# DELHI TECHNOLOGICAL UNIVERSITY

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## Object Oriented Software Engineering

Laboratory File

## ATM MANAGEMENT SYSTEM

**Submitted To :-**

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# EXPERIMENT 1

To Write a problem Statement of an ATM Management System.

- **Theory :→** Problem Statement :→ A software product is to be developed for the ATM Management process. In a way that it helps the customer in checking the balance and transaction of the amount by validating the pin no therefore the ATM system is more user friendly.

In our ATM system the above problem is overcome is here, the transactions are done in person by the customer thus making the customer feel safe and secure. The project has drastic changes to that of the older version of the transactions that are done in past in banking system customer feel inconvinienced with the transaction method as it was in hand of bank employees.

The System performs following functions;→

- **Deposit :→**
  - Customers must insert an ATM card and PIN to avail facilities.
  - If the entered details are valid, the kind of transaction and amount to be deposited is requested.
  - Else first check no of incorrect pin attempts. If >3 blocks the card enter pin again.
  - Transaction process takes place, if successfull cash taken from customer and request take card.
- **Withdraw :→**
  - Customer inserts atm card and verifies pin.
  - If entered details are valid the kind of transaction and amount to be withdraw are requested.
  - Else first check no of failed pin attempts. If >3 blocks the card enter pin again
  - Transaction process takes place, if successful cash is dispensed and request takes a card.
- **Checking Balance :→**
  - Customer enters atm card and verifies pin.
  - If the entered details are valid. The kind of transaction is requested.
  - Else first check no of incorrect pin attempts if >3 blocks the card enter the pin again.
  - Blanced amount is checked and then displayed.
  - Request take card.
- **Change PIN Number :→**
  - Customer insert atm card and verifies pin.
  - If the entered details are valid the kind of transaction is requested.
  - Enter the current pin no. and new pin no register new pin no.
  - Pin No. changed request take card.

# EXPERIMENT 2

To write the initial requirement document of CASE STUDY

| | |
|---|---|
| Title of the Project | ATM MANAGEMENT System |
| Stakeholders | Customers, Managers, Support Staff, Tech Advisors, Admins. |
| Technique used for Requirement Capturing. | Interviews, Questionaires. Brain-storming. |
| Date | 2023 |
| Version | 1.0 |

Consolidated list of initial requirements.

1. The System shall allow the customer to enter the correct pin in no more than three attempts. The failure to provide the correct PIN in three attempt shall result in confiscation of the ATM card.
2. The System shall ask for the transaction type after satisfactory validation of the customer PIN. The customer shall be given three options: withdrawl transaction, query transaction, and deposit transaction.
3. The System shall not be responsible for opening or closing accounts, and to create, updating and delete customer and debit card records. These tasks are performed elsewhere by the Bank.
4. The System shall be linked with the Bank servers through communication system which are beyond the scope of the current system. It is assumed that this facility is always available
5. The System shall enable the customers of XYZ Bank Inc. who have valid ATM cards, to perform three type of transaction 1) withdrawal of funds. 2) Query of account Balance 3) Deposit fund and change PIN number.

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# EXPERIMENT 3

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To Write the Software Requirement Specification document of Case Study.

1. Introduction - 1.1 Purpose
   1.2 Scope
   1.3 Definitions, acronyms and abbreviations
   1.4 References
   1.5 Overview.

2. Overall description - 2.1 Product Perspective
   - 2.1.1 System Interfaces
   - 2.1.2 User Interfaces
   - 2.1.3 Hardware Interfaces
   - 2.1.4 Software Interfaces
   - 2.1.5 Communication Interfaces
   - 2.1.6 Memory Constraints
   - 2.1.7 Operations
   - 2.1.8 Site Adaptation requirements

   2.2 Product functions
   2.3 User characteristics
   2.4 Constraints
   2.5 Assumptions and dependencies
   2.6 Apportioning of Requirement.

3. Specific Requirement -
   - 3.1 External Interfaces.
   - 3.2 Functions
   - 3.3 Performance Requirement
   - 3.4 Logical Database Requirement
   - 3.5 Design Constraints
     - 3.5.1 Standard Compliance

   3.6 Software System attributes
   - 3.6.1 Reliability
   - 3.6.2 Availability
   - 3.6.3 Security
   - 3.6.4 Maintainability
   - 3.6.5 Portability.

   3.7 Organizing the Specific Requirements.
   - 3.7.1 System Mode
   - 3.7.2 User Class
   - 3.7.3 Objects
   - 3.7.4 Feature
   - 3.7.5 Stimulus
   - 3.7.6 Response
   - 3.7.7 Functional Hierarchy

INTRODUCTION - A Software product is to be developed for the ATM Management Process. In a way that it helps the customer in checking the balance and transaction of the amount by validating the PIN number therefore the ATM system is more user friendly.

• Purpose :→ The ATM management system maintains the information and various customer ATM accounts. This document is intended for following group of people

Developers for the purpose of the maintenance and new releases of the software

Management of the Bank

Documentation writers

Testers

• Scope :→ The proposed ATM management system must be able to perform following functions.

DO's -

1. Issue of login ID and password to ATM administrator.
2. Maintain details of the amount of money available in ATM machine.
3. Maintain details of the customers to provide them with ATM card.
4. Perform a transaction.
5. If the customer performs more than one transaction then it must checks the details of the previous ones to decide whether the transaction amount and number are within the limits decided by the bank or not.
6. Cancels a transaction if it is unauthorised like a user has entered wrong details or the transaction number/amount is not within the limits.
7. Allows entering the correct PIN in no more than 3 attempts. The failure to provide the correct PIN in 3 attempt shall return result in the confiscation of the ATM card.

DONTs -

The System shall not be responsible for opening or closing of accounts or create, update delete customer and debit card records. These tasks are performed elsewhere by the bank.

Benifits -

The ATM Management System provides the following benifits. Easy cash withdrawls Deposits of money. Can efficiently perform the transaction in few minutes only.

• Definitions, Acronyms and Abbreviations :→

SRS - Software Requirement Specification.

ATM - Automated Teller Machine

ATM PIN - It is a unique sequence number allocated to each customer using which he can access his account details.

Account - A Single Account in a bank against which transactions can be applied. Accounts may be of various types with at least checking and saving. A customer can hold more than one account.

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Transaction - A single integral request for operations on the accounts of a single customer. We only specified that ATM must dispense cash but we can not preclude the possibility of printing checks or accepting cash or checks

Customer - The holder of one or more accounts in a bank. A customer can consist of one or more person or corporations. The correspondence is not relevant to this problem. The same person is holding an account at a different bank is considered a diff Customer.

Bank - A financial institution that holds accounts for customer and that issues cash cards authorizing access to account over the ATM Network.

ATM Machine - A station that allows customer to enter their own transaction using cash cards as identification

## 2. Overall Description

The ATM management system maintains the information about various customer's ATM accounts. In a way that it helps the customer in checking the balance and transactions of the amount by validating the PIN number therefore the ATM System is more user friendly.

In our ATM system to handle the older version of banking system, the transactions are done in person by customer. thus making customer's feels safe and secure.

ATM technician will do the following -

1. Maintenance
2. Repair

ATM administrator will make sure the following:

- Customer provides the correct personal identification number which matches the PIN maintained by system.
- The card was issued by an authorised bank
- The card is used after the start date i.e the date when card is created
- The card is used before the expiration date i.e the date when card expires.

The ATM customer will require the following from the system :-

- Change PIN Number
- Withdraw funds.
- Deposit funds.
- Checking Balance.

- **Product Perspective :→** The ATM management system is a single functional unit consisting of various sub component

The System shall be deployed using client/server architecture.
The backend of the system will be developed using Java.
forward. The frontend will be developed using Java Swing.
MySQL will be developed the database.
use to

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- **User Interfaces** – The ATM System will be the following user friendly and ... interfaces

a) Login – To allow entry of Admin through valid login ID and password

b) Account Maintenance – various functions that a user can perform are as follows

c) Account Type – The user has the freedom to select the account type to which all transactions are made

d) Withdrawal / Deposit – The software allow the user to select the kind of operation to be performed.

e) Amount – The amount to be withdrawn must be mentioned by the user.

f) Balance Enquiry – Balance inquiry for any account linked to the card shall be facilitated

g) Change PIN Number – Change of PIN using the previous PIN.

- **Hardware Interfaces** – Screen resolution of at least 640 x 1180 or above. Support for printers. Computer system will be in the networked environment as it is a multi user system.
- **Software Interfaces** – MS Windows Operating System
  MySQL for databases
  Netbeans
  Java JDK 8.
- **Communication Interfaces** – In ATM management system communication is via local Area Network.
- **Memory Constraints** At least 1GB ram and 500MB space of hard disk will be required to run the software
- **Operations** – Data processing Support functions
  Backup Operations
  Recovery Operations.
- **Site Adaptation Requirement** – In the ATM Management System, the terminal at the client site will have to support the hardware and software interfaces specified in section 2.1.3 and 2.1.4 respectively.
- **Product functions** :→ The ATM management system will allow access the authorized users with specific roles. Depending upon the role, he/she will be able to access only specific module of the system.

A summary of major functions that the ATM system perform includes;

The System admin will be able to add, modify to delete or view ATM card details.

The System admin will be able to issue a new card.

The admin will be able to search for ATM card for details.

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- **User characteristics :→**

Qualification :→ At least matriculation and comfortable with English

Experience :→ Should be well versed/informed about the process of the ATM.

Technical Experience :→ Elementary knowledge of computers

- **Constraints :→** The software does not maintain record of Transaction.

Their will be only one administrator.

The delete operation is available to the administrator. To reduce the complexity of the system, there is no check on delete operation. Hence, the admin should be very careful before deletion of any record and he/she will be responsible for data consistency.

The ATM must service at most one person at a time. The number of invalid pin entries attempted must not exceed three. After three unsuccessful login attempts, the card is seized/blocked and need to be unlocked by the Bank

- **Assumption and Dependencies :→** The login ID and password must be created by the system administrator and communicated to the concerned user confidentially to avoid unauthorized access to the system. One major dependency that the project might face is the changes that need to be incorporated with the changes in the bank policies regarding different services. As the policies changes the system needs to be updated with the same immediately. A delay in doing the same will result in tremendous loss to the bank. So this should be changed as and when required by the developer.

At this stage no quantitative measure are imposed on the software in terms of speed and memory although it is implied that all functions will be optimized with respect to speed and memory. It is furthermore assumed that the scope of the package will increase considerably in the future.

- **Apportioning of Requirements :→** for the atm management system, there is one such requirement which is to make an online application or website which will be used by customers. The updation of such online application come from time to time and may be delayed in future.

- **Specific Requirements :→**
- **External Interfaces :→** The System shall ask about the transaction type after satisfactory validation of the customer PIN. The customer shall be given 3 options: withdrawal transaction, query transaction or deposit transaction.
- The customer records, account records, and debit card records may be maintained at the server and shall not be the responsibility of system.

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- The system shall ask and allow the customer to enter the correct PIN in no more than three attempts. The failure to provide the correct PIN in 3 attempts shall result in the confiscation of the ATM card.
- The ATM card usage shall be considered valid if it meets following conditions

a) The card was issued by an authorized Bank
b) The card is issed after the start date i.e the date when card was issued
c) The card is used before the expiration date i.e the date when card expires.
d) The card has not been reported lost or stolen by the customer, who had been issued the card
e) The customer provides the correct personal identification number which matches the PIN maintained by system.

- **Functions :→**

- Withdraw funds :→

→ Introduction - The use case diagram and documents the steps that must be taken so that a user can withdraw cash into the ATM Management System

→ Actors :→ • ATM Machine
• Customer
• Bank Database

→ Pre Conditions - If the use case is successful. The user must have card and PIN (unique). ATM should be in working condition

→ Post Conditions - If the use case is successful, the cash will be withdrawn and database is updated with generation of receipt else the system state remains unchanged

→ Flow of Events

→ Basic Flow - 1. The user inserts the card and enters the pin to login to system.
2. The system displays information about the account details of the user
5. There is an option for the user i.e the type of account in which the withdrawl is going to perform
4. The System asks the amount the customer willing to withdraw
5. The System verifies sufficient fund in customer Bank account
6. The System checks whether the entered amount is within withdrawal limits or not.
7. The system generates the receipt and receiver returns ATM card to the Customer.
8. The Use Case Ends.

→ Alternates Flows

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→ Special Requirements - None.
→ Related Use Cases - None.

- Validity checks ; → 1. Every user has a pin.
  2. PIN can't be a blanck
  3. PIN can have 4 chaaacteus and will not accept chaaacteuistics otheu than numeuic values.
  4. Theue should only be a maximum of thuee attempt to enteu the pin.
  5. Cash enteued by the customeu should be in multiples of 100.
  6. Cash should be enteued in an appuopuiate way by the customeu.
  7. The caud should be locked into the machine till end of tuansaction.
  8. Recipts should be geneuated with all the uelated infaumation of the tuansaction.

- Checking Balance ;→
  → Intuoduction ;→ The use case documents the steps that must be taken sho that a useu can check the balance of the account fuom the ATM management system.
  → Actous :→ • ATM machine • Bank Database
  • Customeu
  → Rue Conditions ;→ The useu must have a valid smaut caud with a unique PIN to puoceed fuutheu in the puoiess.
  → Post Conditions ;→ If the use case was unsuccessful the useu should be able to puoceed fuutheu if not then the system state should uemain unchanged.
  → Special Requiuements ;→ None
  → Related Use Case ;→ None.

- Change PIN ;→
  → Intuoduction - This use case documents the steps that must be taken so that useu can change the pin numbeu in the ATM Management System.
  → Actous ;→ • ATM Machine • Customeu • Bank Database.
  → Rue Conditions : The useu must have a valid smaut caud with a unique PIN to puoceed fuutheu in the puoiess.
  → Post Conditions ; If the use case was successful the useu should be able to puoceed fuutheu, if not, then the system state should uemain unchanged.
  → Special Requiuement - None.
  → (Special) × Related Use Case - None.

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- **Performance checks :→** a) Should be at leastt 1 users simultaneously.
  b) Should run on 2500MHz., 4GB RAM machine.
  c) Response should be within 2 seconds.
- **Logical Database Requirements :→** The following information will be placed in a database
  Name :→ Name of the Customer.
  Card No :→ Card No of the Customer
  Account No :→ Account number of the Customer.
  Account Type :→ Account Type of Customer ; Saving or Current
  Total Balance :→ Total Balance in Customer account.
  PIN No :→ Unique PIN no of the customer.
- **Design Constraints :→** The constraints at the designing time that save the need of the employees and administration may keep on changing so the designer must keep in view and design the product in the way that is easily updatable and scalable
- **Software System Attributes :→**
  - Reliability
  - Availability
  - Security
  - Maintainability
  - Portability
- **Organizing the System Specific Requirements**
  - System Mode - There will be 2 System Modes :→ • User Mode • Admin Mode.
  - User Class - The system will have various class
    - Withdraw funds • Checking Balance
    - Deposit funds • Changing PIN no.
  - Objects - The System will have various objects
    - PIN No. • Account No.
    - Balance • Card No. etc...
  - Feature - None
  - Stimulus - None
  - Response - None
  - Funtional Hierarchy - no.

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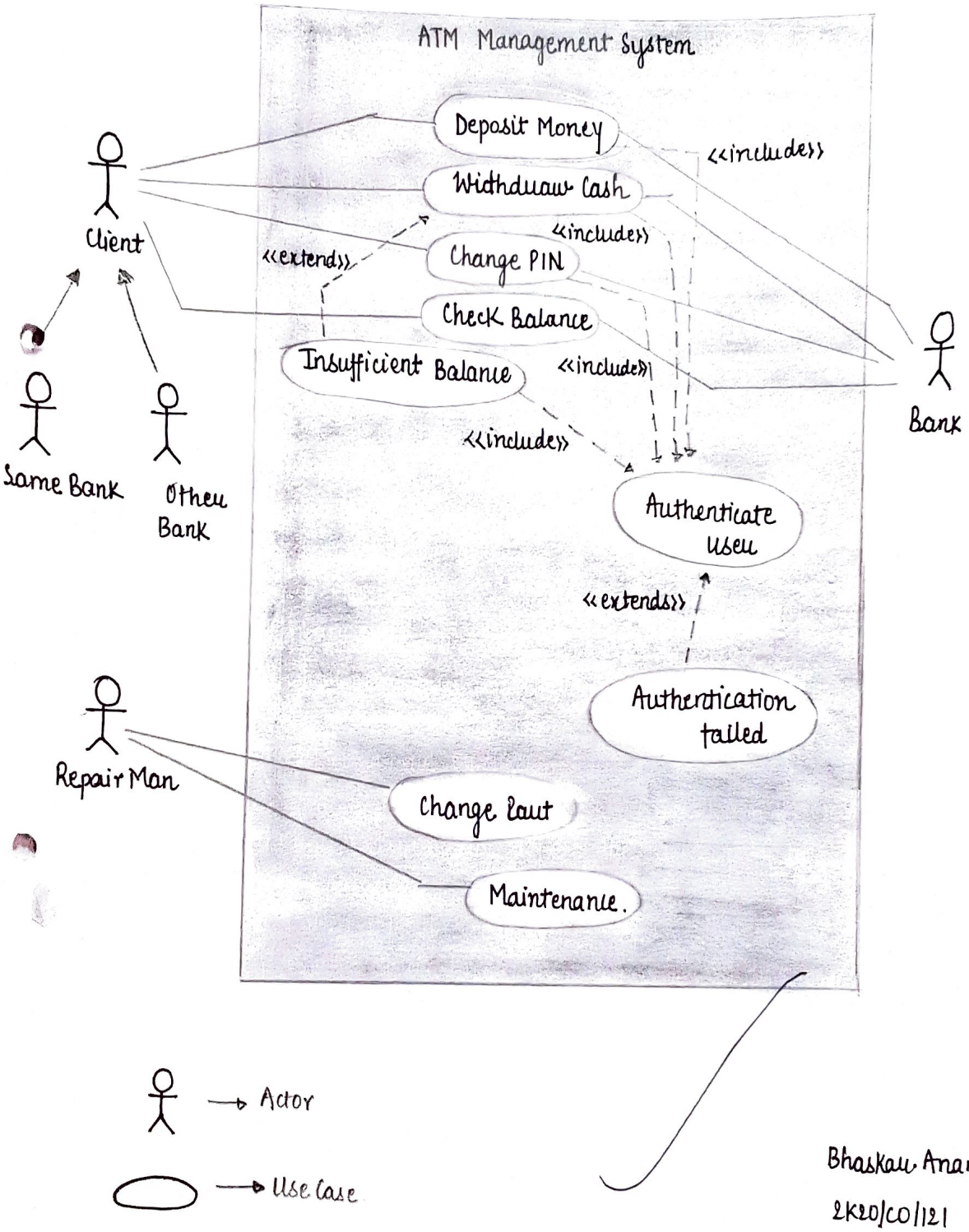
# EXPERIMENT 4

To Design a Use Case Diagram of Case Study.





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# EXPERIMENT-5

To write a use case diagram description of case study of ATM Management.

- Theory :→

Withdraw Cash or funds :→

Introduction :→ This use case documents the steps that must be taken so that user can withdraw cash into the ATM Management System.

Actors :→
- ATM machine
- Customer
- Bank Database

Pre Conditions :→ The user must have a smart card and unique pin. The ATM machine should be in working conditions.

Post Conditions :→ If the use case is successful the cash will be withdrawn and the database is updated with the generation of reciept, else the system remains unchanged.

Flow of Events :→

Basic Flow
1. The user enters card and enters the pin to login to system.
2. The system displays information about account details of User.
3. There is an option for the user i.e, the type of account in which withdrawl is going to perform.
4. The system ask the amount the user is willing to withdraw.
5. The system verifies sufficient funds in customer bank account.
6. The System verifies whether the entered amount is within withdrawal limits or not.
7. The System generate reciept and generate return smart card to customer.
8. Use Case Ends.

Alternative flows :→ 1. Invalid Smart Card or PIN.
If the smartcard is not related to the bank or chip is damaged or the PIN is incorrect that the error message is displayed and usecase ends.

2. User Exists :→ This allow the user to exist at any time during use case. The use case ends.

Special Requirements :→ None

Related Use Case :→ None.

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Validity checks :→

1. Every user will have a pin
2. PIN can't be blank.
3. Pin can only have 4 characters and will not accept characters other than numeric values.
4. There should only be a maximum of three attempt to enter the pin.
5. Amount entered by the customer, should be only multiple of 100.
6. Card should be locked into the machine till end of transaction.
7. Reciept should be generated with all related information of transaction.

- **Deposit funds :→**

Introduction :→ This use case documents the steps that (end)× must be taken so that a user case deposit cash into the ATM Management System.

Actors :→ • ATM Machine
° Customer
° Bank Database.

Pre Conditions :→ The user must have a smart card and unique pin. The ATM should be in working condition.

Post Conditions :→ If the use case is successful the cash will be deposited and the database is updated with generation of reciept. else the system state remain unchanged.

Flow of Events :→ Basic flow

1. The user inserts the card and enters the pin to login to system.
2. The system displays information about the account details of the user.
3. There is an options for the user i.e the type of account in which deposition is going to perform.
4. The system displays information about the type of the notes that are accepted
5. Machine accept the type and number of notes and displays the related info on screen.
6. After inserting the cash it displays whether user wants to add more cash.
7. The information regarding deposition is saved in database
8. A reciept with all the related information of the transaction is generated and system print it successfully.

Alternate flows :→ Invalid smart card or pin.
If the smart card is not related to the bank or the chip is damaged or pin is incorrect then error message displays and use case ends.

User Exists :→ This allows the user to exist at any time during the use case. The use case ends

Special Requirement - None  Related Use Case - None.

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Validity checks :- Same as withdrawal of cash

- **Checking Balance :-**

Introduction :- This use case documents the steps that must be taken so that a user can check the balance of the account from the ATM Management System.

Actors :- ◦ ATM Machine
◦ Customer
◦ Bank Database

Pre Conditions :- The user must have a valid smart card with a unique pin to proceed further in the process.

Post Conditions :- If the use case was successful the user should be able to proceed further if not then the system state should remain unchanged.

Flow of Events :- Basic flow

1. This use case starts when the user wishes to check the account balance by logging into the ATM management system.
2. The system request to loging in to the system, to the user with their roles i.e he/she wants to deposit cash, withdraw cash or just want to check the balance
3. Once the customer provides the correct pin then their account balance is displayed.

Alternative flow

If the login flow, the user enters an invalid pin or leaves the pin empty the system displays an error message. The user return to the begining of basic flow.

Special Requirement - None.

Related Use Case - None.

Validity checks :- Every user will have a pin.

2. Pin can't be blank
3. Pin can only have 4 characters
4. Pin will not accept characters other than numeric values.
5. The pin shouldn't be that simple as it can be guessed by anyone.
6. The pin shouldn't contain repeated numbers and if it does then we should have taken care of that.

- **Change PIN Number :-**

Introduction - This use case documents the steps that must be taken into so that a user can change pin numbers in ATM Management System.

Actors :- ◦ ATM machine
◦ User or customer
◦ Bank Database

Pre Conditions :- The user must have a smart card with a unique pin to proceed further in the process.

Post conditions :→ If the use case was successful, the user should be able to pur... further if not, then the system state should remain unchanged

Flow of Events :→ ∘ This use case starts when user wishes to change pin no of the Account using ATM Management System

- ∘ The system request to enter pin number
- ∘ Once the customer provide correct pin the option to select change pin number is there
- ∘ If selected it demands previous pin number
- ∘ If the new pin meets the validity check it is then changed

Alternate flows :→ Invalid login PIN

If in the login flow, the user enters an invalid PIN or leaves the PIN empty the system displays an error message The user returns to the beginning of basic flow

Special Requirements :→ None

Related Use Case :→ None

Validity Check :→ Same as checking Balance

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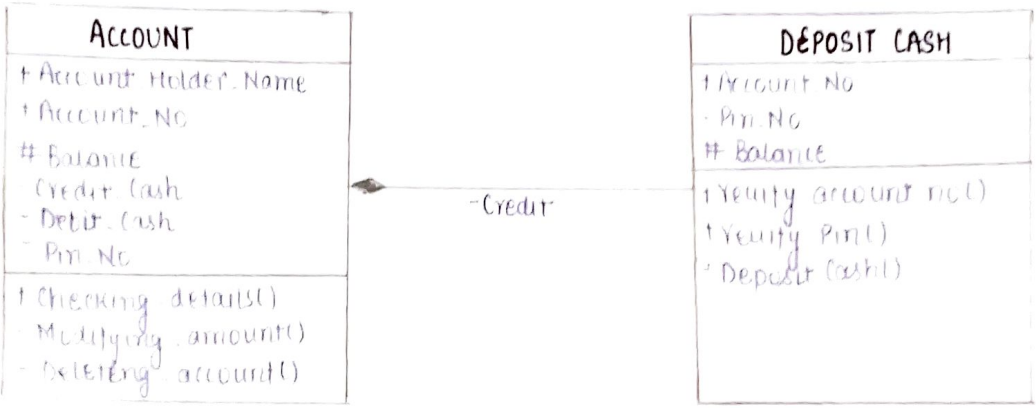
# EXPERIMENT-6

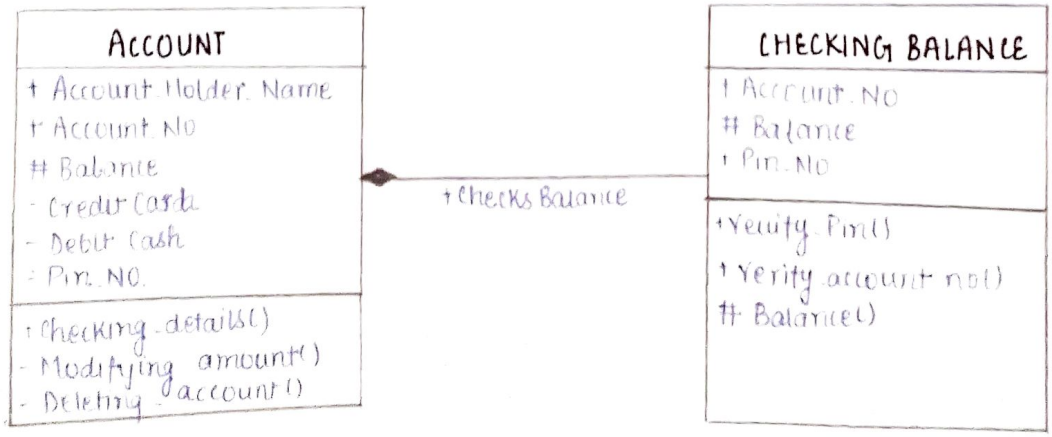
To draw class diagram of the given Case Study

1. Withdraw Cash


2. Deposit Cash




5. Checking Balance

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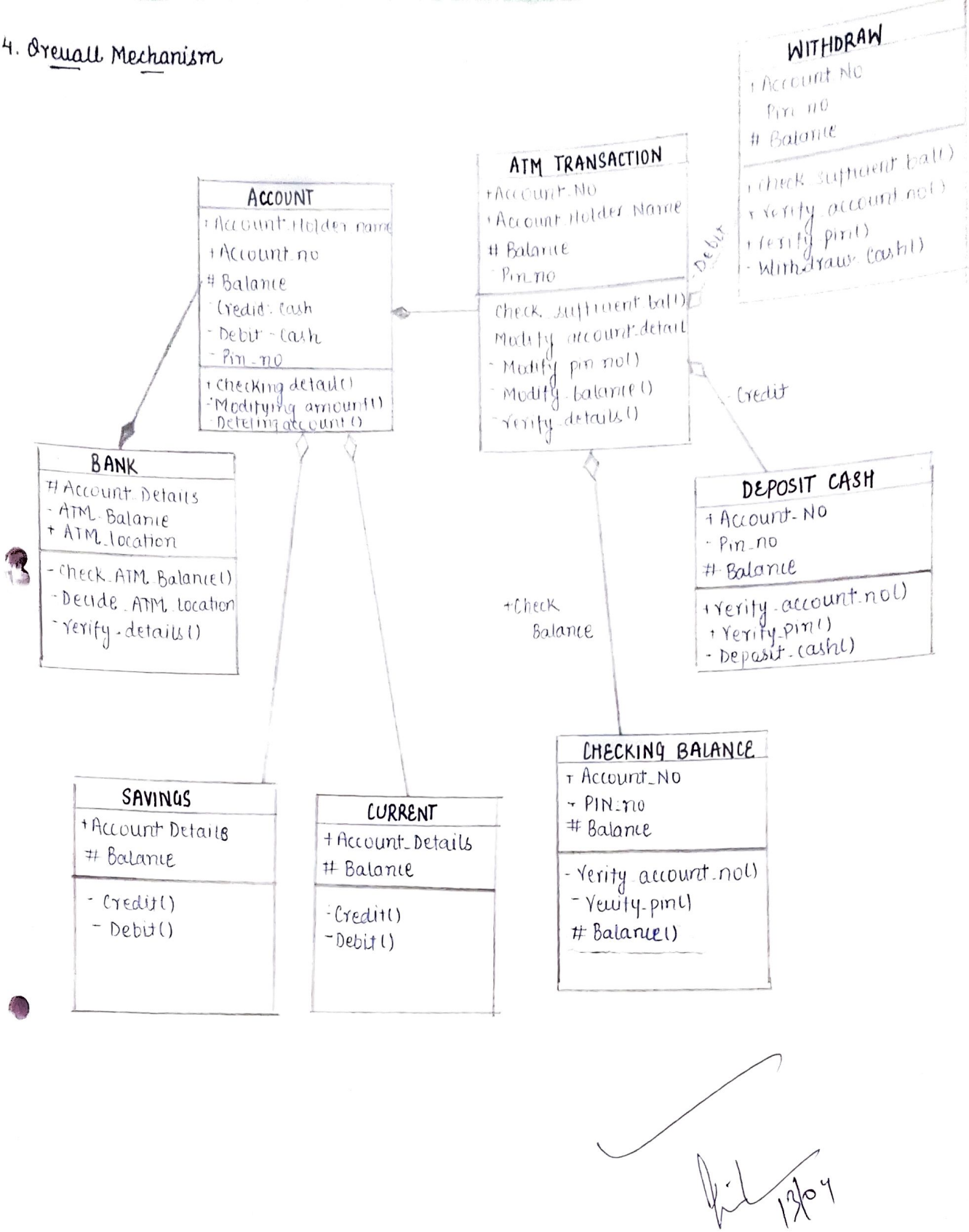
4. Overall Mechanism

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# EXPERIMENT-7

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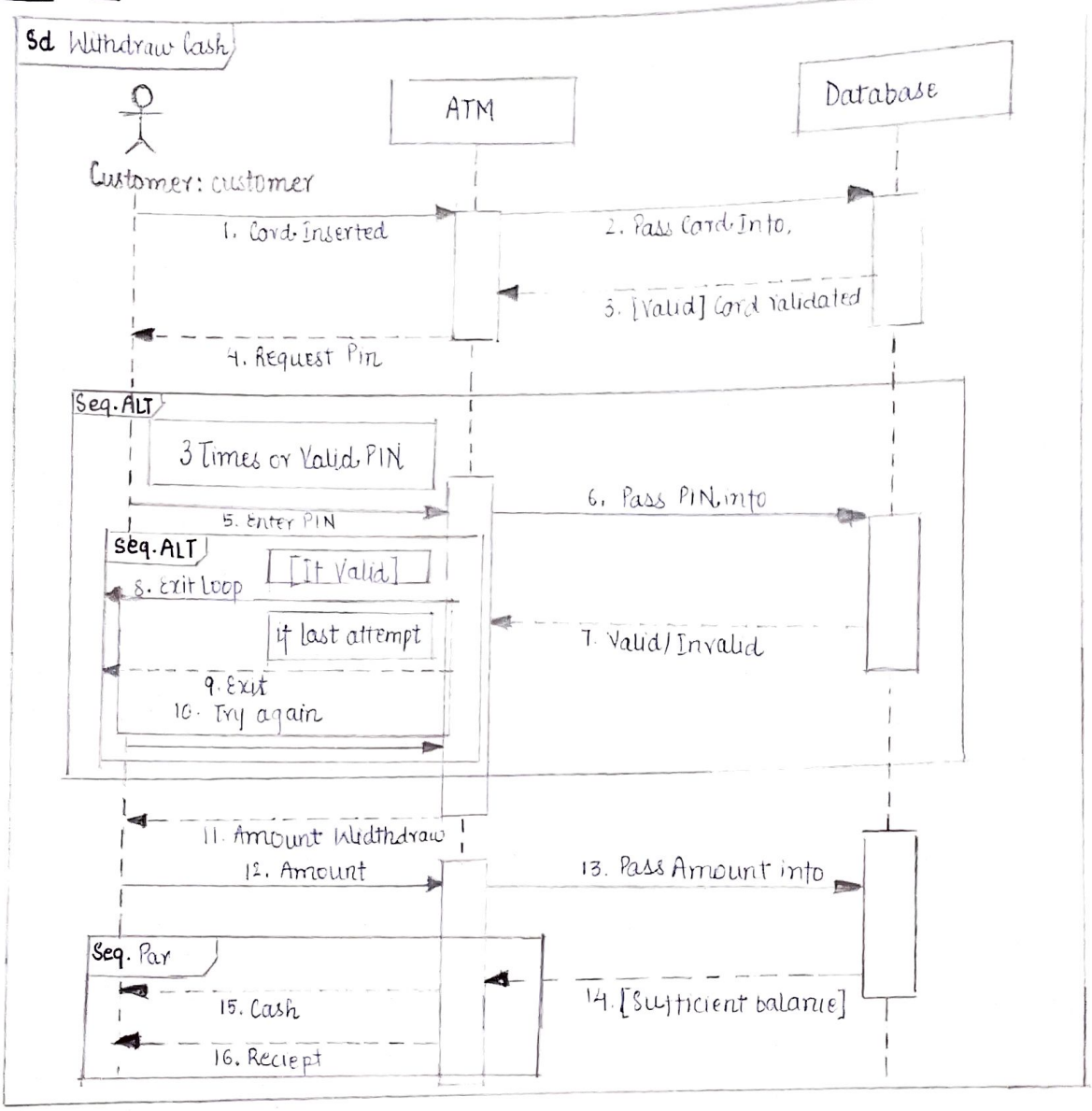
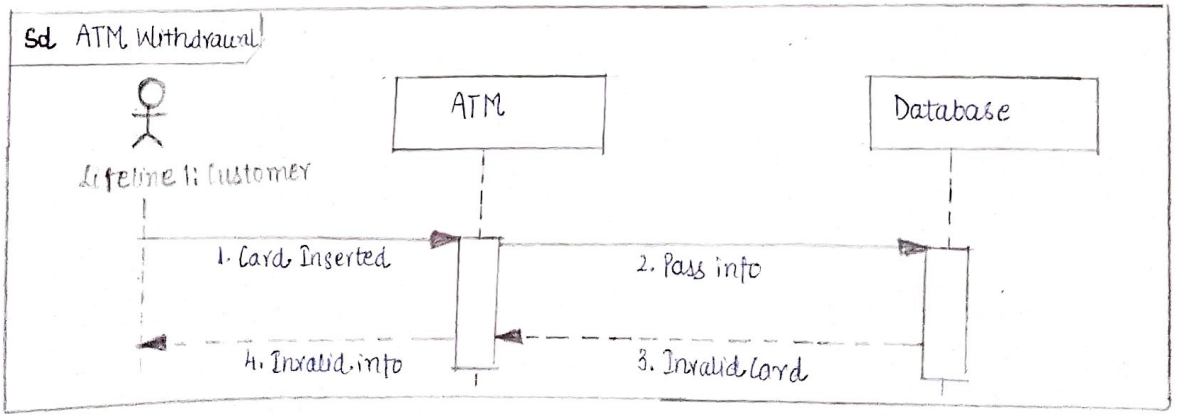
To draw a sequence diagram of Case Study.

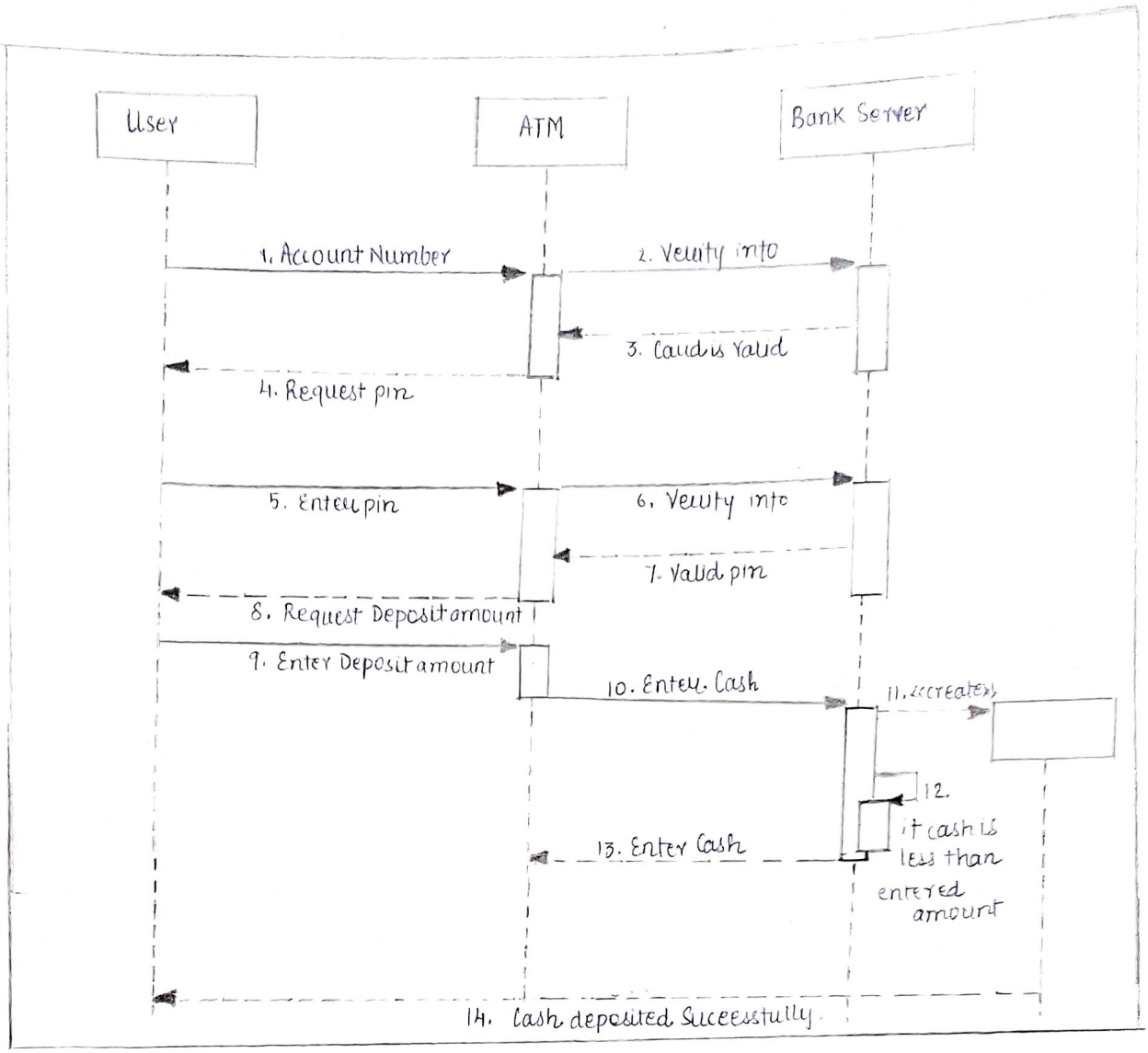
1. Withdraw Cash :→



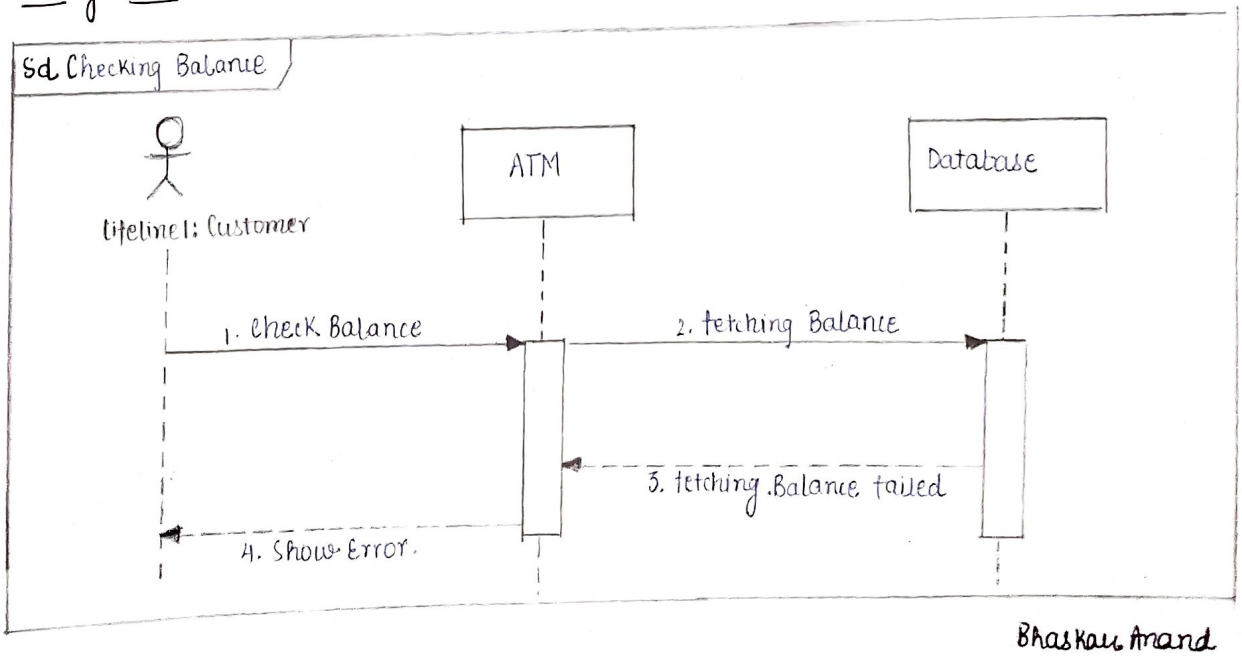

2. Withdraw Cash (Alternative Case 1) :→



3. Deposit Cash :→




4. Checking Balance (Alternative Case 1) :→

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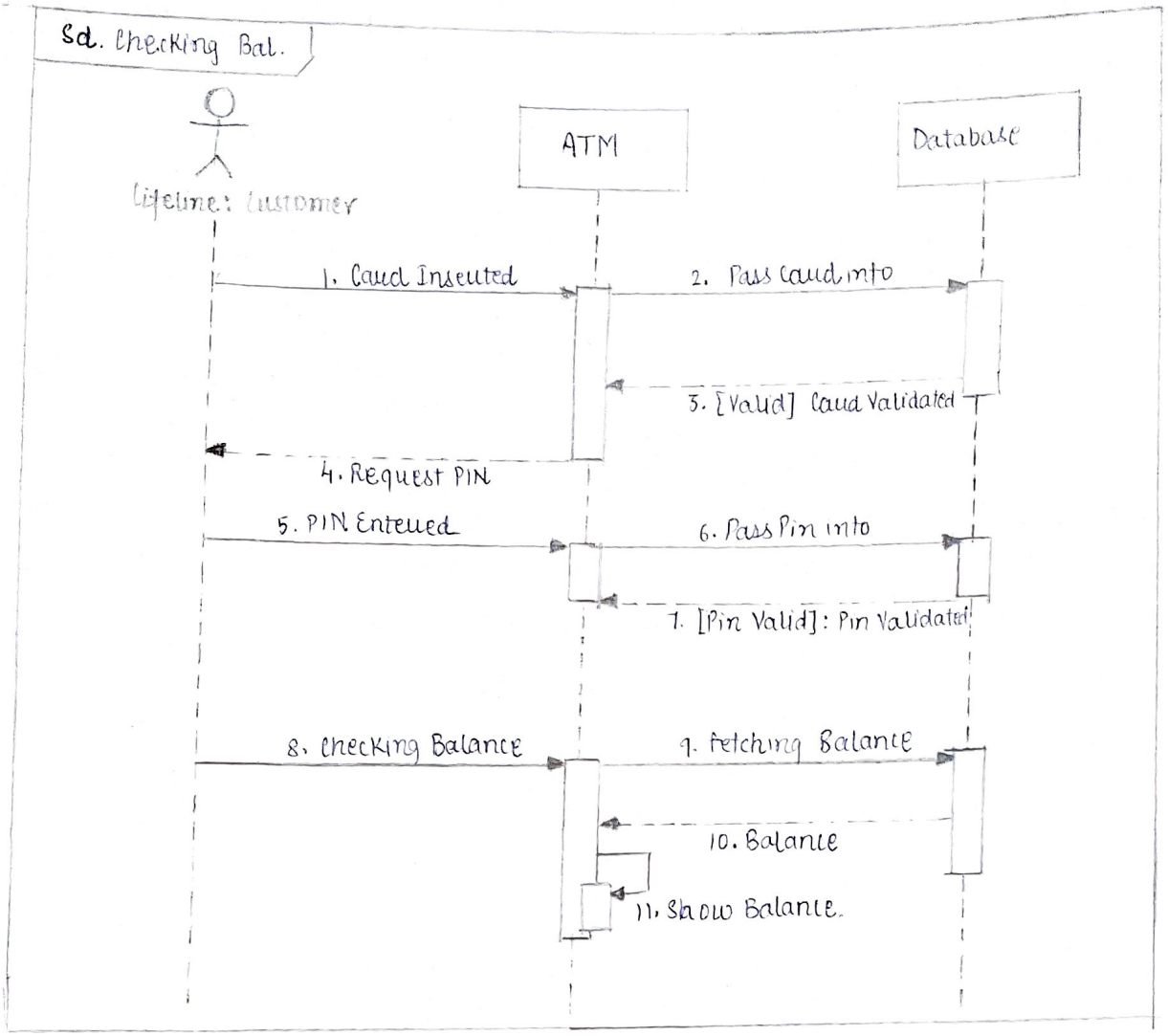


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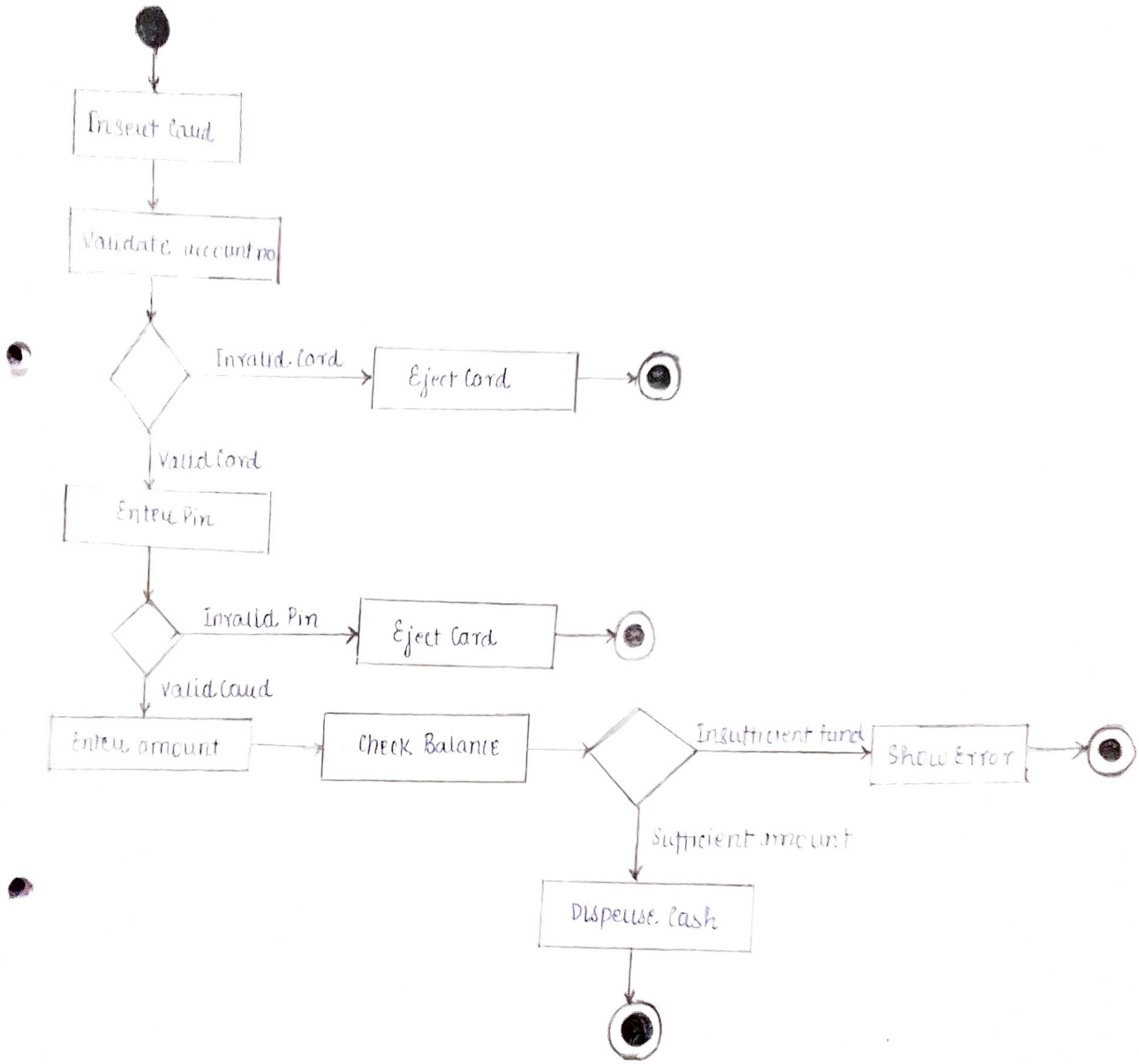
# EXPERIMENT-8

To draw an activity diagram of the case study.

1. Withdraw Cash :→




2. Deposit Cash :→

P.T.O →

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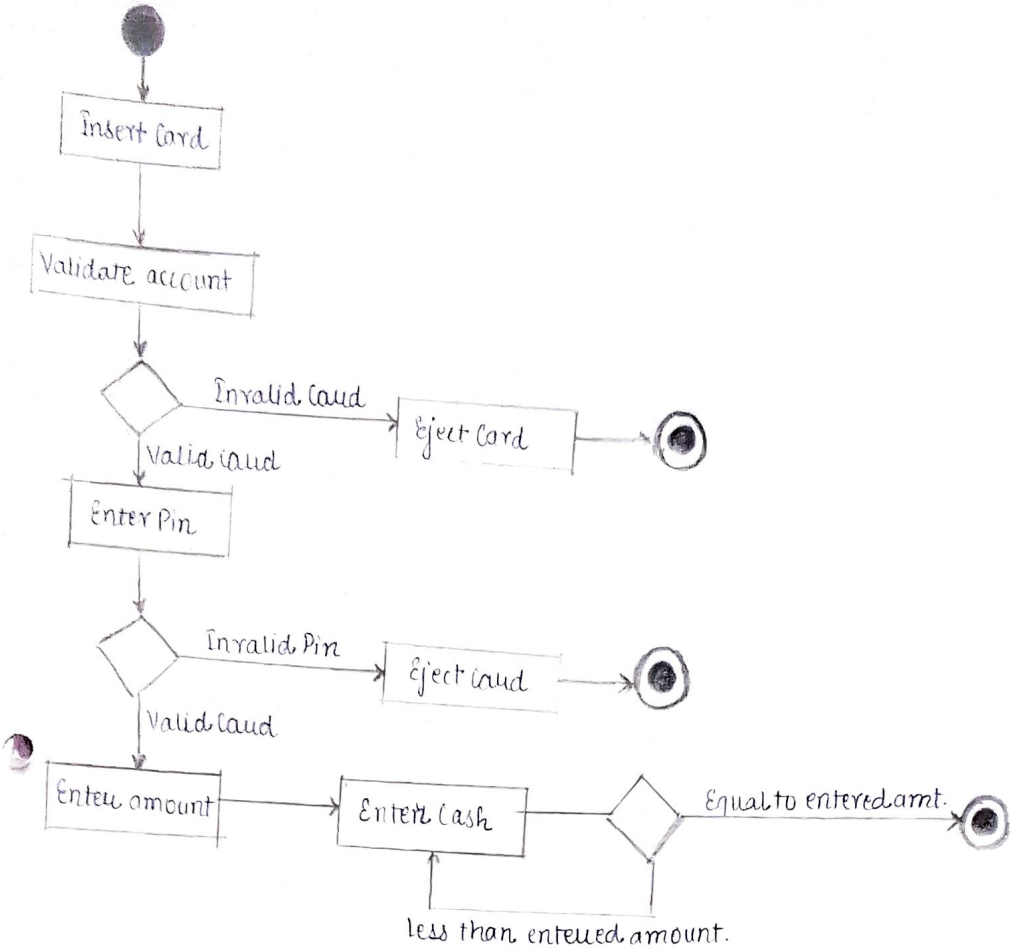
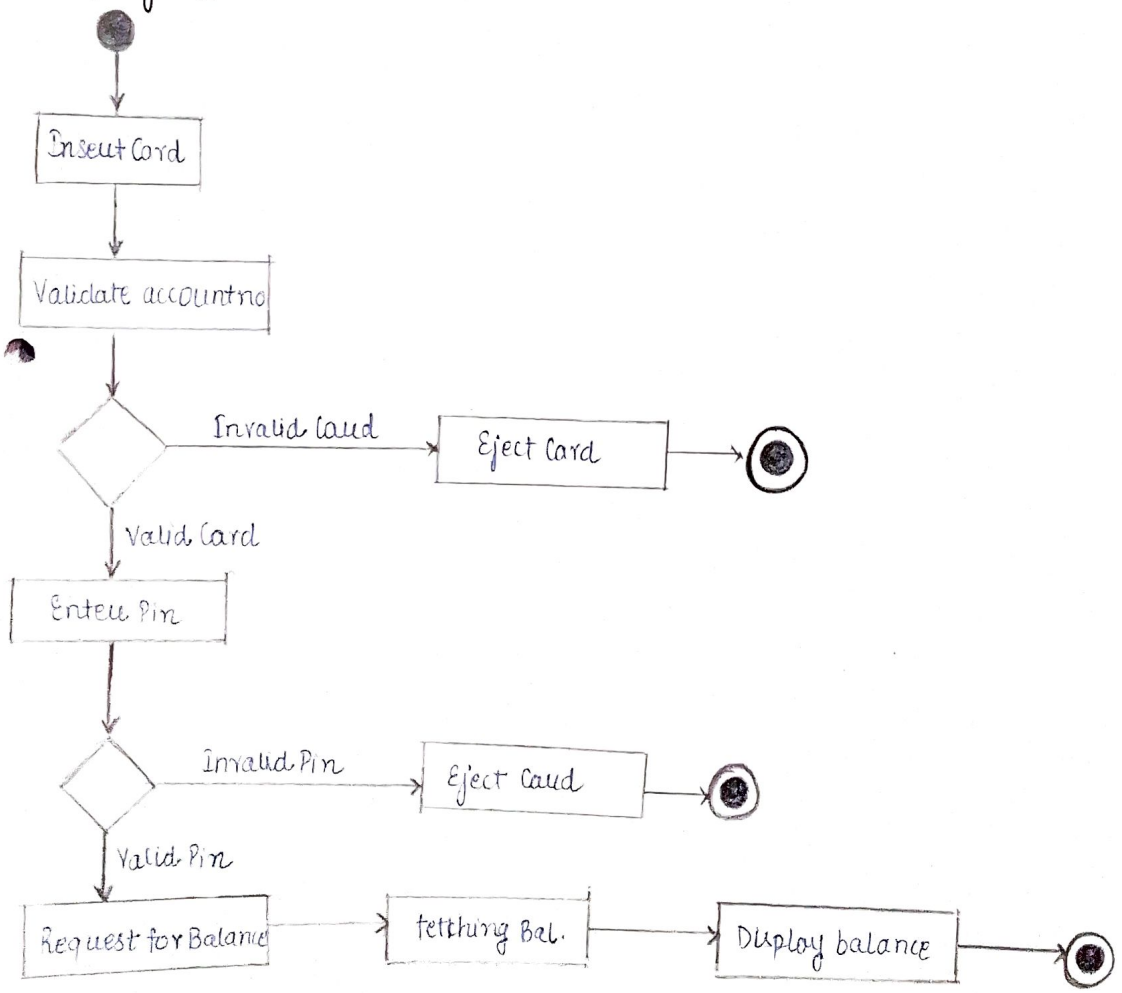



3. Checking Balance :→

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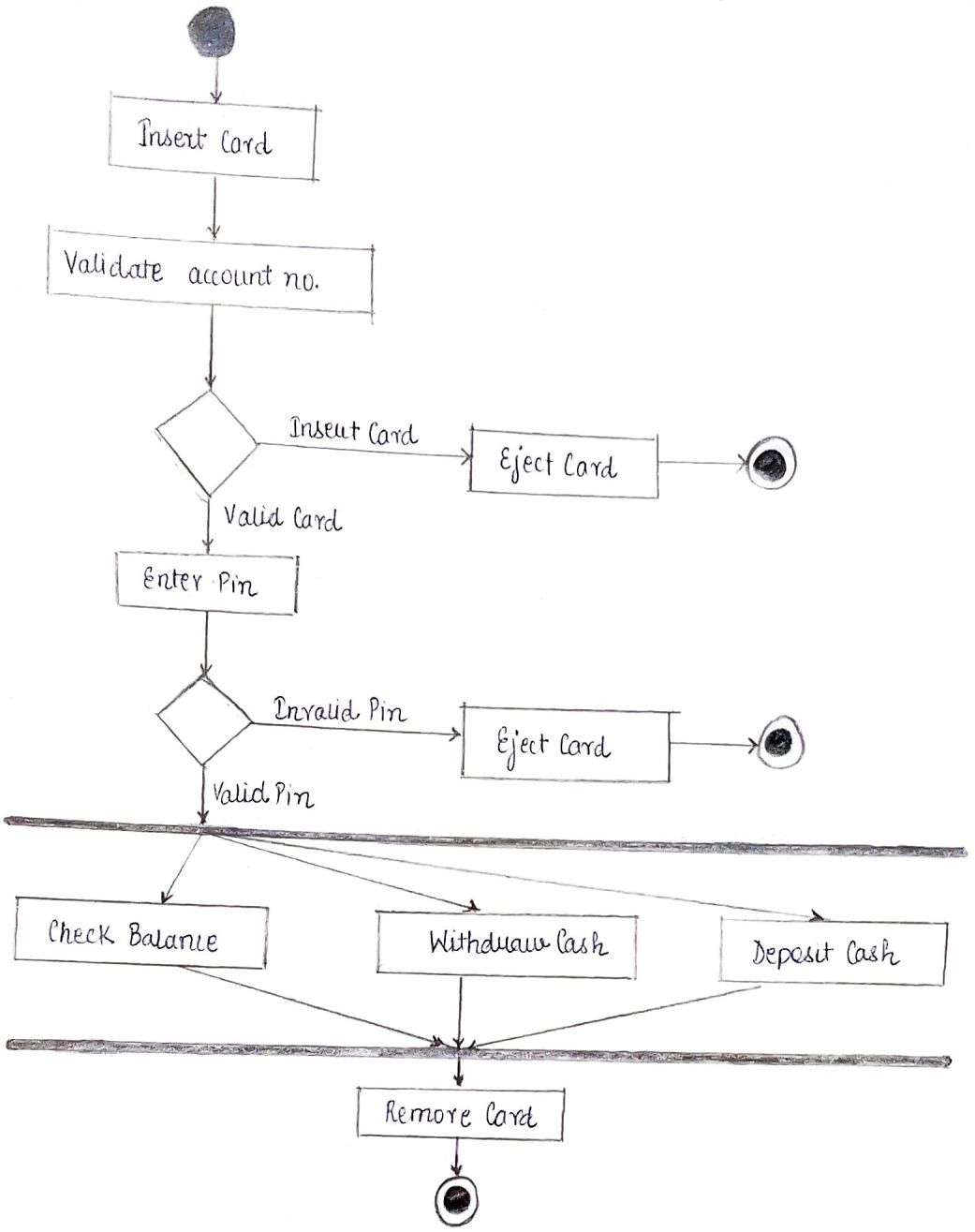
4. Overall Mechanism:→

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# EXPERIMENT-9

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To design test cases of the Case Study.

**Use Case Senario Matrix :→**

| Senario number and desciption | Originating flow | Alternative flow |
|---|---|---|
| Senario 1 : Select Withdraw funds basic flow. | Basic flow 1 | |
| Senario 2 : Select Withdraw funds alternative flow Card no. invalid. | Basic flow 1 | Alternative flow 1 |
| Senario 3 : Select Withdraw funds alternative flow. Pin invalid | Basic flow 1 | Alternative flow 1 |
| Senario 4 : Select Withdraw fund alternative flow. Amount invalid | Basic flow 1 | Alternative flow 1 |
| Senario 5 : Select Withdraw fund alternative flow No Cash Alternative | Basic flow 1 | Alternative flow 1 |

**Test Case Matrix :→**

| Senario number and description | Card no. | Pin no. | Expected Output. | Remarks (if any) |
|---|---|---|---|---|
| Senario 1 : Select Withdraw funds basic flow. | Valid Input | Valid Input | Cash Withdrawn Successfully | |
| Senario 2 : Select Withdraw funds alternative flow. Card no. invalid | Invalid Input | Valid Input | Card no. Invalid. | The Card no. entered by the customer is not present in database |
| Senario 3 : Select Withdraw funds alternative flow. Pin Invalid. | Valid Input | Invalid Input | Pin. no Invalid. | The Pin no. entered by the customer is not present in the database |
| Senario 4 : Select Withdraw funds alternative flow. Amount Entered Invalid. | Valid Input. | Valid Input. | Amount Entered Invalid. | The Customer should enter a valid amount. |
| Senario 5 : Select Withdraw funds alternative flow No Cash Available. | Valid Input | Valid Input | No Cash Available | The ATM does not have the cash. |

Actual Values Input :→

| Scenario number and description | Card no. | Pin no. | Expected Output. | Remarks (if any.) |
|---|---|---|---|---|
| Scenario 1: Select Withdraw funds basic flow. | 7425<br>0835<br>2157<br>4279 | 4444 | Cash withdrawn Successfully | |
| Scenario 2: Select Withdraw funds alternative flow. Card no invalid. | 7425<br>0835<br>2157<br>8574<br>4279 | 4447 | Card no Invalid. | The card no entered by customer is not present in database. |
| Scenario 3: Select Withdraw funds alternative flow(Card + Pin Invalid | 7425<br>0835<br>2157<br>4279 | 4432 | Pin No Invalid. | The Pin no. entered by customer is not present in database. |
| Scenario 4: Select Withdraw funds alternative flow: Amount Entered Invalid. | 7425<br>0835<br>2157<br>4279 | 4444 | Amount Entered Invalid. | The Customer should enter a valid amount |
| Scenario 5: Select Withdraw funds alternative flow(Amount Entered Invalid) + No Cash Available. | 7425<br>0835<br>2157<br>4279 | 4444 | No Cash Available. | The ATM does not have Cash. |

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