Model the industry context in which the solution is to perform.
- Business Process View:** Models the current, 'As-Is' internal business processes.

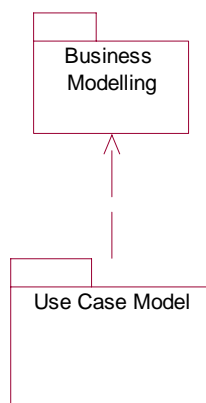
2.1 Domain View

The Domain Model briefly describes and narrates an object-oriented analysis of Store's business environment. A Domain Model describes "what is the business problem" while the "As-Is" Business Model and "To-Be" Use Case Model describe "how the problem is to be solved". The specific mechanisms for interacting with the business are left to the Business and Use Case Models.

The Domain Model serves three purposes:

- It confirms the analyst understands the business problem by packaging it up and echoing it back to the business community.
- It provides an effective vehicle to communicate the business problem to the rest of the project team.
- It serves as an initial starting point for the Business and Use Case Models.

Clothing Department Store Top Level Use Case View

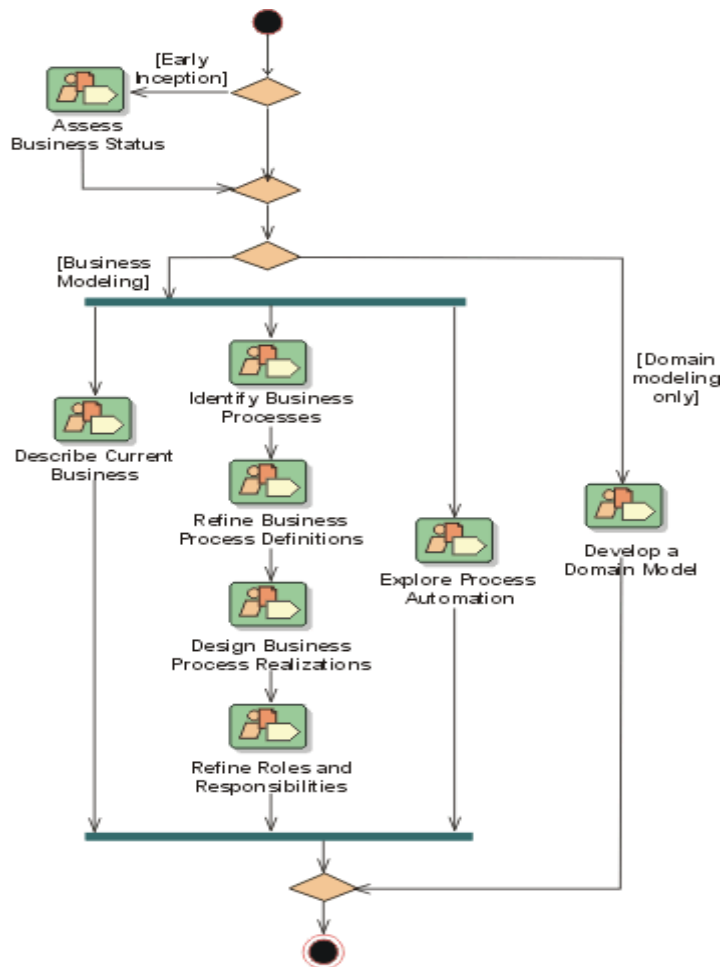


The purposes of business modeling are:

- To understand the structure and dynamics of the organization.
- To ensure that customers, end users, and developers have a common understanding of the organization.
- To derive requirements on systems to support the organization.

The use-case model is a model of the system's intended functions and its environment, and serves as a contract between the customer and the developers. The use-case model is used as an essential input to activities in analysis, design, and test.

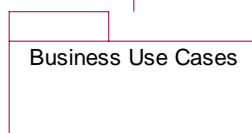
2.2 Business Modelling



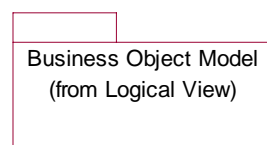
Business Modeling



A business actor represents a role played in relation to the business by someone or something in the business environment.



The business use-case model is a model of the business intended functions. The business use-case model is used as an essential input to identify roles and deliverables in the organization.



The business object model is an object model describing the realization of business use cases. It serves as an abstraction of how business workers and business entities need to be related and how they need to collaborate in order to perform the business.

2.2.1 Business Actors

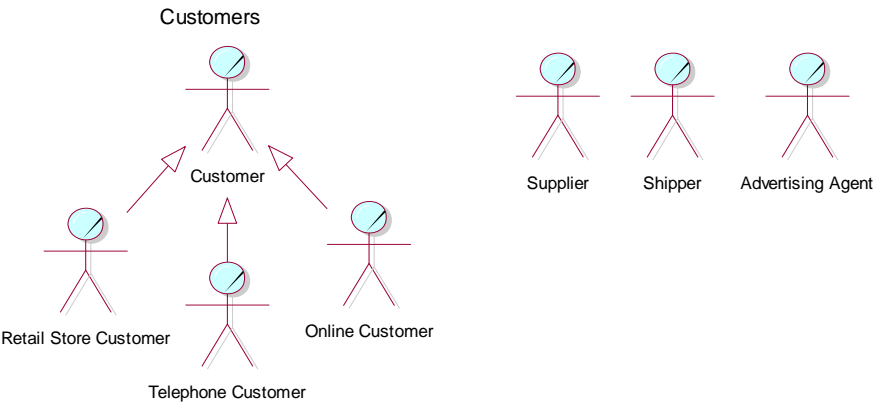
This section describes each of the actors that participate in the domain use cases. This section introduces each actor and their role in the business domain, similar to a playbill's introduction of cast in a play.

Actor	Role
Customer	Any individual or organization that purchases classical music items from Clothing Department Store.
Retail Store Customer	Any customer that purchases items from a retail store.
Supplier	Provides wholesale items for Clothing Department Store for resale.
Shipper	The shipping company delivers items from the Clothing Department Store. warehouse and delivers them to the customers.
Point Of Sale System	The point of sale system is a combination of hardware and software that performs the role of a checkout register. The POS device is capable of scanning bar codes, and credit cards. POS systems are used in all Clothing Department Retail Stores.
Inventory Management System	The Inventory Management System manages the inventory at the Clothing Department Store. corporate offices. This includes telephone sales, on-line sales and inventory for retail stores.
Accounting System	The accounting system is an "off the shelf" software application for managing the company's general ledger, accounts payable, accounts receivable, payroll, and for preparing the companies taxes.

Note: Only described Actors participated within POS, for the rest see the attached CD.

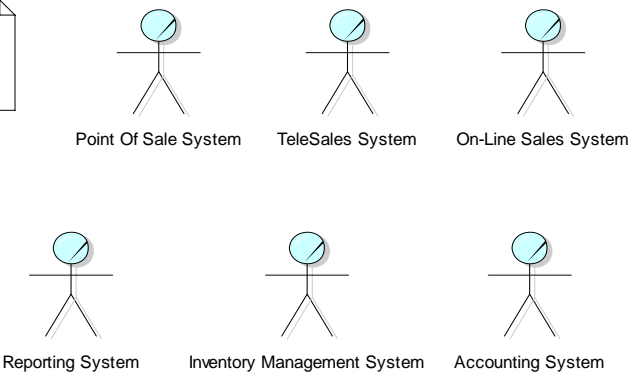
Business Actors

A business actor represents a role played in relation to the business by someone or something in the business environment.



Information Systems

Sometimes the employees of one business contact the employees of another business by using the other business' information system. From the perspective of the mode...

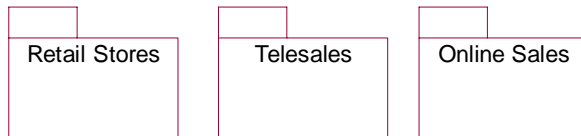


2.2.2 Business Use Cases

The business use-case model is a model of the business intended functions. The business use-case model is used as an essential input to identify roles and deliverables in the organization. The Business Model serves as a benchmark starting point to be compared with the “To Be” business processes described in the Use Case Mode

Business Use Cases (Processes)

Principal Sales Outlets

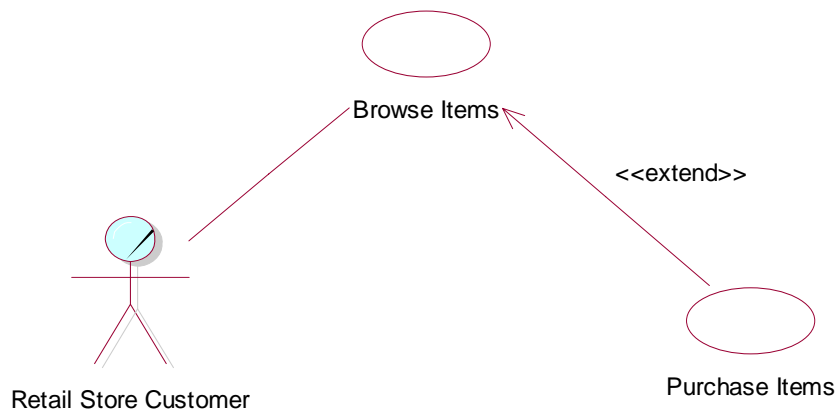


Management and Supporting Use Cases



Management and supporting business use cases do not necessarily need to connect to a business actor, although they normally have some kind of external contact. A management business use case, for instance, might have the owners of the business, or the board, as its business actor.

- Principal Sales Outlets - Retail Store

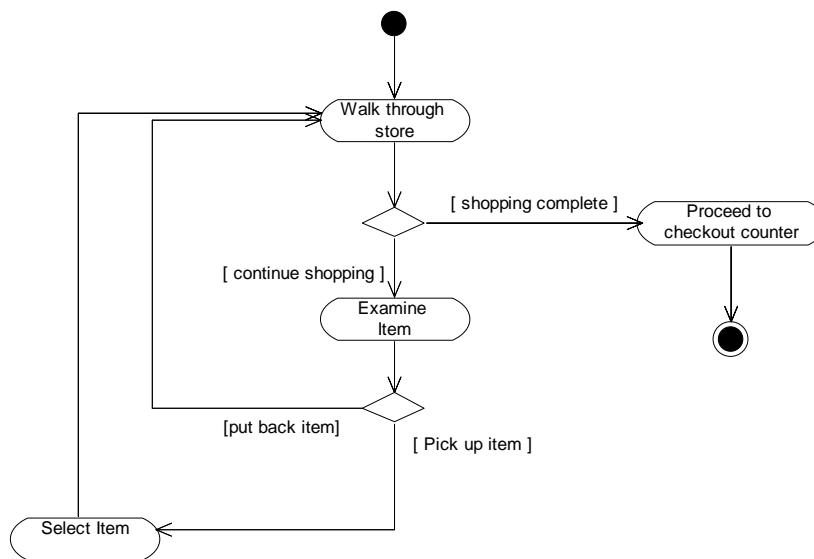


Actor	Role
Retail Store Customer	Any customer that purchases items from a retail store.

Use Case Name	Documentation
Browse Items	The customer looks at the product selections on display in the store. The customer can pick up and examine any of the products out on display.
Purchase Items	<p>The customer, having selected at least one item, brings the items up to the check out register (POS) and purchases the item(s).</p> <p>The sales person accepts the items and one by one adds them to the total bill of sale. The POS device computes the total cost, including any appropriate taxes.</p> <p>The sales person remove the tickets from the garments and swipes any items that have security stickers on them before bagging the item to prevent the store alarm from going off.</p> <p>.</p>

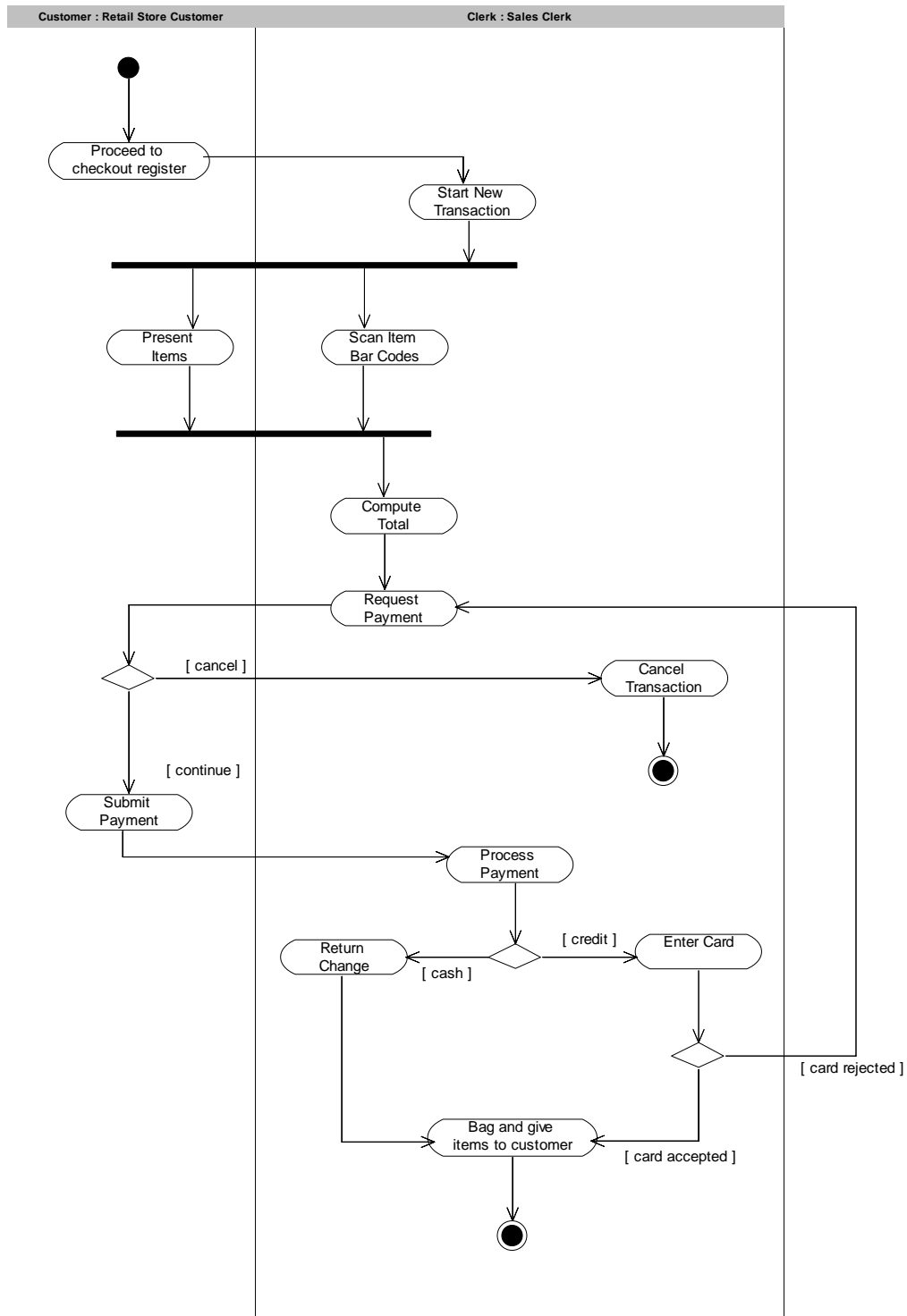
- **Browse Items**

The below active diagram depicts the workflow of examining the products on display by the customer within the store.



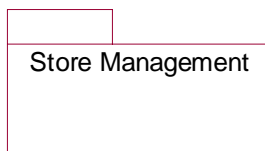
- **Purchase Items**

The below activity diagram illustrates an workflow of making a purchase between the customer and sales person.



- **Management and Supporting Use Cases**

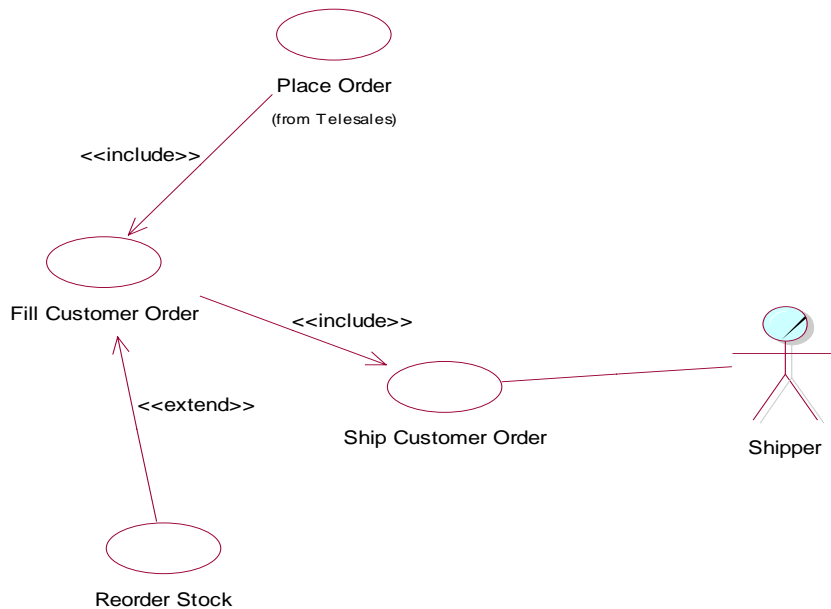
Management and supporting business use cases do not necessarily need to connect to a business actor, although they normally have some kind of external contact. A management business use case, for instance, might have the owners of the business, or the board, as its business actor.



- **Inventory/Shipping**

Use Case Name	Documentation
Place Order	<p>A customer calls Clothing Department Store's toll free order line and talks with a Tele-sales clerk. The customer tells the clerk which items he/she would like to order.</p> <p>If the customer does not know the exact item number the clerk will help the customer find the item by searching the product database.</p> <p>Ultimately the customer will confirm the item list and request the items to be purchased.</p> <p>The clerk gets the customers name, addresses and payment information. The clerk confirms payment from the credit card and tells the customer that the order has been processed.</p>
Fill Customer Order	<p>The shipping clerk obtains a new customer order, that has been placed either by telesales or the new on-line store. The order contains a list of items that have been paid for. The clerk collects these items from the warehouse and packages them together.</p> <p>A copy of the bill of sale, package list and any additional flyers or marketing information is included with the shipment. A printout of the shipping address and information is attached to the box.</p> <p>The box is placed in the bin appropriate for the method of shipping (3 day ground, next day air).</p>
Reorder Stock	<p>When the inventory of a particular item reaches a minimum value, the stock is reordered from the supplier.</p>
Ship Customer Order	<p>Twice a day the clerk collects all the items in the next day air bin and organizes them on the loading dock so that</p>

Actor	Role
Shipper	The shipping company delivers items from the Clothing Department Store. warehouse and delivers them to the customers. The Shipping company can be the postal service, next day air company, or a preferred ground transportation company.



- **Store Management**

Till Management

Employee Management

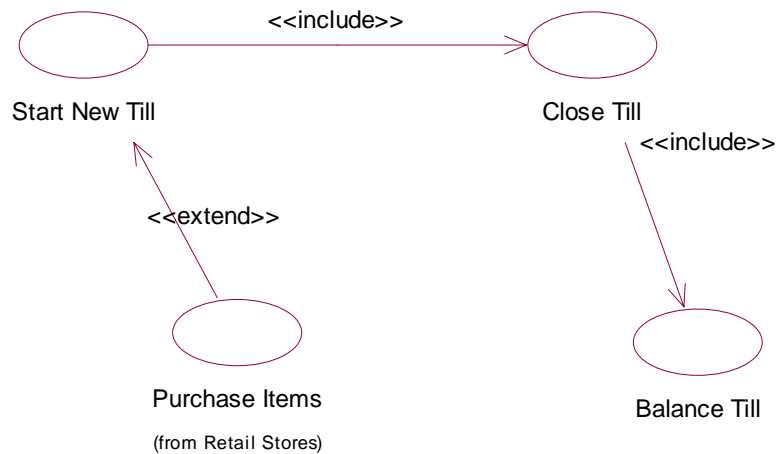
Inventory Management

Building Management

Seles Period Management

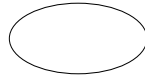
- **Till Management**

Use Case Name	Documentation
Purchase Items	<p>The customer, having selected at least one item, brings the items up to the check out register (POS) and purchases the item(s).</p> <p>The sales person accepts the items and one by one adds them to the total bill of sale. The POS device computes the total cost, including any appropriate taxes.</p> <p>The sales person remove the tickets from the garments and swipes any items that have security stickers on them before bagging the item to prevent the store alarm from going off.</p>
Start New Till	<p>The manager creates a new till box, and fills it with enough money to adequately make change for customers. The manager then indicates to the POS machine that a new till has been started. The sales person enters in a personal password code to tell the POS sale machine who is currently managing the till.</p>
Close Till	<p>The sales person indicates to the POS that the till should be closed. The POS will not register any other sales until an new till has been started. The sales person adds up all the money in the till, and presents it to the manager. This use case then includes the Balance Till use case.</p>
Balance Till	<p>The till is reconciled with what the POS system indicates should be the ending balance. The manager assists and confirms the sales person's balance.</p>

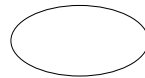


- **Employee Management**

Use Case Name	Documentation
Manage Employee Schedules	The manager creates a work schedule for all employees, including the managers themselves.
Create Time Card	Identify the hours that the employee has worked for the particular pay period.
Propose Commissions	Some of the store staff (sales people) are paid partly on commission. Manger provides the Accounting Department with the information for the bills of the sales of the particular staff. The sales person adds up all the money in the till, and presents it to the manager. This use case then includes the Balance Till use case.
Propose Commissions	Some of the store staff (sales people) are paid partly on commission. Manger provides the Accounting Department with the information for the bills of the sales of the particular staff.



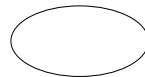
Manage Employee Schedules



Create Time Card



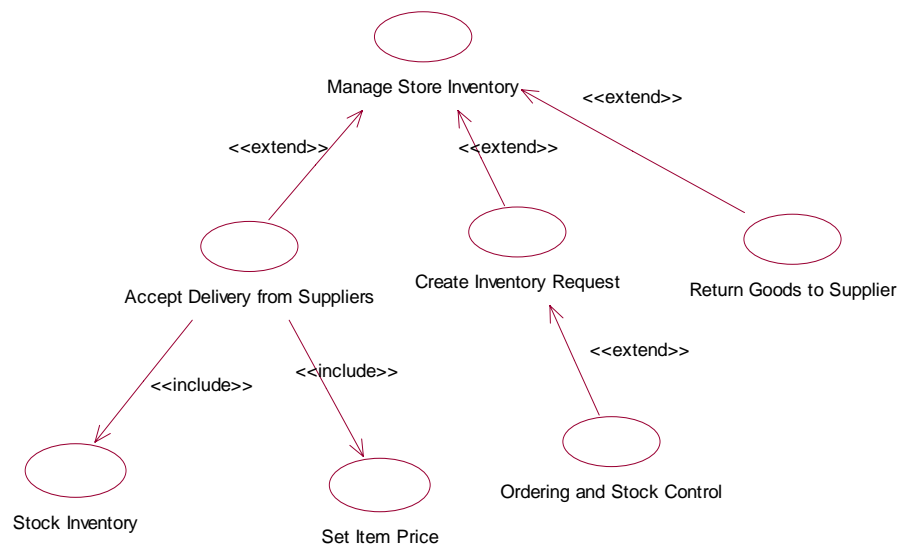
Propose Commissions



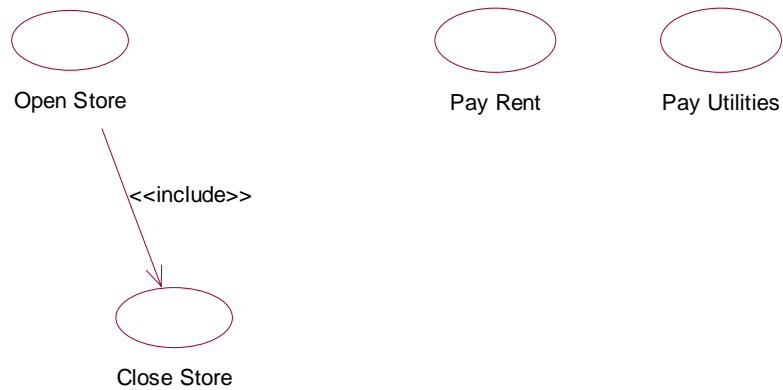
Process Time Cards

- **Inventory Management**

Use Case Name	Documentation
Manage Store Inventory	The manager ensures that the retail store is properly stocked with items for sales. The manager reviews the current trends and examines the store inventory to determine which items are and will be needed and which items can be reduced for quick sale.
Accept Delivery from Suppliers	When new inventory arrives, the manager confirms its receipt, and makes sure that the stock clerk has checked the goods against the supplier's delivery note and against the original order. Any discrepancies between the order and delivery are dealt with by telephoning the supplier Once verifies the inventory can be priced stocked.
Stock Inventory	Each item in received package must be priced with a sticker. The manager and/or stock clerks will determine the proper price for each item and attach the appropriate sticker to the item before placing it on the store's shelves.
Set Item Price	The manager sets the price of the item based on the suggested price and any extenuating local conditions. The manager can change the price of any item in the store at any time, provided that the POS sale system is updated as well. Managers will discount poorly selling or very old inventory for quick sale.
Ordering and Stock Control	The stock clerks collect the tickets from the garments and create list of the goods that have been sold that day, from that information they update the stock cards and produce orders for suppliers
Create Inventory Request	The manager examines the current inventory and prepares a request for new items from corporate headquarters. The manager then sends the request to the Inventory Manager.
Return Goods to Supplier	Store clerk accepts the returned goods by customer, either because they turn out to be the wrong size or because garment is faulty. Manager fills in the return form and arrange a refund. if a garment is returned because it is faulty, the Stock Inventory Department arranges to return it to the Suppliers



- **Building Management**



Use Case Name	Documentation
Open Store	The store manager is the first to arrive in the morning (or whenever the store is scheduled to open). The manager unlocks the store, turns on all lights, and activates all POS equipment. The manager ensures that the store is ready for the tellers to arrive, and eventually for customers to begin browsing and purchasing items.
Close Store	The manager closes and locks the stores doors. Using a printout from the computer system the manager balances
Pay Rent	The manager submits payment for rent of the store building.
Pay Utilities	The store manager submits payment for all the utility bills of the store (electric, water, sewage, etc.).

- **Sales period Management**

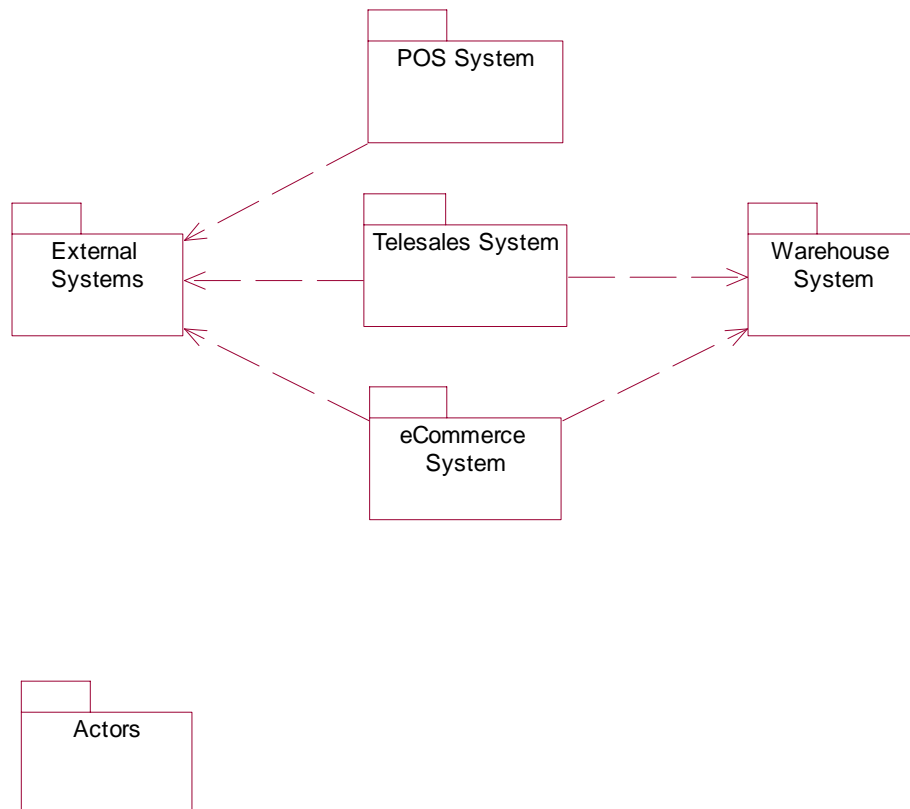
Use Case Name	Documentation
Adjust Sales Period	During the Sales (normally in January and again in July), some goods are remarked by hand with new prices this is done by Stock Clerks in accordance with the instructions of the Department Managers



2.3 Use Case Model

The use-case model is a model of the system's intended functions and its environment, and serves as a contract between the customer and the developers. The use-case model is used as an essential input to activities in analysis, design, and test.

Clothing Department Store
Use Case Model



Note: *Telesales System* & *eCommerce System* have not been discussed, form more information please see the attached CD with mdl files.

- **Actors**

Common Actors

These are actors that participate in multiple use case packages.

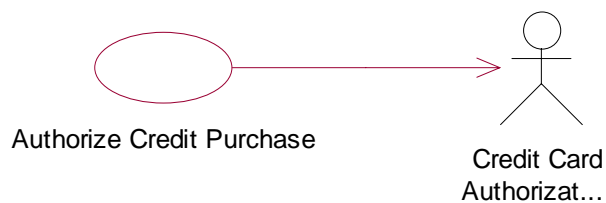


The warehouse system actor represents Clothing Department Store warehouse system. Even though the warehouse system is part of Clothing Department Store, it is considered an actor (or external system) from the point of view of the Order Processing system.



The credit card authorization system validates a customer's credit card number.

- **External Systems**



Use Case Name	Documentation
Authorize Credit Purchase	The system requests authorization from a credit card authority to debit the card holders account for a specific purchase.

- **Point Of Sales System Use Case Model**

The point of sale system is a combination of hardware and software that performs the role of a checkout register. The POS device is capable of scanning bar codes, and credit cards. POS systems are used in all Clothing Department Retail Stores.

POS Use Case Diagrams

The Point of Sale Use Cases are divided up into three main diagrams. Each diagram focuses on a subset of the use cases. The note icons below are hyperlinks to the specific diagrams. The diagrams can also be navigated to through the main Rose browser on the left.

Use Case Diagram: POS System / Till Management

The Use Case diagram showing the usage of the till (cash drawer). The principal actor is the sales person, however there are some interactions with the Store manager and the Credit Card System.

Use Case Diagram: POS System / User Management

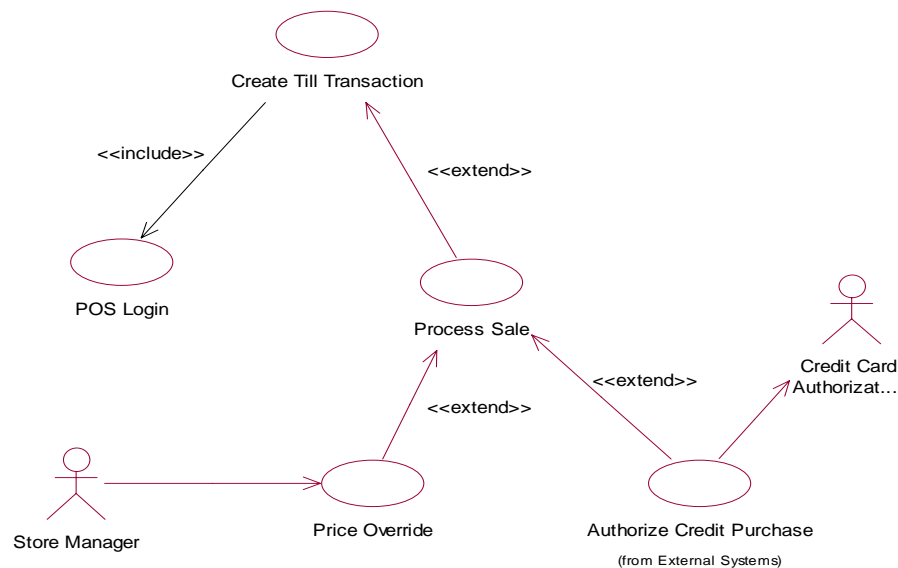
The Use Case diagram showing the POS User Management function of the system. The principal actor is the Store Manager.

Use Case Diagram: POS System / Inventory Management

The Use Case diagram showing the inventory management functions of the system. The principal actor is the store manager.

- **POS System/ Till Management**

Till Management Use Cases

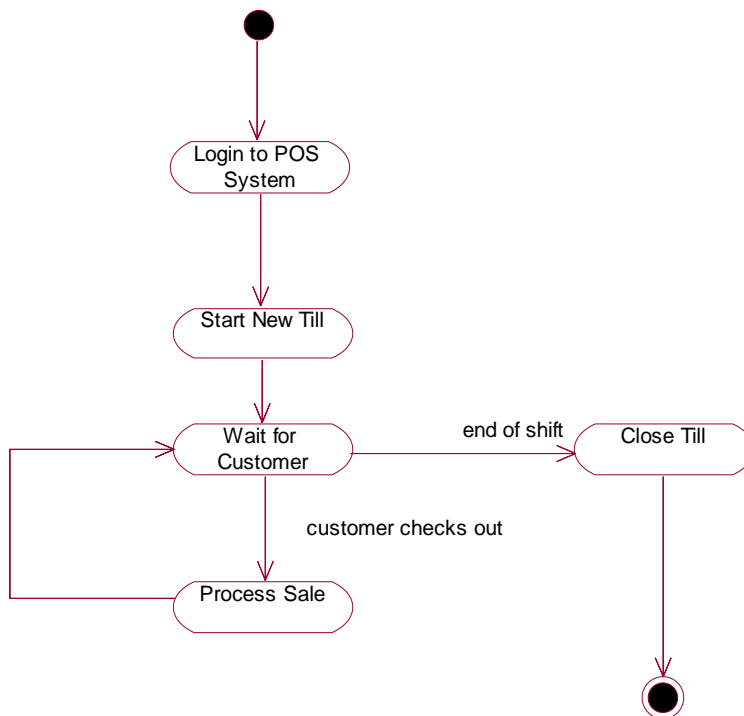


Use Case Name	Documentation
Create Till Transaction	Sales clerk uses the POS device to process sales.
POS Login	Verifies and logs in a POS system user.
Process Sale	A sales clerk will process a sale for a customer allowing the customer to purchase an item. The sale will automatically be tracked in the inventory system.
Price Override	The store manager changes the price of an item that is part of a sale. (Typically in the case of discounted or damaged items).
Authorize Credit Purchase	The system requests authorization from a credit card authority to debit the card holders account for a specific purchase.

Actor	Role
Store Manager	The manager is an employee of the store responsible for running a particular store. This includes management of employees as well as sales and inventory.
Credit Card Authorization System	The credit card authorization system validates a customer's credit card number.

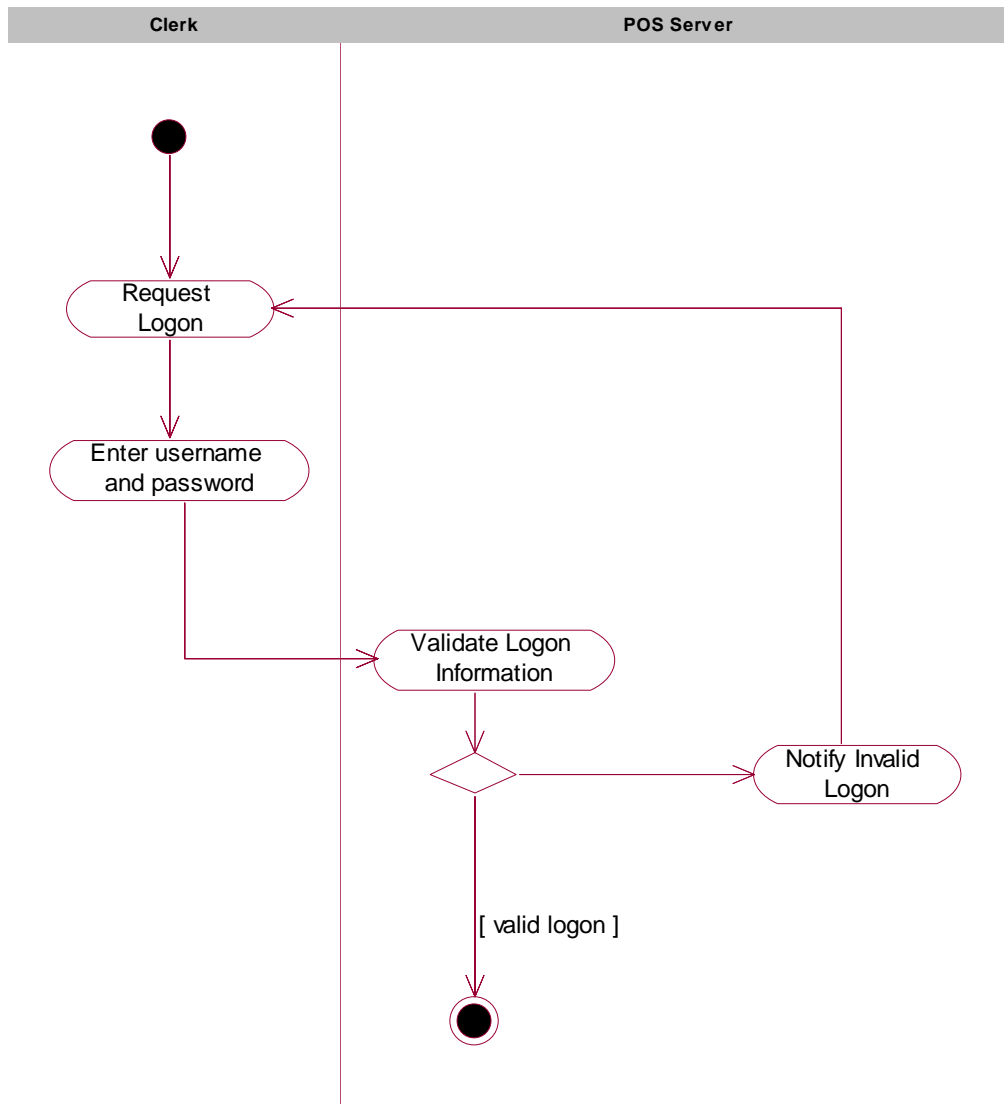
- **Create Till Transaction**

The following activity diagram depicts the business activity of creating a till transaction by Store Manger / Sales Person and Credit Card Authorization System.



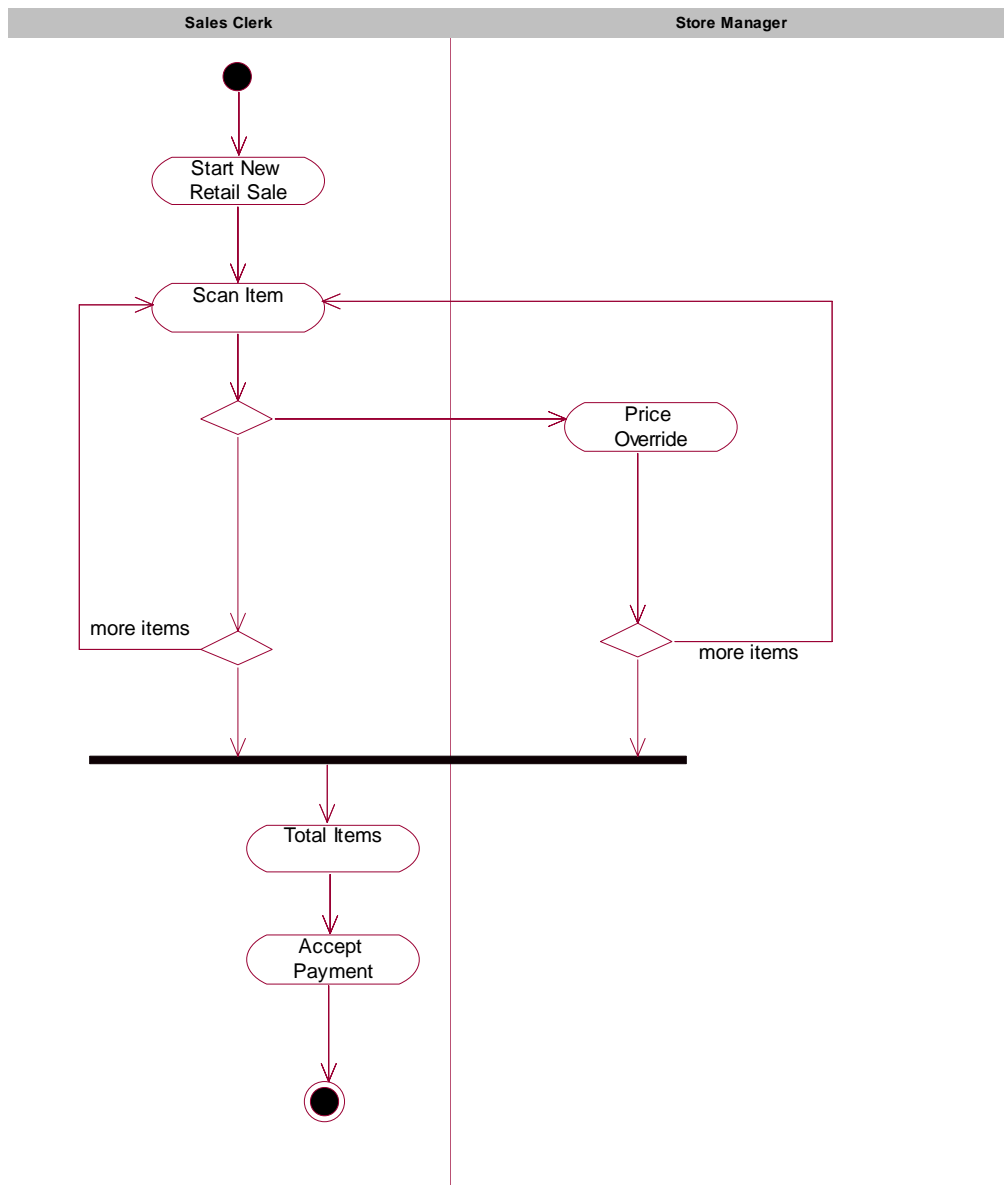
- **POS Login**

The following activity diagram depicts the workflow process of login to POS System by the Clerk (Store Manger / Sales Person) and POS Server.



- **Process Sales**

The following activity diagram depicts the business process of sales by the Sales Clerk (Sales People) and Sales Manager.

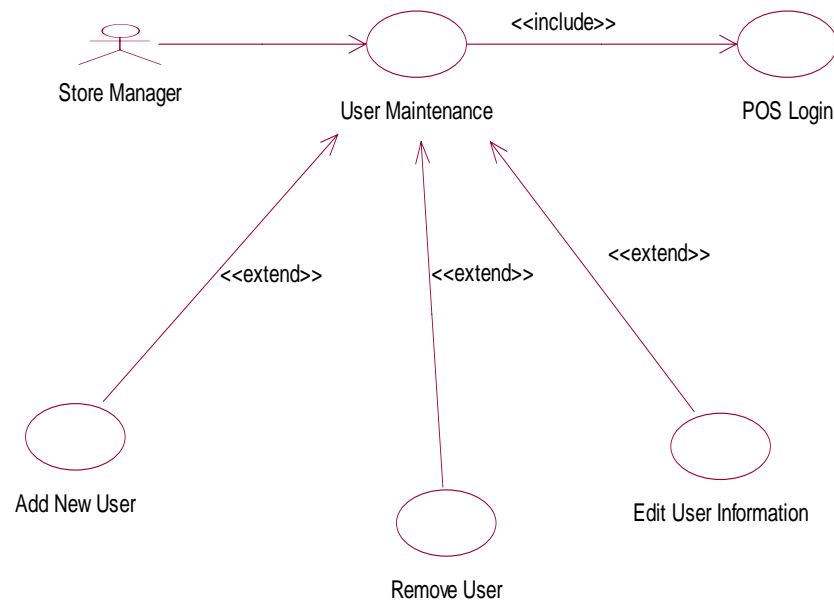


- **POS System/User Management**

The Use Case diagram showing the POS User Management function of the system.

The principal actor is the Store Manager

User Management Use Cases



Use Case Name	Documentation
User Maintenance	Store managers may add, delete and modify the sales person information. This information includes the store clerks name, verification information as well as address and social security information for the payroll system.
POS Login	Verifies and logs in a POS system user.
Add New User	Adds a new sales person (or manager) user to the POS system.
Remove User	Removes a user from the system. This use case is invoked when an employee leaves Clothing Department Store.
Edit User Information	Allows the actor to change user information (name, ssn, address, etc.) including privileges (i.e. manager level responsibilities)

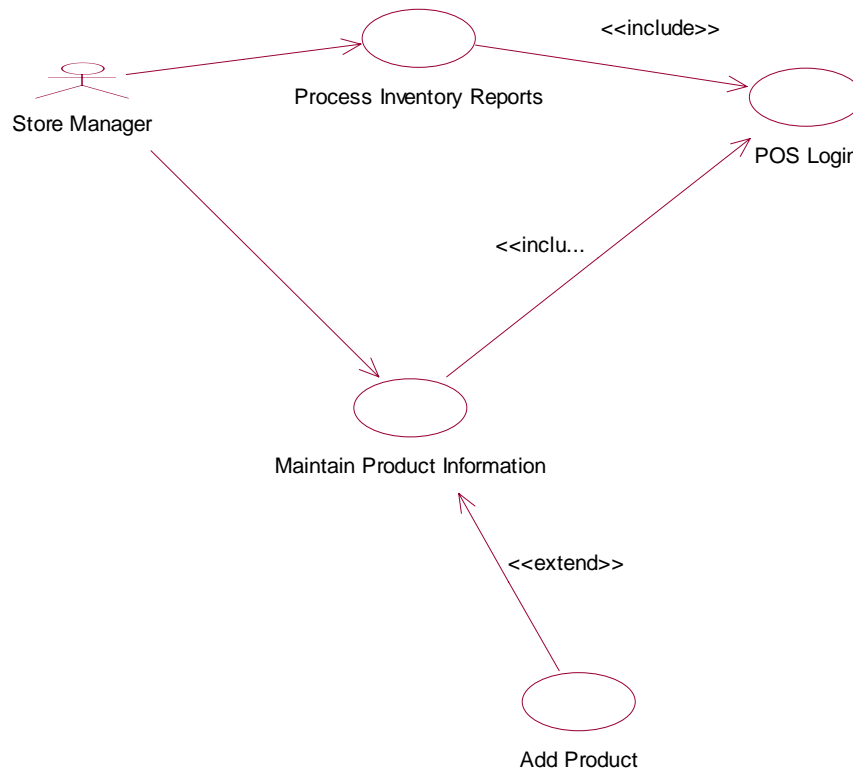
Actor	Role
Store Manager	The manager is an employee of the store responsible for running a particular store. This includes management of employees as well as sales and inventory.

- **POS System/ Inventory Management**

The Use Case diagram showing the inventory management functions of the system.

The principal actor is the store manager.

Inventory Management Use Cases



Use Case Name	Documentation
Process Inventory Reports	Store manager analyses the inventory report created by stock clerk.
POS Login	Verifies and logs in a POS system user.
Maintain Product Information	includes the deactivating of a product.
Add Product	Approve the sales of the new products introduced to the store

Actor	Role
Store Manager	The manager is an employee of the store responsible for running a particular store. This includes management of employees as well as sales and inventory.

3 Software Architecture

The architecture of a software system requires six distinct views, each view focusing on different aspects of the system. Its purpose is to communicate the major components of the system, how it is structured, the system process flows, and major interfaces. From a high level, the goal is to examine the system from several different perspectives, each providing a different “view” in order to capture all critical system features. A brief description of the six architecture views is provided as follows:

Deployment View – This view documents the physical topology of the system modeled in the Deployment Model. It includes each computer in the implementation and describes how they are interconnected. The configuration for each node is also specified – O/S, DB, COTS and custom applications.

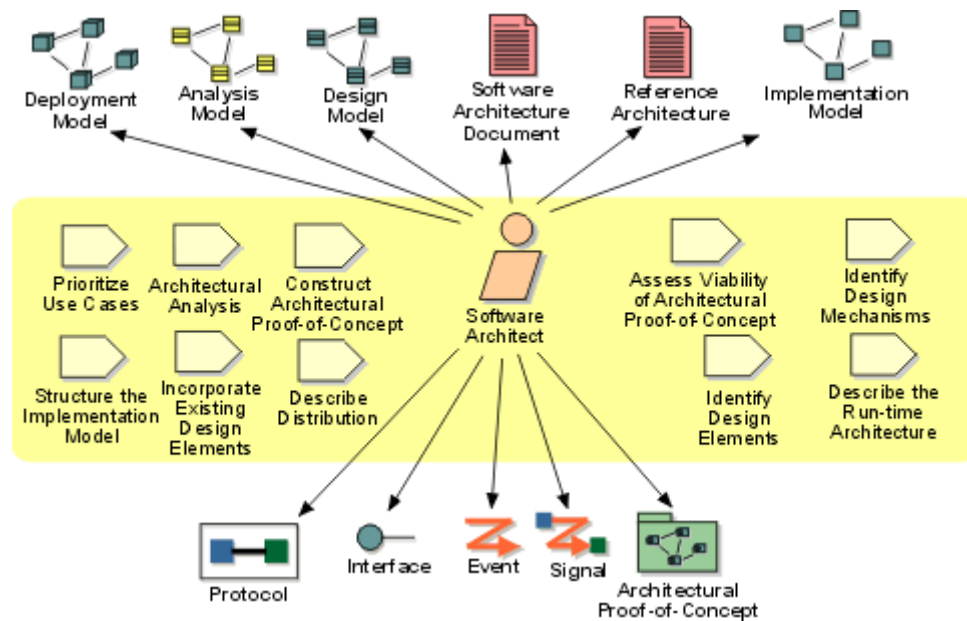
Logical View – The logical view documents the Design Model, which defines the layers of the application and the primary classes within each layer. The system architect identifies patterns of functionality and creates common mechanisms to provide this functionality to several areas across the application.

Data View – Classes in the logical view are classified as transient or persistent. The persistent classes are mapped to structures on disk, usually into a combination of rows in a relational database. An entity-relationship data model describes the database schema. This view also communicates how the OO classes are mapped to the relational tables.

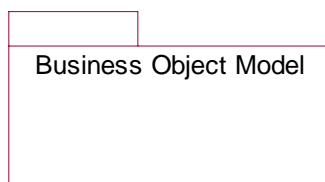
Process (Concurrency) View – This view focuses on the concurrency aspects of the system and how they contend for shared resources (i.e., transaction semantics, etc.). The process view documents the independent threads of execution within the system and describes how they communicate. It also lists the resources in contention by these threads and the transaction model for maintaining integrity with these resources.

Implementation View – This view maps the classes in the Logical View to physical source files and combines the files into deployable components. The implementation view also tracks the dependencies among the components.

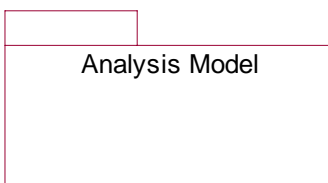
Security View – This view focuses on how the system identifies end users, grants authorization to them based on their identity, ensuring integrity of the system and of the data and properly tracking and auditing of system activity.



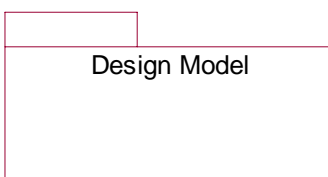
Clothing Department Store Top Level Logical View



The business object model is an object model describing the realization of business use cases. It serves as an abstraction of how business workers and business entities need to be related and how they need to collaborate in order to perform the business.



The analysis model contains the analysis classes and any associated artifacts. It is an object model describing the realization of use cases, and serves as an abstraction of the Design Model.



The design model is model of the system that contains the classes and collaborations of objects that realize the use cases of the system.

3.1 Business Object Model

The business object model is an object model describing the realization of business use cases. It serves as an abstraction of how business workers and business entities need to be related and how they need to collaborate in order to perform the business.

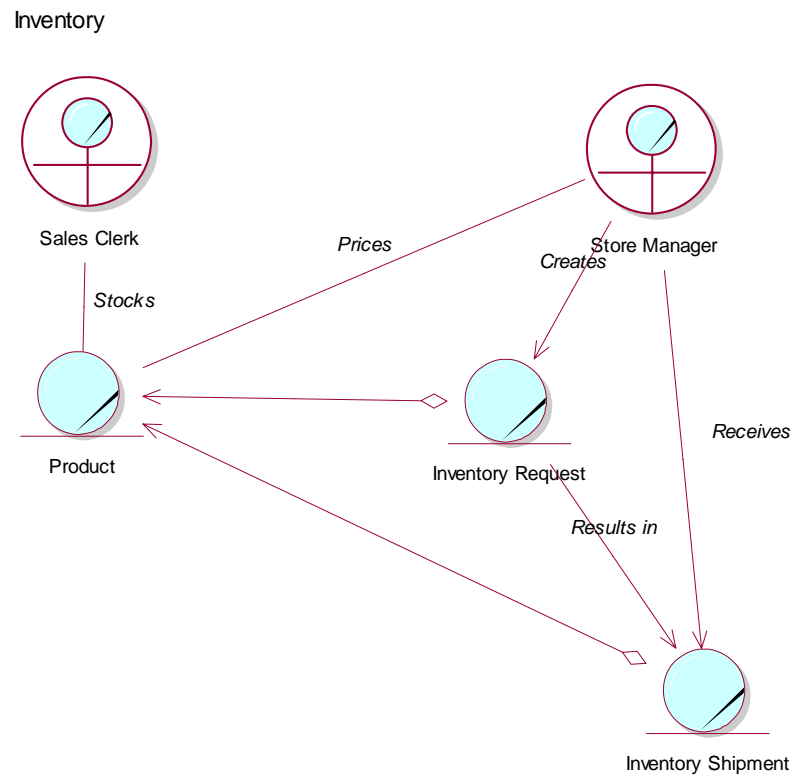
Business Object Model

Organizational Units



- **Retail Store Unit**

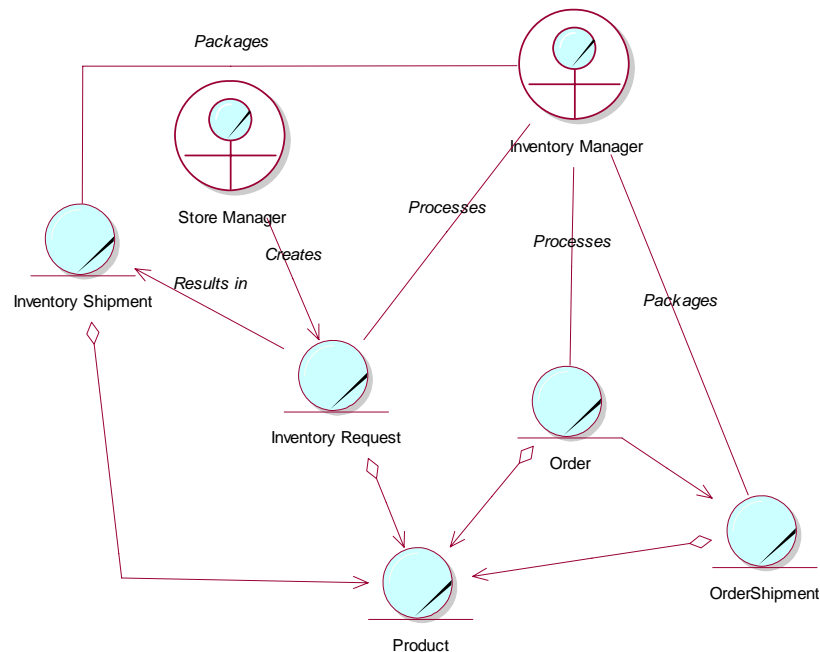
The following class diagram depicts the collaboration between the business worker and the business entity within the retail store unit.



Class Name	Stereotype	Documentation
Sales Clerk	Business Worker	The Sales Person within the Clothing Department Store employee responsible for managing the checkout counter in a retail store.
Product	Business Entity	The generic term for any item that Clothing Department Store sells.
Store Manager	Business Worker	Manages a retail store.
Inventory Request	Business Entity	A request by a store manager for inventory to replace sold items in the store (or to add new items to the existing store inventory).
Inventory Shipment	A package of items to replenish a retail store's stock.	A package of items to replenish a retail store's stock.

- **Inventory Shipping Unit**

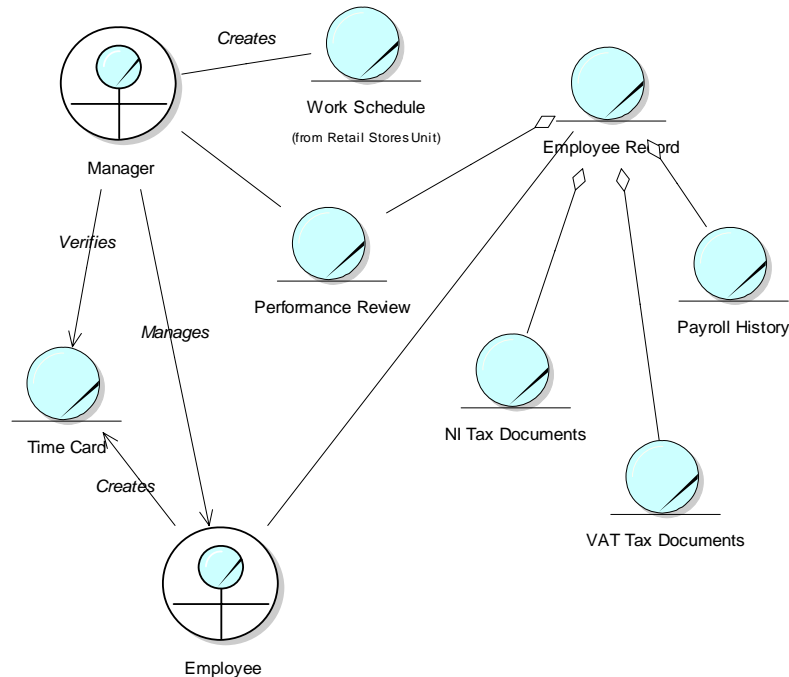
The following class diagram depicts the collaboration between the business worker and the business entity within the inventory shipping unit.



Class Name	Stereotype	Documentation
Store Manager	Business Worker	Manages a retail store.
Inventory Request	Business Entity	A request by a store manager for inventory to replace sold items in the store (or to add new items to the existing store inventory).
Inventory Shipment	Business Entity	A package of items to replenish a retail store's stock.
Product	Business Entity	The generic term for any item that Clothing Department Store sells.
Order	Business Entity	An order is a request for Clothing Department Store items by a customer.
OrderShipment	Business Entity	A packaged collection of items ordered by a customer either over the phone (telesales) or through the on-line store front.
Inventory Manager	Business Worker	Manages the inventory of items at the corporate headquarters.

- **General Use Entities**

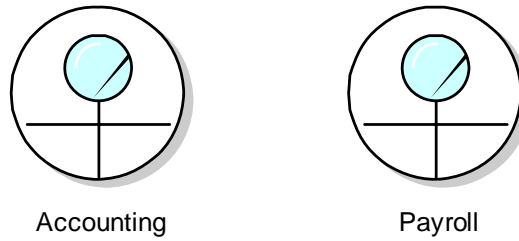
The following class diagram depicts the collaboration between the business worker and the business entity within the general use entities.



Class Name	Stereotype	Documentation
Manager	Business Worker	A manager is responsible for the management of a group of employees. Manager also have other duties particular to the type of manager they are.
Employee	Business Worker	Any person who works for Clothing Department Store
Time Card	Business Entity	A time card is a document that indicates the hours worked by an employee.
Performance Review	Business Entity	A document outlining an employee's performance over a period of time (typically one year). Shows the staff (sales people) entitled for commotions. This document is prepared by each employee's manager.
Work Schedule	Business Entity	A schedule indicating the dates and times employees are expected to work.
Employee Record	Business Entity	The collection of all an employee's information. This includes all performance reviews, payroll history, emergency contact information, commotions etc.
NI Tax Documents	Business Entity	All of an employee's National Insurance forms, as required by the UK government.
VAT Tax Documents	Business Entity	The collection of an employee's vat tax documents.
Payroll History	Business Entity	An employee's payroll history. This document includes summaries of all payroll payments, and salary history.

- **Accounting Unit**

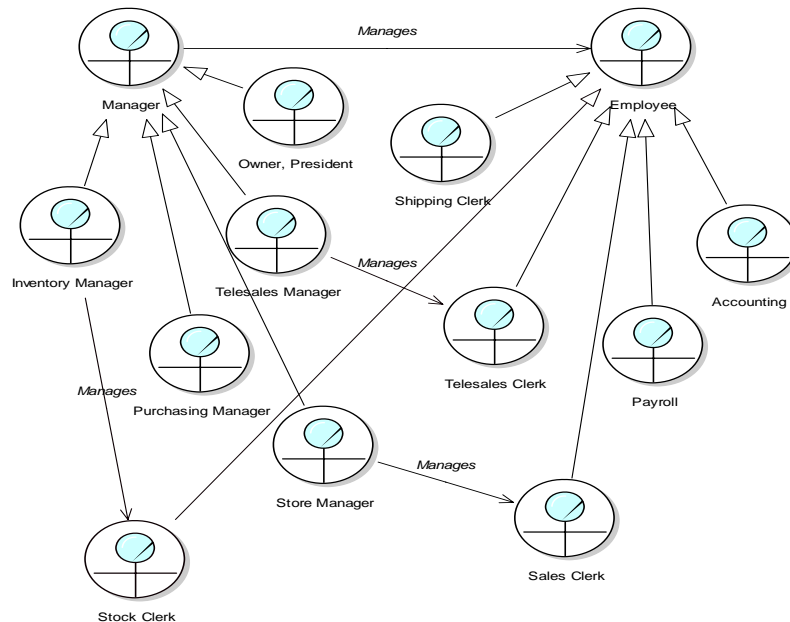
The following diagram illustrates the composition of the Accounting Unit



Class Name	Stereotype	Documentation
Accounting	Business Worker	Manages the companies accounts, including accounts payable and accounts receivable.
Payroll	Business Worker	Manages the processing of employee times cards and recommended commissions submitted by store managers, and the payment all of the companies employees.

- **Employees**

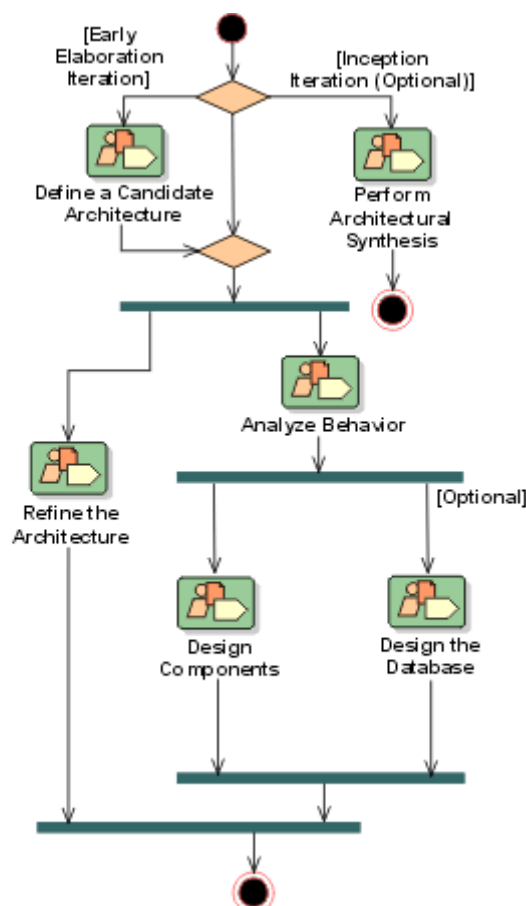
The following class diagram depicts the collaboration between the business worker within employees



Class Name	Stereotype	Documentation
Manager	Business Worker	A manager is responsible for the management of a group of employees. Manager also have other duties particular to the type of manager they are.
Employee	Business Worker	Any person who works for Clothing Department Store
Owner, President	Business Worker	The owner and manager of the Clothing Department Store.
Purchasing Manager	Business Worker	Manages the purchase of items from Clothing Department Store suppliers.
Inventory Manager	Business Worker	Manages the inventory of items at the corporate headquarters.
Store Manager	Business Worker	Manages a retail store.
Sales Clerk	Business Worker	The Sales Person within the Clothing Department Store employee responsible for managing the checkout counter in a retail store.
Telesales Manager	Business Worker	Manages the telesales clerks. This includes scheduling, hiring and firing and performance reviews.
Telesales Clerk	Business Worker	Accepts customer orders for items over the phone.
Payroll	Business Worker	Manages the processing of employee times cards and recommended commissions submitted by store managers, and the payment all of the companies employees.
Accounting	Business Worker	Manages the companies accounts, including accounts payable and accounts receivable.

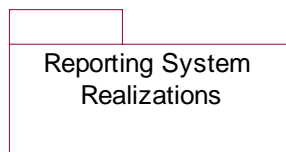
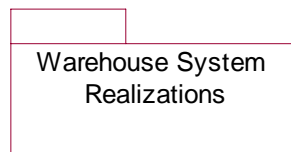
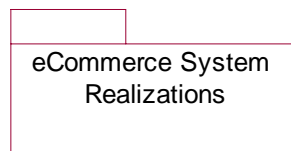
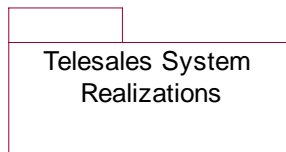
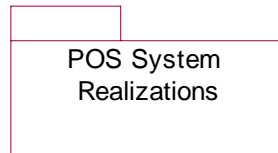
3.2 Analysis Model

The analysis model contains the analysis classes and any associated artifacts. It is an object model describing the realization of use cases, and serves as an abstraction of the Design Model. For each use-case realization there is one or more interaction diagrams depicting its participating objects and their interactions. There are two types of interaction diagrams: Sequence diagrams and collaboration diagrams. They express similar information, but show it in different ways. Sequence diagrams show the explicit sequence of messages and are better when it is important to visualize the time ordering of messages, whereas collaboration diagrams show the communication links between objects and are better for understanding all of the effects on a given object and for algorithm design



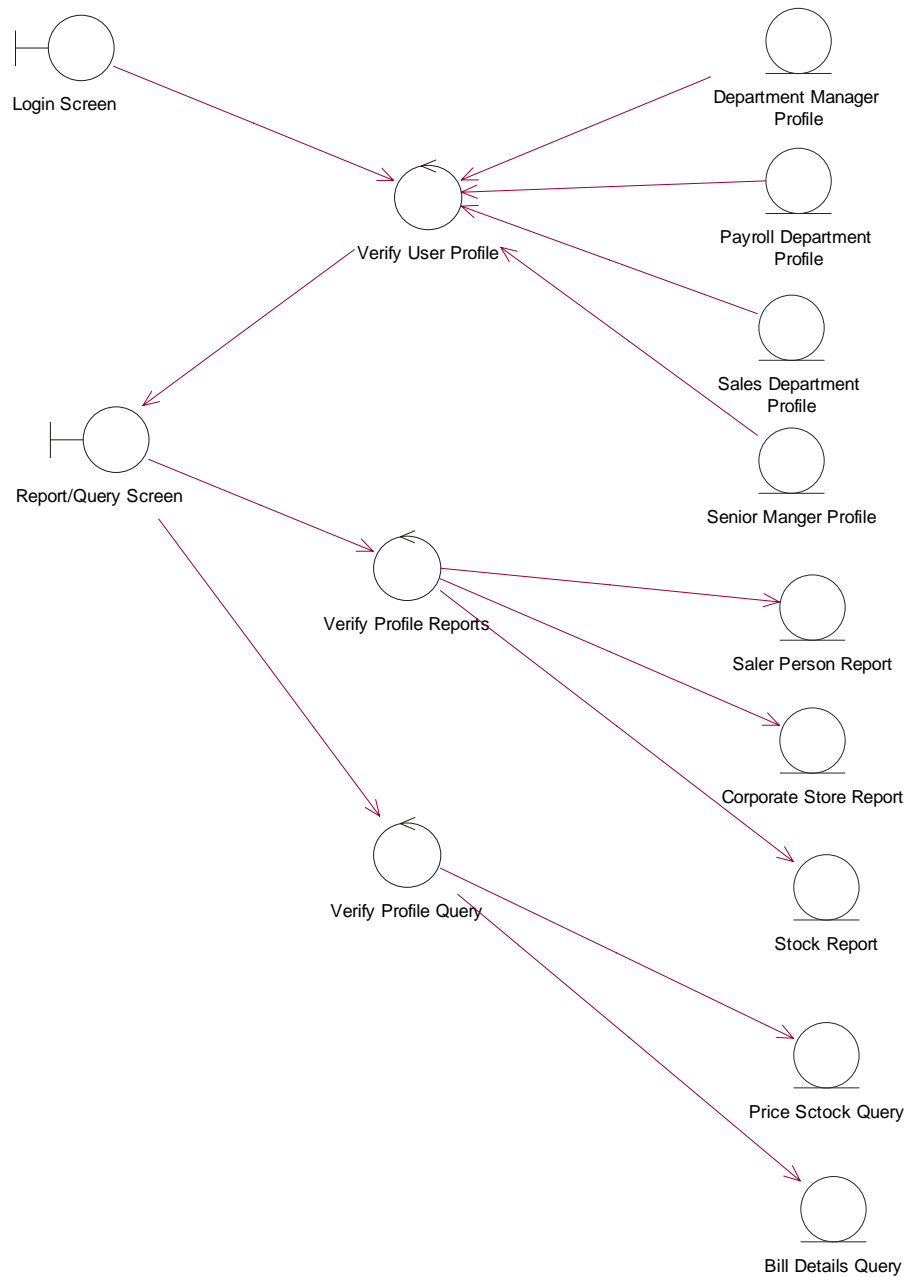
Analysis Model

Use Case Realizations

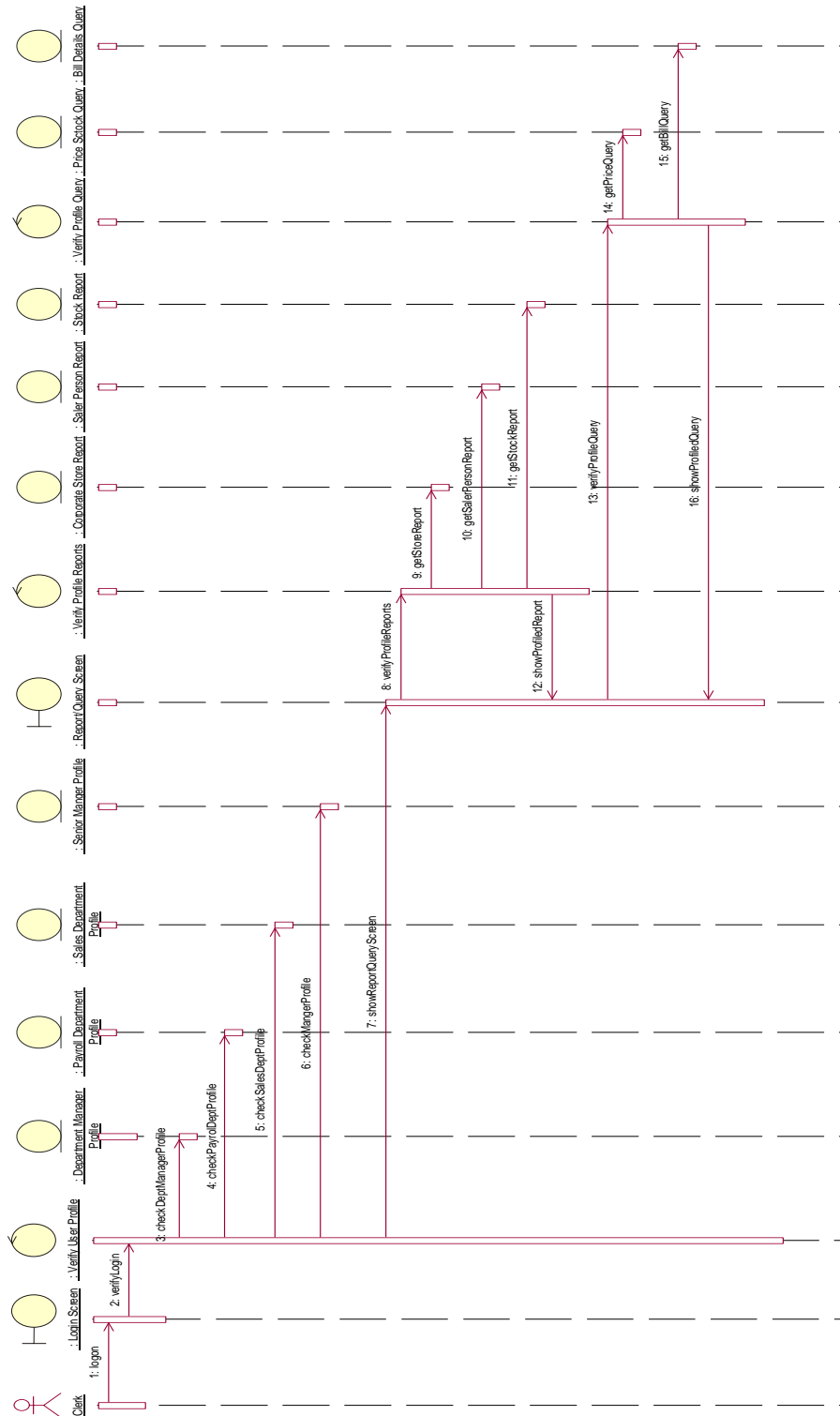


- **Reporting System Realizations**

The figure below shows a class diagram for the realization of the **Reporting System** use case



The Sequence diagram below shows the sequence of the time ordering of messages for Reporting System use case realization



- **Login Screen User Interface**

Oracle Forms Runtime

Action Edit Query Block Record Field Window Help

Login Screen

User Name

Password

Login

Previous Block

Record: 1/1

- Price Stock Query User Interface

Oracle Forms Runtime

Action Edit Query Block Record Field Window Help

Price Stock Query

Id	Name	Category	Status	List Price	Total	Total Id
13	5MP Teleph	Photo	STATUS	899.99	TOTAL	1
14	17" LCD w/b	Peripherals	STATUS	999.99	TOTAL	1
15	Envoy 256M	Hardware	STATUS	999.99	TOTAL	1
16	Y Box	Electronics	STATUS	299.99	TOTAL	1
17	Mini DV Cam	Photo	STATUS	1099.99	TOTAL	1
18	Envoy Amba	Hardware	STATUS	1299.99	TOTAL	1
19	Laptop carry	Software/Oth	STATUS	55.99	TOTAL	1
20	Home Theatr	Electronics	STATUS	599.99	TOTAL	1
21	18" Flat Pane	Peripherals	STATUS	899.99	TOTAL	1
22	Envoy Exterr	Peripherals	STATUS	24.99	TOTAL	1

Corporate Store Report Sales Person Report Stock Report

Record: 10/?

- **Bill Details Query User Interface**

Oracle Forms Runtime

Action Edit Query Block Record Field Window Help

Bill Details Query

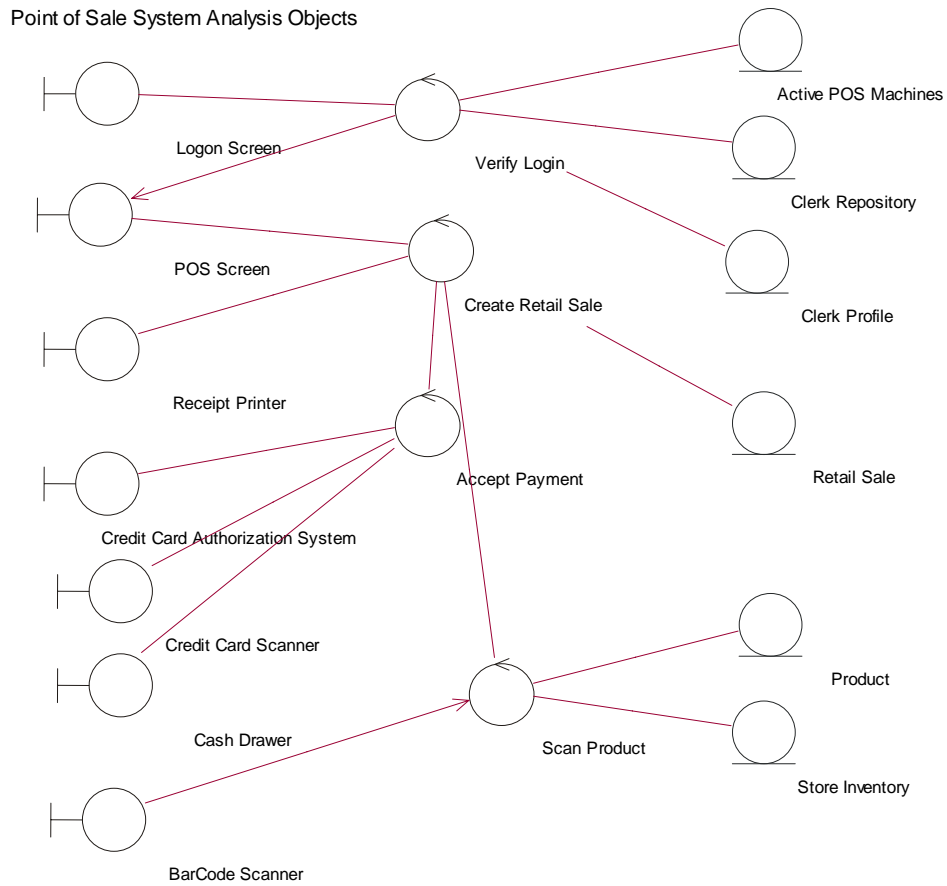
Bill Id	Line Item Id	Product Id	Unit Price	Quantity
2392	4	3124	77	63
2393	6	3082	78	10
2394	6	3134	18	45
2399	6	2311	86.9	20
2400	4	2999	880	16
2411	6	3106	45	11
2412	6	3139	20	79
2418	4	3110	45	20
2419	4	3129	43	57
2421	6	3129	43	172

Corporate Store Report Sales Person Report Stock Report

Record: 1/?

- **POS System Realizations**

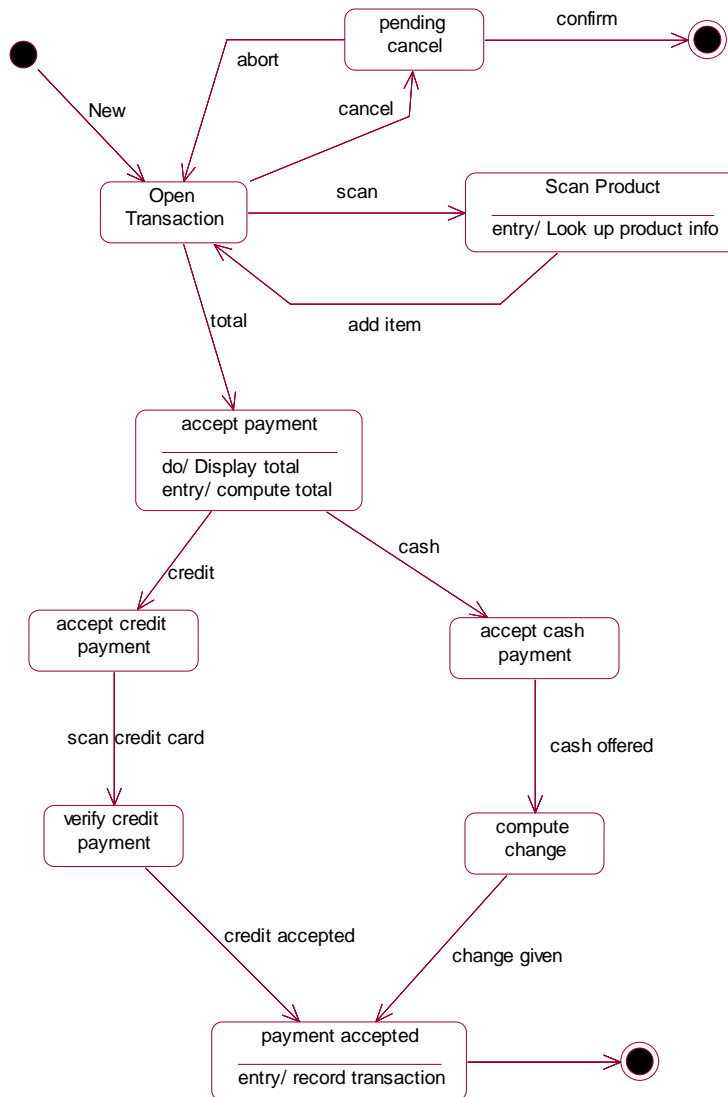
The figure below shows a class diagram for the realization of the **Point of Sale** use case



Class Name	Stereotype	Documentation
Logon Screen	boundary	The logon screen that all clerks must use to gain access to the system. It requests a user id and password.
POS Screen	boundary	The main interface for the clerk to create sales transactions with. With this interface the clerk manages retail sale transaction.
Credit Card Authorization System	boundary	The interface to the external system that authorizes credit card payments.
Receipt Printer	boundary	The printer attached to the POS machine that creates printed receipts for the customer.
Credit Card Scanner	boundary	Scans credit cards.
Cash Drawer	boundary	The till of the POS machine. It contains an electric lock that is activated only through the use of the POS machine software system.
BarCode Scanner	boundary	The device that scans the SKU Bar Codes of products.
Verify Login	control	The system validates the logon information and if successful, registers the machine as an active POS machine. reviews.
Create Retail Sale	control	Creates a new retail sale transaction in the system. This controller coordinates the scanning of products, and the receipt of payment.
Accept Payment	control	Controls the process of accepting payment from a customer.
Scan Product	control	Manages the scanning and recording of a product for sale. Once the product is scanned, its information is collected from the store inventory system and made available for use in a Retail Sale.
Active POS Machines	entity	POS machines currently used.
Clerk Repository	entity	Clerk Repository more details
Clerk Profile	entity	Clerk Profile details
Retail Sale	entity	Retail Sales Information
Product	entity	A product is an item that Clothing Department Store sells. Each product has a scan-able bar code that contains its SKU number.
Store Inventory	entity	The entity that represents the entire store's inventory. It contains descriptions and amounts of all the stores products.

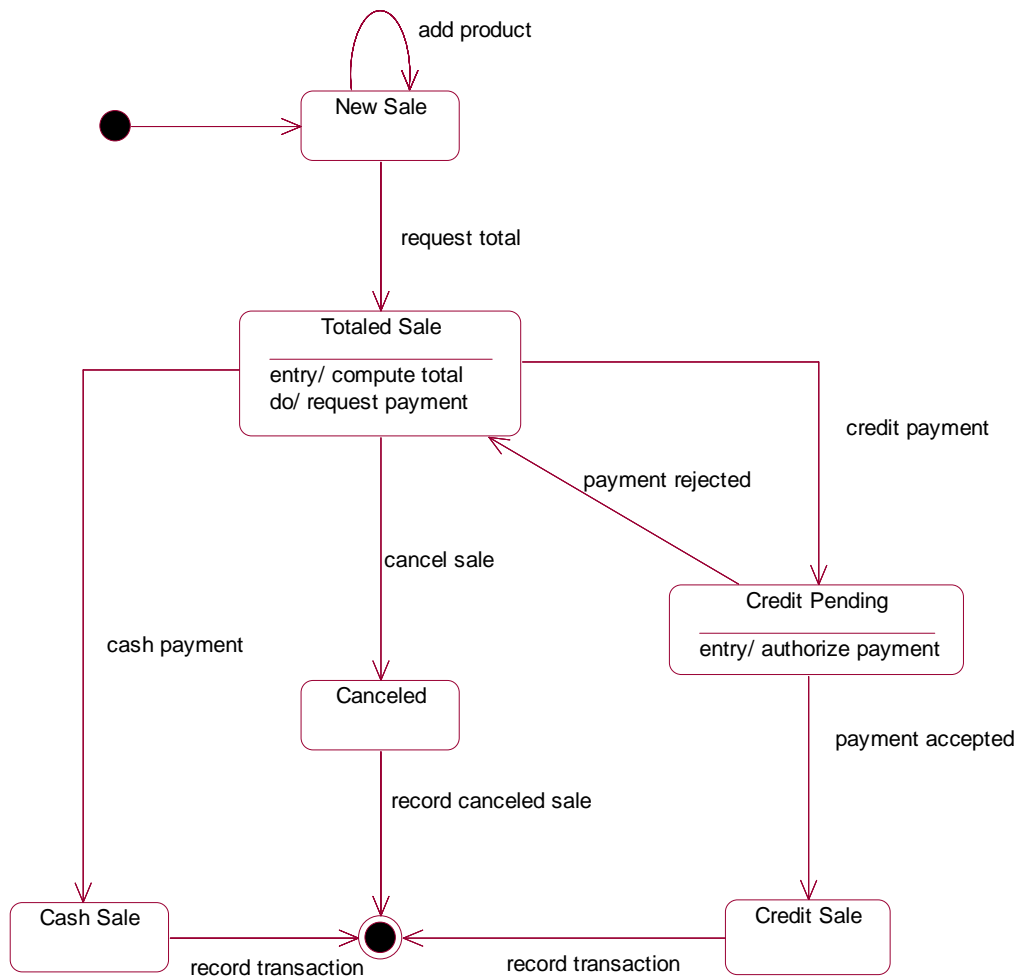
- **Logon Screen**

The Statechart diagram below shows a transition between the states of the Logon Screen class.



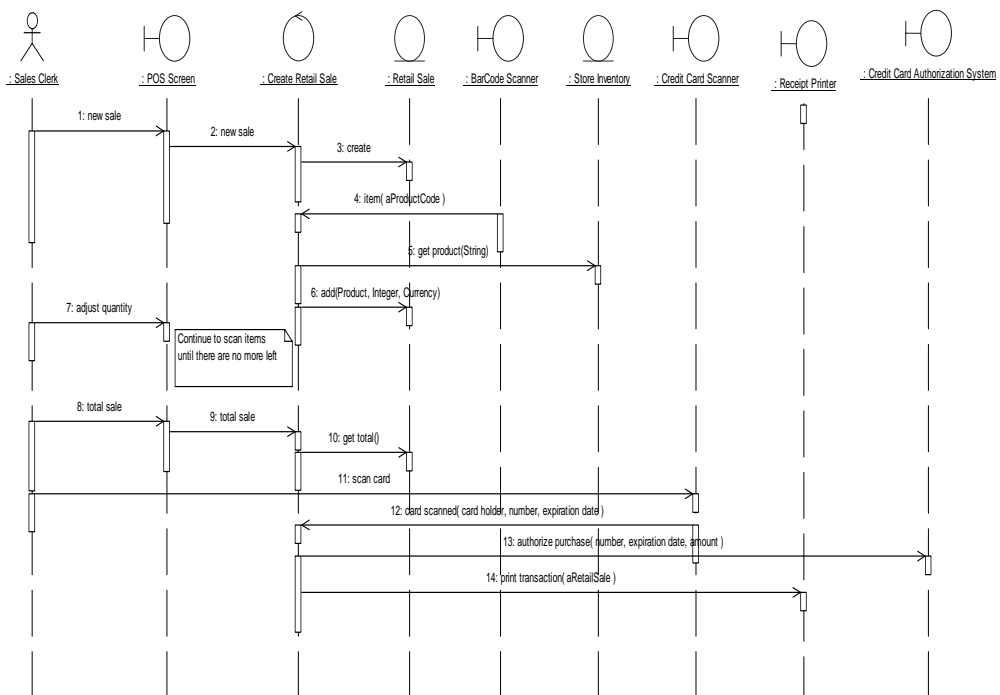
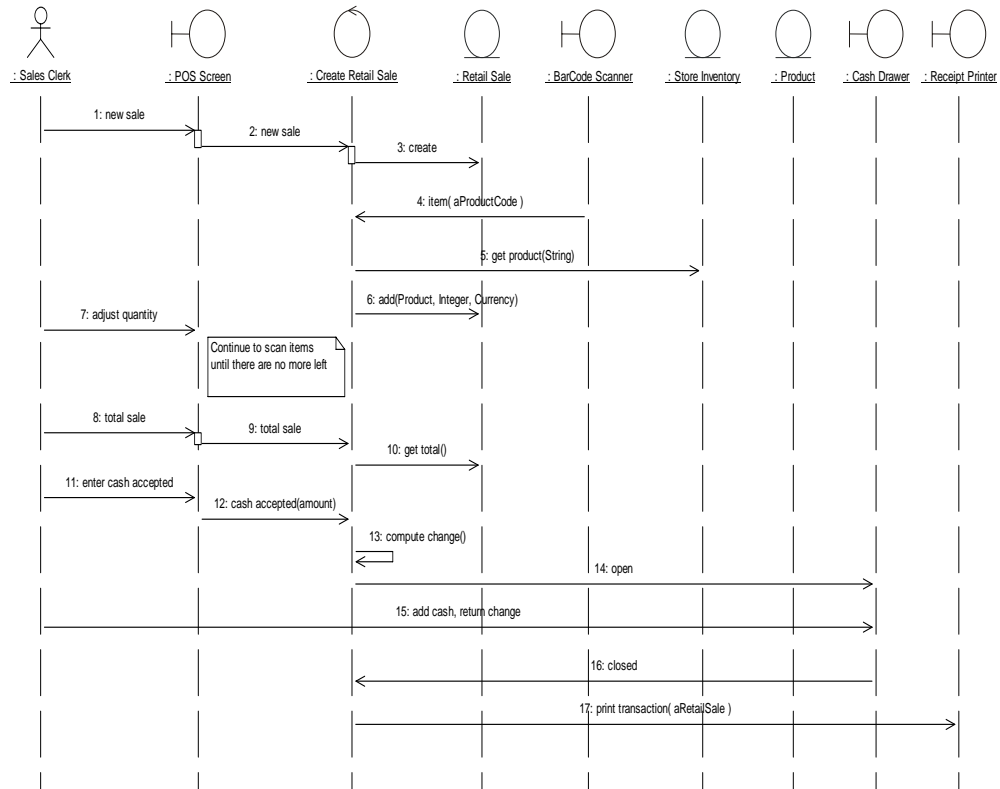
- **Retail Sale**

The Statechart diagram below shows a transition between the states of the Retail Sale class



- **Process Sale realization**

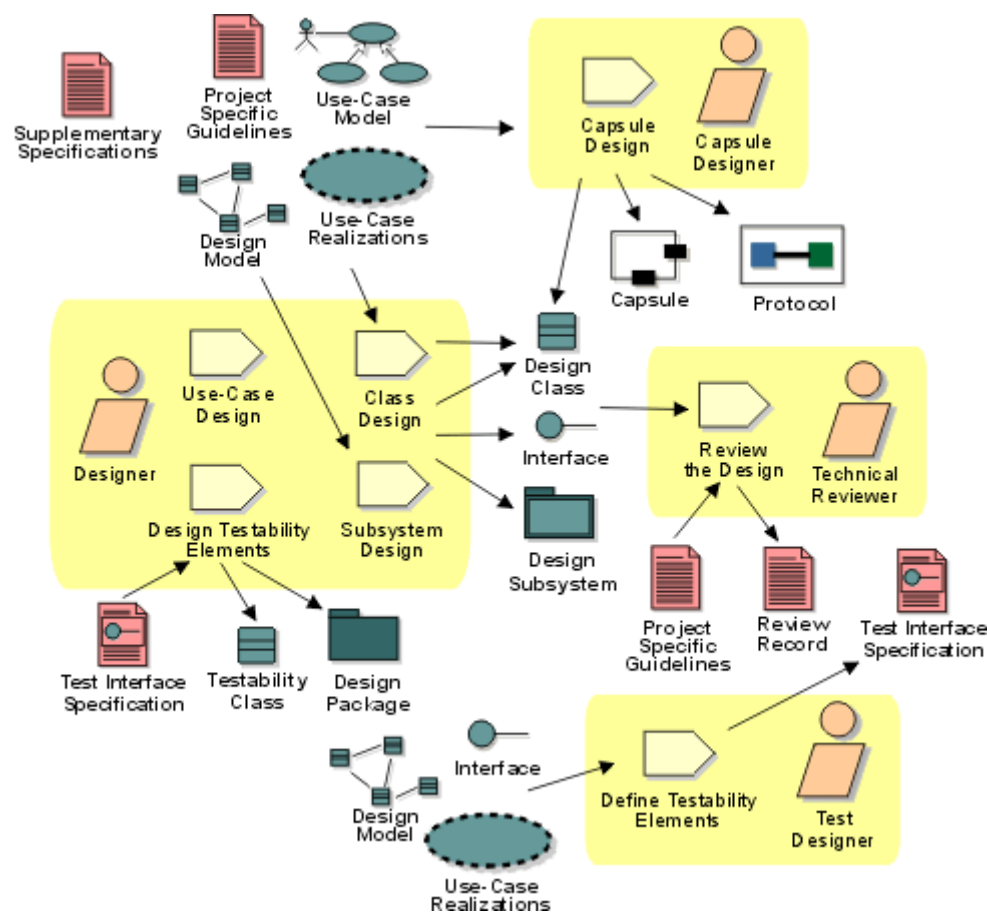
The two Sequence diagrams below show the sequence of the time ordering of messages for Process Sale use case realization



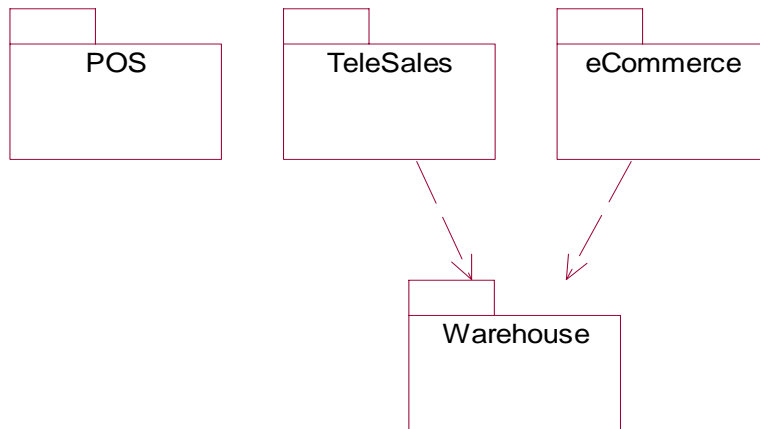
3.3 Design Model

The design model is an object model describing the realization of use cases, and serves as an abstraction of the implementation model and its source code. It is used as essential input to activities in implementation and test.

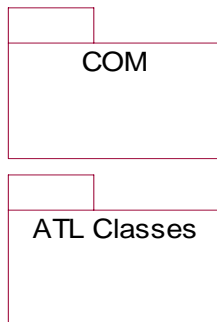
The design model is an abstraction of the implementation of the system. It is used to conceive as well as document the design of the software system. It is a comprehensive, composite artifact encompassing all design classes, subsystems, packages, collaborations, and the relationships between them.



Clothing Department Store Design Model

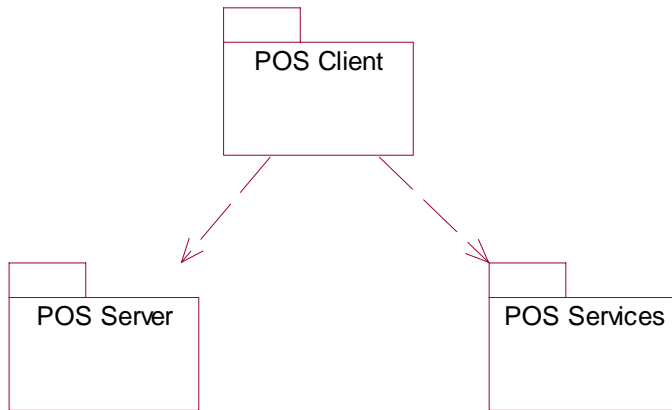


WinDNA Infrastructure Packages

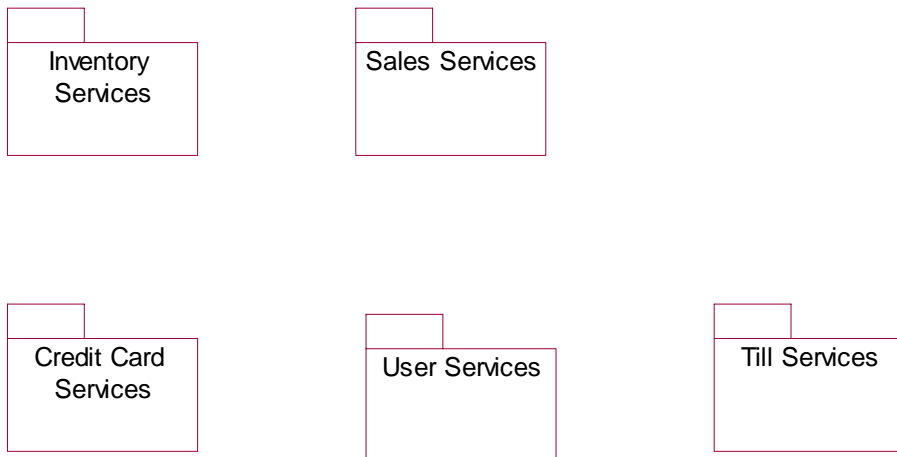


3.3.1 Point of Sales Model

Point of Sales is client server architecture.

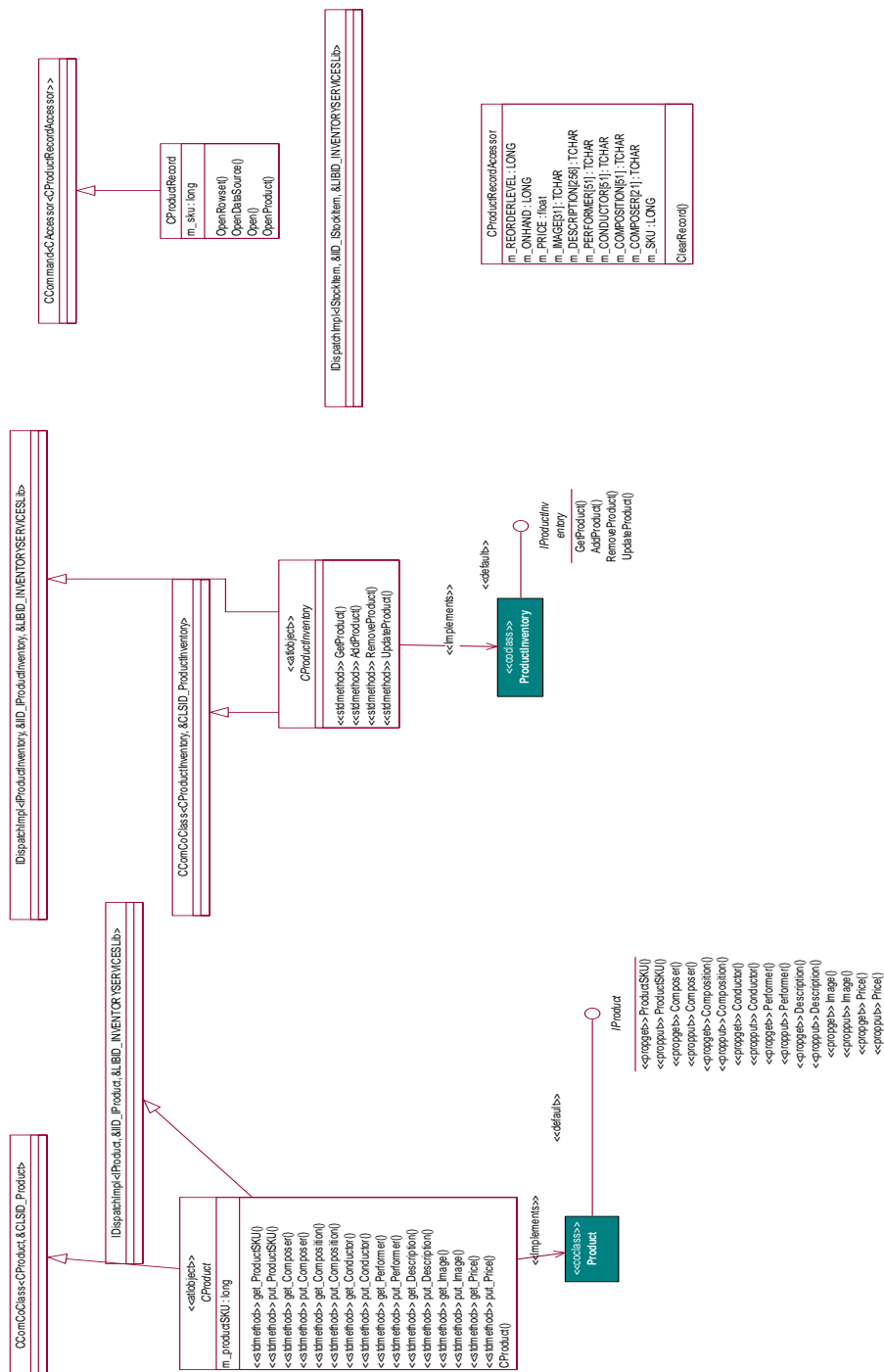


3.3.2 POS Server



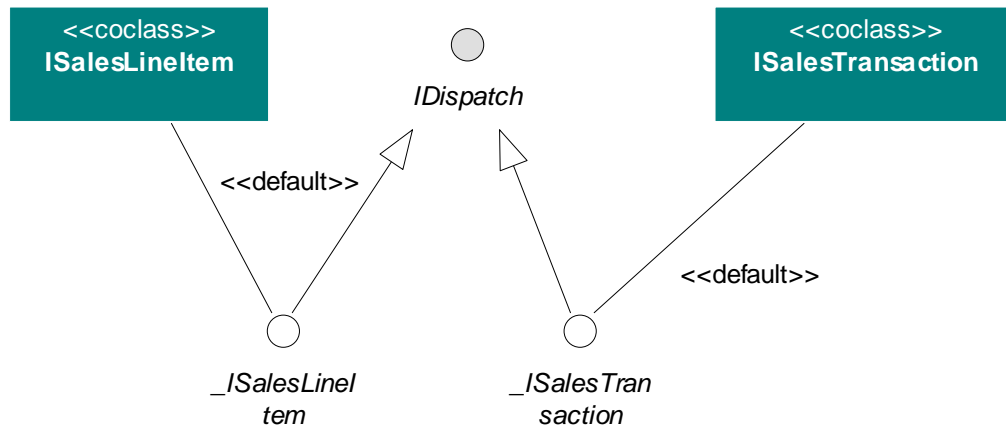
- **Inventory Services**

The Inventory Services class diagram shows the classes of the Inventory System, their interrelationships (including inheritance, aggregation, and association), and the operations and attributes of the classes. The diagram has been generate for C++ development using CoClasses and ATLObject type classes.



- **Sales Services**

The following class diagram shows their interrelationships (including inheritance, aggregation, and association) between the CoClasses of Sales Services System



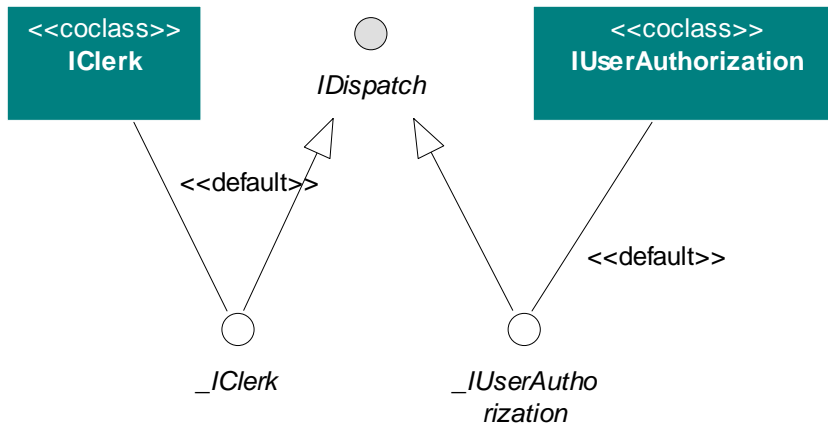
- **Credit Card Services**

The following class diagram shows their interrelationships (including inheritance, aggregation, and association) between the CoClasses of Credit Card Services System



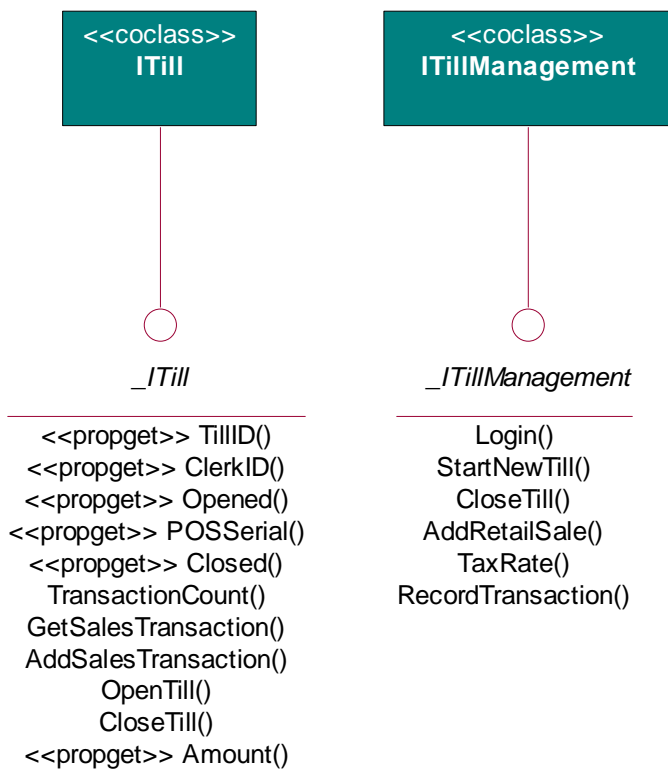
- **User Services**

The following class diagram shows their interrelationships (including inheritance, aggregation, and association) between the CoClasses of User Services System



- **Till Services**

The following class diagram shows their interrelationships (including inheritance, aggregation, and association) between the CoClasses of Till System

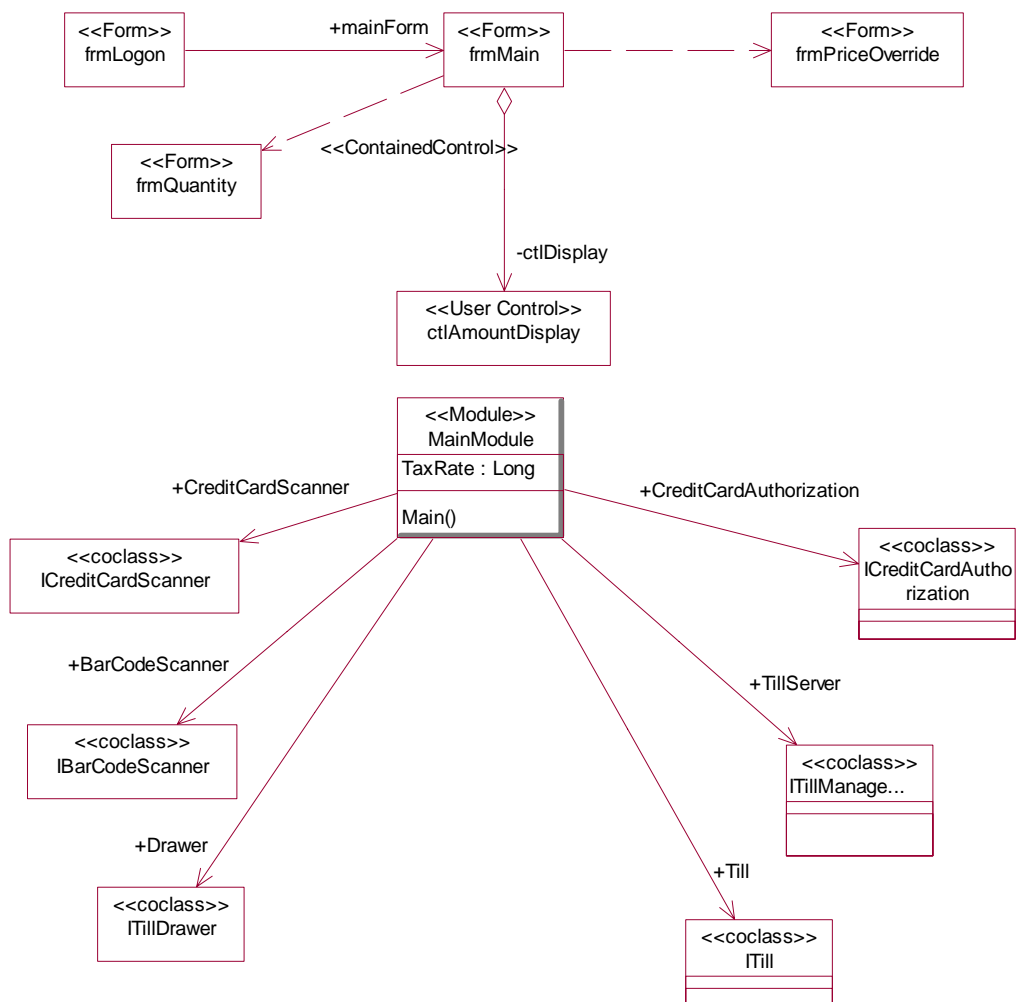


3.3.3 POS Client

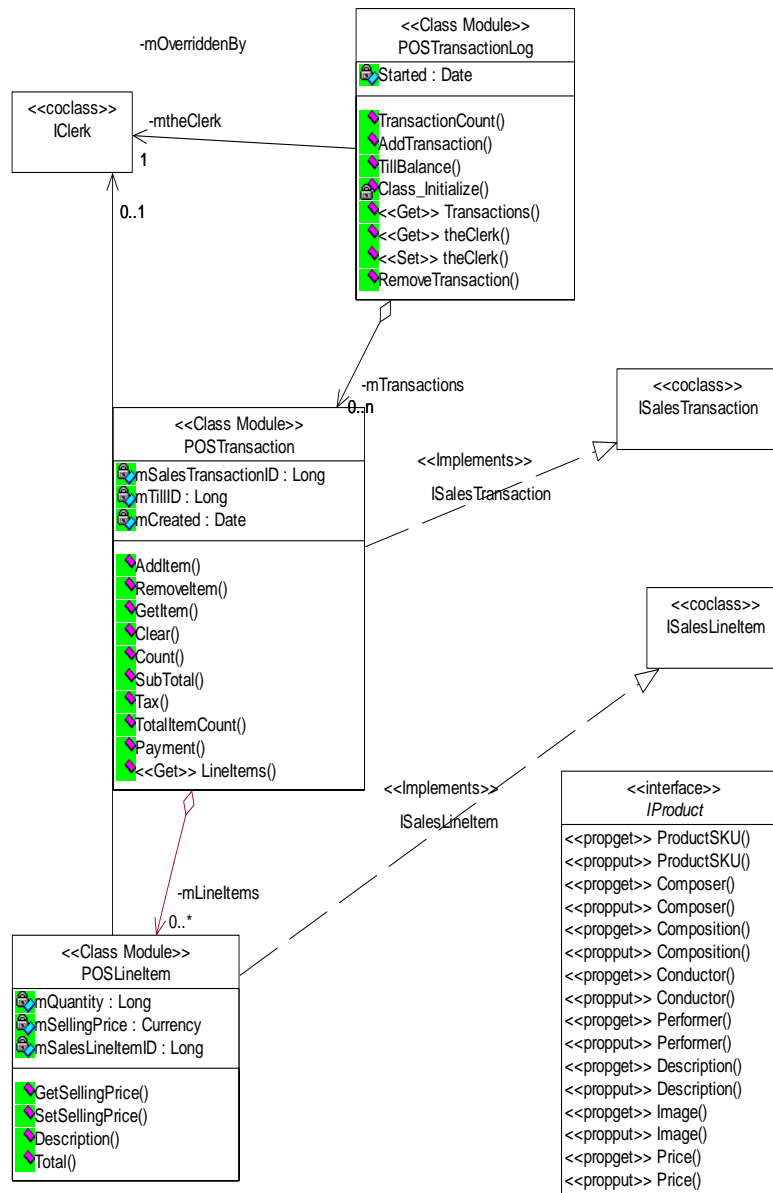


- **POS Client UI**

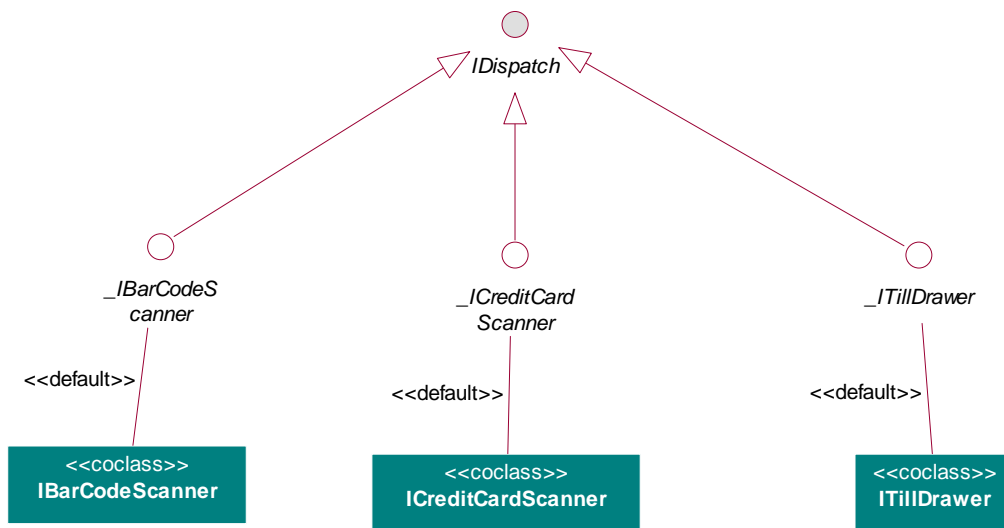
The following class diagram shows different type classes used for creating the user interface of the client within the Point Of Sale system.



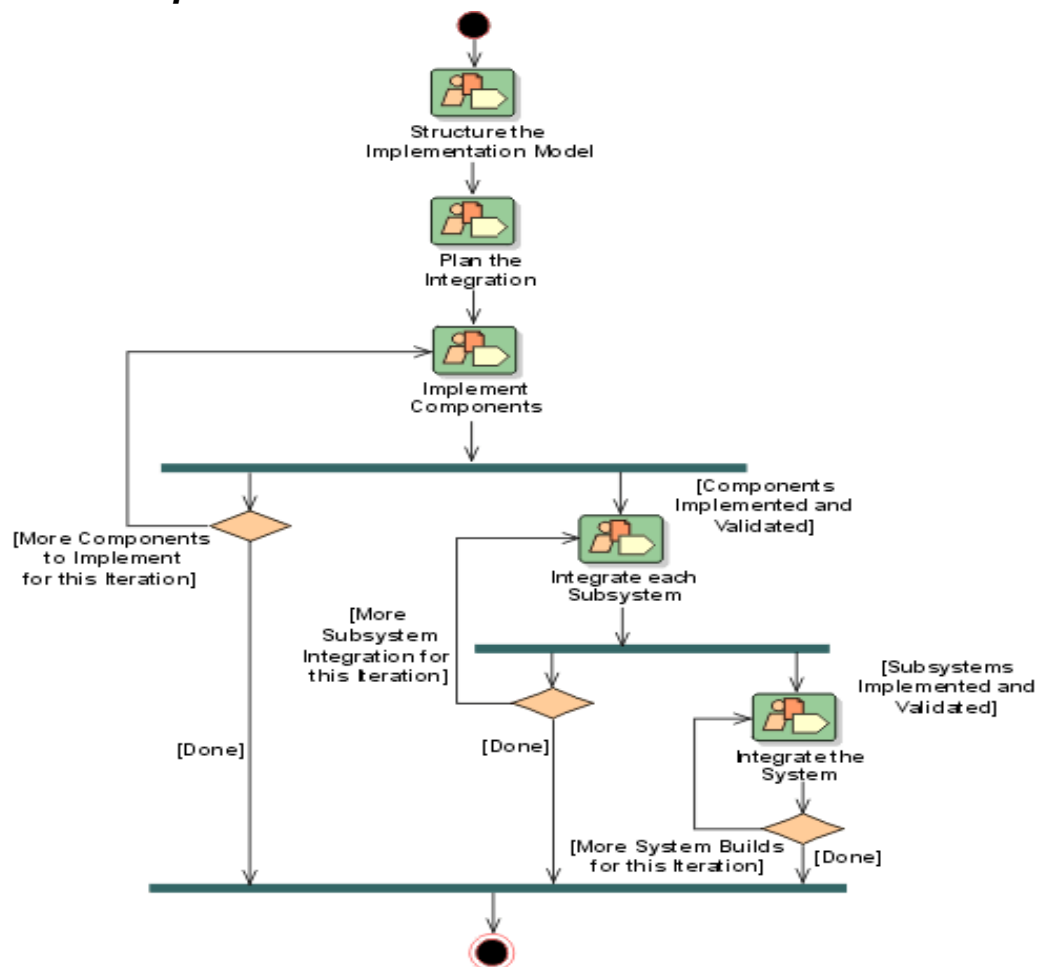
- POS Client Business Objects

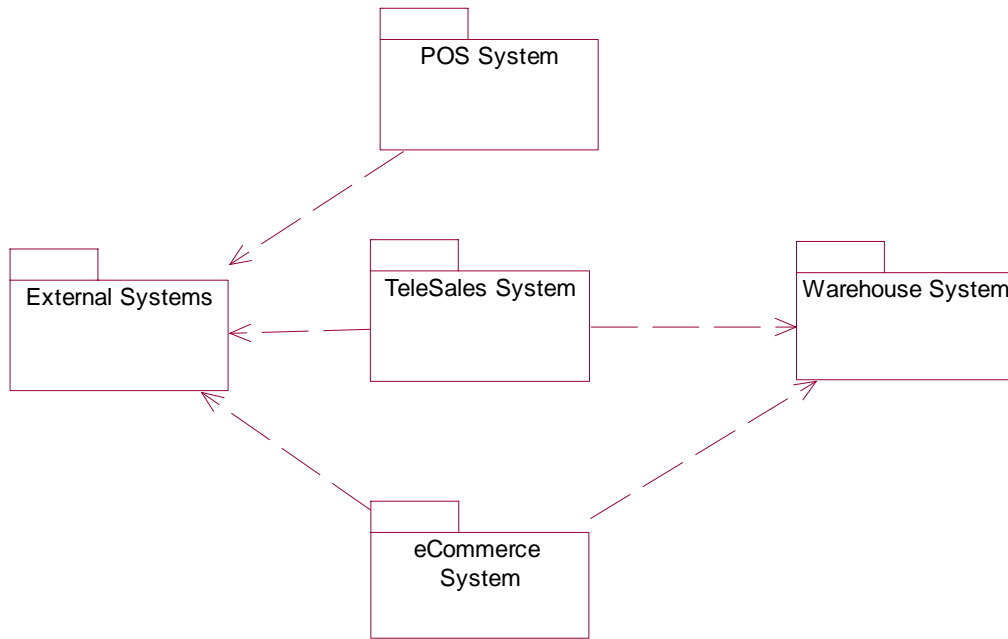


3.3.4 POS Services

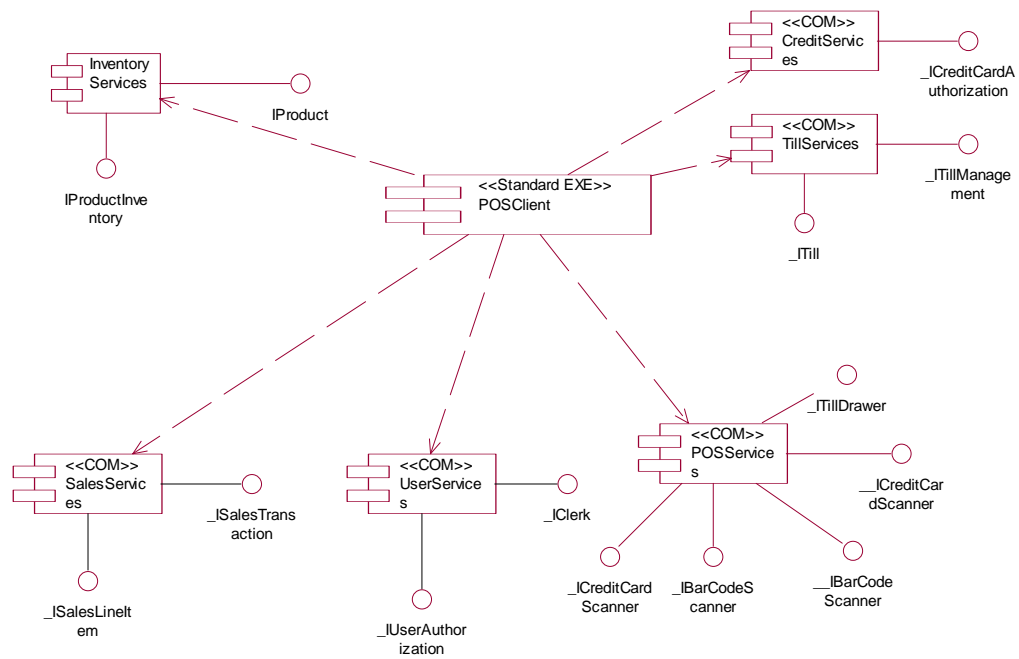


3.4 Component View Model





• POS System



3.5 Deployment View

