Faculty of Computers and Artificial Intelligence

Cairo University

Final Assessment Project

Course Title:	**Analysis and Design of Information Systems-2**	**Course Code: IS352**
Semester:	**Second Semester**	**Date: May 2020**
Instructor:	**Dr. Iman Helal**	

Projects Details

Contents

Project 1: Purchase Order Processing for Automobile Industry

1. Description

The main goal of this project is to create of an integrated **purchase order processing scenario** for an enterprise in the automobile industry called Automobile Incorporation (a kind a AutoInc). AutoInc contains different departments, e.g. Sales, Logistics, Manufacturing, etc, and collaborates also with other partners like suppliers, banks, carriers, etc. During the next sessions you will be able to design services and processes that realize a comprehensive scenario that may cross departments' and organizations' boundaries.

The order processing scenario is triggered when a customer submits a *Purchase Order* to the online order management system of the AutoInc Sales. The *Purchase Order* is then registered to the system with the *date of receipt* and a newly assigned *orderID*. The *orderID* is used to keep track of the order during the whole scenario. In the next step, AutoInc Sales verifies whether the order contains enough and correct information such as the *Customer Data*, the *list of ordered Items* and the *Price* that the customer has already negotiated with AutoInc Sales before (*Note:* the Price Quoting process normally takes place before submitting a purchase order and is <u>not</u> included in this scenario). If the order verification fails, an order cancellation is sent back to the customer and AutoInc Sales closes this order in its system. Otherwise, the order confirmation will be sent to the customer and the order is passed over to next departments for further processing.

In the next step, the AutoInc Customer Relationship Management (AutoInc CRM) checks whether the order comes from a long-term partner, which could be a "preferred" or "standard" retailer, or just from an individual customer. The reason for this checking task is that AutoInc has different policies concerning purchase orders from different *Types of Customers*. For instance, if the order comes from individual customers, payment is only possible with credit card and the credit card worthiness must be checked in the next step. If the credit card check fails, the purchase order is rejected and closed by the AutoInc Sales. Individual customers will also be notified when credit card check fails

The *Purchase Order* is passed back to AutoInc Sales after the *Customer Type* check and, in case of individual customers, the successful credit card worthiness check. According to the type of the customer, AutoInc Sales aggregates the current *Prices of all the ordered items* to a single price, based on different price schemas for preferred retailers, standard retailers, and individual customers.

The next step in the scenario is the planning of inventory release at the AutoInc Enterprise Resource Planning (AutoInc ERP) department. According to the ordered
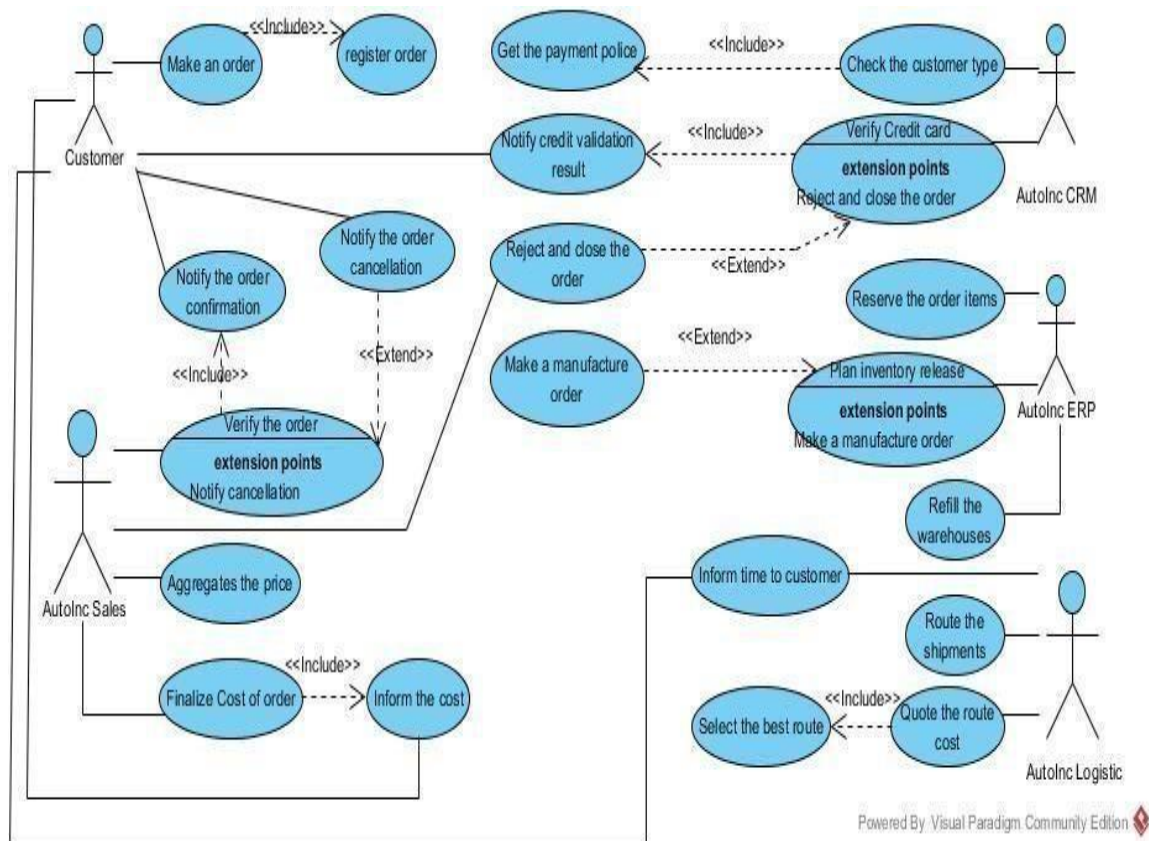
list of items in the purchase order, inventory is reserved by the AutoInc ERP at many different warehouses. Depending on the availabilities of the products, inventory release (*Date, Locations*) at the warehouses is planned by AutoInc ERP, which may have to take into consideration the manufacturing time for unavailable products as well. Besides,

AutoInc ERP is also responsible for refilling the warehouses. Hence, it may have to place replenishment orders to the manufacturing factories after scheduling inventory release.

The inventory release information (*Date and Location*) planned in the previous step is needed by the AutoInc Logistics to plan the *Shipment* of products. AutoInc Logistics is responsible for routing the shipment from the warehouses to the customer, which may include many shipment *Routes*. On each route, AutoInc Logistics has to quote the *Shipment Cost and Duration* from lots of possible *Carriers*. At the end, AutoInc Logistics selects on each route the best carriers based on its own criteria.
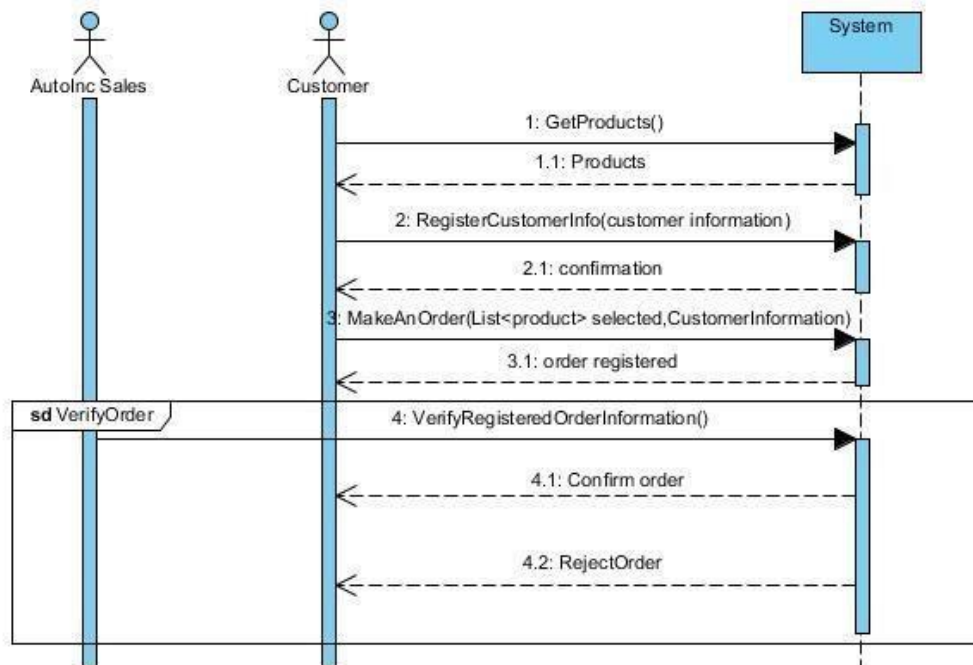
Lastly, *Shipment Cost* and the *Price* of the ordered items will be finalized together resulting to the final *Cost of the Purchase Order* by the AutoInc Sales. This cost will be informed to customers by AutoInc Sales. AutoInc Logistics is then responsible for informing the customer the *Delivery Date*. The order processing ends here.
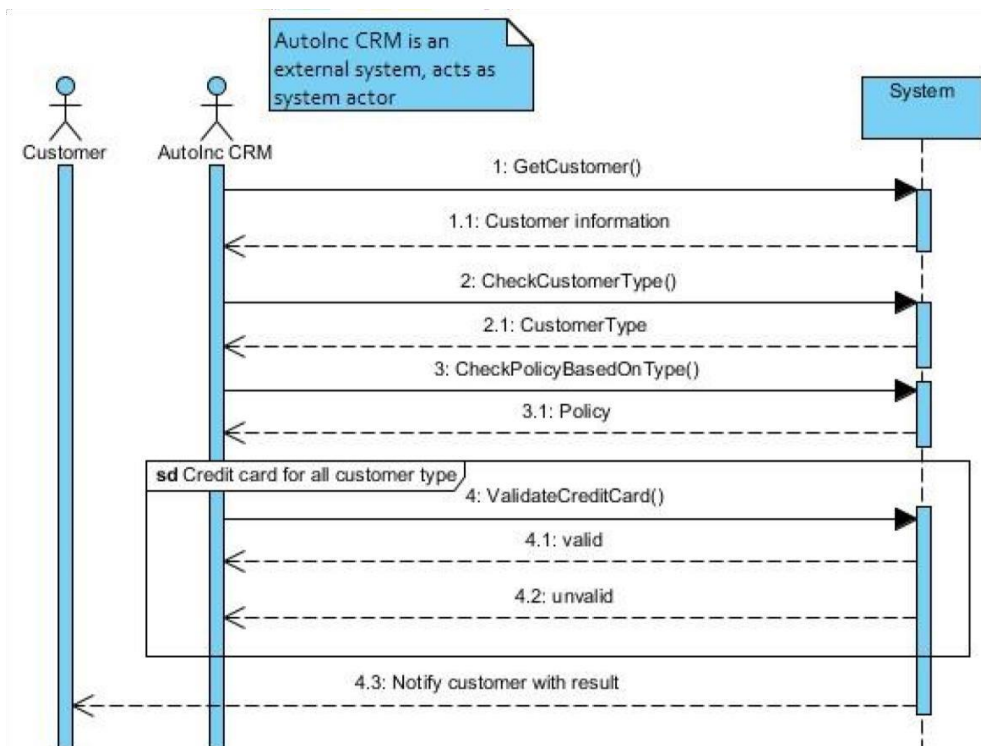
2. Use case model

3. Sequence diagram

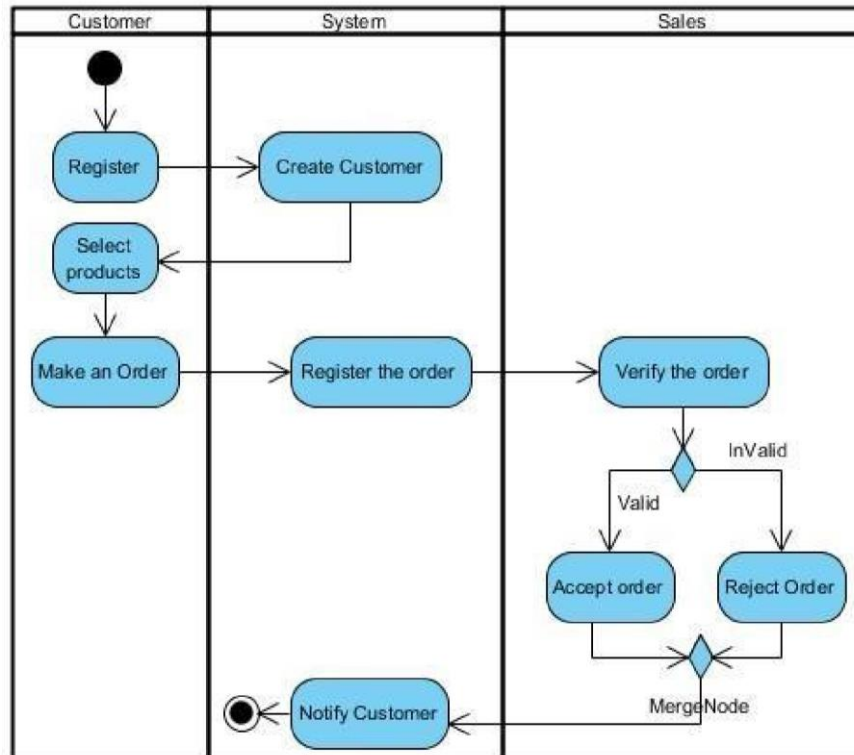## 3.1. Purchase an order [Make an order + Verify the order] use cases

3.2. Purchase an order [CHECK customer type + validate credit card]
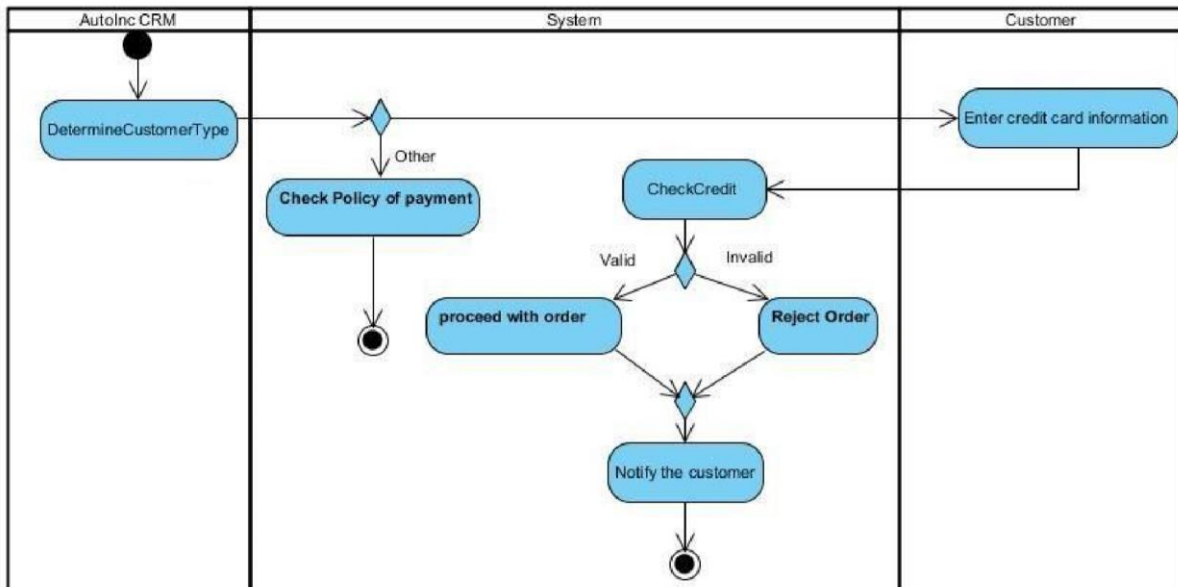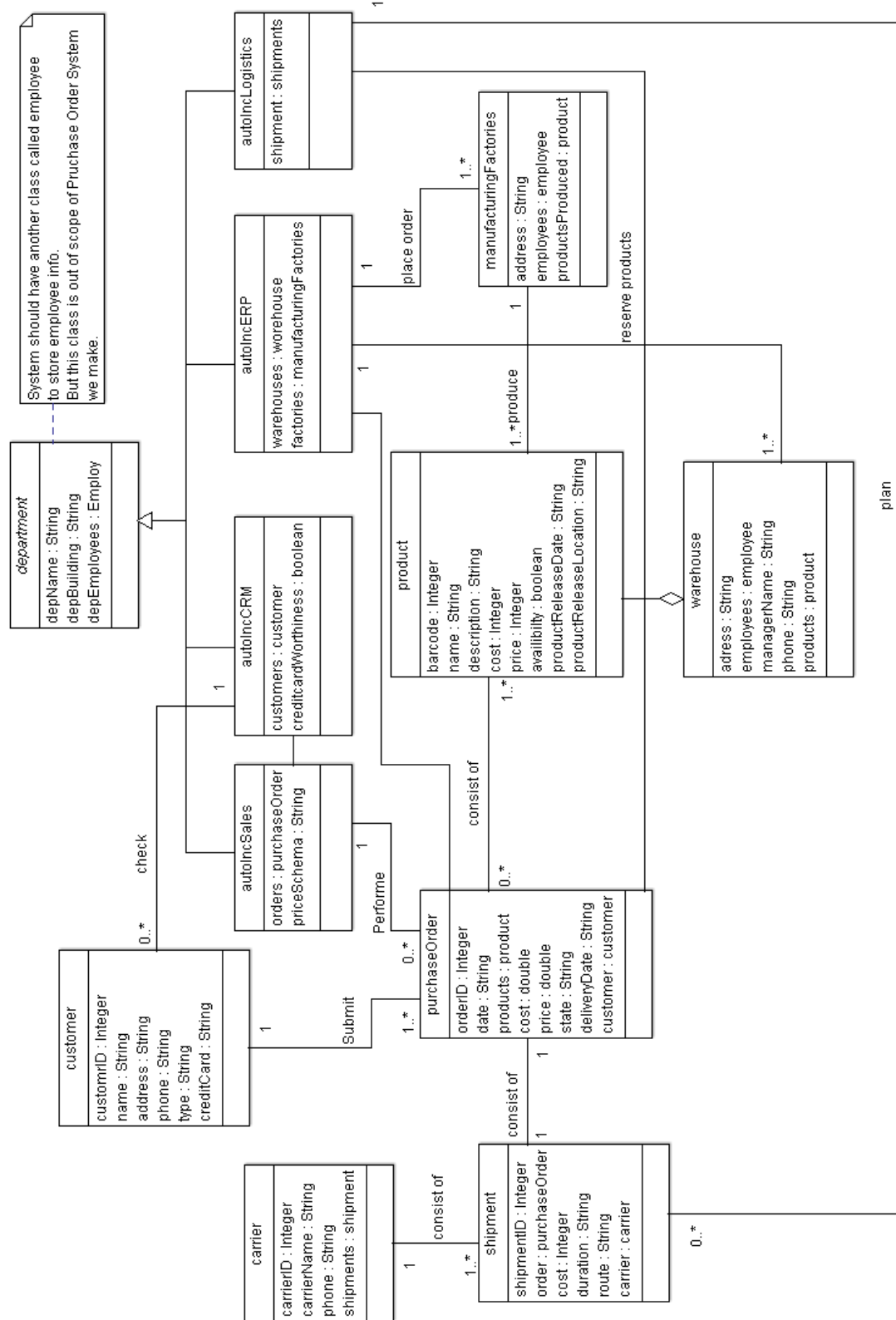
4. Activity diagram

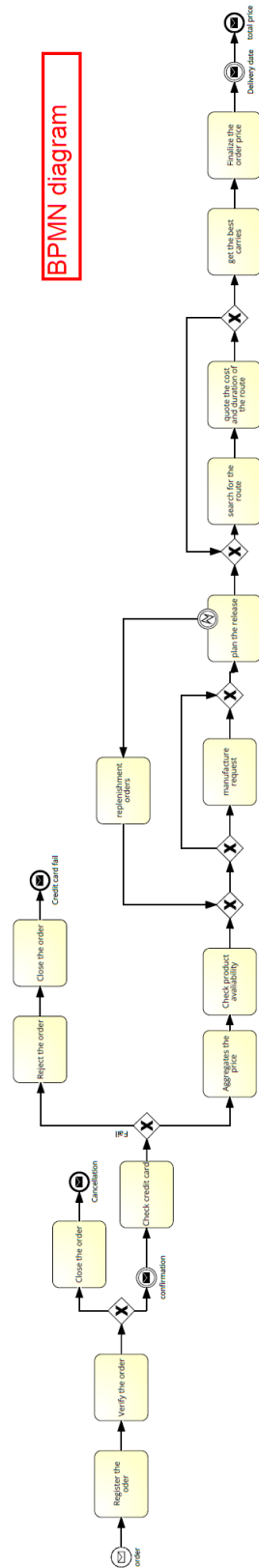## 4.1. Purchase an order [Make an order + Verify the order] use cases

4.2. Purchase an order [CHECK customer type + validate credit card]

5. Class diagram

6. BPMN

BPMN diagram

Project 2: Internet Reseller
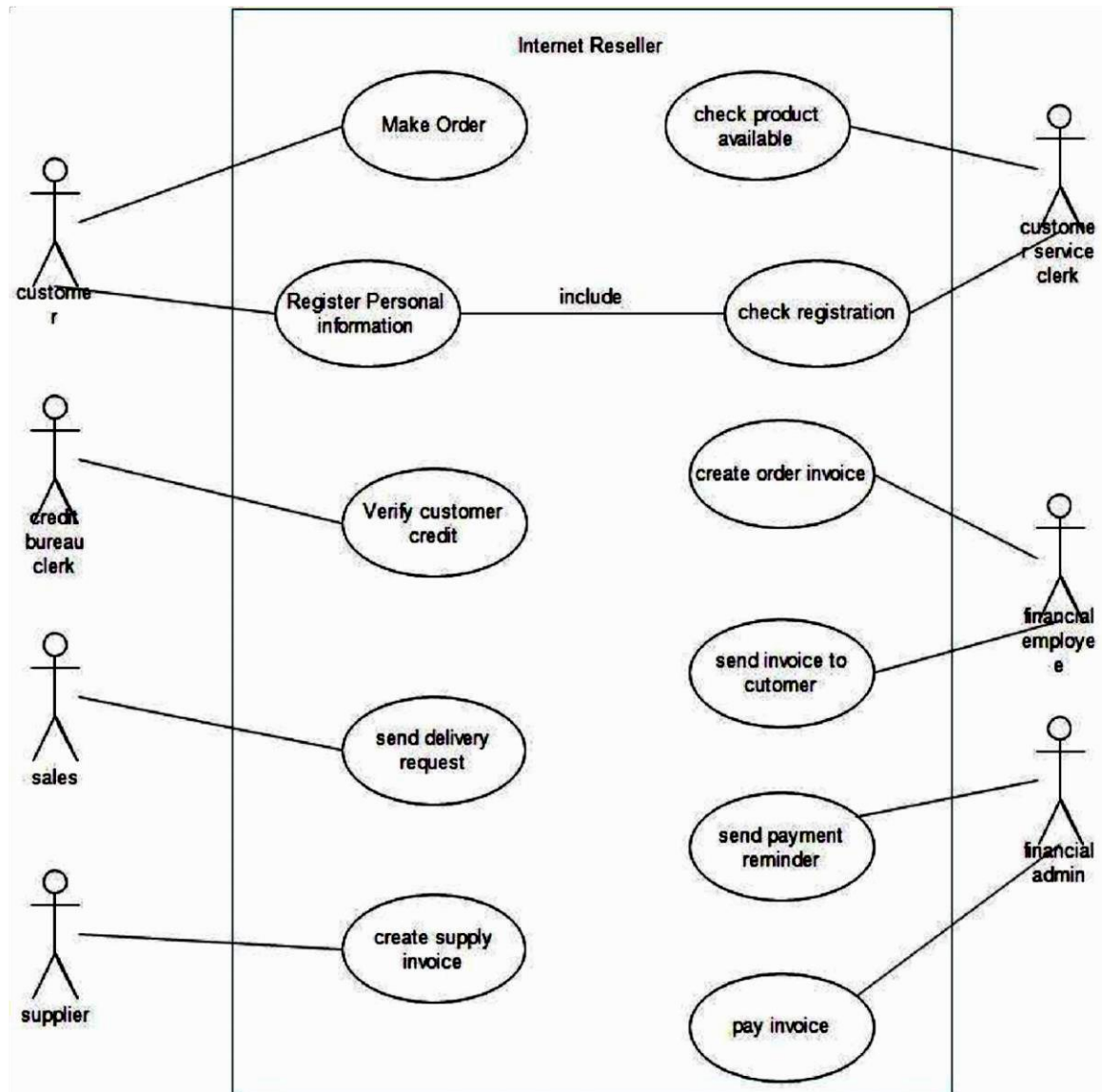
1. Description

The general environment in which this scenario takes place is the e-business applications domain, and particularly, online product selling systems. We focus here on an online product selling scenario. The scenario starts by the customer visiting the website of ZYX. The customer searches for a product on the website of ZYX. She considers the details of the product, the selling price, the terms of delivery and may decide to buy one or multiple products. The system checks if there is stock available regarding the selected product and indicates to the customer if she can order.

The customer then registers her personal information, such as name, address, contact information, nationality, bank account number and authorization for credit worthiness check. The system then checks if everything has been fully and corrected filled. The Sales Department then sends the Credit Bureau a formal request to check the credit worthiness of the customer. The Credit Bureau verifies the authorization of handling the data and checks credibility of the customer. The official results are sent to the Sales Department. The Sales Department decides whether to proceed with the customer order and marks the initiator of the order as credible. The Sales Department then validates the order by checking whether all its fields are fully and correctly filled, and the indicated price is correct. It also double-checks if the ordered products are still available. Finally, the order is digitally signed by the Sales Department inside the Order Application.

The Financial Department then automatically creates an invoice based on the information from the Order Application, checks and signs the invoice and sends the invoice to the customer. The Financial Administration automatically checks the debtors' records to identify customers who have not paid yet. If a customer has not paid, a warning is displayed in the Financial Application and a reminder is automatically generated by the system. The Financial Administration checks the reminder and sends it to the customer. If a customer paid correctly, the state of the order will be set to "paid" and the order will be further handled by the Sales Department.

The Sales Department then checks the payment and sends the delivery request to the supplier. Based on this delivery request, the supplier creates its invoice. The supplier delivers the product to the customer and receives a proof of delivery from the customer. The supplier sends the proof of delivery to ZYX. Then based on the invoices which are matched with the proofs of delivery, the Financial Administration pays the invoices which are sent by the supplier.

2. Use case model

3. Sequence diagram

3.1. Make order

3.2. Send Delivery Request

4. Activity diagram

4.1. Make order

4.2. Send Delivery Request

5. Class diagram

6. BPMN
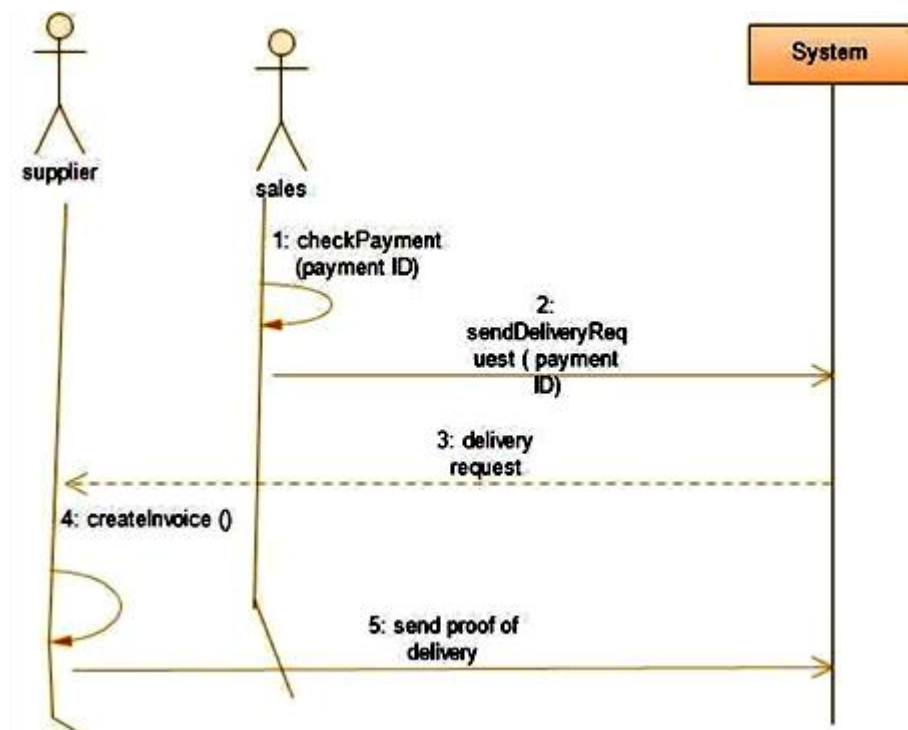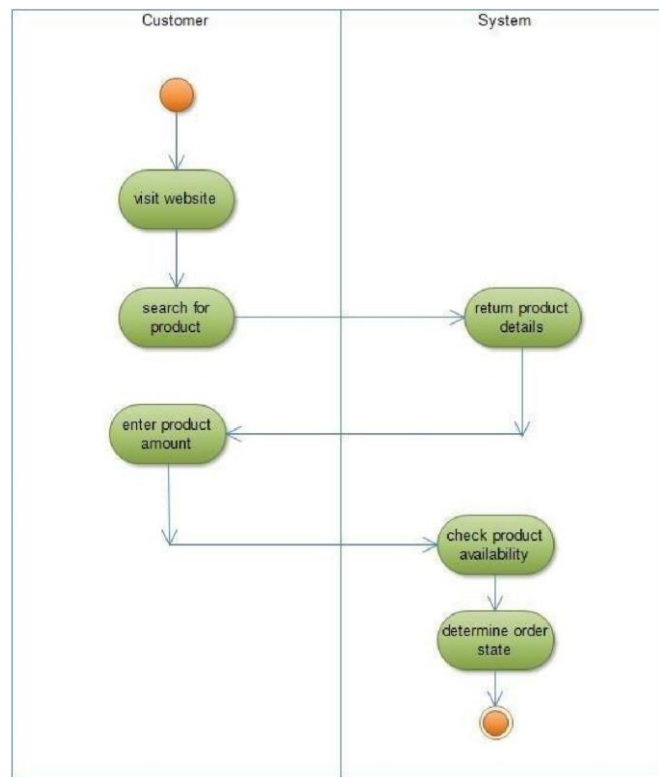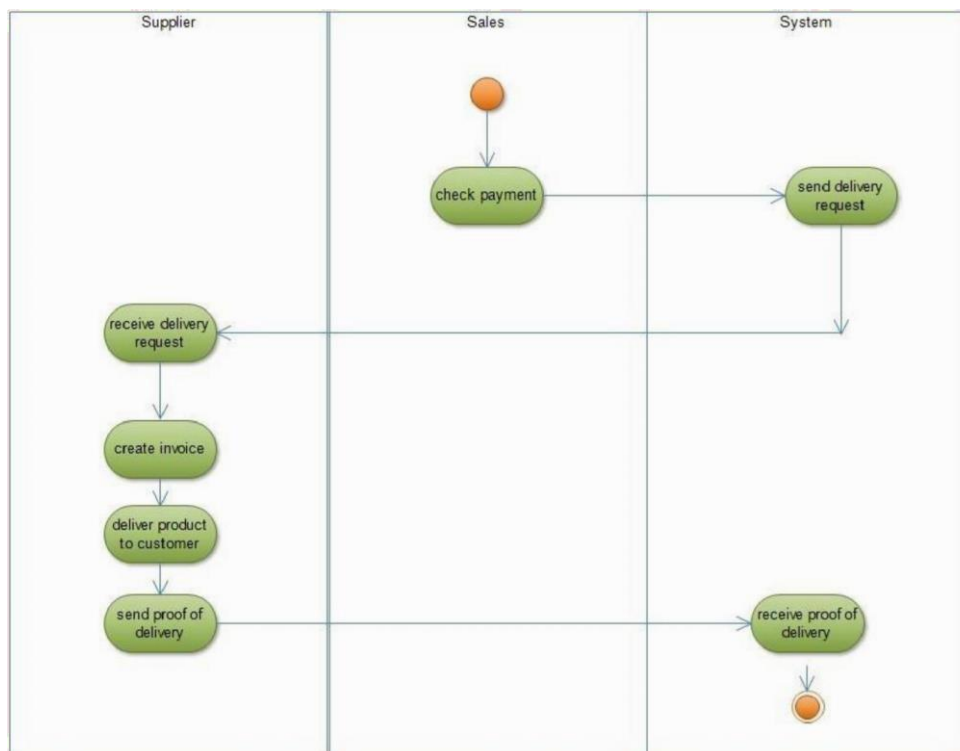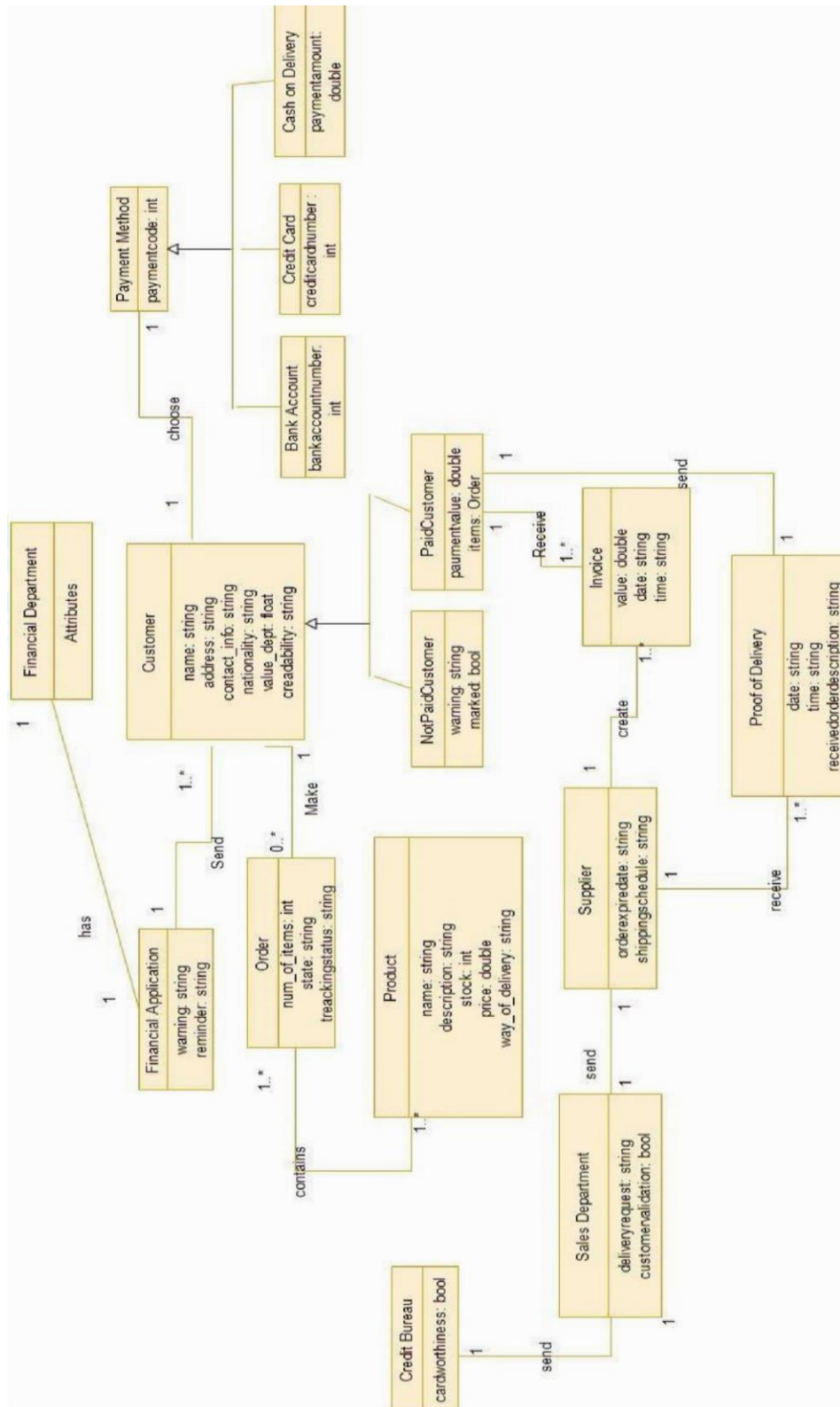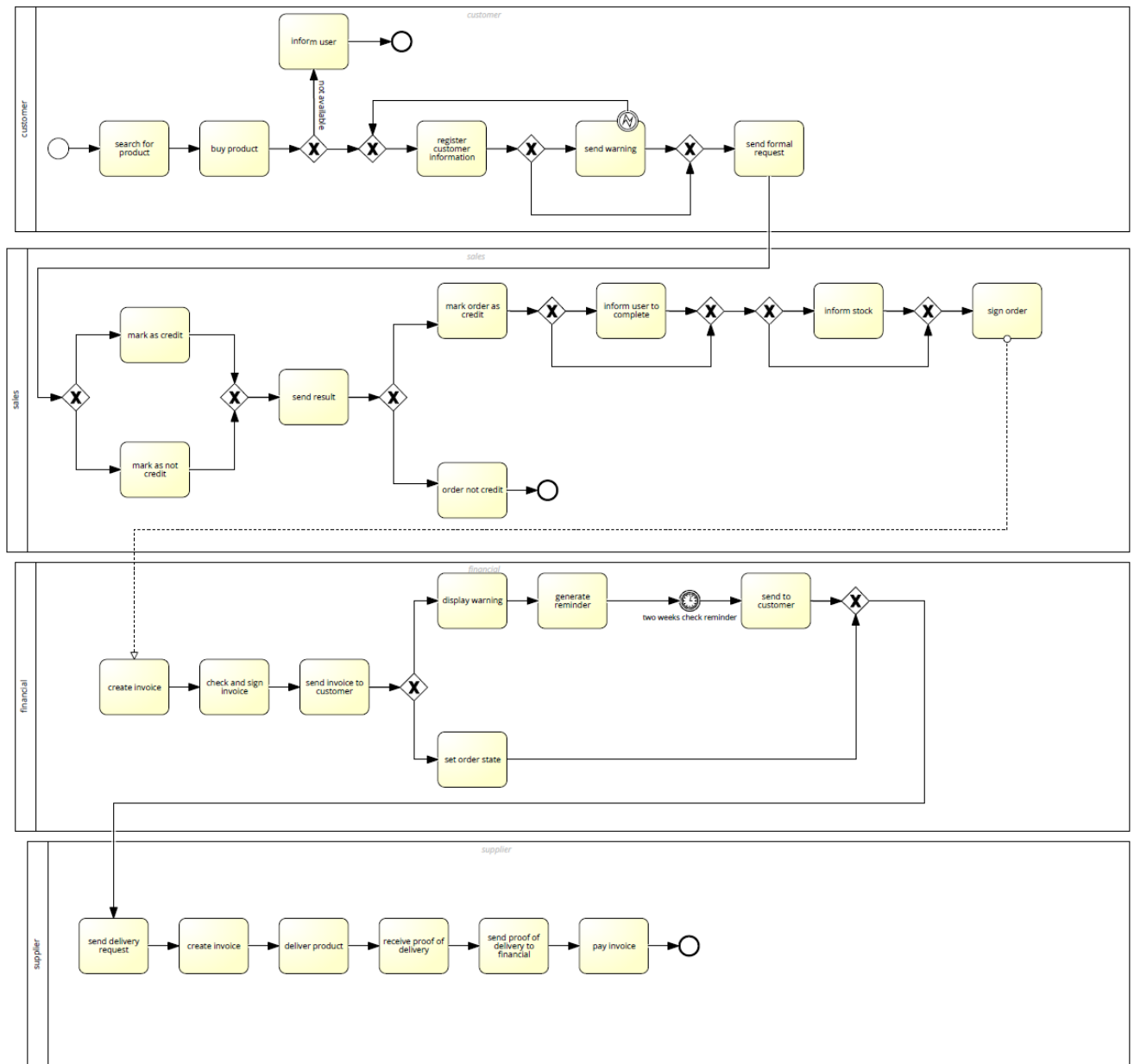
Project 3: Health Information Network

1. Description

The online Health Information Network (HIN) is a representative of a web application used by patients, health providers, and government regulators as a national system for managing and exchanging health records in accordance with HIPAA standards. HIN needs self-adaptation capabilities to balance a number of goals. The system maintains a high authentication system for each type of stakeholders to keep the confidentiality of health records and provides each stakeholder with the appropriate view.

Using the HIN system, a patient can access his/her country-wide health records. The process allows for search by date, type of incident, and so on. Patients can make appointment requests with health providers. Appointment requests defer based on type of illness requested and patient's record of treatments. For instance, HIN gives priory to placing a patient to the health provider, with whom the patient had received treatment earlier. However, if the illness is of an emergency nature, the system places the patient with the health provider that has the closest availability. The patients can be notified by email and/or SMS for approaching appointments. Appointments maybe cancelled or changed. If an appointment is cancelled by the patient, further appointments will be treated as a new appointment following the same criteria described above. Change of appointment depends on the availability of the health provider and the type and emergency nature of the illness.
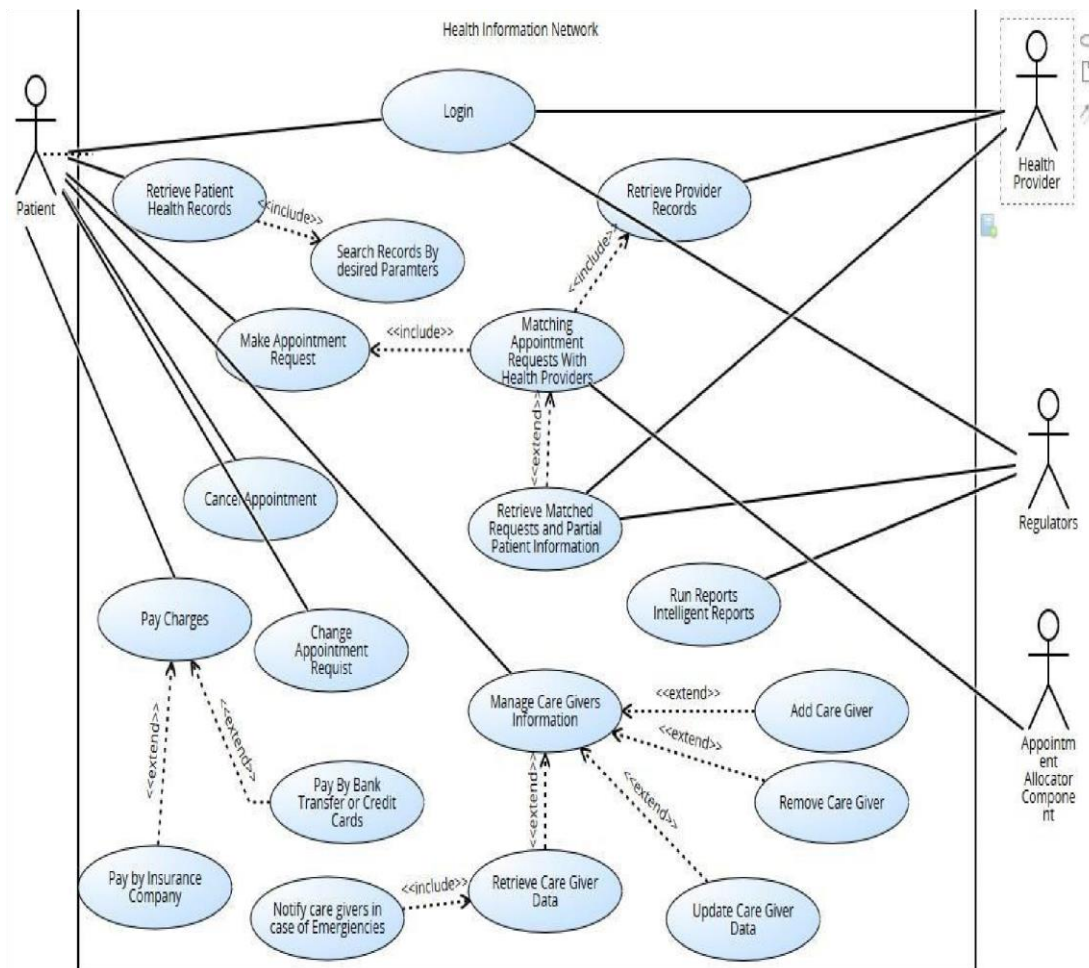
Periodically, an appointment allocation component fetches patients' appointment requests and matches them with a HIN health provider. HIN health providers can then retrieve appointments that have been placed to them using a dedicated Portal. Based on the type of illness, a subset of the patients' information is forwarded to the health provider. To privacy purposes, a pairwise evidence of the forwarded information is tracked so that regulators can govern and monitor HIPAA compliance in case legal disputes arise.

The regulators may also run other intelligent reports using report generator and report builder to monitor other nation-wide trends.

The system keeps track of the care givers' providers of patients, e.g., their family, friends, etc. and they get notified automatically by the system in case an emergency condition is detected and as instructed by the patient. The patients can include, remove or update the list of associated care givers at any time.

Patients who have health insurance coverage by a registered health insurance company will be charged through their health insurance company based on their health insurance package. Patients who are not insured need to pay themselves using credit cards or bank transfers.

2. Use case model

3. Sequence diagram

3.1. Retrieve Patient Health Records

3.2. Request Appointment

4. Activity diagram

4.1. Pay Charges

4.2. Request appointment

5. Class diagram

Country

+ ID : Integer
+ Name : String
+ Code : string

+ setCountry (Country country) : Void
+ getCountry(String Name) : return Country

Insurance Company

+ HealthProviderID : int
+ Name : String
+ Address: String
+ Email:String
+PhoneNumber:String

Payment()

Patient

+ PatientID : Integer
+ Name : String
+ Age : Integer+ Address : String
+ Email : String
+ PhoneNumber:String
+PatientCountry:Country
+ viewHealthRecordByCountry( ) : return List <HealthRecord>
+ requestAppointment () : Appointment
+ cancelAppointment (Appointment p) : return boolean
+ changeAppointment (Appointment p) : return bloolean
+payment()

0..1 ─ Follow

1..* View

Health Records

+ HealthRecordsID : Integer
+ CreationDate : DateTime
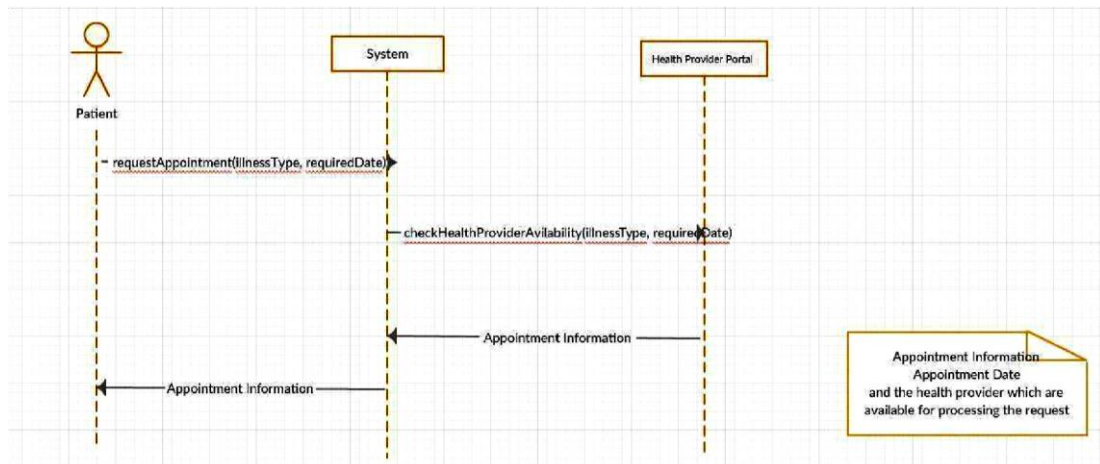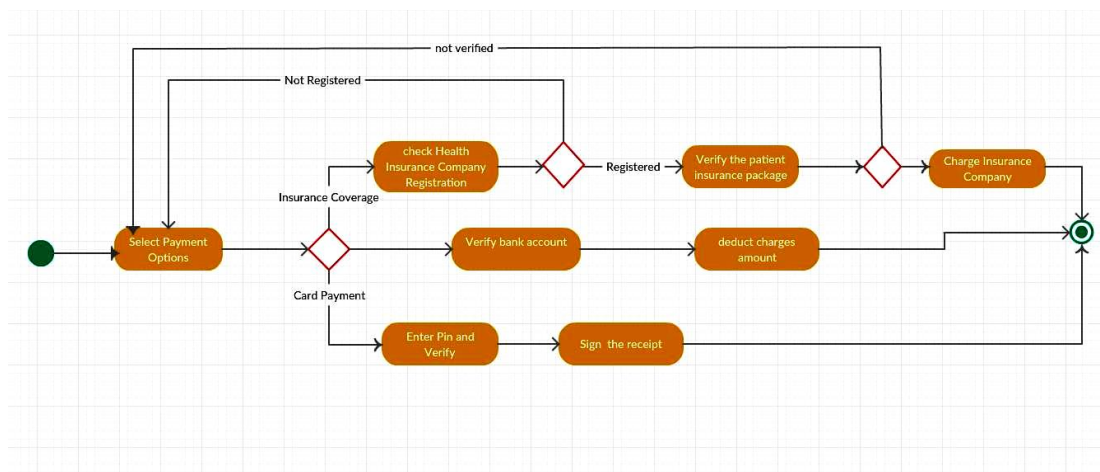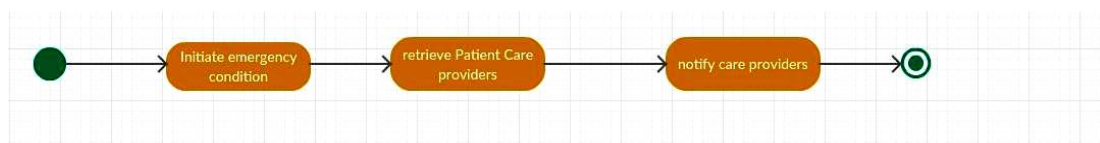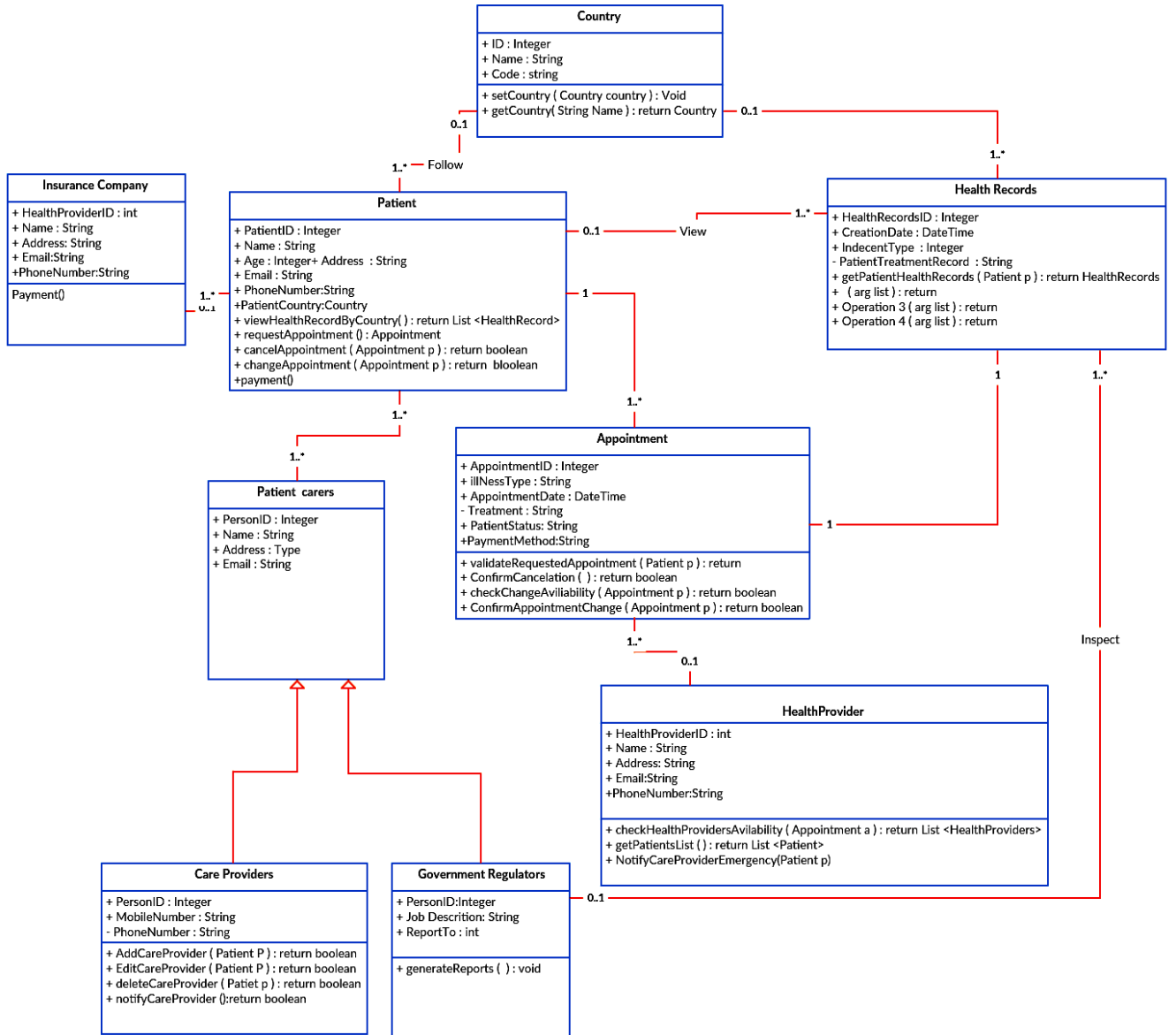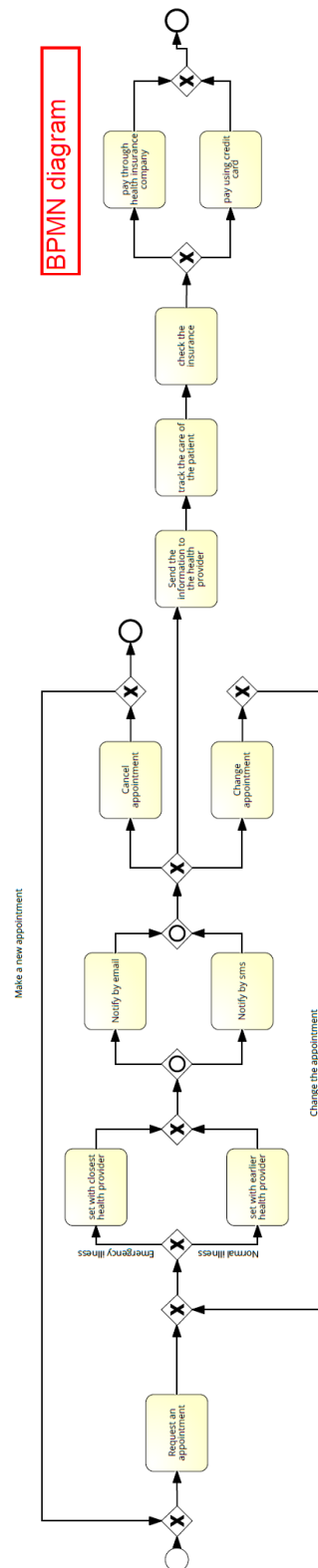+ IndecentType : Integer
- PatientTreatmentRecord : String
+ getPatientHealthRecords (Patient p) : return HealthRecords
+   (arg list) : return
+ Operation 3 (arg list) : return
+ Operation 4 (arg list) : return

Patient carers

+ PersonID : Integer
+ Name : String
+ Address : Type
+ Email : String

Appointment

+ AppointmentID : Integer
+ illNessType : String
+ AppointmentDate : DateTime
- Treatment : String
+ PatientStatus: String
+PaymentMethod:String

+ validateRequestedAppointment (Patient p) : return
+ ConfirmCancelation ( ) : return boolean
+ checkChangeAviliability (Appointment p) : return boolean
+ ConfirmAppointmentChange (Appointment p) : return boolean

HealthProvider

+ HealthProviderID : int
+ Name : String
+ Address: String
+ Email:String
+PhoneNumber:String

+ checkHealthProvidersAvilability (Appointment a) : return List <HealthProviders>
+ getPatientsList ( ) : return List <Patient>
+ NotifyCareProviderEmergency(Patient p)

Inspect

Care Providers

+ PersonID : Integer
+ MobileNumber : String
- PhoneNumber : String

+ AddCareProvider (Patient P) : return boolean
+ EditCareProvider (Patient P) : return boolean
+ deleteCareProvider (Patiet p) : return boolean
+ notifyCareProvider ():return boolean

Government Regulators

+ PersonID:Integer
+ Job Descrition: String
+ ReportTo : int

+ generateReports ( ) : void

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6. BPMN

BPMN diagram

Project 4: Automatic Teller Machine

1. Description

An Automatic teller machine is an electronic telecommunications device that enables the customers of a financial institution to perform financial transactions, particularly: (i) cash withdrawal, without the need for a human cashier, clerk or bank teller, (ii) view their current balance and deposit funds. Each user can have only one account at the bank. The use interface typically includes a screen to display messages, a keypad for numeric input, a case dispenser and a deposit slot (see Figure 1).

The cash dispenser begins each day loaded with 500 $20 bills. The machine must authenticate the user based on account number and the PIN code, which is matched against the bank's account information database including (among others) customers account numbers and associated PIN codes, and balances. The ATM session starts by displaying a welcome message and prompt the user to enter and account number. The user enters a five-digit PIN using the keypad, then the screen prompts the user to enter the PIN code.
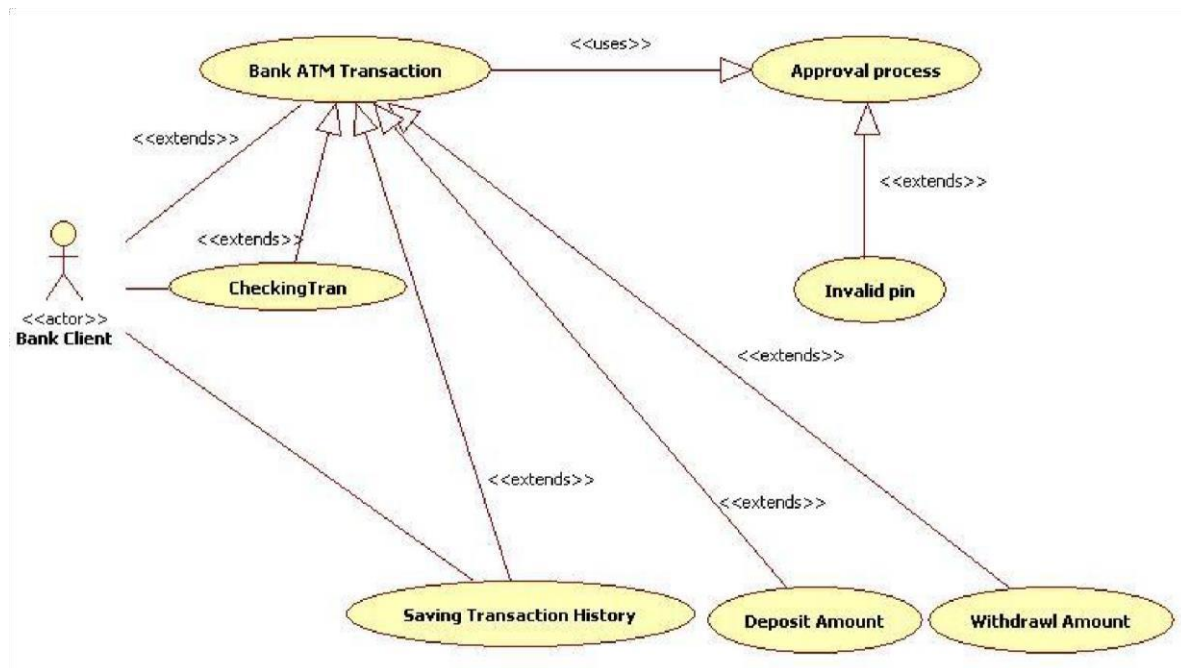
Figure 1 Typical ATM user interface

The use enters the five-digit PIN using the Keypad. If the use enters a valid account number and the correct PIN for that account, the screen displays the main menu. If the user enters an invalid account number or incorrect PIN, the screen displays an appropriate message, then the ATM returns to authentication process. When an invalid option is entered, an error message is displayed, the main menu is redisplayed. If the login is successful, the user might proceed with displaying the account balance, withdraw cash, or deposit cash. To withdraw cash, withdrawal amounts must be less than the customer's balance, and the machine should react with request withdrawal amounts greater than the customer's balance. If the requested withdrawal amount is valid, the machine re-authenticates the user by asking for the PIN, if successful, the requested withdrawal amount is debited from the customer's balance, money is dispensed. The customer may also request for a printed receipt. Then the machine reminds the user to take the money and the card.
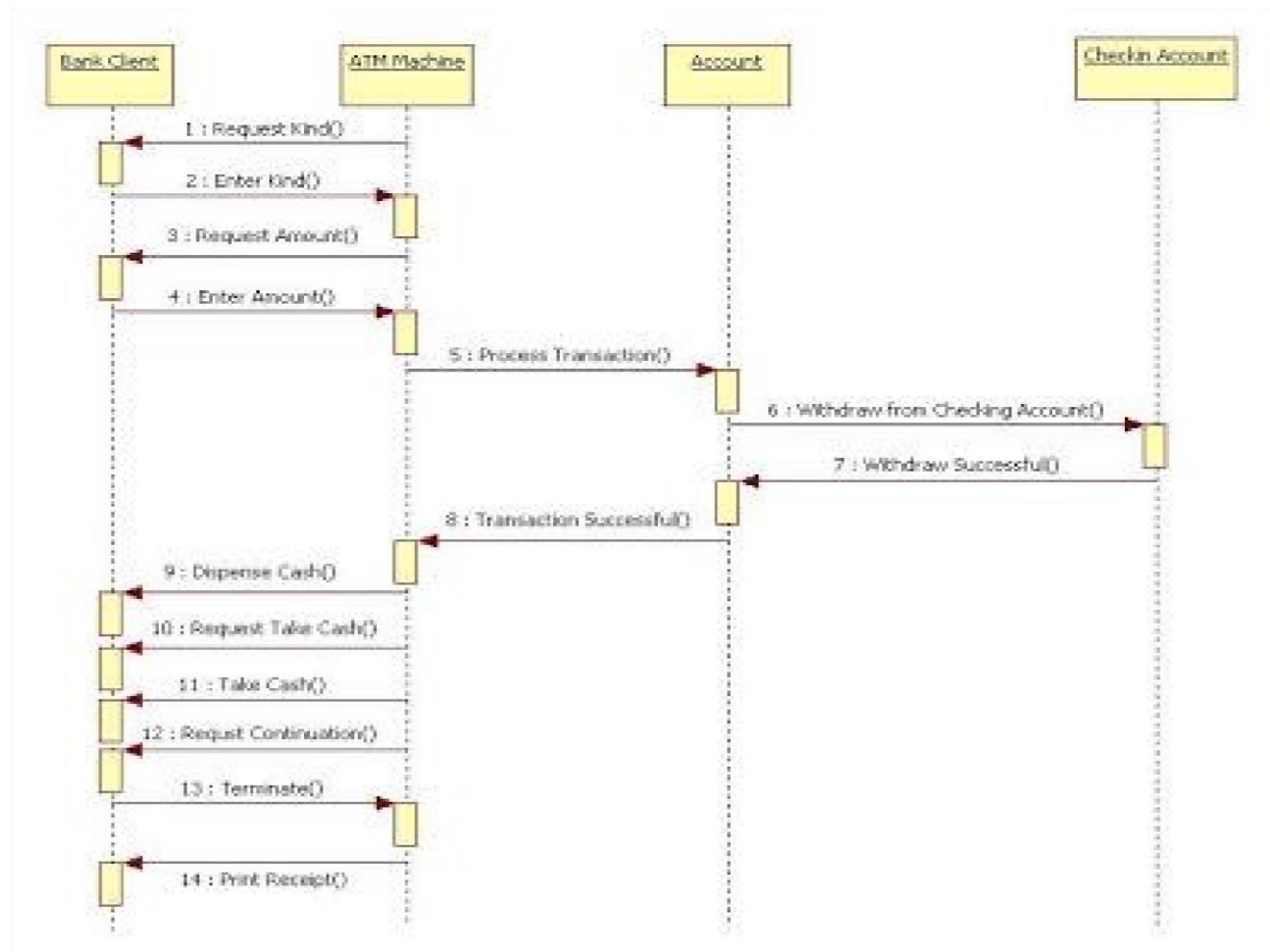
To deposit funds, after authentication, the customer is prompted to enter a deposit amount or 0 (zero) to cancel the transaction. The amount is entered as a number of cents (e.g., 125), the ATM divides this number by 100 to obtain a dollar amount (e.g., 125/100 = 1.25), the user then is requested to insert the cash notes into the deposit slot, and if the slot receives the notes within two minutes, the ATM credits

the amount to the balance of the customer. Usually, the money is not immediately available for withdrawal, first the bank verifies the amount and then updates the balance of the respective customer. The ATM will also react to an inactivity for more than two minutes. Finally, the main screen is displayed, and the user may choose to exit the system or perform another transaction.
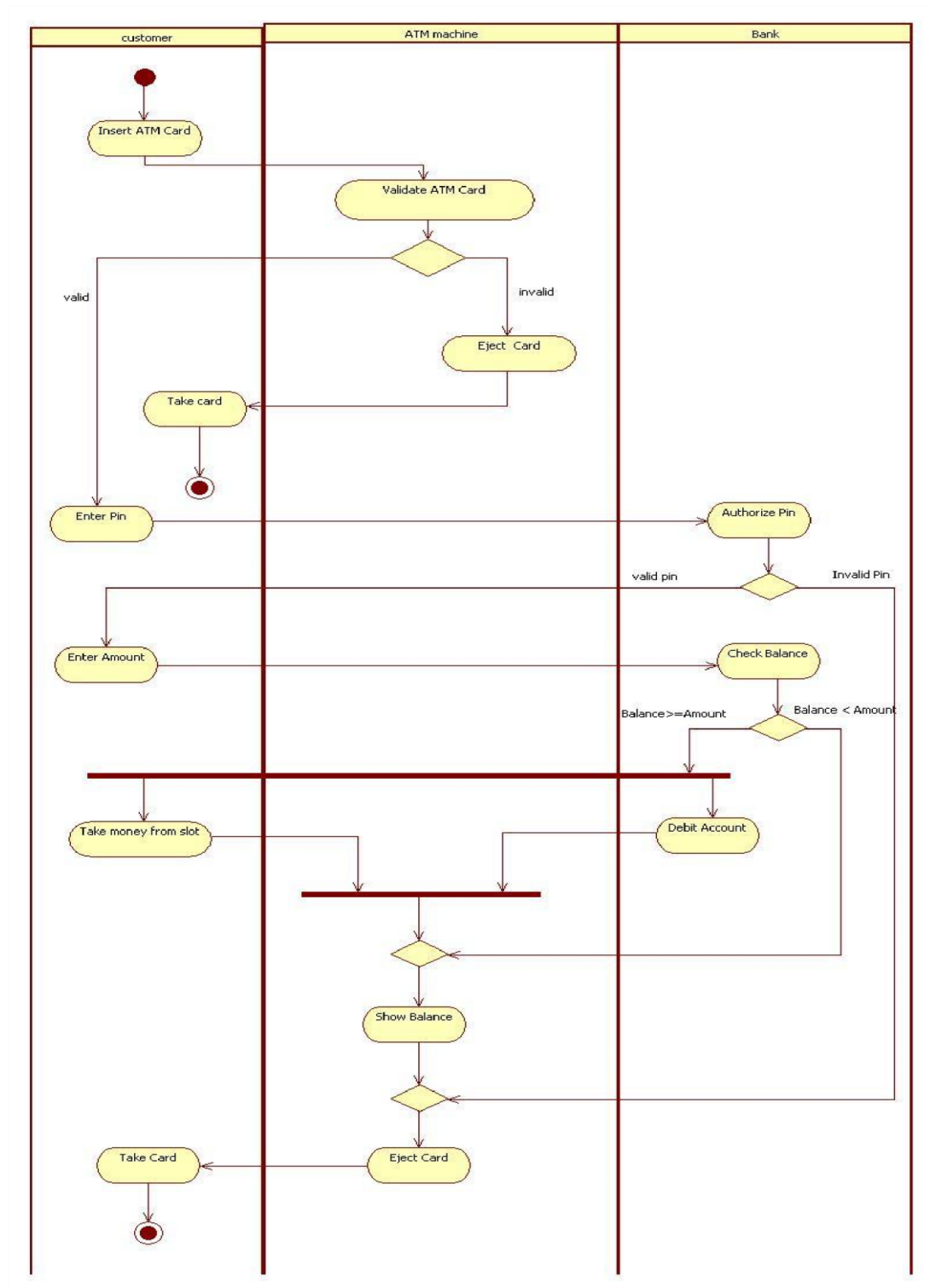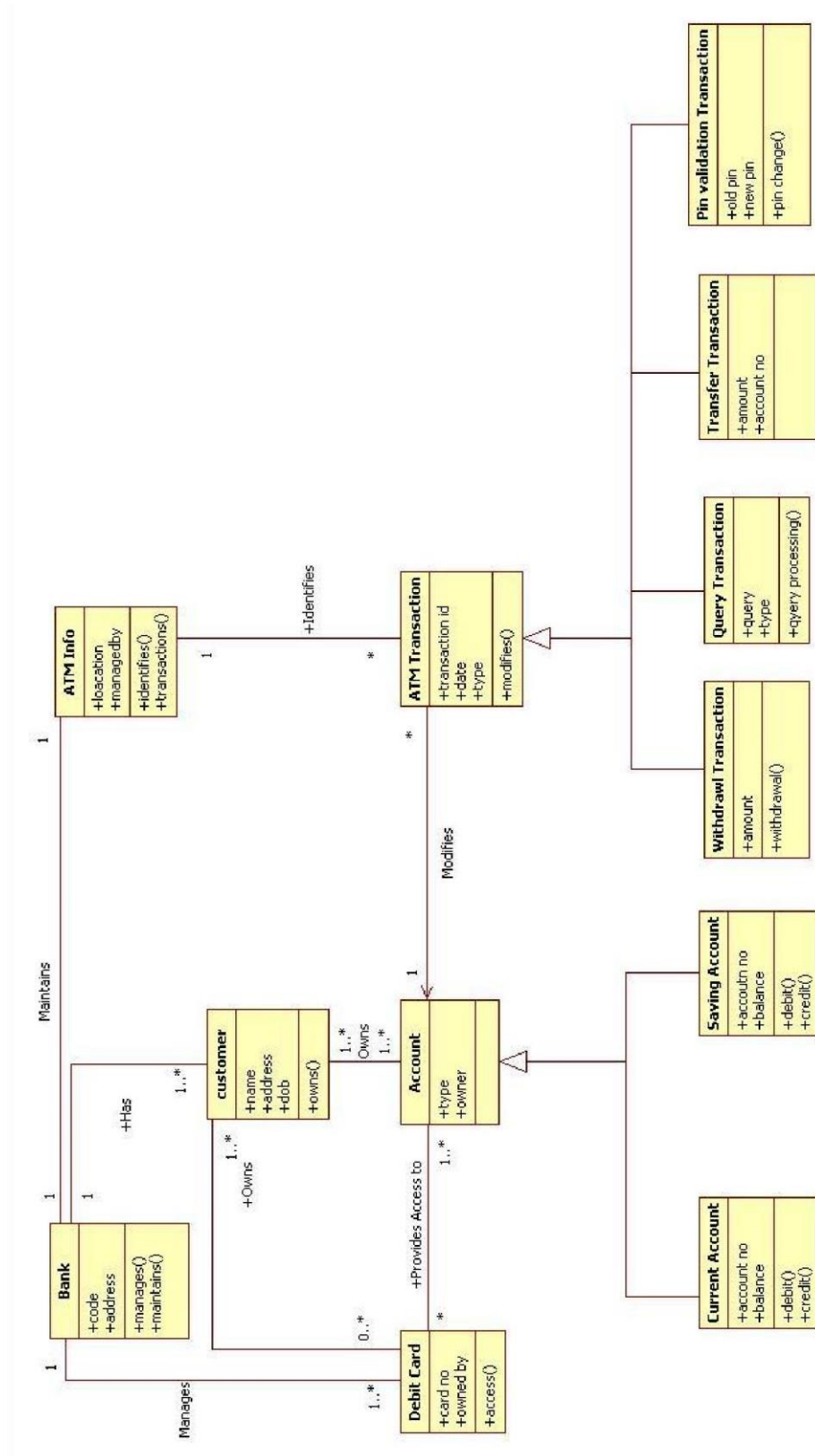
2. Use case model

3.   Sequence diagram

4. Activity diagram

5. Class diagram

6. BPMN