BANK AUTOMATED TELLER MACHINE

Software Engineering (SEN 941)
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Submitted to:
Prof. Dr. Richard Riehle
By: Akanskha Avinash(12300106)
Dharti Rathod(84213)
Madhu Mahadevaiah(84344)
Slesha Vemuganti(82938)
Ramya Keerthi(84108)
Trupti Kholiya(84829)

SEN – 941 SOFTWARE ENGINEERING – ATM PROJECT

Acknowledgement

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Akanksha   Avinash (12300106)

Dharti   Rathod (84213)

Madhu   Mahadevaiah (84344)

Slesha   Vemuganti (82938)

Ramya   Keerthi (84108)

Trupti   Kholiya (84829)

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Automated Teller Machine

An automated teller machine (ATM) is an electronic telecommunications device that enables the clients of a financial institution to perform financial transactions without the need for a cashier, human clerk or bank teller. ATMs are known by various other names including ATM machine, automated banking machine and various regional variants derived from trademarks on ATM systems held by particular banks. On most modern ATMs, the customer is identified by inserting a plastic ATM card with a magnetic stripe or a plastic smart card with a chip that contains a unique card number and some security information such as an expiration date. Authentication is provided by the customer entering a personal identification number (PIN).

Using an ATM, customers can access their bank accounts in order to make cash withdrawals, debit card cash advances, and check their account balances. Our ATM Bank machine puts over some improvements to the system like dispensing blank checks with the all the details of the account holder printed on the check. It also prints the demand drafts with the account holder details as well as the person or company name for which the demand drafts had been issued. One major improvement that has been done in order to make the ATM's more secure is capturing the fingerprints of the account holder so that we can keep a check on any kind of theft.

2.1 Requirement Constraints

The constraints can be defined for timing, component relationships, range of values of data types, permissible operations on various artifacts of the system, etc. The important thing is that constraints must be part of the requirements development process, and they must be defined quantitatively whenever possible. One of the most valuable ideas in requirements development is that of discovering the valid set of values (constraints) for the elements of the future software system. This is particularly useful when we know that the tools for implementation will enable us to directly represent those constraints.

Developing software for ATM machine aims mainly towards saving lot of time as well as money. Some other constraints are making the system more secure and safe so that hackers attack on bank accounts can be prevented. What kind of security and safety systems can be added in the system of ATM machine.

2.2 Functional Requirements

For ATM Machine

General

- ATM initialized with 'n' dollars, blank money orders & check.
- If ATM is running out of money, no cards should be accepted. An error message is display. Should also notify the bank to refill the ATM with money ASAP.
- If the ATMs' bank server is down, the ATM should display a error message.

Authorization Starts after customer has entered his card.

- ATM has to check if entered card is a valid debit card. In case if the card is blocked, ATM should keep the card and display error message or call 911 - in case card holder has reported it is lost.
- If ATM card is valid, ATM should read serial number and back code.
- Selection of Language - ATM machine should first prompt for selection of language like English, Chinese, and Spanish etc.
- Authorization dialogue – validate pin. Enter valid pin. Accepts or rejects card.
- If password and serial number (ATM card number) are okay, the author275ization process is finished for cash withdrawal.
- (Extra security) Fingerprint validation for "money orders and check" printouts.

- If password, serial number (ATM card number), fingerprints are okay the authorization process is finished for money order and check withdrawal.
- If invalid pin/password is entered more than three consecutive time, the card would be kept by ATM. A message will be displayed that customer should call bank. Instead of calling bank there should be an option where you can reset your pin/password. If you click that option on your phone should get an auto generated pin by the system and then you can use that pin to reset your pin and it should not be the one you set before.

Usability

- Once the customer enters a valid pin, ATM should prompt the customer with language of communication (English, Spanish, French, etc.).

Function

- These are the requirement for different function ATM should provide after authorization.

- ATM offers 5 functions for transaction –
- Cash withdrawal,
- Money order
- Check
- Transfer (to another account) V) Balance inquiry

- The amount is logged in (eg. $20 bill) for dispense
- For successful transaction money, money order and check are dispended.
- For incomplete transaction error message should be displayed, card should be ejected.

Requirement of Bank Computer for ATM

Functional requirements

Authorization - Bank computer gets a request from ATM to verify an account.

- Checks if the cash card is issued by bank. Valid or invalid bank code. (If the card belongs to another bank partner, then mark the transaction for additional transactional charge – Eg: using BOFA card in Wells Fargo ATM).
- Checks for valid or invalid passwords, fingerprints of ATM customer.

- If Cash card (debit card) is valid, password is valid, but there is problem with account, the bank will send a message to ATM - "bad account".
- For valid Cash card, valid password and fingerprints, valid bank account, ATM should prompt – account ok.

Transaction – The bank computer gets a request to process a transaction from ATM.
- Before transaction, ATM machine should ask account type from User. For example, transaction from saving account or checking account.
- Upon cash withdrawal request, bank computer checks if the account holder has money in account and then processes the transaction. If there is less money than requested, respond "Insufficient Balance".
- Upon Bank customer's account, after money has been dispensed.
- Each bank has "$ n" limit for cash withdrawal each day/month.
- Receipt is printed upon request by the user for the current transaction.

User Interface Requirements

- ATM machine should have, card slots, cash slots, receipt slots, money order & check slots, key pad, pin pad, earphone plugs - for blind people to operate.
- User Interface also includes the view of the screen. It should be touch screen display. What all options available and how it looks like.

Hardware Interface Requirements

- Various printers, ink.
- ATM machine.
- Several types of networks and so on.

2.3 Non- Functional Requirements

Non-Functional Requirements that are not directly concerned with the specific functions delivered by the system. Typically relate to the system as a whole rather than the individual system features. Often could be deciding factor on the survival of the system (e.g. reliability, cost, response time).

Types of Non Functional Requirements

- **Interface requirements** how will the system interface with its environment, users and other systems;   e.g., "user-friendliness".
- **Performance requirements**

- **Time/space bounds:** such as workloads, response time, throughput and available storage space, e.g., "system must handle 1,000 transactions/sec");
- **Reliability:** availability of components and integrity of data, e.g., "less than 1hr downtime/yr."
- **Security:** permissible access to data and operations;
- **Survivability:** such as system will survive fire, natural catastrophes.
- **Operating requirements** include physical constraints (size, weight), personnel availability, and skill level
- **Lifecycle requirements:** can be classified under two sub-categories:
- **Quality of the design:** such as maintainability, ability to enhance, portability; expected market or product lifespan, (These don't affect initial system but may lead to increased maintenance costs or early obsolescence.)
- **Limits on development:** other software lifecycle phases, such as development time limitations, resource availability, methodological standards etc.
- **Economic requirements:** immediate and/or long term costs

2.4 Security Requirements

- Network should have maximum security.
- User's accessibility is censored in all ways using cameras.
- Users are advised to change PIN on first use.
- Users are advised not to share PIN to anyone.
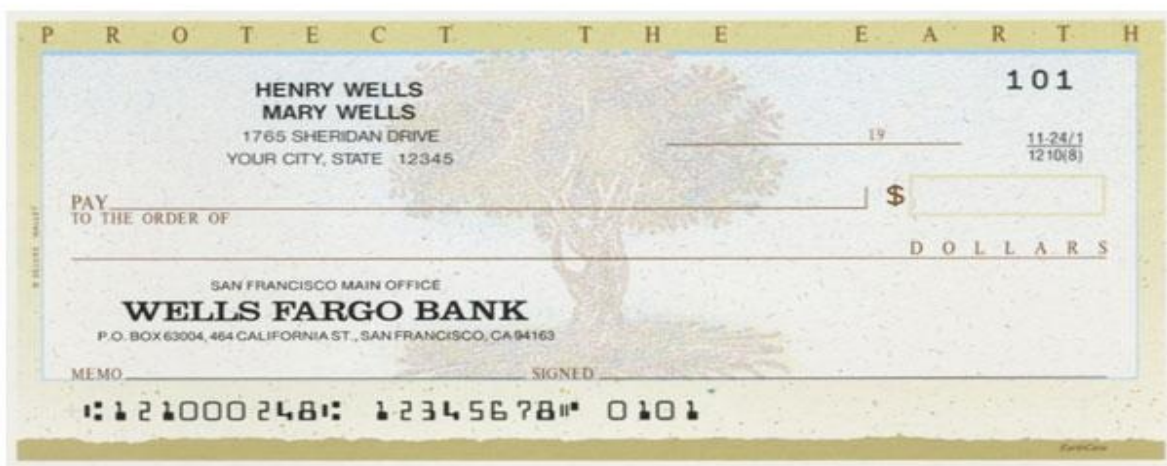- The maximum number of attempts to enter PIN is three.

Biometric identity – Finger print

Printing blank checks

Printing demand draft

3.1 OPERATIONAL FEASIBILITY

Operational feasibility is the study that evaluates how well the ATM system will address the operational challenges and meet the requirements raised as part of Requirement analysis phase.

This study measures the acceptability of the ATM system with respect to the scope of the requirement, for designing the ATM system ,several considerations are made to determine the degree of feasibility such as the operational cost, labour requirement ,ease of use of the application, government regulations ,legal complications, security consideration, regional issues.

For effective maintenance and safety of the ATM systems there should be proper monitoring and surveillance that should ensure the safety and security of the customers and the ATM Machines.

3.2 Economic Feasibility

The system developed should be economically feasible for the company developing it. There is increasing use of ATM machines worldwide for the quick and safe transaction of money needed any time. For this reason, Bank should make ATM machines available to the populated areas of cities and towns at traditional locations such as bank premises as well as non-traditional locations such as shopping malls, theatres, airports, gas stations, markets, schools and universities etc.
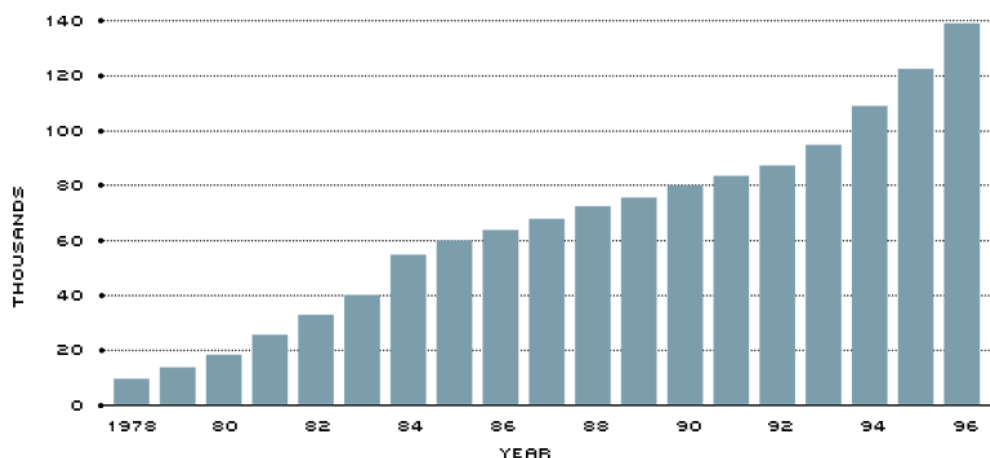

Figure: Total number of ATM machines installed in The United States (SOURCE: Bank Network News)
Economic feasibility mainly involves the cost of development and operations it performs. Development cost per machine includes purchase of custom based machines, servers

maintaining the transactions of the machine and labor cost of technicians assigned to each machine. In addition to the development cost, operation cost also need to be considered for repairing and replacing hardware and software components of the system along with labor cost associated with it. Bank ATM should be economically feasible without compromising the quality and safety of the system.

3.3 Technical Feasibility

Technical feasibility is attainability of a system using currently existing technology. Technical feasibility takes into account whether the required technology is available or not and whether the required resources are available in terms of manpower and equipment.
The technical feasibility assessment is focused on gaining and understanding of the present technical resources of the organization and their applicability to the expected needs of the proposed system. It is an evaluation of the hardware and software and how it meets the need of the proposed system.

Operating system, software to interact with the user, touch screen technology, CCTV Cameras, are all proven technologies which form the basis of a safe, easy and user friendly environment for Automated Teller Machine (ATM) to be implemented.

Introducing cheque and demand draft dispense, making the system more secure by taking finger print as one of the account login step along with the pin number is will definitely help people. No one have to stand in queue to wait for the bank employees to get there job done more over bank will have to employee less number of people.

4.1 Project Management Plan

Project management involves the planning, monitoring, and control of the people, process, and events that occur as software evolves from a preliminary concept to full operational deployment. Everyone "manages" to some extent, but the scope of management activities varies among people involved in a software project.

Team Structure

Role	Name	Email Address
Team Lead	Akanksha Avinash	avinash.akanksha@gmail.com
Team Member	Madhu Mahadevaiah	Madhukarthik12@gmail.com
Team Member	Dharti Rathod	dharti.krunal@gmail.com
Team Member	Trupti Kholiya	truptiketanvala@gmail.com
Team Member	Slesha Vemuganti	Vemuganti.slesha@gmail.com
Team member	Ramya	Ramyanvinay@gmail.com

Project Responsibilities

Team Leader
Task: Perform all necessary activities to ensure that a task assigned to a team is performed well and on time.

This includes but is not limited to:
- Planning and coordinating team activities
- Providing feedback about team progress to everyone
- Motivating team members
- Chairing reviews of the items made by his team

Team Member
Task: Perform all necessary activities to ensure that a task assigned to a team is performed well and on time.
This includes but is not limited to:
- Assisting the Team Leader by signaling problems in an early stage

- Executing plans made by the Team Leader
- Keeping track of time spent on various tasks
- Following procedures and plans

Managerial Process

Objectives and Priorities

The management objective is to deliver the product in time and of high quality. The Lead works together with team to achieve this by respectively checking that progress is made as planned and monitoring the quality of the product at various stages.

Assumptions, Dependencies and Constraints

In this project plan, a number of factors are taken into account. Due to the deadline of Nov end, running out of time will have its reflection on the product, and not on the duration of the project. By assigning a priority to every user requirement, a selection can be made of user requirements that may be dropped out if time runs out.

Risks with respect to the work to be done

1. Miscommunication

Probability: Medium

Prevention: After a meeting, one group member creates an interview report. Every participant and every person who should have been a participant of the meeting should get a copy of this report. Team members should not hesitate to ask and re-ask questions if things are unclear.

Correction: When it becomes clear that miscommunication is causing problems, the team members involved and the customer are gathered in a meeting to clear things up.

Impact: High

2. Time shortage

Probability: High

Prevention: Care is taken to plan enough spare time.

Correction: When tasks fail to be finished in time or when they are finished earlier than planned the project planning is adjusted. If time shortage becomes severe, user requirements, which have low priority, are dropped after consultation with Team Leader and the customer.

Impact: High

3. Design Errors

Probability: Medium

Prevention: The design should be reviewed critically. The advisor should be consulted frequently on his opinion about the feasibility and the correctness of certain design decisions.

Correction: When errors in the design are noticed the advisor should be consulted to help correct the design errors as soon as possible. Also all the work, that depends on the faulty design, should be halted until the error is corrected.

Impact: High

4. Illness or absence of team members

Probability: High

Prevention: Team members should warn their team leader timely before a planned period of absence.

Correction: By ensuring that knowledge is shared between team members, work can be taken over quickly by someone else if a person gets ill. When work needs to be taken over by someone are division is made of his other tasks so that the workload does not get too high. Planned absence is dealt with in the planning.

Impact: Medium

4.2 Project Team Report

Task Name	Begin(2013)	End(2013)
Project Kickoffs	9/10	9/10
Meeting 1: Time- 10:00 pm PST • **P**roject ideas with team members and finalizing the project topic	9/11	9/11
Meeting: 2 Time: 5:00-5:45 pm • Project proposal • Assigning topics to individuals • High-level Requirements gathering	9/17	9/24
Meeting 3: Time: 5:00-5:45 pm • Decision table • Requirement document • Review of the topics done last week.	9/24	10/1

Meeting 4: Time: 5:00-5:45 pm • Requirements analysis • Diagrams like activity, collaboration. • Review of the topics done last week.	10/1	10/8
Meeting:5 Time: 5:00-5:45 pm • Feasibility study(operational, Economic, Technical, Environmental)	10/8	10/15
Meeting:6 Time: 5:00-5:45 pm • Risk analysis • Risk and volatile areas	10/15	10/22
Meeting:7 Time: 5:00-5:45 pm • UML diagrams • Sequence diagram	10/22	10/29
Meeting :8 Time: 5:00-5:45 pm • Writing Use cases • Introduction	10/29	11/5
Meeting :9 Time: 5:00-5:45 pm • Use case Diagrams and their review	11/5	11/12
Meeting : 10 Time: 5:00-5:45 pm • Test plan and test cases • Project schedule • Glossary, Vision document, project scope	11/12	11/19
Meeting :11 Time: 5:00-5:45 pm • Documentation	11/19	11/26
Meeting :12 Time: 5:00-5:45 pm	11/26	12/3

• Preparing slides for presentation • Final project document preparation		

4.3 GANTT Chart
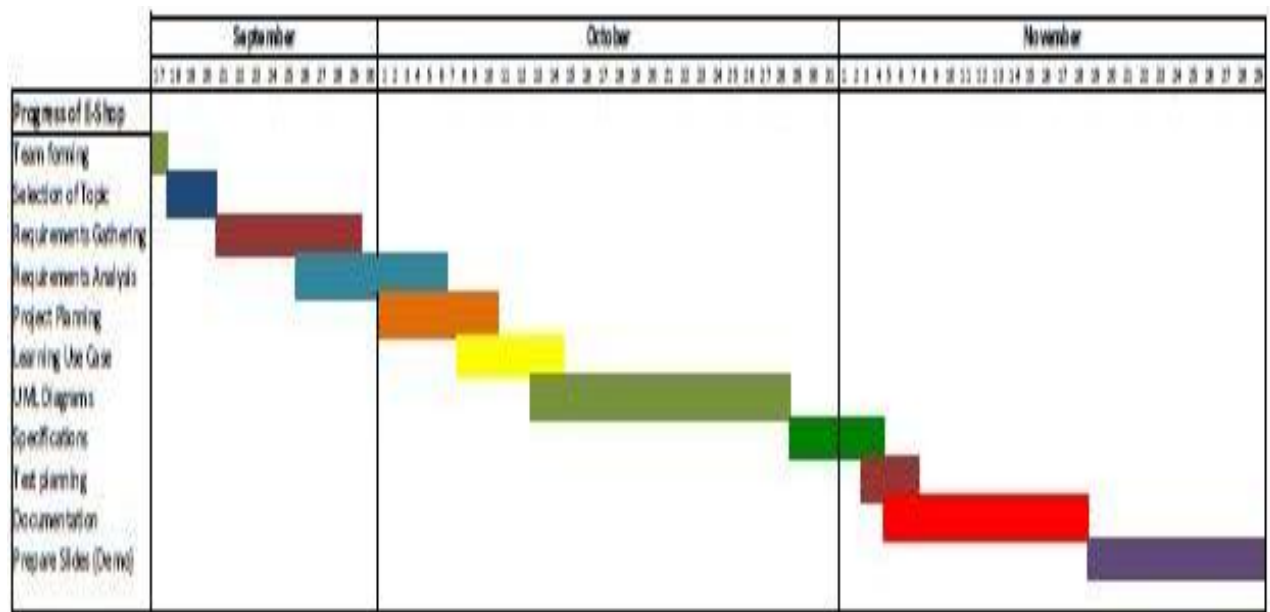
5.1 Risk and Volatile Areas

Study of risk and volatile areas includes systematic analysis on most likely sources of changes and risks, especially new requirements and technology that would impact the design of the system. For appropriate areas, one needs to study how the system will be designed to allow timely response to changes or what the contingency path is for changes.

The following are some risks and volatile areas with respect to ATM.

No	Risks and Volatile Areas	Response
1	*Loss of service/down time* Many ATM machines faced this problem of out of service due to faults or malfunction in system or machine itself.	Bank can assign more staff for regular check of ATM system located at various places. Frequent update of system server can also be carried out.
2	*Waste of paper for receipt* Most customers take a glance look at receipts to verify balance whereas others simply take it as a routine process. Most receipts are wasted in trash or on ATM floor.	ATM e-receipts. Bank can let customers receive a digital ATM receipt via email—eliminating the use of paper.
3	*Varying bill denominations* For years, most ATMs only dispensed cash in the form of $20 bills. In instances when exact change is needed, the ATM is not useful. However, banks are recognizing customers want more flexibility when it comes to their cash withdrawals.	Bank can start to roll out ATMs that are capable of spitting out $1 and $5 bills instead of just $20 bills.
4	*Cardless ATM Access* More and more mobile phone manufacturers are building smartphones with near field communication (NFC) technology, which lets your mobile phone communicate with certain devices within close proximity.	ATM machine can develop NFC-enabled smart phone access technology to provide flexibility.
5	*Credit card and loan payment* You can pay your credit card bill or mortgage	Bank should be ready to implement such technologies in

	through the mail, online banking or a bank teller, yet you've never been able to perform this task through the ATM.	near future.
6	*Insider Fraud/Employee Dishonesty* Now a days, ATM experiences more frauds like loss of sensitive data, loss of funds and loss of property	Bank should keep eyes on Employee screening, monitoring, employee dishonesty, Errors & Omissions, CyberCrime / CyberLiability insurance policies, etc.
7	*Outsourcing/sub-contracting* Shares in risks from exposures of third party contractor	Bank should perform background checks prior to partnering; third-party security policy; contractual protections; management controls over contractors; regular stakeholder forums and feedback processes
8	*Crime/Location* Robbery and insider fraud of ATM cash, cash in transit and cash in possession	Bank should take action against employee dishonesty and implement ATM vault cash insurance and CIT policies
9	*Fire/Disaster* Damage to property and physical assets	Bank should plan for appropriate disaster recovery policies
10	*Deterioration/depreciation* Natural wastage and depreciation in value; environmental damage	Bank should perform regular maintenance regime

5.2 Environment of ATM

Automated Teller Machine is an example of embedded systems. It's a combination of hardware and software.

The hardware environment under which ATM machines are been built are:

- CPU (to control the user interface and transaction devices)
- Magnetic and/or Chip card reader (to identify the customer)

- PIN Pad EEP4 (similar in layout to a Touch tone or Calculator keypad), manufactured as part of a secure enclosure.
- Secure crypto processor, generally within a secure enclosure.
- Display (used by the customer for performing the transaction)
- Function key buttons (usually close to the display) or a Touchscreen (used to select the various aspects of the transaction)
- Record Printer (to provide the customer with a record of their transaction)
- Vault (to store the parts of the machinery requiring restricted access)
- Housing (for aesthetics and to attach signage to)
- Sensors and Indicators

ATM machines software environment is on Microsoft operating system Windows XP.

Decision Table

Decision table is a way to model complicated logic. Decision table (like flowcharts, if-then-else statements) associate conditions with actions to perform in a more elegant way.

Each decision corresponds to a variable, relation or predicate whose possible values are listed among the condition alternatives. Each action is a procedure or operation to perform, and the entries specify whether (or in what order) the action is to be performed for the set of condition alternatives the entry corresponds to.

Aside from the basic four quadrant structure, decision tables vary widely in the way the condition alternatives and action entries are represented. Some decision tables use simple true/false values to represent the alternatives to a condition, other tables may use numbered alternatives, and some tables even use fuzzy logic or probabilistic representations for condition alternatives. In a similar way, action entries can simply represent whether an action is to be performed (check the actions to perform), or in more advanced decision tables, the sequencing of actions to perform (number the actions to perform).

Decision Table

		Rules															
Conditions	ATM has cash	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
	Valid Debit Card	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	N	N	N	N
	Valid PIN Number	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
	Account has sufficient balance	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Actions	Use the ATM	x	x	x	x	x	x	x	x								
	Enter PiN	x	x	x	x												
	Re-enter PIN					x	x	x	x								
	Withdraw cash	x															
	Deposit Cash	x	x														

PHASE # 1

Requirements are the set of functions and constraints that the end user expects from the system. Requirement were gathered from end user, i.e ATM/Bank customer and were analyzed for their validity, feasibility and possibility of incorporating them. We gathered the users requirement and finalized the idea of incorporating add on features to ATM machine, such as

1. 24*7 demand drafts printing facility availabile via ATM machine.
2. 24*7 cheque printing facility available via ATM machine.
3. Using Biometric technology of finger printing for users identity.

Requirement gathering

Requirement gathering was done by entire team. We followed the interview process and interviewed bank customer as well as general public. The interview process we followed was via phone and one-on-one interview. Requirement gathering documentation was prepared considering various factors such as economic resource, environment resource, human resource and so on.

PHASE # 2

Before starting the actual implementation phase, it is highly important to understand the requirements of the end user and also have an idea of how the end product should look like. The requirement specification from the 1st phase were studied. ATM Structure System design was prepared. The design helps in specifying hardware and system requirements, and also helps in defining the overall system architecture. The system design specifications serve as an input for the next phase of the model. Team work scheduling is tracked by individual team minutes and team minutes work log.

Scheduling methods like Time-Line chart or GANTT chart enables us to determine what task will be conducted at what given time. Also it helps to produce project table/tabular listing of project task. We also developed GANTT chart which helped us to illustrates the start and finish dates of the terminal elements and summary elements of a project. Project planning process, scope and feasibility report was generated. Project planning also included, who will do what work? Estimation for ATM machine's project was also considered. Various factors such as 1) Human resource 2) Software resource 3) Environmental resource were also considered. Each team member were allotted to do work and we requested to do timely submission. Scheduling is the culmination of planning activity that is a primary component of ATM project management. This helped

us to provide road map to each team members when combined with estimation method

and risk analysis.
PHASE # 3

After making our ATM system design and specification documents, the work is divided in modules/units and actual project work starts. Our ATM vision statement was ready with inclusion of wish list and adds on features. The ATM system project is first elaborated into small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality; this is referred to as unit testing. Unit testing mainly verifies if the modules/units meet their specifications.

All our project work as divided amongst each team member, after completion of individual allotted work, each team member will email to other team mates for review and revising the topics. Various team meeting were set up to discuss various project related issues.
PHASE # 4

The units are now integrated to form a complete ATM project during the integration phase and tested to check if all modules/units coordinate with each other and the system as a whole behaves as per the specifications. Time constrains and boundary was set up. Cross references and traceability were considered. After the topic integration the entire project was proof read by each team members for errors and other. After successfully testing the project is delivered to the professor with each add on feature. Making sure that each feature is working properly and biometric identity is working perfectly fine.
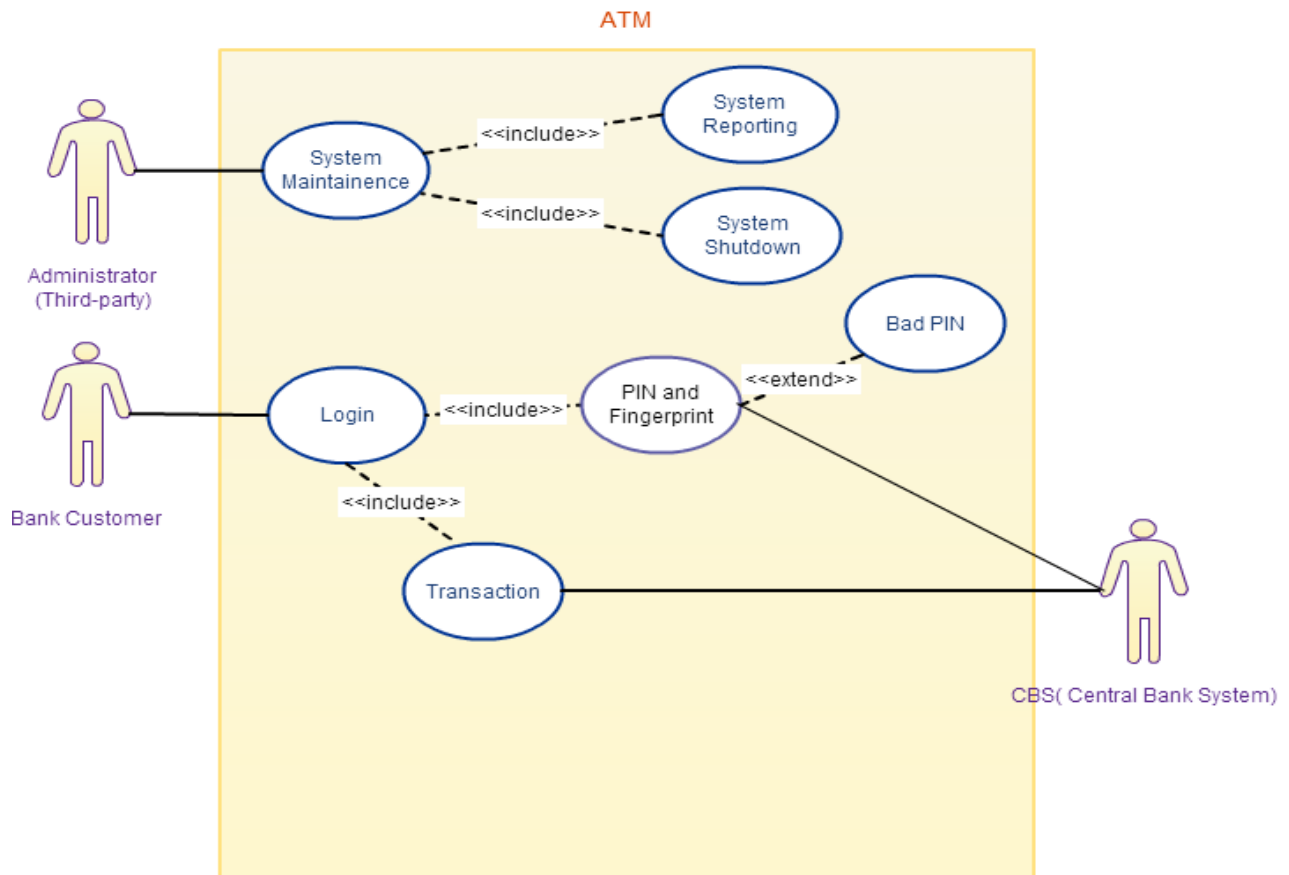
PHASE # 5

This phase of our ATM project model is virtually never-ending. Generally, problems with the ATM system (which are not found during the development cycle) come up after its practical use starts, so the issues related to the system are solved after its deployment. Not all the problems come into picture directly, but they arise from time to time and need to be solved time to time. Hence this process is referred to as maintenance, even though it's still pretty much in the testing phase. After very lecture we learned various new things which we kept on including in our ATM project. Also various project errors were resolved after of project was entirely ready, which were resolved and maintained.
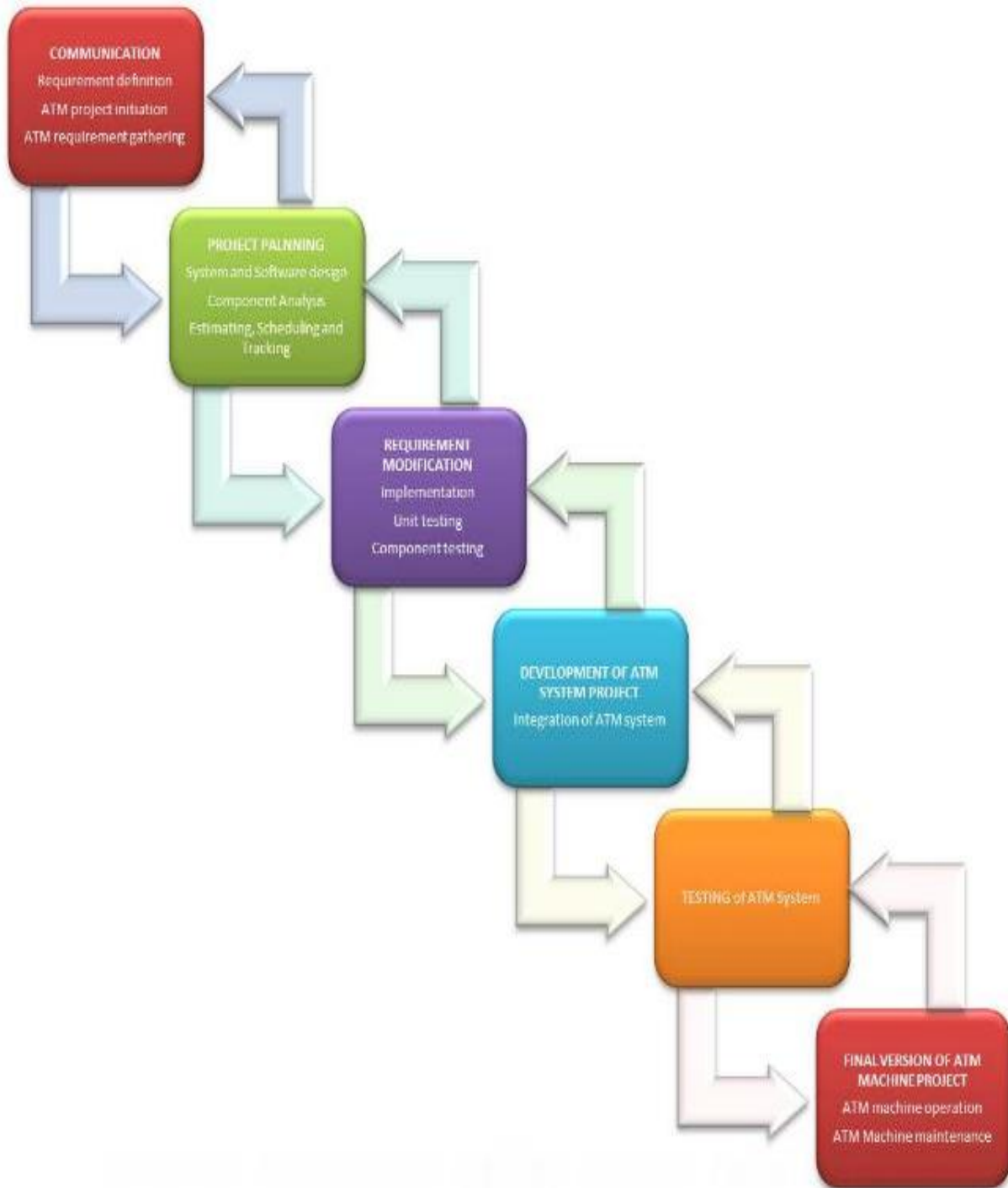
8.1 High level design

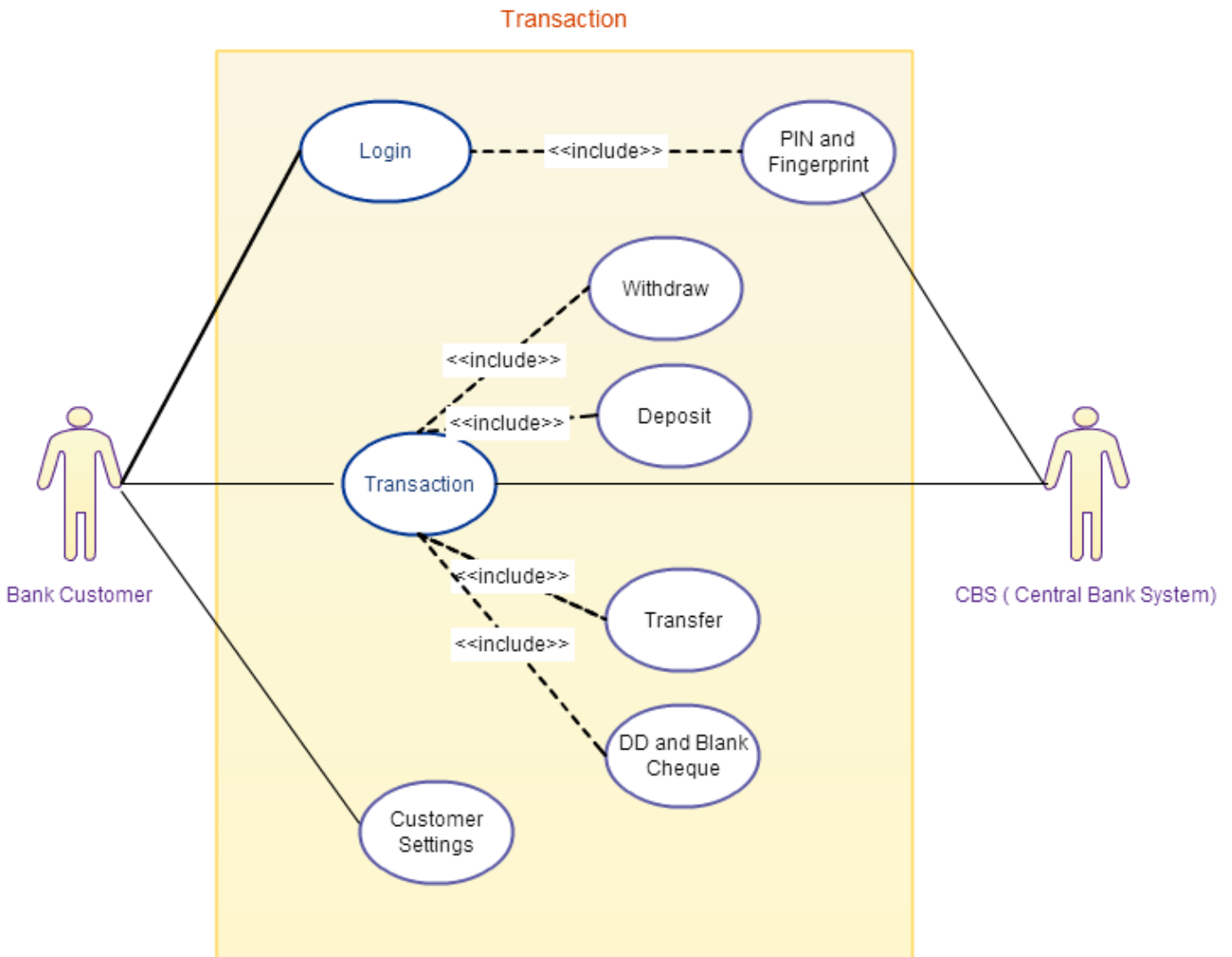# 8.1.1 Use cases

1. Overall Use case

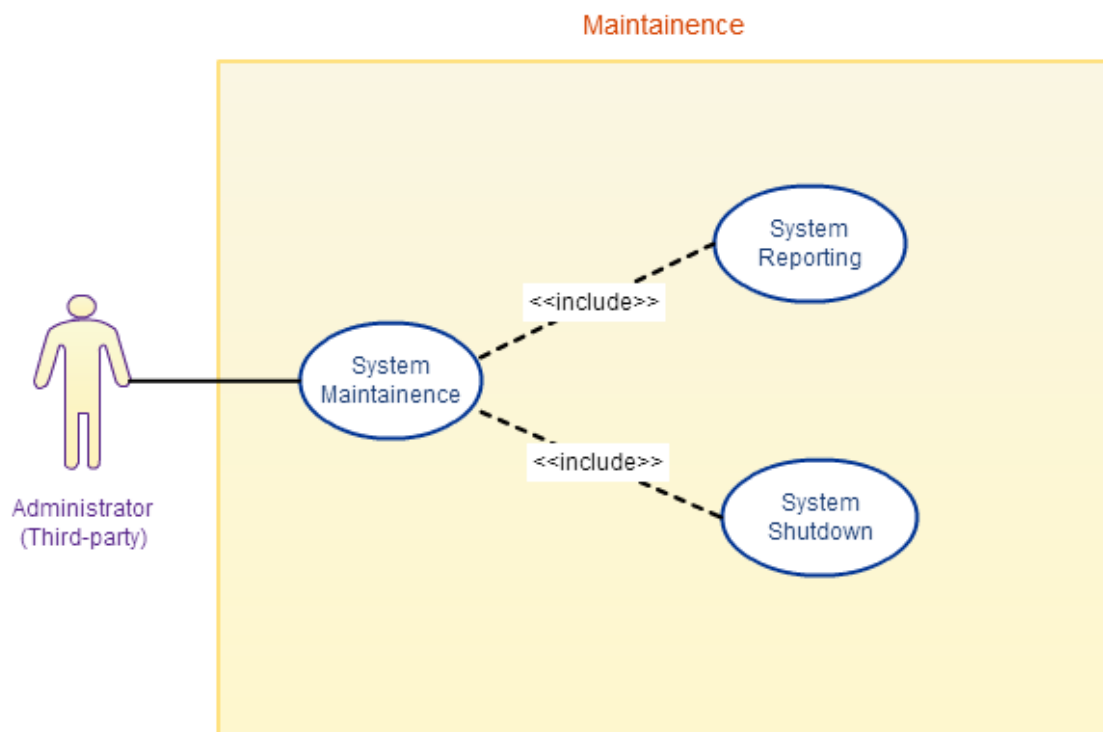## 2. Transaction Use case

3. Maintenance Use case

Maintainence

System Reporting

<<include>>

System Maintainence

<<include>>

System Shutdown

Administrator
(Third-party)

4. Login Use case
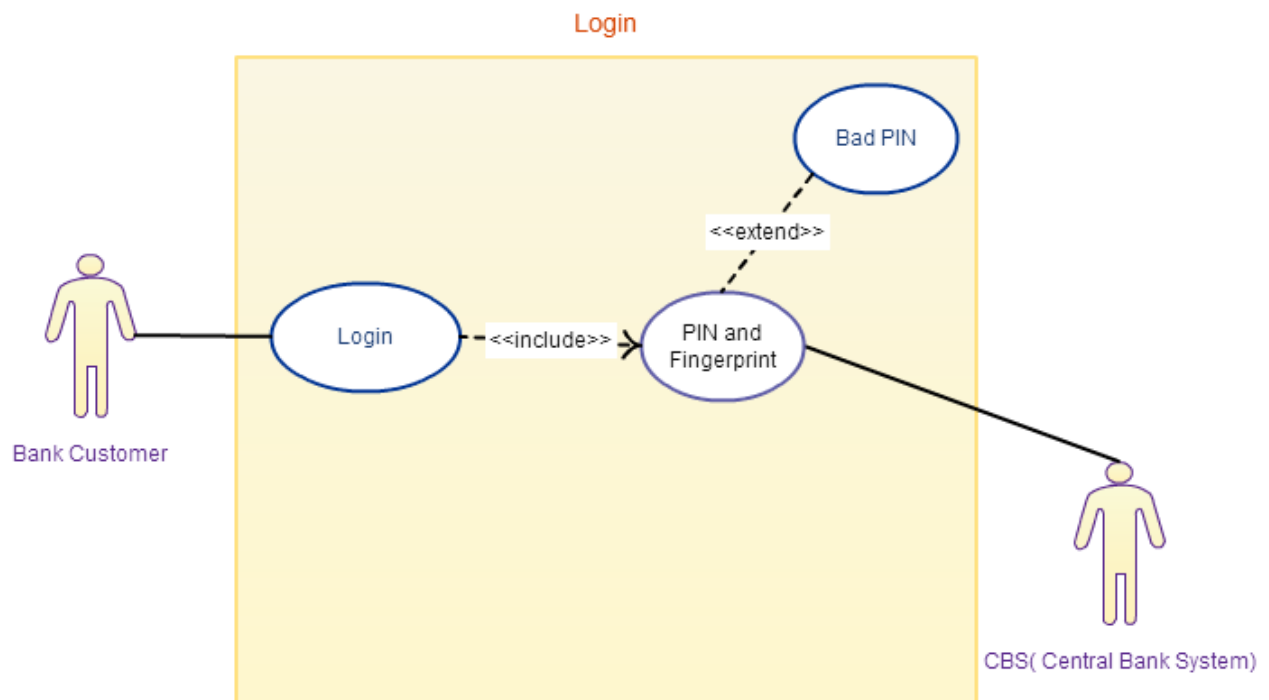
5. Withdraw Use case
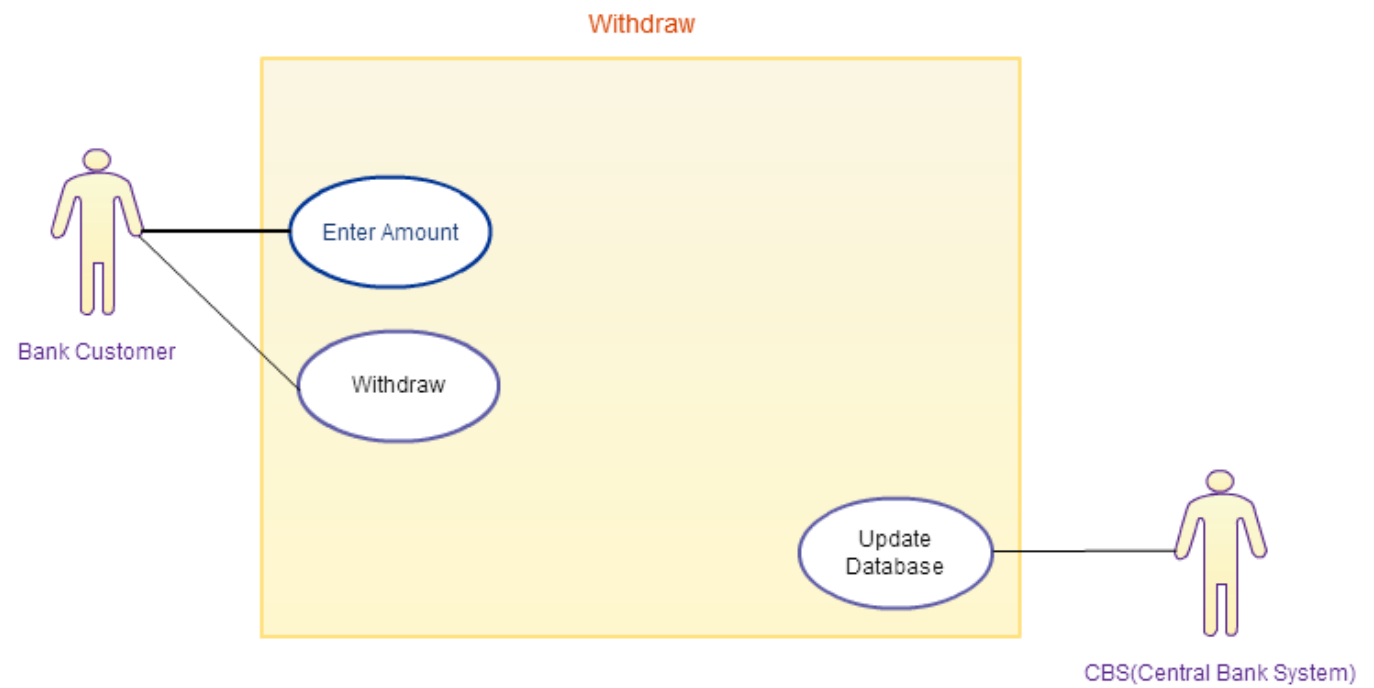
6. Deposit Use case
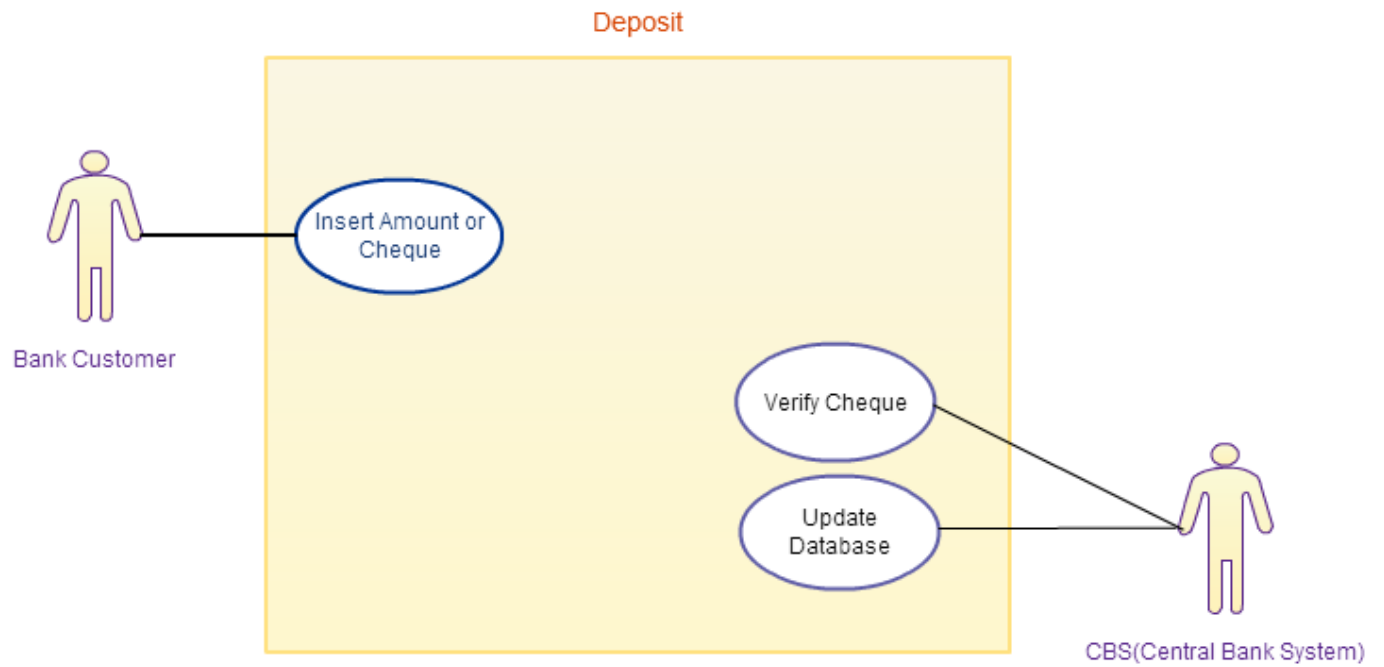
7. Balance Inquiry Use Case

Balance Enquiry
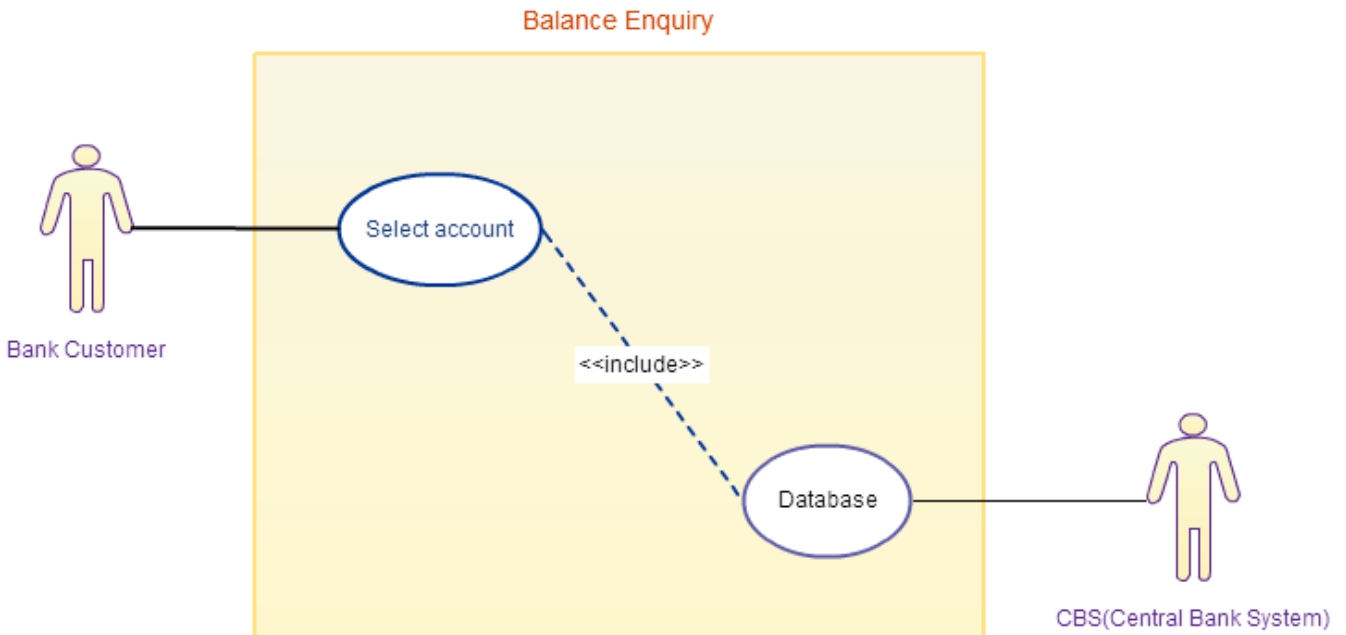
Use case 1: Maintenance Use case:

Description: The operator or administrator start's up as well as shut's down the ATM system to make sure everything is working perfectly well.
Actors: CBS, Administrator.

Precondition:
1. ATM is in idle state.
2. ATM should be under surveillance
3. ATM should be connected to banks network and database.

Triggering Event: ATM is shutdown.

System shutdown scenario
The system is shut down when the operator makes sure that no customer is using the machine, and then turns off the ATM system. The network connection to bank will be shut down. Then the operator is free to remove deposited envelopes, replenish cash, paper, feed the printer roll and so on.

System start up scenario
The system is started up when the operator turns the ATM switch to the "on" position. The operator will be asked to enter the amount of money currently in the cash dispenser, and a connection to the bank will be established. Thus system is ready to provide service to the bank customer.

Flow of Events:

1. ATM is shutdown.
2. Administrator removes the cards struck in the card reader.
3. Administrator removes any envelopes that have been deposited in envelope feeder.
4. Administrator refills envelope slot with envelopes.
5. Administrator refills the Demand drafts in demand draft feeder.
6. Administrator refills the blank cheques.
7. Refills the cash dispenser.
8. Refills printer paper supply.
9. Reboots the system.

ADMINISTRATOR	SYSTEM RESPONSE
	A1. ATM is shutdown.
1. Removes the cards struck in the card reader. 2. Removes any envelopes that have been deposited in envelope feeder. 3. Refills envelope slot with envelopes. 4. Refills the Demand drafts in demand draft feeder. 5. Refills the blank cheques. 6. Refills the cash dispenser. 7. Refills printer paper supply. 8. Reboots the system.	
	A2. ATM reboots.

Postcondition:
1. ATM is in idle state.
2. ATM must get connected to the bank's network and database. Security surveillance camera should be in working state.

Exception:
1. Suppose postcondition fails, System operator must call security.
3. Bank must be updated about this situation.
2. ATM machine has to be repaired as soon as possible.
3. ATM machine should not be made available for the customer to use.

Resulting events: ATM resumes its operation.

Use case 2: Login Use case:

Description: User inserts card into the card reader slot, CBS(Central bank system) validates PIN and fingerprint, ATM displays menu options to customer.

Actors: User, CBS.

Precondition:
1. ATM is in idle state.
2. User should have Bank card in order to carry out transactions.
3.The network connection to the Central Bank System must be active.
4.The system must have card reader slot and fingerprint identification slot.

Triggering events: User inserts card into the card reader.

Flow of Events:
1. User inserts card into card reader which reads the card information.
2. ATM prompts the user for fingerprint.
3. User gives his fingerprint in the designated slot.
4. ATM prompts the user to enter the PIN.
5. User enters the PIN.
6. PIN is authorized and CBS validates account number, fingerprint and PIN.
7. ATM displays language options.
8. User selects a language.

9. ATM displays menu with transaction options (withdraw, deposit, transfer, check balance, Demand draft, cheque, receipt, exit.) and setting options (change password,receipt preferences, language preferences, etc.)

Actor (User)	System Response
1. Inserts card in to the card reader which reads card information	A1. Prompts the user for fingerprint.
2. Gives fingerprint in the designated slot.	A2. Prompts the user to enter the PIN.
3. Enters the PIN	A3. PIN is authorized and CBS validates account number, fingerprint and PIN.
4. Selects a language.	A4. Displays language options B4. ATM displays menu with transaction options (withdraw, deposit, transfer, check balance, Demand draft, cheque, receipt, exit.) and setting options (change password,receipt preferences, language preferences, etc.)

Postcondition: ATM is in transaction state.

If post condition fails :-
1) User must report error to the bank.
2) Bank representative must fix error as soon as possible.

Resulting event: Transaction menu is displayed.

Alternatives:
ALT-1: If cards account number isn't recognised by CBS.
1a.Card is returned

ALT-2: If fingerprint doesn't match.
2a. Card is withheld
2b. CBS suspends account.
ALT-3: If PIN hasn't been entered within 20 seconds.
3a. If there is no response card is withheld.
3b. CBS suspends account.
ALT-4:If user enters 3 invalid PINs successively.
4a. Card is withheld.
4b. CBS suspends account.

Exception:
1.System validation finds that the user record does not exist in the database.
2. Systems alert the user that their record does not exist.
3. Use case ends.

Use case3: Withdraw transaction Use Case:

Description: The User selects Withdraw from the menu and withdraws cash from the ATM.

Actors: User, CBS

Precondition:
1.ATM is in the transaction state.
2.User should have debit card in order to carry out transactions.
3.The network connection to the Central Bank System must be active.
4.The system must have at least some cash that can be dispensed.
5.The cash withdrawal service option must be available.
6. The system must have paper filled in to print the transaction record.

Triggering Event: User selects Withdraw from the menu.

Flow of Events:
1. The User selects Withdraw from the menu.
2. CBS provides a list of accessible User accounts.
3. ATM displays the accounts.
4. The User selects an account to withdraw from.
5. The ATM collects the information.
6. ATM prompts the User to enter the amount to withdraw.
7. The User enters the amount.

8. The ATM collects the information.

9. The ATM verifies that the amount is a multiple of $20 and that there is sufficient cash for the withdrawal.

10. CBS validates that the User has enough cash in the bank account.

11. ATM opens the cash dispenser and dispenses the cash.

12. User is prompted to take money.

13. The cash dispenser is closed.

14. The CBS updates the account information and the transaction log.

15. The User is prompted to print a transaction record.

ACTOR(User)	SYSTEM RESPONSE
1. Selects Withdraw from the menu	A1CBS provides a list of accessible User accounts. B1 ATM displays the accounts.
2.Selects an account to withdraw from.	A2 The ATM collects the information. B2 Prompts the User to enter the amount to withdraw.
3. Enters the amount.	A3 collects the information. B3 verifies that the amount is a multiple of $20 and that there is sufficient cash for the withdrawal. C3 CBS validates that the User has enough cash in the bank account. D3 ATM opens the cash dispenser and dispenses the cash.
4. Prompted to take money	A4 cash dispenser is closed. B4 The CBS updates the account information and the transaction log
5. Prompted to print a transaction record	

Postcondition:

ATM is in the print state.

2. ATM must give cash out to the bank user.

3. User must collect cash before leaving ATM machine.

If postcondition fails:-
1. Bank user must report to bank.
2. Bank or ATM administrator must fix the error as soon as possible.
3. Bank must suggest user alternative solution based on relative error.
4. If the ATM dispenses the wrong amount of money, In such rare cases, the ATM user should call their bank to verify completion of the transaction and amounts processed.

Resulting event: The User makes a choice at the prompt.

Alternatives:
ALT-1: If the amount entered exceeds the amount of cash in the ATM.
1a. ATM prompts a message insufficient balance in ATM and returns to transaction menu.
1b. User re enters the amount.
ALT-2: If the User doesn't have enough money in the bank account
2a. ATM prompts message insufficient balance in the account and asks to try different account.
2b. User re enters the amount.
ALT-3 If the User enters an amount that is not a multiple of 20:
3a. ATM prompts to re enter amount in multiples of 20.
3b. User re enters the amount.

Exception:
1.The ATM shall not enable an account holder to withdraw any amount of funds from an associated account if the account is currently overdrawn.
2. When the dispensed cash is not taken in the respective time by the customer it goes back into the ATM.

Use case 4: Deposit transaction Use Case :

Description: The User selects the Deposit option from the main menu and deposits cash or cheques into the ATM.

Actors: User, CBS

Precondition:

1.ATM is in the transaction state.

2.User should have bank card in order to carry out transactions.

3.The network connection to the Central Bank System must be active.

4.The system must have at least some cash that can be dispensed.

5.The cash Deposit service option must be available.

6. The system must have printer roll filled in to print the transaction record.

7. User must not deposit coins along with cash in envelope.

Triggering Event: User selects Deposit from the menu.

Flow of Events:

1. User selects Deposit from the menu.

2. The envelope drawer is unlocked and it is verified that there are a sufficient number of envelopes.

3. CBS provides a list of accessible User accounts.

4. ATM displays the accounts.

5. The User chooses an account from the list.

6. ATM collects the information.

7. ATM prompts the User for the amount to be deposited.

8. User enters an amount.

9. ATM collects the information.

10. The User puts the deposit item (cash or cheques) into an envelope then the envelope feeder accepts it.

11. ATM locks the envelope drawer.

12. The CBS updates the account information and the transaction log.

13. The User is prompted to print a transaction record

ACTOR (User)	SYSTEM RESPONSE
1. Selects Deposit from the menu.	A1. The envelope drawer is unlocked and it is verified that there are a sufficient number of envelopes. B1. CBS provides a list of accessible User accounts. C1. ATM displays the accounts.
2. User chooses an account from the list.	A2. Collects the information. B2. Prompts the User for the amount to be

	deposited
3. Enters an amount.	A3. Collects the information.
4.Puts the deposit item (cash or cheques) into an envelope then the envelope feeder accepts it.	A4. Locks the envelope drawer. B4. The CBS updates the account information and the transaction log.
5. Prompted to print a transaction record	

Postcondition:
1. ATM is in the print state.
2. User must log out before leaving the ATM machine.

If Postcondition fails:
1. ATM machine must logout the Bank user automatically if the screen remains inactive for more than 1 minute.

Resulting Event: The User makes a choice at the prompt.

Alternatives:
ALT-1 If the ATM is out of envelopes;
1a. The User will be notified and returned to the menu.

Exception:
1. Ejects the bills which are torn out.
2. Unable to read the amount in the designated box.

Use case 5: Transfer transaction Use case

Description: User selects transfer from the menu and selects an account to which the amount is to be transferred.

Actors: User.

Precondition:
1.ATM is in the transaction state.
2.User should have debit card in order to carry out transactions.

3.The network connection to the Central Bank System must be active.

4.The system must have at least some cash that can be dispensed.

5.The cash transfer service option must be available.

6. The system must have paper filled in to print the transaction record.

Triggering Events: User selects transfer from the menu.

Flow of Events:

1. User selects transfer option from menu.

2. ATM prompts from which account the amount must be transferred.

3. User selects the account type.

4. ATM prompts to which account the amount must be transferred (within the account or to different account).

5. User provides the information.

6. CBS provides a list of accessible accounts.

7. ATM displays the accounts.

8. User chooses an account from the list.

9. ATM collects information.

10. ATM prompts for user to enter amount.

11. User enters the amount.

12. ATM collects the info.

13. The CBS updates the account information and the transaction log.

14. The User is prompted to print a transaction record.

ACTOR(USER)	SYSTEM RESPONSE
1. Selects transfer option from menu	A1.Prompts from which account the amount must be transferred.
2. User selects the account type.	A2. Prompts to which account the amount must be transferred (within the account or to different account).
3. Provides the information.	A3. CBS provides a list of accessible accounts. B3. Displays the accounts.

4. Chooses an account from the list.	A4. Collects information. B4. Prompts for user to enter amount.
5. Enters the amount	A5. ATM collects the info. B5. The CBS updates the account information and the transaction log. C5. The User is prompted to print a transaction record.

Postcondition: ATM is in print state.

Resulting Event: The User makes a choice at the prompt.

Alternatives:
ALT-1: If the user doesn't have enough money in the selected account
1a. User is prompted to try different account.
ALT-2: If the user doesn't have enough money in that account too.
2a. User will be notified and returned to re enter the amount.
ALT-3: If the ATM is out of paper.
3a. User is notified and returned to the main menu.

Exception:
1. Lack of funds
2. Transfer more than the limit per day
3. Invalid account number of the transferee.

Use case 6: Demand draft transaction Use Case :

Description: User selects Demand draft also known as remotely created check. It is a check created by a merchant with a user's checking account number on it, but without the user's original signature.

Actors: User, ATM.

Precondition:

1.ATM is in the transaction state.

2.User should have bank card in order to carry out transactions.

3.The network connection to the Central Bank System must be active.

4.The system must have at least some cash that can be dispensed.

5.The Demand draft service option must be available.

6. The system must have printer roll filled in, to print the transaction record.

Triggering Event: User selects Demand draft from the menu.

Flow of Events:

1. User selects Demand draft option from the menu.

2. ATM prompts for the recipients details.

3. User inputs recipients details.

4. ATM prompts for the amount to be drafted.

5. User enters the amount.

6. CBS updates the account information and sends the demand draft details.

7. ATM prints the Demand draft.

8. User collects the demand draft.

9. ATM prompts for receipt.

10. The User is prompted to print a transaction record.

ACTOR (USER)	SYSTEM RESPONSE
1. Selects Demand draft option from the menu.	A1. Prompts for the recipients details.
2. Inputs recipients details.	A2. Prompts for the amount to be drafted.
3. Enters the amount.	A3. CBS updates the account information and sends the demand draft details. B3. ATM prints the Demand draft.
4. Collects the demand draft.	A4. Prompts for receipt. B4. User is prompted to print a transaction record.

Postcondition:

1. ATM is in print state.

2. User must collect printed demand draft before leaving ATM machine.

3. User must logout before leaving ATM machine.

If postcondition fails:
1. ATM machine must logout the Bank user automatically if the screen remains inactive for more than 1 minute.
2. If Bank user does not collect demand draft within 1 minute, ATM machine must pull back the draft into its feeder.

Resulting Event: The User makes a choice at the prompt.

Alternatives:
ALT-1: If ATM is out of Demand draft.
1a. User is notified and returns to the transaction menu.
ALT-2: If the amount entered exceeds the amount of cash in the ATM.
2a. ATM prompts a message insufficient balance in ATM and returns to transaction menu.
2b. User re enters the amount
ALT-3: If the amount entered by the user exceeds the minimum limit.
3a. User is notified and asks to re enter the amount.
ALT-4: If the User doesn't have enough money in the bank account
4a. ATM prompts message insufficient balance in the account and returned to re enter the amount.
ALT-5: If the user doesn't pick the Demand draft within 20 second
5a. Demand draft is withheld.
ALT-6: If ATM is out of paper.
6a. The User will be notified and returned to the menu.

Use case 7: Blank cheque transaction Use Case :

Description: User selects Blank cheque option from the transaction menu, which has the users account details printed on it, but the amount and recipients details are left blank.

Actors: User

Precondition:
1.ATM is in the transaction state.
2.User should have bank card in order to carry out transactions.
3.The network connection to the Central Bank System must be active.
4.The system must have at least some cash that can be dispensed.

5.The Blank cheque service option must be available.

6. The system must have printer roll filled in to print the transaction record.

Triggering Event: User selects Blank cheque option.

Flow of Events:

1. User selects Blank cheque option from the transaction menu.

2. ATM signals CBS.

3. CBS updates the account information and sends the users account details that is to be printed.

4. ATM prints the Blank cheque.

5. User collects the Blank cheque.

6. ATM prompts for receipt.

7. The User is prompted to print a transaction record

ACTOR(USER)	SYSTEM RESPONSE
1. Selects Blank cheque option from the transaction menu.	A1.ATM signals CBS. B1. CBS updates the account information and sends the users account details that is to be printed. C1. Prints the Blank cheque.
2.Collects the Blank cheque.	A2. Prompts for receipt. B2. User is prompted to print a transaction record.

Postcondition: ATM is in print state.

2. User must collect their cheque before leaving ATM machine.

3. User must logout from their account before leaving ATM machine.

If postcondition fails:

1. ATM machine must logout the Bank user automatically if the screen remains inactive for more than 1 minute.

2. If Bank user fails to collect cheque within 1 minute, ATM machine must pull back the cheque into its feeder.

Resulting Event: The User makes a choice at the prompt.

Alternatives:

ALT-1: If ATM is out of Blank cheque.

1a. User is notified and returns to the transaction menu.

ALT-2: If ATM is out of paper.

2a. The User will be notified and returned to the menu.

Use case 8: Balance inquiry transaction Use Case :

Description: The user selects balance inquiry from the menu and balance is displayed from the account.

Actors: User.

Precondition:

1.ATM is in the transaction state.

2.User should have Bank card in order to carry out transactions.

3.The network connection to the Central Bank System must be active.

4.The system must have at least some cash that can be dispensed.

5.The Balance inquiry service option must be available.

6. The system must have Printer roll filled in to print the transaction record.

Triggering Event: User selects balance inquiry from the menu.

Flow of Events:

1. User selects balance inquiry from the menu.

2. CBS provides a list of accessible user accounts.

3. ATM displays accounts.

4. User chooses an account from the list.

5. ATM collects information.

6. CBS sends account information to the ATM.

7. ATM displays account balance to the user.

8. User is prompted to print transaction.

ACTOR(USER)	SYSTEM RESPONSE
1. Selects balance inquiry from the menu.	A1.CBS provides a list of accessible user accounts. B1. ATM displays accounts.

2. Chooses an account from the list.	A2. ATM collects information.
	B2. CBS sends account information to the ATM.
	C2.ATM displays account balance to the user.
	D2. User is prompted to print transaction.

Postcondition: ATM is in transaction state.
2. User must logout from their account before leaving ATM machine.

If postcondition fails:
1. ATM machine must logout the Bank user automatically if the screen remains inactive for more than 1 minute.

Resulting Event: The user makes a choice at the prompt.

Exception:
Lost network connection with the CBS

Use case 9: Print transaction Use Case :

Description: ATM prints a record after transaction.

Actors: User

Precondition:
1.ATM is in print state.
2.User should have bank card in order to carry out transactions.
3.The network connection to the Central Bank System must be active.
4.The system must have at least some cash that can be dispensed.
5.The print transaction service option must be available.
6. The system must have printer roll filled in, to print the transaction record.

Triggering Event: The user chooses to print after transaction.

Flow of Events:
1. The user chooses to print after transaction.
2. printer checks for sufficient ink and paper to print.
3. printer prompts for receipt types.
4. User selects the receipt types.

5. Printer gets information from CBS.
6. Printer prints transaction records.
7. ATM returns to transaction menu.

ACTOR(USER)	SYSTEM RESPONSE
1. Chooses to print after transaction.	A1. Printer checks for sufficient ink and paper to print. B1.Printer prompts for receipt types.
2. Selects the receipt types.	A2. Printer gets information from CBS. B2. Printer prints transaction records. C3. Returns to transaction menu.

Postcondition: ATM is in transaction state.
2. Bank user must logout from their account before leaving ATM machine.

If postcondition fails:
1.ATM machine must logout the Bank user automatically if the screen remains inactive for more than 1 minute.

Resulting Event: The user is returned to transaction menu.

Alternatives:
ALT-1: If user doesn't choose to print after transaction.
1a. ATM returns to transaction menu.
ALT-2: If there are insufficient material.
2a. User will be notified of insufficient material.
2b. User will be returned to transaction menu.

Exception: If the ATM is out of paper the system displays error and prompts the user to select email.

Use case 10: Settings Use case.

Description: User can set the options like change password,receipt preferences, language preferences, etc.

Actors: User, CBS.

Precondition:
1.ATM is in the transaction state.
2.User should have debit card in order to carry out transactions.
3.The network connection to the Central Bank System must be active.
5.The settings option must be available.

Triggering Events: User selects setting option.

Flow of events:
1. User selects settings option from the menu.
2. ATM displays all setting options like change password,receipt preferences, language preferences, etc.
3. User selects an option from the available options.
4. ATM displays present settings, and prompts an edit option.
5. User edits the settings preferences.
6. ATM prompts to save the settings.
7. User selects save option.
8. CBS saves the settings.

ACTOR(USER)	SYSTEM RESPONSE
1. Selects settings option from the menu.	A1.Displays all setting options like change password,receipt preferences, language preferences, etc.
2. Selects an option from the available options.	A2. Displays present settings, and prompts an edit option.
3. Edits the settings preferences.	A3. Prompts to save the settings.
4.Selects save option.	A4. CBS saves the settings.

Postcondition: ATM is in transaction state.

Resulting Event: The user makes a choice at the prompt.

Alternatives:

ALT-1:If user selects language preferences.

1a. User selects a language from the available language options like english or spanish, etc.

ALT-2: If user selects change password option.

2a. ATM prompts to enter the new password.

ALT-3: If user selects receipt preferences.

3a. ATM prompts all the available receipt options

3b. User selects one option like print with image, etc.

Exception:

If the password has not the required criteria, then the system prompts an error message.

Use case 11: Exit Use Case :

Description: User completes session with ATM and retrieves card.

Actors: User.

Precondition:

1.ATM is in the transaction state.

2.User should have debit card in order to carry out transactions.

3.The network connection to the Central Bank System must be active.

4.The system must have at least some cash that can be dispensed.

5.The exit/ cancel option must be available every time..

6. The system must have printer roll filled in to print the transaction record.

Triggering Event: User selects exit from menu.

Flow of Events:

ACTOR(USER)	SYSTEM RESPONSE
1. Selects exit or cancel from menu during any part of the transaction.	A1. Ends the transaction.

1. User selects exit or cancel from menu during any part of the transaction.
2. ATM ends the transaction.

Postcondition: ATM is in idle state.
2. Bank user must logout from their account before leaving ATM machine

If postcondition fails:
1. ATM machine must logout the Bank user automatically if the screen remains inactive for more than 1 minute.

Resulting Event: User retrieves card from ATM.

Alternatives:
ALT-1: If card is not retrieved.
1a. ATM withholds card and CBS suspends the account.

Use case 12: Communication failure Use Case :

Description: During a session, when ATM is unable to communicate with the CBS, the ATM shut's down and returns the card to the user.

Actors: User, CBS.

Precondition: ATM is in transaction state.

Triggering Event: ATM does not receive a response from CBS.

Flow of Events:
1. ATM attempts to establish or use a connection with CBS.
2. CBS does not respond within 20 seconds.
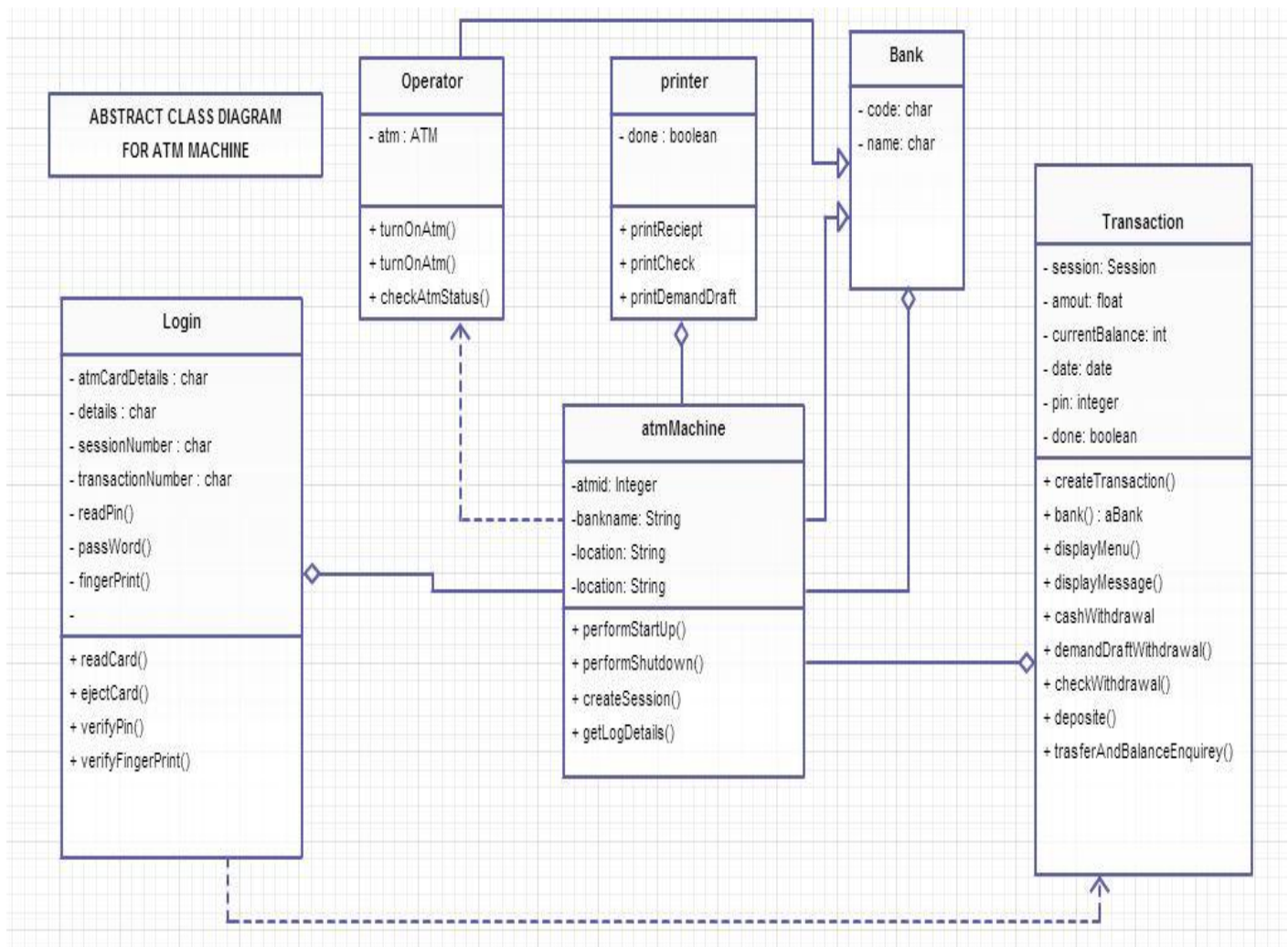3. User's card is returned.
4. ATM is shutdown.

ACTOR(USER)	SYSTEM RESPONSE
	A1**.** Attempts to establish or use a connection with CBS. B1**.**CBS does not respond within 20 seconds.
2. Card is returned.	A2. ATM is shutdown.

Postcondition: ATM is shutdown.

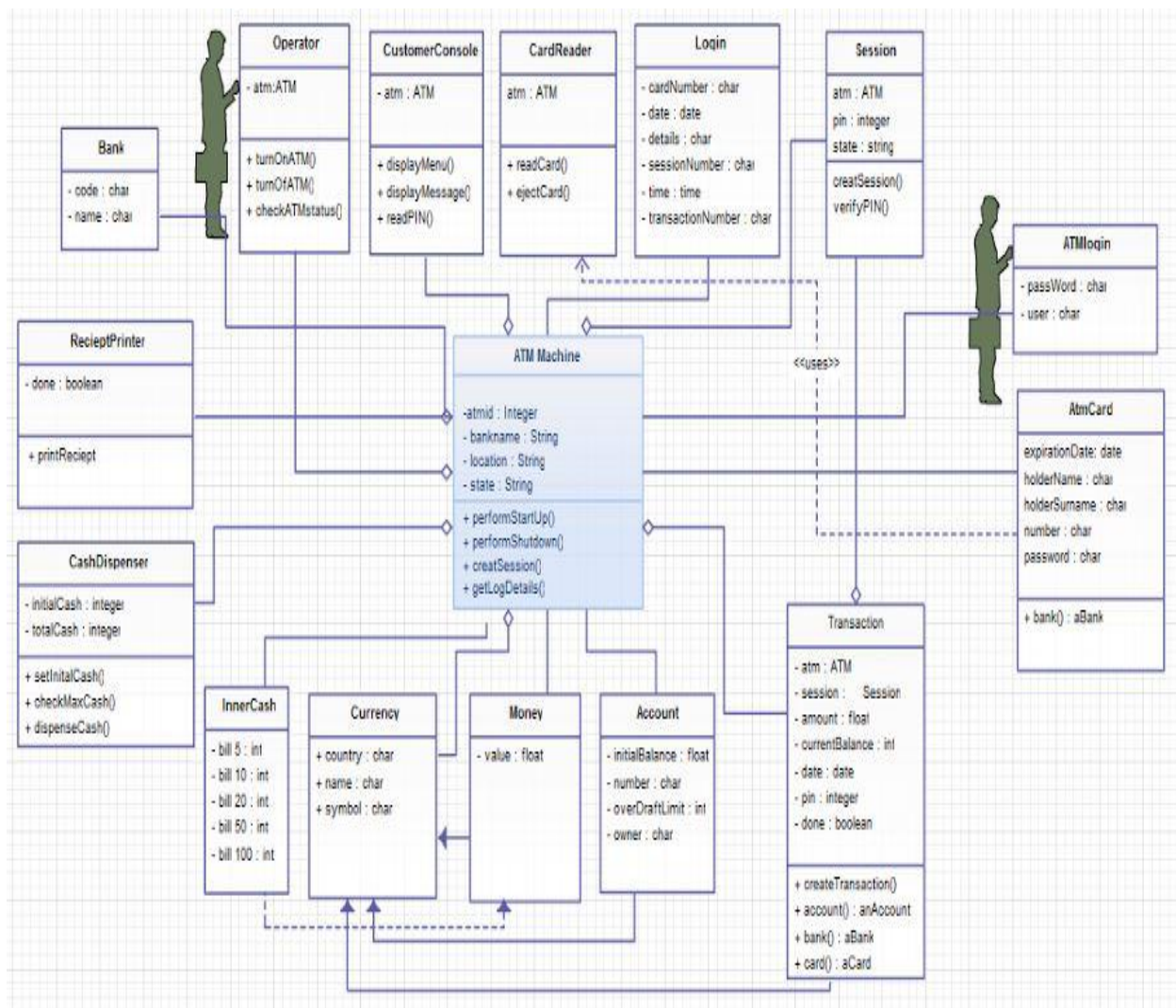**Resulting Event:** User retrieves card from ATM.

8.1.2   CLASS DIAGRAM

ABSTRACT CLASS DIAGRAM

DETAILED CLASS DIAGRAM

DETAILED CLASS DIAGRAM – TRANSACTION
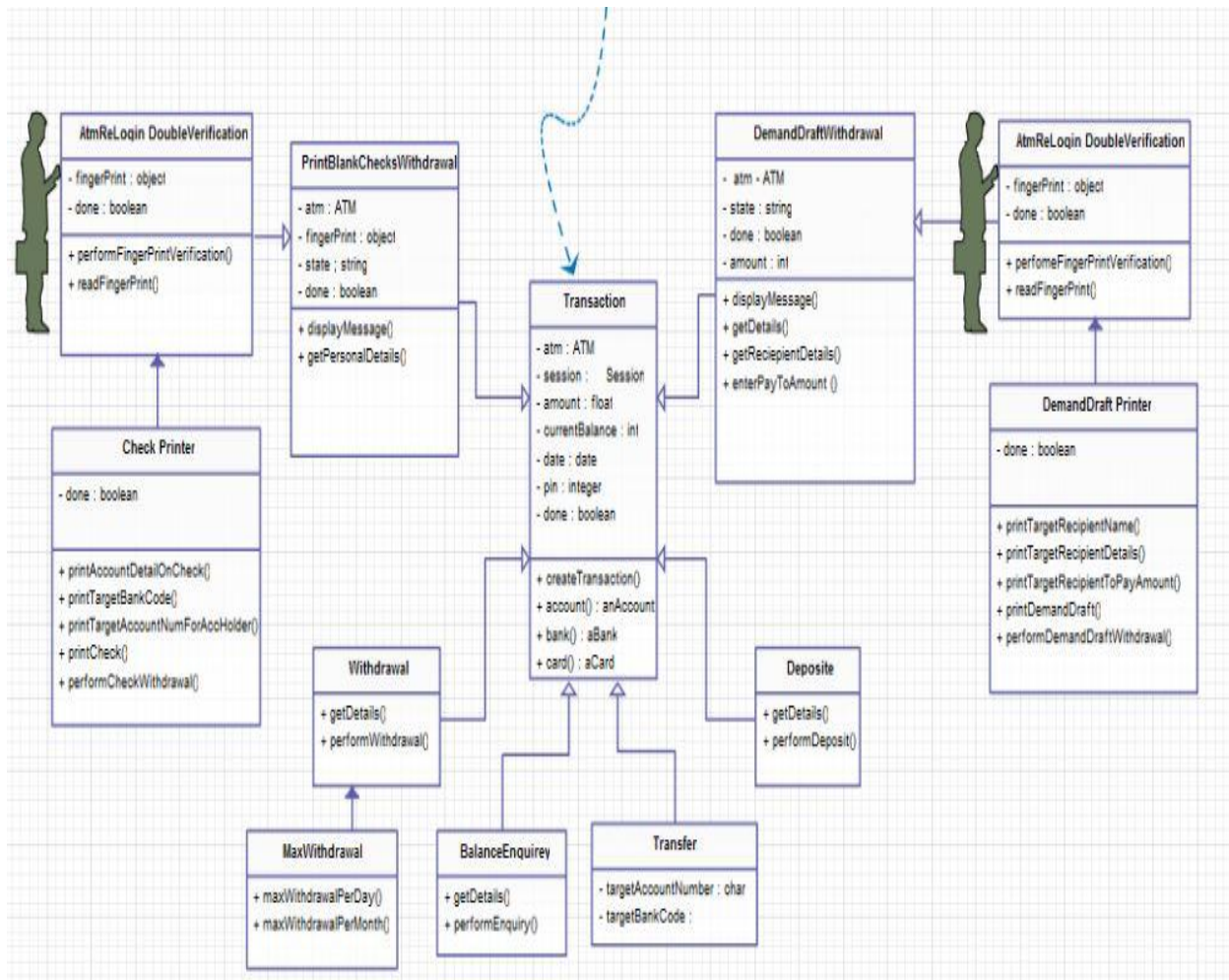
ZOOMED CLASS DIAGRAM – CHECK PRINTER
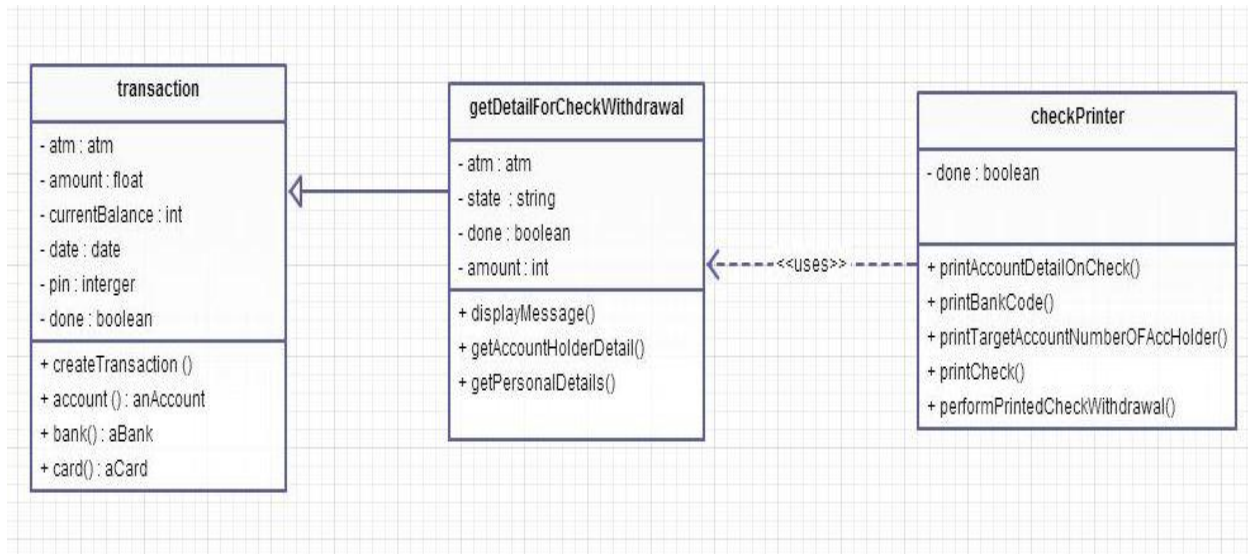
ZOOMED CLASS DIAGRAM – DEMAND DRAFT PRINTER

8.1.3 ACTIVITY DIAGRAM

ATM Balance Inquiry

ATM Check Deposit

Customer	ATM Machine	Bank

Swipe ATM Card

Enter PIN

Enter Fingerprint

Validate Card/PIN/ Fingerprint

Is everything Valid?

Check Deposit Selected

Check Deposit

Yes

No

Is it Valid Check?

Check Dispensed

Dispense Check

Yes

No

Update Account

Print Demand Draft

Customer	ATM Machine	Bank

Swipe ATM Card

Enter PIN

Enter Fingerprint

Validate Card/PIN/Fingerprint

Is everything Valid?

Print DD Selected

Print DD

Yes

No

Details Entered

Enter Name/ Company

Is everything Valid?

No

Yes

Print DD

Update Account

8.1.4 SEQUENCE DIAGRAM INTERACTIVE DIAGRAM (SYSTEM SEQUENCE ARCHITECTURE)

Sequence diagram in UML, indicates how events cause transitions from object to object. Once events have been identified by examining a use case, the modeler creates a sequence diagram—a representation of how events cause flow from one object to anothe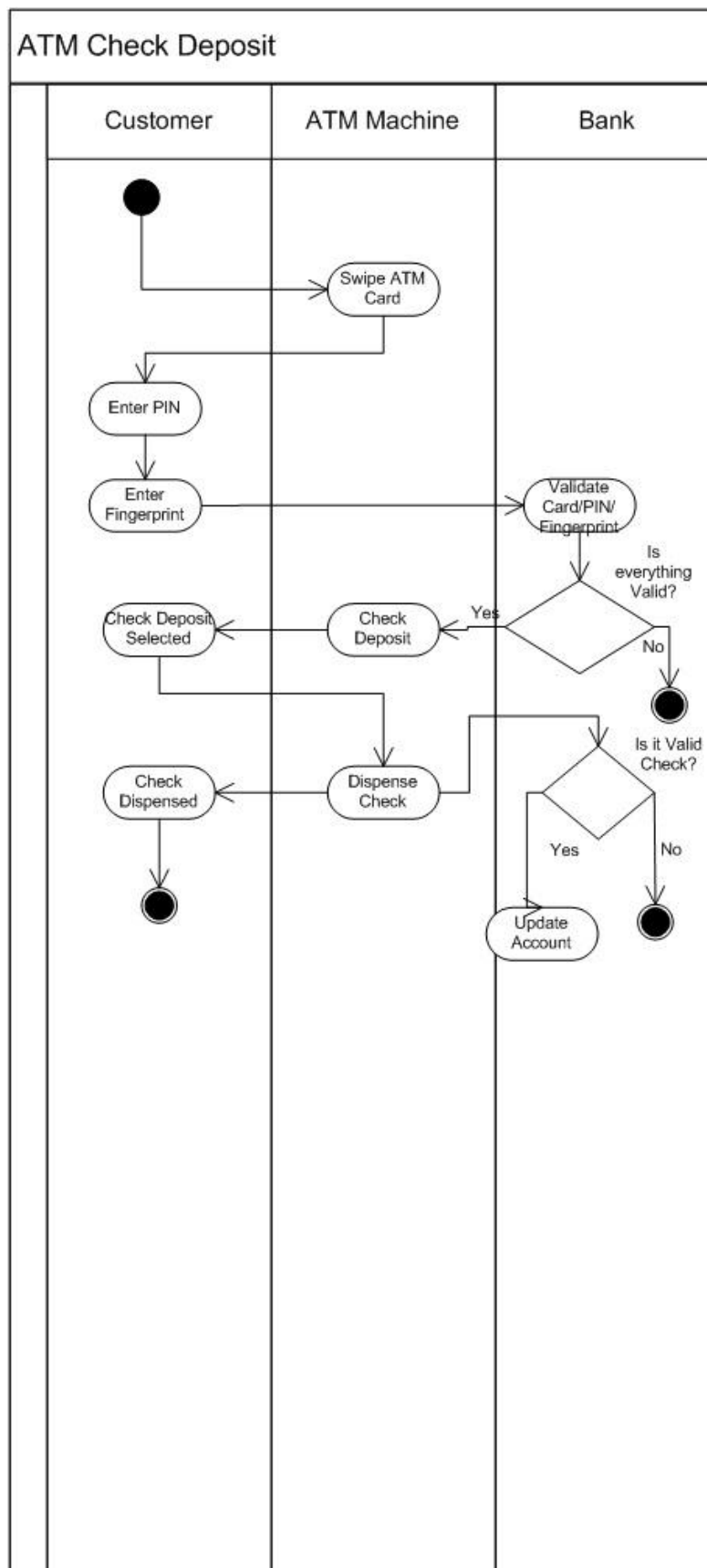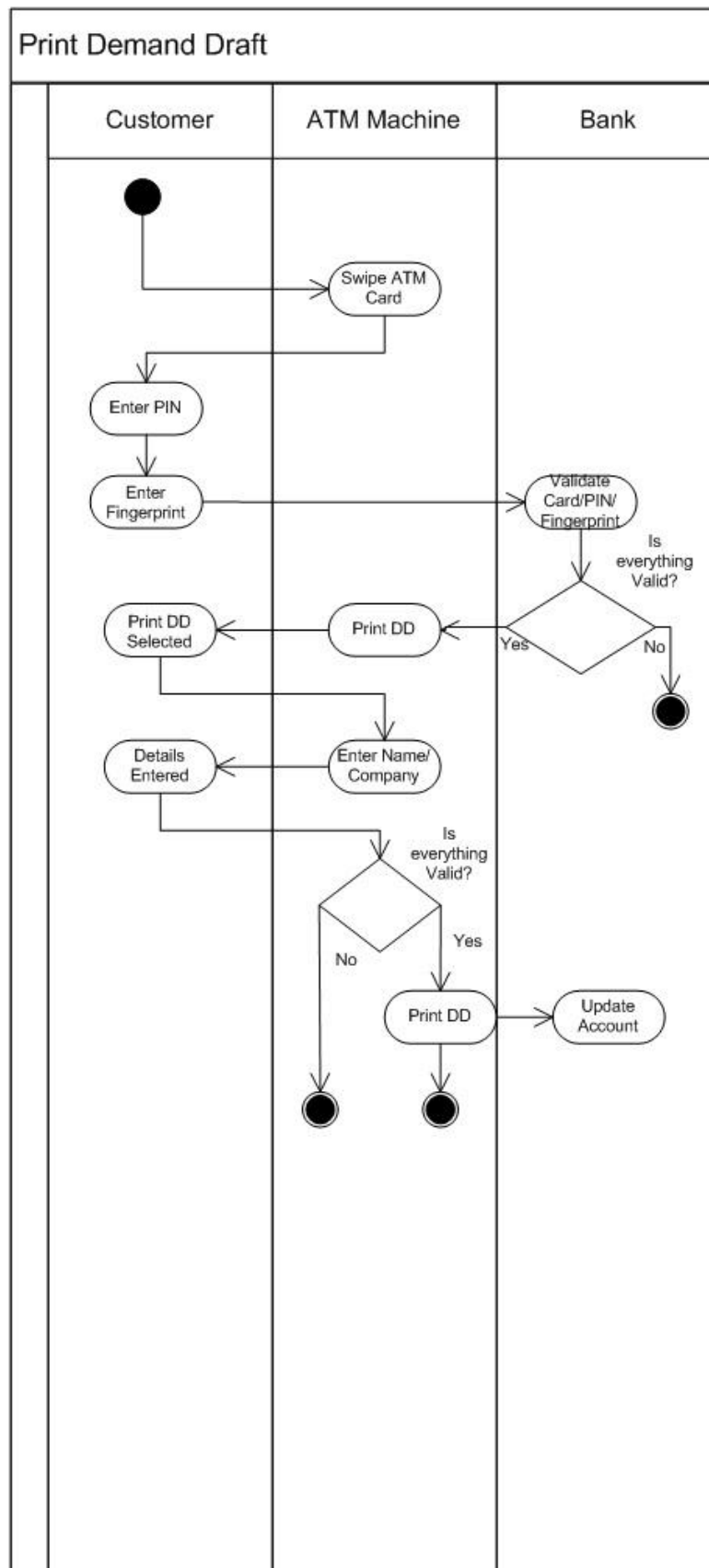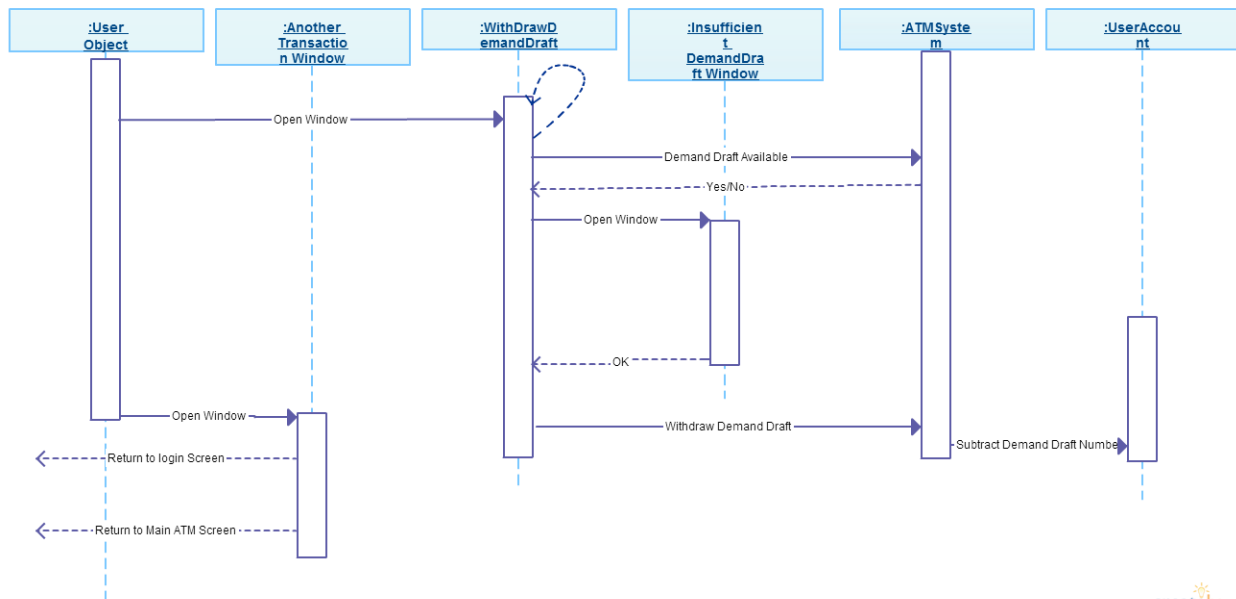r as a function of time. In essence, the sequence diagram is a shorthand version of the use case. It represents key classes and the events that cause behavior to flow from class to class.

The sequence diagram is used primarily to show the interactions between objects in the sequential order that those interactions occur. Much like the class diagram, developers typically think sequence diagrams were meant exclusively for them. However, an organization's business staff can find sequence diagrams useful to communicate how the business currently works by showing how various business objects interact. Besides documenting an organization's current affairs, a business-level sequence diagram can be used as a requirements document to communicate requirements for a future system implementation. During the requirements phase of a project, analysts can take use cases to the next level by providing a more formal level of refinement. When that occurs, use cases are often refined into one or more sequence diagrams.

An organization's technical staff can find sequence diagrams useful in documenting how a future system should behave. During the design phase, architects and developers can use the diagram to force out the system's object interactions, thus fleshing out overall system design.

One of the primary uses of sequence diagrams is in the transition from requirements expressed as use cases to the next and more formal level of refinement. Use cases are often refined into one or more sequence diagrams. In addition to their use in designing new systems, sequence diagrams can be used to document how objects in an existing (call it "legacy") system currently interact. This documentation is useful when transitioning a system to another person or organization.

Withdraw Demand Draft Sequence Diagram

Withdraw Sequence Diagram
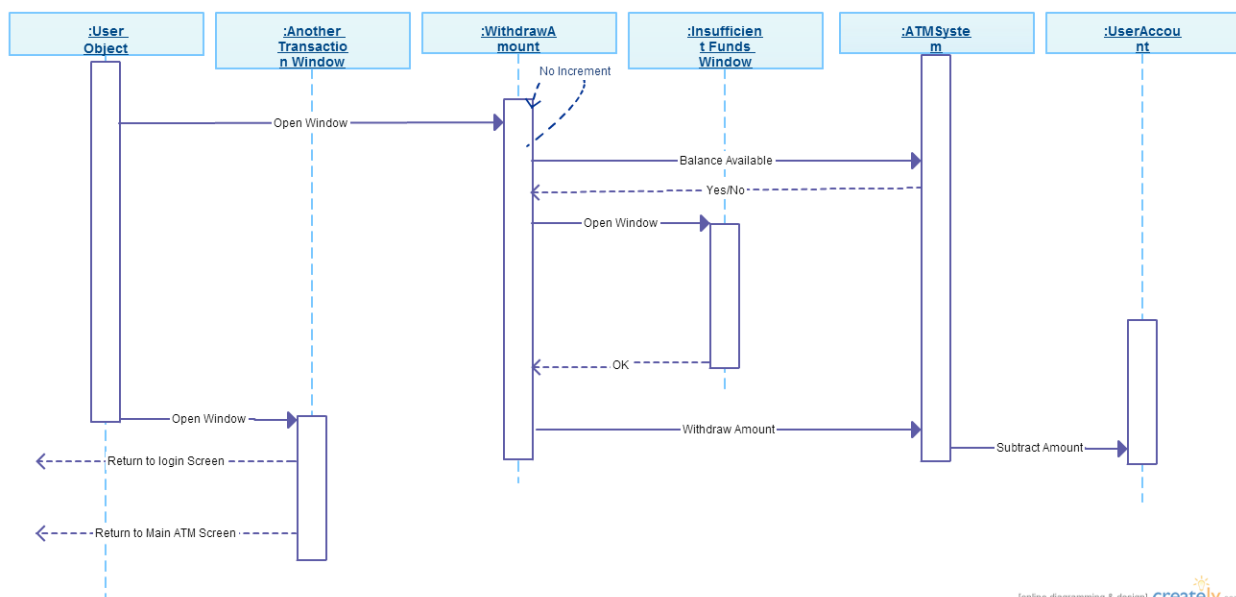
Withdraw Check Sequence Diagram

:User Object	:Another Transaction Window	:WithdrawCheck	:InsufficientChecks	:ATMSystem	:UserAccount

No Increment

Open Window

Available Checks

Yes/No

Open Window

OK

Open Window

Return to login Screen

Withdraw Check

SubtractCheckNumbers

Return to Main ATM Screen
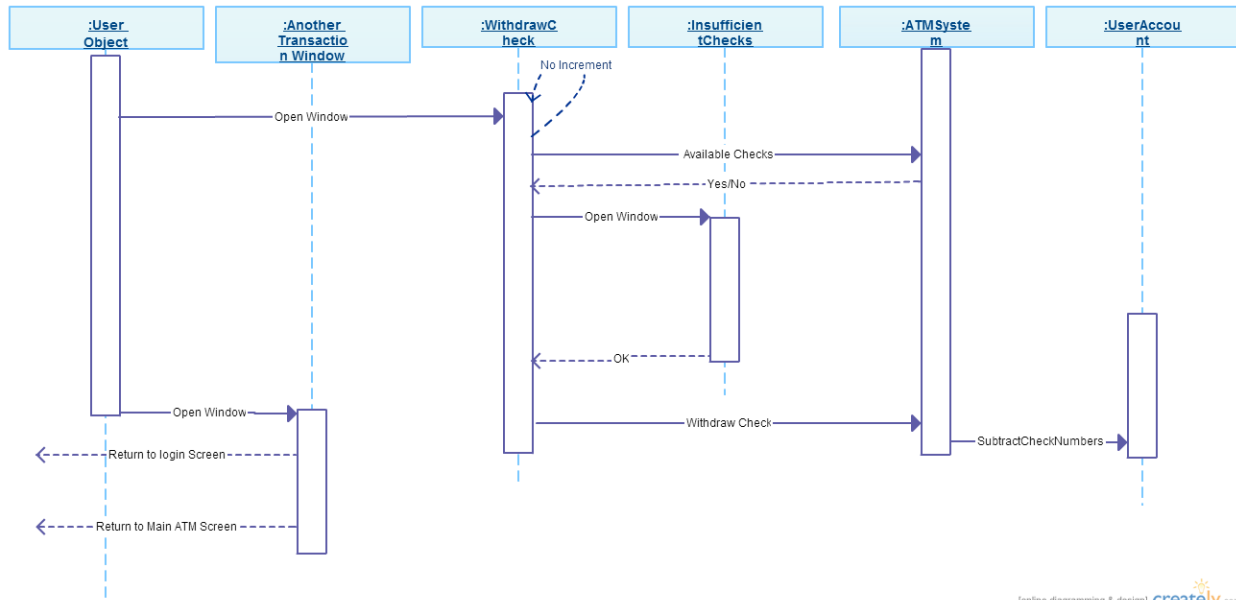
[online diagramming & design] creately.com

Deposit Sequence Diagram

:User Object	:Another Transaction Window	:Deposit Window	:ATM System	:User Account

Open Window

Deposit Amount

User Account

Open Window

Return to login Screen

Set updateBalanceNeeded

Return to Main ATM Screen

[online diagramming & design] creately.com

Authentication Sequence Diagram
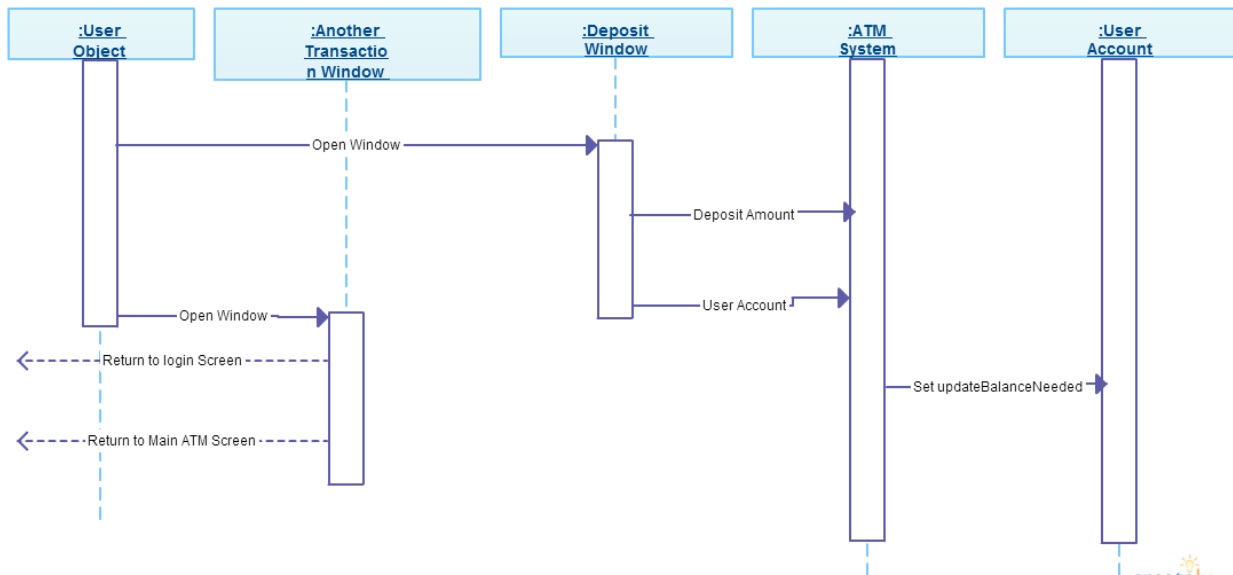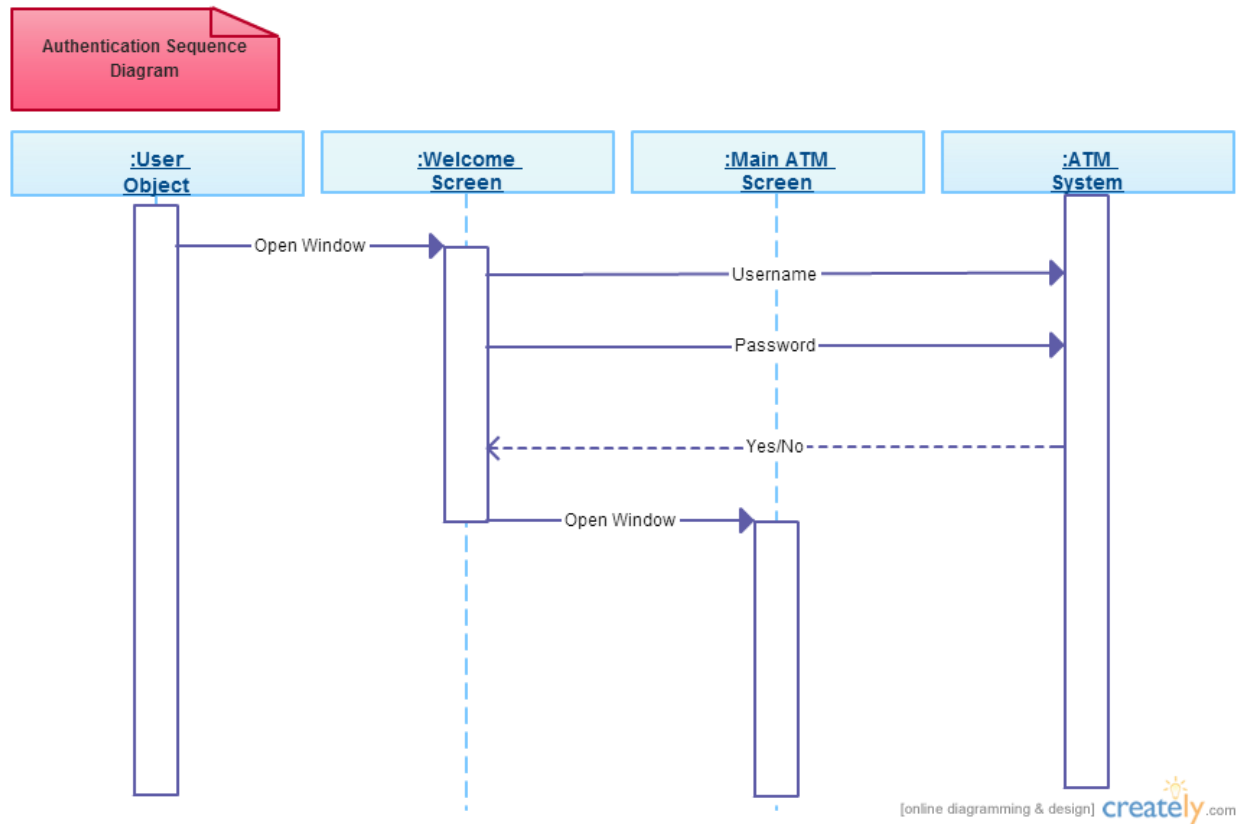
Data Flow Diagram is a graphical representation of all the major steps of a process. It can help:

- Understand the complete process.
- Identify the critical stages of a process.
- Locate problem areas.
- Show relationships between different steps in a process.

Flow-oriented modeling provides an indication of how data objects are transformed by processing functions. Data flow modeling is a core modeling activity in structured analysis. Data flow-oriented modeling is one of the most widely used requirements analysis notations in use today. Although the data flow diagram (DFD) and related diagrams and information are not a formal part of UML, they can be used to complement UML diagrams and provide additional insight into system requirements and flow.

Creating a Data Flow Diagram

The data flow diagram enables you to develop models of the information domain and functional domain. As the DFD is refined into greater levels of detail, you perform an implicit functional decomposition of the system. At the same time, the DFD refinement results in a corresponding refinement of data as it moves through the processes that embody the application.

A few simple guidelines can aid immeasurably during the derivation of a data flow diagram:

1. The level 0(zero) data flow diagram should depict the software/system as a single bubble.
2. Primary input and output should be carefully noted.
3. Refinement should begin by isolating candidate processes, data objects, and data stores to be represented at the next level.
4. All arrows and bubbles should be labeled with meaningful names.
5. Information flow continuity must be maintained from level to level.
6. One bubble at a time should be refined.

DFD - Level 0(zero) for ATM

DFD - Level o(zero) for ATM
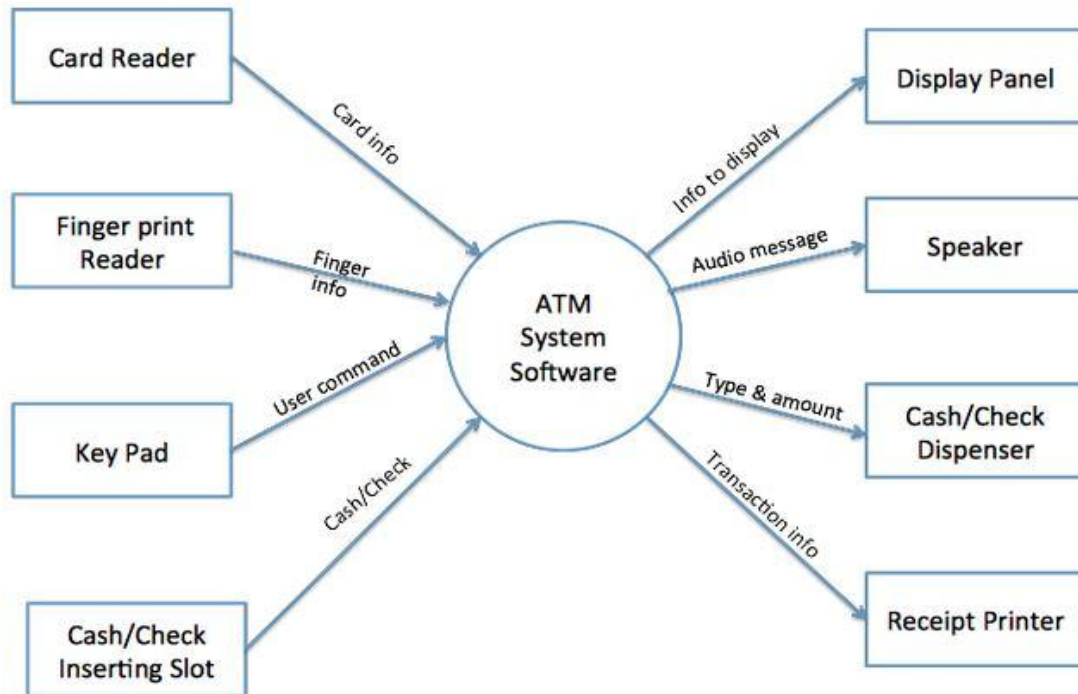
DFD - Level 1 for ATM

DFD - Level 1 for ATM
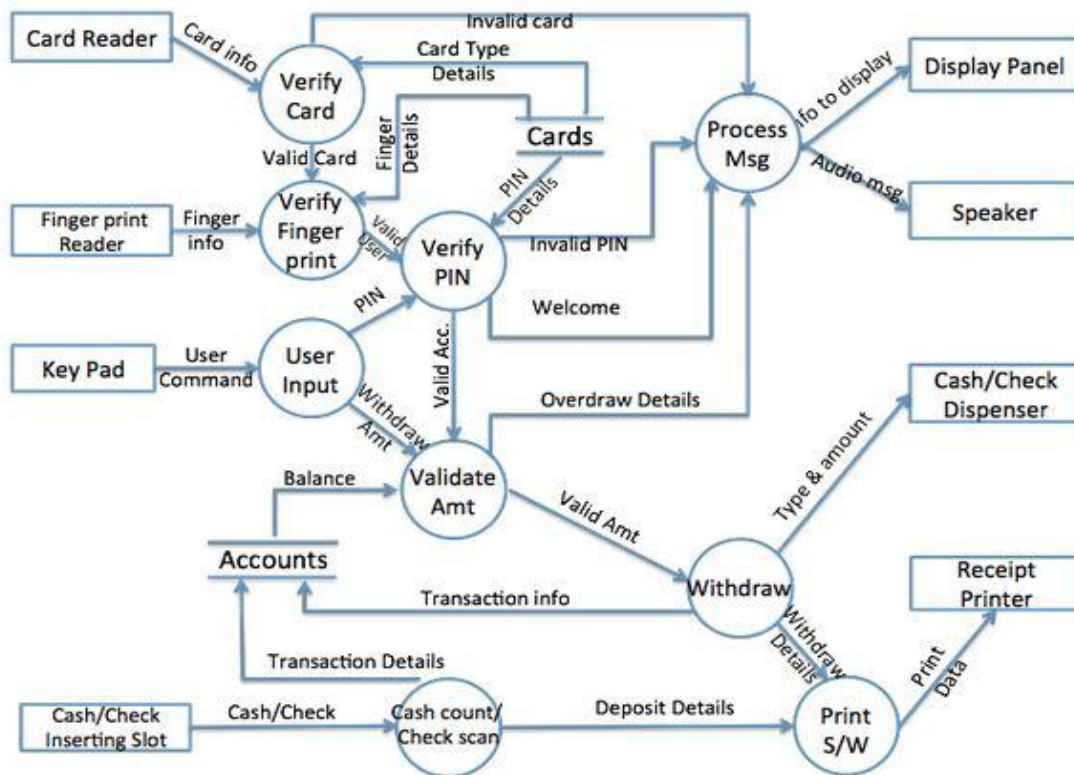
DFD - Level 2 for ATM (refines 'Validate Amt')

DFD - Level 2 for ATM (refines 'Validate Amt')
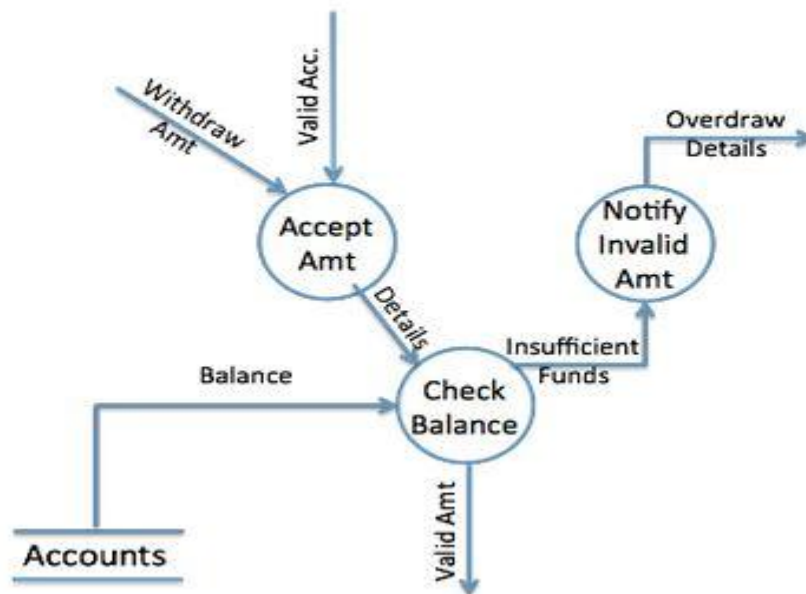
DFD - Level 3 for ATM (refines 'Process Msg')

DFD - Level 3 for ATM (refines 'Process Msg')
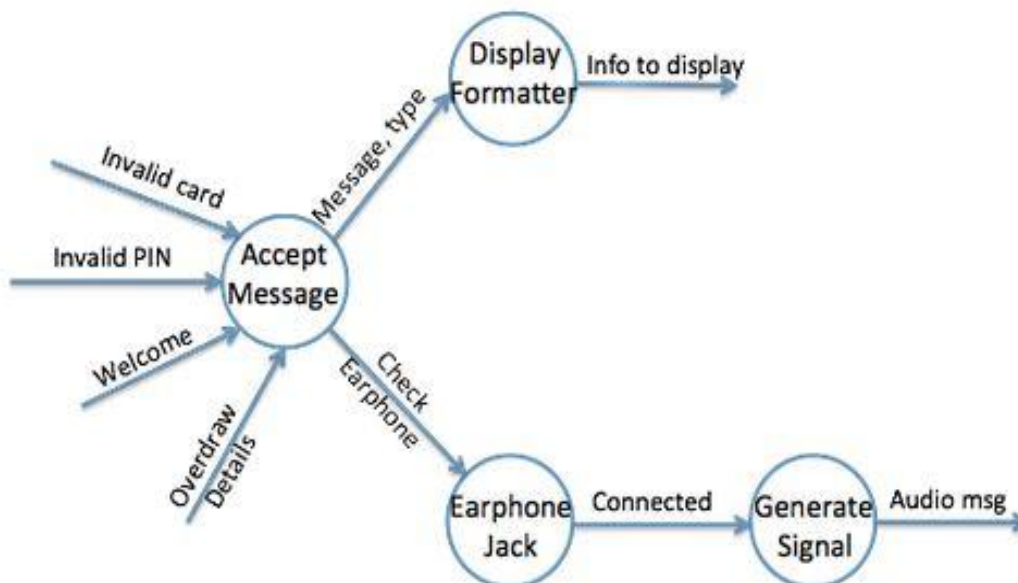
DFD - Level 4 for ATM (refines 'Slot')
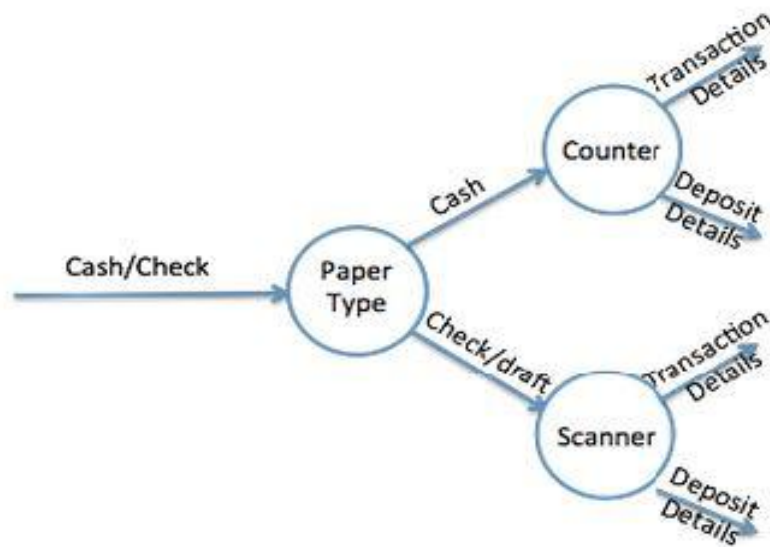
10.1 Risk process

Information system assets should be adequately protected from unauthorized access, deliberate misuse or fraudulent modification, insertion, deletion, substitution, suppression or disclosure.

- Risks that are deemed material should be thoroughly evaluated and prioritized to enable a strategy to be developed for addressing and mitigating these risks.
- A comprehensive security strategy should be developed. This is a vital Component of an effective risk management process and should have the support of the highest echelon of management.
- The risk management process should include the identification, measurement and assessment of risks, as well as formulating a plan to mitigate risks down to an acceptable level.
- An identification of the list of information system assets that need to be protected should be performed. The value of information system assets should ascertain to facilitate the ranking and prioritization of these assets.
- At the same time, it is essential to have a clear policy commitment to asset protection with respect to its security goals.

10.2 Risk identification

First step in risk management is to look closely at your business and identify potential risks. Until you know the scope of all possible risks, you cannot develop a realistic, cost-effective strategy for dealing with them. The aim of this stage of risk management is to create a database of risks relevant to your particular business.

Types of risk
There are many different types of risk. The types of risk you face will therefore be specific to your business and its objectives, but will generally relate to the following areas.
Financial risks
Operational and environmental risks
Legal risks
Strategic risks
Privacy and information risks

Ways of identifying risk
During risk identification, it is important to seek out the 'real' risks. There are various methods and tools for capturing statements of risks.   Some examples of popular

techniques are listed below.   Techniques may be used alone or combined, depending on the approach that is best for the team.

Brainstorming
This process encourages a group of people meeting face to face to put forward all their thoughts and ideas on a specific topic. During a brainstorming session all input is encouraged without evaluation. Evaluation of ideas occurs at the completion of the session when the ideas are analyzed. The diversity of participants will have an impact on the nature of the ideas and perspectives, so some thought will need to be given to who will participate in the process.

Focus groups
A focus group is made up of individuals who are invited to attend one or more meetings in order to focus their attention and provide information and feedback on a specific topic or area of concern.

Experience judgment
Is the information or opinion given based on an individual's experience and knowledge in their field of expertise?

Flow charts
These allow a dynamic process to be represented diagrammatically on paper. The process may then be analyzed for critical activities and areas of higher risk.

SWOT analysis
An effective method for prospective risk identification is a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. A SWOT analysis is a tool commonly used in planning and is an excellent method for identifying areas of negative and positive risk.

Analysis of systems
This involves studying the way a system or process functions and interacts within an organization in order to find any weaknesses. System may refer to the management processes as well as to the policies and procedures that support those processes. It may also refer to an operational system of interlinking procedures or processes.

Audits
This is the name given to the process of analyzing a management system, checking to see that the documented procedures and operational methods are the same.

Scenario building

In this process a situation or condition is created either on paper or as a model to reflect potential outcomes. These fictitious situations allow analysis and treatment options to be considered where, for example, an event have not occurred before and no data is available.

Accident investigation or failure analysis
This process involves looking at previous accidents and incidents and analyzing them to determine what went wrong or why the process failed or broke down. This will highlight risk areas for future situations.

Checklists
This involves using a list of items against which to check a situation, event, scenario, process, etc.

Risk identification forms
These forms generally include standardized questions or a set of steps to be followed in order to help identify risks. They are often tailored to specific situations, processes, scenarios, etc.

Feedback and communication
This includes safety meetings, customer feedback forms or phone calls, complaints handling, etc.
For any method, always ask these questions?
1. When, where, why, and how are risks likely to occur in this business?
2. Are the risks internal, external or random?
3. Who might be involved or affected if this occurs?

10.3 Risk analysis and Response Planning

There are many elements, known or unknown (defined or undefined), may introduce risk factor in the system. Identifying, analyzing, evaluating, responding and ultimately monitoring risks is broadly known as Risk Management Process and it is very crucial element of all of the software systems developed till now. Risk is something which can go wrong with the system. In other words, risk is a potential situation or event which creates negative impact on system's ability.

Some Definitions:
"A possible future event that, if it occurs, will lead to an undesirable outcome" (Leishman and VanBuren, 2003).

"Risk is a combination of an abnormal event or failure, and the consequences of that event or failure to a system's operators, users, or environment. A risk can range from catastrophic (loss of an entire system, loss of life, or permanent disability) to negligible (no system damage or injury)" (Glutch, 1994).

"Risk refers to a possibility of loss, the loss itself, or any characteristic, object, or action that is associated with that possibility" (Kontio, 2001).

"If you don't actively attack your risks, they will attack you!" (Tom Gilb)

Barry Boehm has explained Software Risk Management Process in mainly two steps: Risk Assessment and Risk Control. Risk assessment mainly deals with risk identification, analysis and prioritization. Risk identification produces a list of the project risk items using several techniques. Risk analysis assesses the loss probability and loss magnitude for each identified risk and risk prioritization produces a ranked ordering of the risk items identified and analyzed.

Risk Analysis for Automated Teller Machine:

Few of the Risks associated with Automated Teller Machine are described as under:
1)   Risks related to the Size of the Product:
          Ø Judgment on the size of the product can be a threat
          Ø Judgment on the number of users using the product can be a threat
          Ø Judgment on the size of the associated database can be a threat
          Ø Uncontrolled changes in the product requirements can be a threat to the product size
2)   Risks related to Customers:
          Ø Type of customers who happily accept a product as it is when delivered
          Ø Type of customers who are of complaining nature & usually tend to grumble on the quality of the product delivered to them.
          Ø Type of customers who have good technical knowledge of the product
          Ø Type of customers who have fairly good understanding of the usage of the product
          Ø Type of customers who are not much aware of the product & start using it as & when it comes
3)   Risks related to the Technology of Development:
          Ø An absolutely new technology being used for building the software application can be a threat to the organization.
          Ø Unless proper interface is developed between the software & hardware of some new configurations, there can be a cause of threat.

Ø Unless function, performance and interface of the database system have been proven across the application area in question, there can be a cause of threat.

Ø Requirement of some absolutely new or highly specialized interface as expected by the product can also pose a threat

Ø Demand of some specialized requirements of particular type of design and testing tools and techniques can be a cause of concern or risk.

Ø Too much of structured requirements imposed by the customer can a lot of pressure on the performance of the product

Ø Inadequacy of productivity-related metrics and quality related metrics available to the product development teams can pose risk of emergence of poor quality product

4)   Risk related to Business/Corporate:

Ø Threat related to loss of income: Poor budgeting and financial mismanagement; market downturns; loss of market share; loss of customers/customer trust; inappropriate pricing; poor sales performance; quality breakdowns

Ø Threat of service/downtime: Faults/malfunctions

Ø Threat related to reputation/history/management: Inefficiency; bad press; high staff turn-over; failure of management processes

Ø Insider Fraud/Employee Dishonesty: Loss of sensitive data, funds, property

Ø Loss of key staff: Resignation; head-hunting

Ø Outsourcing/sub-contracting: Shares in risks from exposures of third party contractor

5)   Environmental Risks:

Ø Crime/Location: Theft, burglary, ram raids, insider fraud, skimming, forced withdrawals, Armed robbery; insider fraud, Robbery, insider fraud, muggings

Ø Fire/Disaster: Damage to property and physical assets

Ø Deterioration/depreciation: Natural wastage and depreciation in value; environmental damage

Risk analysis involves each risk to be analyzed and documented according to certain actions. There is a need to develop appropriate response for risks associated with system. There are two ways of doing it:

Group similar and related risks: During risk analysis, redundant risks are rejected by the Project Manager and only "make sense" risks are combined and analyzed.

Analyze the risk using Risk Analysis: During the analyze step, risks are quantified according to calculations. Risk can be calculated using two factors: probability of risk occurrence and impact.

Probability:

Probability means possibility of an event to occur. In the case of Risk Analysis, probability is calculated for each scenario and rank is assigned based on its probability value. Risk probability must be greater than zero but less than 100%

Impact:

Impact is an estimate of the overall scale of the impact following an occurrence of each risk. This measures the severity of adverse effects, or the magnitude of a loss, if the risk comes to pass. Table below lists the rating for impact.

Risk Exposure = Probability * Impact.

Rank Risk:

Based on risk qualification, the risk priority is calculated. Those with the highest risk exposure score are addressed first. By ranking the risks, project resources are focused more efficiently and effectively.

Risk Response Planning

Risk Response Planning is the process for "developing options and actions to enhance opportunities and to reduce threats to project objectives"

Risk response planning takes risk information and turns it into decisions and actions. Response planning involves developing actions to address individual risks, prioritizing risk actions, and creating an integrated risk action plan.

Implementing the Risk Response Plan may require generating new and innovative ideas, making creativity key in resolving a risk. There are four innovation styles that assist the Risk Owner with the creative process:

Ø Envision – Focuses on the end result. It provides team with direction, inspiration, and momentum. One can imagine an ideal result and then let the goals guide their vision.

Ø Experimenting – Uses the trial and error method. It emphasizes fact finding and information gathering, and then testing new combinations of ideas.

Ø Exploring – Provides a team with the potential for dramatic breakthroughs by approaching problems from new angles.

Ø Modifying – A step-by-step process where the Risk Owner and team build on what is true and proved by applying known methods and using experience. It provides a team with stability and incremental improvements.

10.4 Risk Monitoring, Controlling and Reporting

The level of risk on a project will be tracked, monitored, controlled and reported throughout the project lifecycle.

Ø The first risk monitoring, controlling and reporting system is the **CCTV camera** which has been installed everywhere, where ever the ATM machine has been installed.

Ø The second risk monitoring, controlling and reporting step is to use the **Intrusion Detection System** which can be either installed on the ATM machine itself or the ATM machine can be connected to a remote system which can use **Intrusion Detection System (IDS)** to monitor many ATM machines. This way we can protect by getting accounts hacked by thief.

Ø The third risk monitoring, controlling and reporting system can be software through which people can monitor every moment and every bit of the performance of the ATM machine. If they find any bug or any kind of virus attack they can immediately report it to the concerned team and they can look into the matter to come to a solution as soon as possible.

Ø Fourth risk monitoring, controlling and reporting system can be, a of list top risk issues can be made and also the list of solution of those risk should be made so that those risk should be handled as soon as they appear.

Ø Fifth risk monitoring, controlling and reporting system can be detection of wrong card, if the somebody's card have been stolen or lost then on the report of the customer the card number should be black listed, more over if the pin is been entered wrong three times then also the card should be discarded.

Ø Sixth risk monitoring, controlling and reporting approach can be prevent criminal from **shoulder surfing** the customer's **Personal Identification Number (PIN)** by drawing privacy areas on the floor.

10.5 Risk contingency budgeting

This document contains the Contingency Plan for the ATM system budgeting. It is intended to serve as the centralized repository for the information, tasks, and procedures that would be necessary to facilitate the ATM system management's decision-making process and its timely response to any disruptive or extended interruption of the department's normal business operations and services. This is especially important if the cause of the interruption is such that a prompt resumption of operations cannot be accomplished by employing only normal daily operating procedures. Automated Teller Machine (ATM), expects to get cash 24 hours a day, 7 days a week. So a bank may determine the ATM is a critical system with a downtime goal of zero minutes. Banks must run redundant and/or parallel systems in order to reduce the chances of disaster.

A financial institution that processes millions of transactions each day has a central communications processor (switch) for connecting to automated teller machines

(ATMs). Which of the following would be the BEST contingency plan for the communications processor?

A. Reciprocal agreement with another organization

B. Alternate processor in the same location

C. Alternate processor at another network node

Explanation

The unavailability of the central communications processor would disrupt all access to the banking network. This could be caused by an equipment, power or communications failure. Reciprocal agreements make an organization dependent on the other organization and raise privacy, competition and regulatory issues. Having an alternate processor in the same location resolves the equipment problem, but would not be effective if the failure was caused by environmental conditions (i.e., power disruption). The installation of duplex communication links would only be appropriate if the failure were limited to the communication link.

Purpose

The purpose of this plan is to enable the sustained execution of mission critical processes and information embedded systems for ATM system in the event of an extraordinary event that causes these systems to fail minimum production requirements. The ATM system Contingency Plan will assess the needs and requirements so that ATM system may be prepared to respond to the event in order to efficiently regain operation of the systems that are made inoperable from the event.

The plan seeks to accomplish the following additional objectives:

- Minimize the number of decisions which must be made during a contingency.
- Identify the resources needed to execute the actions defined by this plan.
- Identify actions to be undertaken by pre-designated teams.
- Identify critical data in conjunction with customers that will be recovered during the hot Site phase of recovery operations.
- Defining the process for testing and maintaining this plan and training for contingency teams. Risk contingency management budgeting team.

Risk contingency management budgeting team

Contingency Plan Coordinator

A coordinator and an alternate should be appointed by Bank management and ATM system owners to monitor and coordinate the Bank ATM machine Contingency Plan, training and awareness, exercises, testing and budgeting.

OPERATIONS TEAM

The Operations Team consists of operators responsible for running emergency production for critical systems, coordinating with Backup Team to ensure that applications system data and operating instructions are correct, and with the Liaison Team to advise of the production status and any unusual problems requiring assistance.

Contingency Phases

Establish an immediate and controlled presence at the incident site.

To conduct a preliminary assessment of incident impact, known injuries, extent of damage, and disruption to the ATM system services and business operations.

To find and disseminate information on if or when access to the ATM system facility will be allowed.

Provide ATM system management with the facts necessary to make informed decisions regarding subsequent resumption and recovery activity.

Resumption Phase

Establish and organize a management control center and headquarters for the resumption operations.

Recovery Phase

Prepare and implement procedures necessary to facilitate and support the recovery of time-sensitive business operations.

Restoration Phase

Prepare procedures necessary to facilitate the relocation and migration of business operations to the new or repaired facility.

Physical Environment

Include the bank's location, internal facilities, Bank staff, entry security measures, alarms, and access control.

Technical Environment

Include accurate description of hardware (processors, memory and media storage) and system software (operating system, applications). Include number of bank customer, valid account holders, interconnected systems, and operational constraints.

Project Planning and Scheduling

Project Scheduling and Cost Control: Planning and monitoring the baseline for ATM project, tracking schedule activities, preparing team report and team gatherings and meeting, setting up deadlines for task fulfillment.

Make design decision to improve the product.

Design decisions for software used and added extra features to ATM system for user/customer ease.

Track Status

Tracking with GANTT chart, team minutes and iterative meetings.

UML Diagram Learning

We have worked with UML diagrams – like Use Case, Sequence diagram, Class diagram, Data flow diagram, Activity diagrams. We understood as well as learnt making and drawing diagrams using different tools. We also understood the classification of Real use case and Essential use case.

Software engineer team member	Lesson
Akanksha (Team Leader)	✓ **Learnt to document a software requirements before the actual implementation of the idea.** ✓ **With the help of all the team members learnt the diagrams like class, activity, data flow diagram.** ✓ **Learnt writing use case for the a software system.** ✓ **Sequential diagrams was learnt as my own topic.** ✓ **Learnt to manage a team and make everybody satisfied by distributing the work fairly among the team members.**
Dharti	✓ **Detailed research in Software engineering and gain better and detailed knowledge regarding project.** ✓ **Learned class diagrams and also learned way to use and draw diagrams.** ✓ **Experience working with team, learning new things and collaborating with each team mates.** ✓ **Understood and learned details of Waterfall process model and its implementation which includes various steps from Requirement specification to Deployment.** ✓ **Innovation is starting point for creative concepts; thanks to my teammates who gave me enough space to come up**

	with my creativity.
Madhu	✓ **Project planning and scheduling.** ✓ **Learnt new ways from teammates in managing progress of project and collaboration with team members.** ✓ **Learned to draw Data flow diagram effectively.** ✓ **Learnt UML diagrams like use case, activity and class diagrams from other team mates.** ✓ **Learnt to be a good team player.**
Ramya	✓ **Study on security requirements.** ✓ **Learned ways to write use cases effectively.** ✓ **Learned use case diagrams with a lot of input from all the team members.** ✓ **Study on risk process.**
Slesha	✓ **Study of ATM system its features and added some additional features.** ✓ **Detailed research on Non functional requirements.** ✓ **Studied various components involved in ATM system.** ✓ **Worked on feasibility and scope of ATM.** ✓ **Researched on Risk Identification.** ✓ **Learned Use case diagrams, and explored a lot on this topic with team mates.**
Trupti	✓ **Study of ATM system and its various components. Relate those studies with Software Engineering Project.** ✓ **Feasibility study of ATM system, especially Economic feasibility.** ✓ **Understanding and learning of UML Activity diagrams for each functionalities carried out by the system.** ✓ **Study of Risk analysis and response planning for ATM System.** ✓ **Study of other UML diagrams like Class diagrams, Sequence diagrams, Data flow diagrams etc carried out by other team members.**

Glossary

Actors**:** A person, a system or some external entity, which defines the system boundaries.

CBS: Central bank system.

Class diagram: It is type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations, and the relationships among objects.

Constraints: A restriction or condition on an element.

Event: An occurrence that has significance.

Exception: when errors happen or to try to illustrate the sequence of steps that must be performed in order to complete a task.

Extension: The set of objects to which the concept applies. The objects in the extension are the examples or instances of the concept.

Functional requirement: In software engineering, a functional requirement defines a function of a system.

Object: In the UML, an instance of a class that encapsulates state and behaviour.

IDS: Intrusion Detection System monitors network or system activities for malicious activities or policy violations and produces reports to a management station

Include: It is used to extract use case fragments that are duplicated in multiple use cases.

PIN: Personal Identification Number.

Postcondition: A constraint that must hold true after the completion of an operation .

Precondition: A constraint that must hold true before an operation is requested.

Risk contingency budgeting: Contingency and risk includes **budgeting** as a control account.

Akanksha Avinash - 12300106

Team Member Name:	*Akanksha Avinash*		Team leader's signature	
Team Leader Team:	*Akanksha Avinash*			
Student Id of Member:	*12300106*		Course	Software Engineering (SEN 941)
Project Start Date:	*September 17, 2013*			
Project End Date:	December 17, 2013			
Date	Task Assigned	Project Detail Completed /In Progress	Duration	Medium of discussion
Sep 10, 2013	Discussion of project topic.	Completed	2 days	Group meeting, online chatting.
Sep 20, 2013	Research and Finalizing the Project topic	Completed	2 weeks	Group meeting, internet chat, phone calls
Sep 26, 2013	Worked and proposed adding new features to ATM machine	Completed	1 day	Via email
Sep 29, 2013	Worked on 1st draft of Requirement document	Completed	1 day	Via email
Oct 9, 2013	Reviewed and finalized Requirement document.	Completed	2 days	

Oct 10, 2013	Worked on 1st draft of individual team mates' work allocation	Completed	1 day	
Oct 13, 2013	Worked on Functional requirement Constraints	Completed	1 week	Internet and Software Engg Book
Oct 19, 2013	Worked on Understanding Sequence diagram	Completed	3 days	Discussed with Professor and Search Internet
Oct 22,2013	Worked ATM Hardware Environment	Completed	3 days	Internet
Nov 12, 2013	Worked on Technical Feasibility	Completed	5 days	Internet and Software Engg Book
Nov 26, 2013	Worked on making Sequence diagram	Completed	4 days	Discussed with professor and Search Internet
Dec 2, 2013	Worked on Power point presentation	Completed	2 weeks	Word Power Point
Team Member Name:	*Trupti Kholiya*		Team leader's signature	
Team Leader of Team:	*Ankanksha Avinash*			
Student Id of Member:	*84829*		Course	Software engineering (SEN 941)
Project Start Date:	*September 17, 2013*			

Project End Date:	December 03, 2013			
Date	Task Assigned	Project Detail Completed /In Progress	Duration	Medium of discussion
Sep 10, 2013	Discussion of project topic.	Completed	2 days	Group meeting, online chatting.
Sep 20, 2013	Research and Finalizing the Project topic	Completed	2 weeks	Group meeting, internet chat
Sep 26, 2013	Worked and proposed adding new features to ATM machine	Completed	1 day	Via email
Sep 29, 2013	Worked on 1st draft of Requirement document	Completed	1 day	Via email
Oct 9, 2013	Reviewed and finalized Requirement document.	Completed	2 days	Via email
Oct 12, 2013	Worked on 1st draft of individual team mates' work allocation	Completed	1 day	Via email
Oct 19, 2013	Worked on Economic Feasibility.	Completed	1 day	Via email
Oct 20, 2013	Worked on Activity Diagrams	Completed	2 days	Via email
Oct 22,2013	Updated Lessons learnt	Completed	1 day	Via email
Oct 23, 2013	Worked on Risk and Volatile Areas.	Completed	2 days	Via email
Oct 25,	Worked on Risk	Completed	2 days	Via email

Date	Task Assigned	Project Detail Completed /In Progress	Duration	Medium of discussion
2013	Analysis and Response Planning			
Nov 21, 2013	Worked on Final draft of the Project	Completed	2 days	
December 3, 2013	Worked on Presentation of Project work	Completed	5 days	Group meeting, group chat, email
Team Member Name:	*Slesha Vemuganti*		Team leader's signature	
Team Leader of Team:	*Akanksha Avinash*			
Student Id of Member:	*82938*		Course	Software engineering (SEN 941)
Project Start Date:	September *17, 2013*			
Project End Date:	December 03, 2013			
Date	**Task Assigned**	**Project Detail Completed /In Progress**	**Duration**	**Medium of discussion**
Sep 10, 2013	Discussion of project topic.	Completed	2 days	Group meeting, online chatting.
Sep 20, 2013	Research and Finalizing the Project topic	Completed	2 weeks	Group meeting, internet chat, phone calls
Sep 26, 2013	Worked and proposed adding new features to ATM machine	Completed	1 day	Via Google Doc Conference calls
Sep 29,	Worked on 1ˢᵗ draft of	Completed	1 day	Via Google Doc

2013	Requirement document			
Oct 8, 2013	Reviewed and finalized Requirement document.	Completed	2 days	In class
Oct 10, 2013	Worked on 1st draft of individual team mates' work allocation	Completed	1 day	In class
Oct 13, 2013	Worked on Non Functional requirement.	Completed	1 week	Internet
Oct 16, 2013	Worked on Operational Feasibility.	Completed	4 days	Internet
Oct 22,2013	Worked on Risk Identification	Completed	3 days	Internet
Nov 5, 2013	Worked on Use case description.	Completed	5 days	Internet, Discussed with Professor.
Nov 12, 2013	Worked on Use case diagram	Completed	4 days	Internet, Discussed with Team mates
Dec 2, 2013	Worked on Power point presentation	Completed	2 weeks	In class
Team Member Name:	*Dharti Rathod*		Team leader's signature	
Team Leader of Team:	*Ankanksha Avinash*			
Student Id of Member:	*84213*		Course	Software engineering (SEN 941)

Project Start Date:	*September 17, 2013*			
Project End Date:	December 03, 2013			
Date	Task Assigned	Project Detail Completed /In Progress	Duration	Medium of discussion
Sep 10, 2013	Discussion of project topic.	Completed	2 days	Group meeting, online chatting.
Sep 20, 2013	Research and Finalizing the Project topic	Completed	2 weeks	Group meeting, internet chat, phone calls
Sep 26, 2013	Worked and proposed adding new features to ATM machin	Completed	1 day	Via email
Sep 29, 2013	Worked on 1st draft of Requirement document	Completed	1 day	Via email
Oct 9, 2013	Reviewed and finalized Requirement document.	Completed	2 days	
Oct 10, 2013	Worked on 1st draft of individual team mates' work allocation	Completed	1 day	
Oct 13, 2013	Worked on Functional requirement.	Completed	1 week	
Nov 13, 2013	Worked on Class diagram	Completed	4 days	
Oct 22,2013	Worked on Risk Contingency budgeting	Completed	3 days	

Date	Task Assigned	Project Detail Completed /In Progress	Duration	Medium of discussion
Nov 12, 2013	Worked on Process model.	Completed	5 days	
Nov 13, 2013	Worked on Class diagram	Completed	4 days	
Nov 26, 2013	Worked on Power point presentation	Completed	2 weeks	

Team Member Name:	*Ramya Keerthi*		Team leader's signature	
Team Leader of Team:	*Akanksha Avinash*			
Student Id of Member:	*84108*		Course	Software engineering (SEN 941)
Project Start Date:	September *17, 2013*			
Project End Date:	December 03, 2013			
Date	Task Assigned	Project Detail Completed /In Progress	Duration	Medium of discussion
Sep 10, 2013	Discussion of project topic.	Completed	2 days	Group meeting, online chatting.
Sep 20, 2013	Research and Finalizing the Project topic	Completed	2 weeks	Group meeting, internet chat, phone calls
Sep 26, 2013	Worked and proposed adding new features to ATM machine	Completed	1 day	Via Google Doc Conference calls
Sep 29,	Worked on 1st draft of	Completed	1 day	Via Google Doc

2013	Requirement document			
Oct 8, 2013	Reviewed and finalized Requirement document.	Completed	2 days	In class
Oct 10, 2013	Worked on 1st draft of individual team mates' work allocation	Completed	1 day	In class
Oct 13, 2013	Worked on security requirements.	Completed	1 week	Internet
Oct 16, 2013	Worked on Risk Process.	Completed	4 days	Internet
Oct 22,2013	Worked on project schedule.	Completed	3 days	Internet
Nov 5, 2013	Worked on Use case description.	Completed	5 days	Internet, Discussed with Professor.
Nov 12, 2013	Worked on Use case diagram	Completed	4 days	Internet, Discussed with Team mates
Dec 2, 2013	Worked on Power point presentation	Completed	2 weeks	In class
Team Member Name:	Madhu Mahadevaiah		Team leader's signature	
Team Leader Team:	*Akanksha Avinash*			
Student Id of Member:	*12300106*		Course	Software Engineering (SEN 941)

Date	Task Assigned	Project Detail Completed /In Progress	Duration	Medium of discussion
	September 17, 2013			
Project Start Date:	December 17, 2013			
Project End Date:				
Date	Task Assigned	Project Detail Completed /In Progress	Duration	Medium of discussion
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Sep 26, 2013	Worked and proposed adding new features to ATM machine	Completed	1 day	Via email
Sep 29, 2013	Worked on 1st draft of Requirement document	Completed	1 day	Via email
Oct 9, 2013	Reviewed and finalized Requirement document.	Completed	2 days	
Oct 10, 2013	Worked on Gathering some additional information for project	Completed	1 day	
Oct 13, 2013	Worked on Project plan management	Completed	1 week	Internet and Software Engg Book
Oct 19, 2013	Worked on Understanding Data flow diagram	Completed	2 days	Internet and software Engg Book
Oct 22,2013	Worked on Completion of Data flow diagram	Completed	1 week	Internet and Software Engg book

Nov 12, 2013	Worked on Making Decision Table	Completed	5 days	Internet and Professor Slides
Nov 26, 2013	Worked on making Gantt Chart	Completed	2days	Internet
Dec 2, 2013	Worked on Power point presentation	Completed	2 weeks	Word Power Point