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ATM Machine

Object Oriented Software Engineering SE-302

Software Engineering

DELHI TECHNOLOGICAL UNIVERSITY

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EXPERIMENT - 1

AIM

To draft the problem statement of ATM Management System.

THEORY

An ATM is known as Automated Teller Machine which basically deals with the transaction between the bank and the account holder. When they came into being, ATM were supposed to be a boon for the general public. With ATMs there was no need to stand in queues in banks to withdraw money or to deposit cash or for changing account pin.

ATM MANAGEMANT SYSTEM

ATM management system is a software that will control ATM machine and would enable an account holder to setup a connection with the bank so that he could perform various transactions like deposit, withdraw cash, change ATM pin, view account balance, etc. ––without going to any branch of the bank.

The ATM will serve one customer at a time. The customer will be required to insert an ATM card and enter a PIN (Personal Identification Number) – both of which will be sent to the bank for validation as a part of each transaction. The customer will then be able to perform one or more transactions.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. If the bank determines that that the customer ‘s PIN is invalid, the customer will be asked to re-enter the PIN before the transaction can proceed. In present system, if the customer is unable to successfully enter the PIN after three tries, the card will be blocked by ATM machine and the customer will have to go to the branch to reactivate the card again. In the modified system, after 3 unsuccessful attempts, if the customer wants to continue, he/she will have to do a SMS verification through their registered mobile number in order to proceed.

If the transaction fails for any other reason than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wishes to do another transaction or not.

After each successful transaction the ATM generates a receipt mentioning the account details.

EXPERIMENT - 2

AIM:

Write the initial requirement document of ATM Management System.

THEORY:

Information Requirement Document (IRD) is the most basic paperwork produced during the software development. It is written during the inception of the software development process.

The IRD is used to consolidate and compile all the initial requirements of the user/customer. The IRD also consists of other important information about the software, such as Title of Project, Stakeholders Involved, Techniques used to capture requirements, Development Team Members, and the Version of the Software being produced.

Development of IRD has many advantages, such as it specifies all the initial requirements for the software and it also acts as an input to create Use-Case Diagram, which is also an important document produced during software development.

STEPS TO BE FOLLOWED:

- The specified format of writing the IRD is looked up.
- The format of the IRD is written on the word file.
- The various sections of IRD are filled accordingly, such as Version, Stakeholders Involved etc.
- The requirements are consolidated and are written under the „Consolidated Requirements" section.

RESULT:

INITIAL REQUIREMENT DOCUMENT	
Title of the project	ATM Management system
Stakeholder involved in capturing requirements	Professors, Students
Technique used for requirement gathering	Interviewing and Brainstorming
Name of person along with designation	Vaibhav verma: Project head Shivam chaudhary:Project head
Date	24 August 2019
Version	1.0

Consolidated list of initial requirements:

1. This software allows the user to access their bank accounts remotely through an ATM without any aid of human teller.

2. The user has freedom to select his account type to which all the transactions are made i.e. he can select whether the account is current or savings account.

3. The software allows the user to select the kind of operation to be performed i.e. whether he wants to withdraw or deposit the money.

4. Balance enquiry for any account linked to the card shall be facilitated.

5. Any transaction shall be recorded in the form of a receipt and the same would be dispensed to the user.

6. The user should be able to abort a transaction with the press of cancel key.

7. The ATM must service at most one person at a time.

8. The number of invalid pin entries attempted must not exceed three. After three unsuccessful login attempts, in order to continue, SMS verification must be done though the registered mobile number.

9. Simultaneous access to account through both, the ATM and the bank should not be supported.

10. The minimum amount of money a user can withdraw is Rs. 100/- and the maximum amount of money a user can withdraw in a session is Rs. 10,000/- and the maximum amount he can withdraw in a day is Rs. 20,000/-

11. The minimum amount a user can deposit is Rs. 100/- and the maximum amount he can deposit is Rs. 10,000/-

12. Balance transfer shall be facilitated between any two accounts linked to the card for example savings and current account.

EXPERIMENT - 3

AIM:

To make USECASE Diagram for ATM Management System.

DESCRIPTION:

The purpose of use case diagram is to capture the dynamic aspect of a system. But this definition is too generic to describe the purpose. Use case diagrams are used to gather the requirements of a system including internal and external influences. These requirements are mostly design requirements. So, when a system is analyzed to gather its functionalities use cases are prepared and actors are identified. Now when the initial task is complete use case diagrams are modelled to present the outside view.

So, in brief, the purposes of use case diagrams can be as follows:

- Used to gather requirements of a system.
- Used to get an outside view of a system.
- Identify external and internal factors influencing the system.
- Show the interacting among the requirements are actors.

Use case diagrams are considered for high level requirement analysis of a system. So, when the requirements of a system are analyzed the functionalities are captured in use cases.
So, we can say that use cases are nothing, but the system functionalities written in an organized manner. Now the second things which are relevant to the use cases are the actors. Actors can be defined as something that interacts with the system.
The actors can be human user, some internal applications or may be some external applications. So, in a brief when we are planning to draw a use case diagram, we should have the following items identified.

- Functionalities to be represented as a use case
- Actors
- Relationships among the use cases and actors.

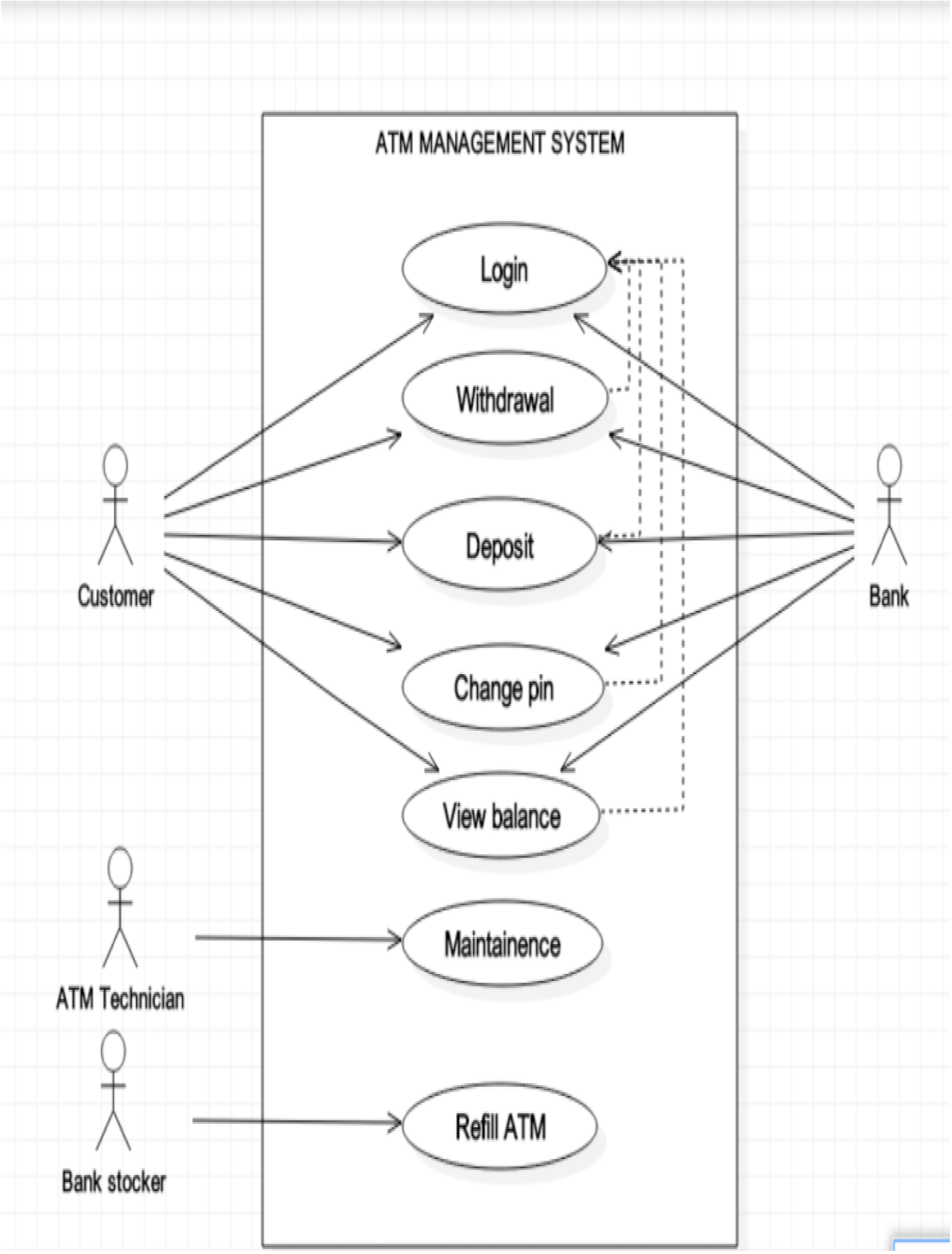
Use case diagrams are drawn to capture the functional requirements of a system.
STEPS FOLLOWED:

The following provides an outline of processes to draw an efficient use case diagram.

- Identify all the different users of the system.
- Create a user profile for each category of users, including all the roles the users play that are relevant to the system. For each role, identify all the significant goals the users have that the system will support. A statement of the system's value proposition is useful in identifying significant goals.
- Create a use case for each goal, following the use case template. Maintain the same level of abstraction throughout the use case. Steps in higher level use cases may be treated as goals for lower level (i.e. more detailed), sub-use cases.
- Structure the use cases. Avoid over-structuring, as this can make the use cases

harder to follow.
- Review and validate with users.
- Connect the users to the functionality initiated by them in the system.

RESULTS:


ATM MANAGEMENT SYSTEM
Login
Withdrawal
Deposit
Change pin
View balance
Maintainence
Refill ATM
Customer
Bank
ATM Technician
Bank stocker

DISCUSSIONS:

We learnt to make the USECASE diagram of the “ATM management System” case study by identifying use cases, Actors and relationships between them.

CONCLUSION:

Use case diagram for Atm system has been implemented

EXPERIMENT - 4

AIM:

Write the use case description of case study “ATM MANAGEMENT SYSTEM”

THEORY:

The use case description is a textual module that tells and describes a processing details of a use case. It provides documentation for the processing status that is internal to use case.

Description of USE CASES

Use Case: LOGIN

• Introduction: A login session is started when a customer inserts an ATM card into the card reader slot of machine. The ATM pulls the card into and reads it. If the reader fails to read the card, then card gets ejected and session is aborted. Then the customer is asked to enter his/her ATM pin and allowed to do one or more transaction after verification of pin. After each transaction, customer is asked whether he wants to do more transaction or not , The customer may abort the ongoing login session by pressing the cancel key .
• Actor: Customer.
• Flow of events: a) Basic flow: Customer inserts a valid ATM card into the reader slot of the machine. The customer is asked to enter his/her pin, and is then allowed to perform one or more transactions, choosing from a menu of possible type of transactions. b) Alternative flow: If the reader cannot read the card due to improper insertion or a damaged stripe, the card is ejected, an error message is displayed, and the login is aborted. If the user entered invalid pin more than 3 times in order to continue with login, a SMS verification must be performed through registered mobile number for further process
• Special Requirement: Proper insertion of card and valid ATM pin as well as valid card with correct pin.
• Pre-condition: Customer inserts a valid ATM card into the card reader slot of the machine.
• Post condition: Requested transaction is successfully executed.
• Associated use case: Withdraw, deposit, view balance, change pin.

Use Case: WITHDRAWAL

• Introduction: A withdrawal transaction asked the customer to choose type of account to withdraw from. The system verifies that it has enough money on hand to satisfy the requested before sending the transaction to the bank If the transaction is approved by the bank, the appropriate amount of cash is dispensed by the machine before it issues a receipt.
• Actor: Customer.
• Flow of events: Basic flow: The customer is asked to enter amount to be withdrawn. Alternate flow: In case of insufficient balance, a message is displayed showing actual amount of account balance. A withdrawal transaction can be cancelled by the customer by pressing cancel key Any item prior to choosing the amount.
• Special Requirement: Enough balance.
• Pre-condition: Enough balance in account.
• Post condition: Requested withdrawal is successfully cashed out.
• Associated use case: Withdraw, deposit, view balance, change pin.

Use Case: DEPOSIT

- Introduction:

  A deposit transaction asked the customer to choose type of account to deposit and to type in amount to be deposit The transaction is initially sent to the bank to verify that the ATM accepts the deposit from this customer to this account If the transaction is approved the machine accepts the cash from the customer and checks before issuing a receipt . Once the cash has been received, a second message is sent to the bank, to confirm that bank can credit the customer's

- Actor:

  Customer.

- Flow of events:

  Basic flow:

  Total amount deposited should be matched exactly with the entered amount

  Alternate flow:

  It deposits amount do not exactly match with the entered amount all deposited amount is ejected out. A deposit transaction can be cancelled by the customer by pressing cancel key any time prior to depositing money.

- Special Requirement:

  Deposited amount should exactly match with entered amount.

- Pre-condition:

  Successfully logged in.

- Post condition:

  Deposit amount is successfully cashed in and is reflected in the account balance.

- Associated use case:

  None.

Use Case: CHANGE PIN

- Introduction:

  The customer is asked to enter PIN which is currently his/her ATM PIN and allow to enter the new PIN with confirm PIN. If the user fails to enter the correct PIN or the new PIN and the confirmed PIN doesn't match, then an error message is displayed.

- Actor:

  Customer.

- Flow of events:

  Basic Flow:

  The customer is asked to enter the PIN and then the new PIN along with confirmed new PIN.

  Alternate Flow:

  If customer fails to enter the correct PIN or the new PIN and the confirmed PIN doesn’t match, then an error message is displayed.

- Special Requirement:

  None.

- Pre-condition:

  Successfully logged in.

- Post condition:

  ATM PIN successfully changed.

- Associated use case:

  None.

Use Case: VIEW BALANCE

• Introduction: The inquiry of view balance asks the customer to choose a type of account to enquire about from a menu of possible accounts. No further action is required once the transaction is approved by the bank before printing receipt.
• Actor: Customer.
• Flow of events: Basic Flow: The customer chooses the account of which he/she wishes to check balance. Alternate Flow: None.
• Special Requirement: None.
• Pre-condition: Successfully logged in.
• Post condition: A receipt containing account details is generated.
• Associated use case: None.

Use Case Maintenance

• Introduction: ATM technician maintains or repair bank ATM. Maintenance includes replenishing ATM with ink or printer pages for receipts, upgrade of hardware, firmware or software.
• Actor: ATM Technician
• Flow of events: • Basic Flow: ATM technician uses keys to open the ATM machine and then he performs routine maintenance and checks if everything functions properly or not. Alternate Flow: If repair is needed, the technician keeps record of which part is to be replaced or repaired and then performs the repair work and submits report to bank.
• Special Requirement: None.
• Pre-condition: The technician must have keys to open the ATM machine and perform the required action.
• Post condition: Routine maintenance is done, or the required repair work is done.
• Associated use case: None.

Use Case: Re-fill ATM

• Introduction: Bank Stocker refills the ATM machine with cash given by bank.
• Actor: Bank stocker
• Flow of events: • Basic Flow: Bank stocker open the ATM machine with keys and fills the cash in respective slots. • Alternate Flow: If any damage is detected to machine, Stocker reports the same to bank.
• Special Requirement: Stocker must have keys of ATM and a valid ID.
• Pre-condition: Stocker should have ATM keys to refill the machine.
• Post condition: ATM machine refilled with cash.
• Associated use case: None.

EXPERIMENT - 5

AIM: To prepare Class Diagram for ATM System.

THEORY: In software engineering, a class diagram in the Unified Modelling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

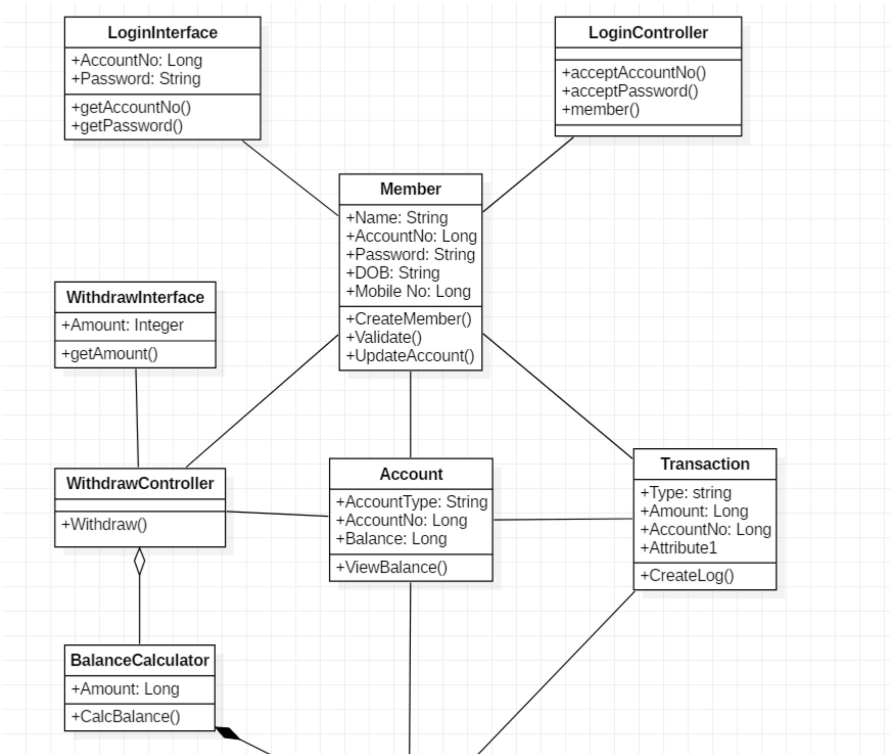
The class diagram is the main building block of object-oriented modelling. It is used for general conceptual modelling of the systematic of the application, and for detailed modelling translating the models into programming code. Class diagrams can also be used for data modelling. The classes in a class diagram represent both the main elements, interactions in the application, and the classes to be programmed.

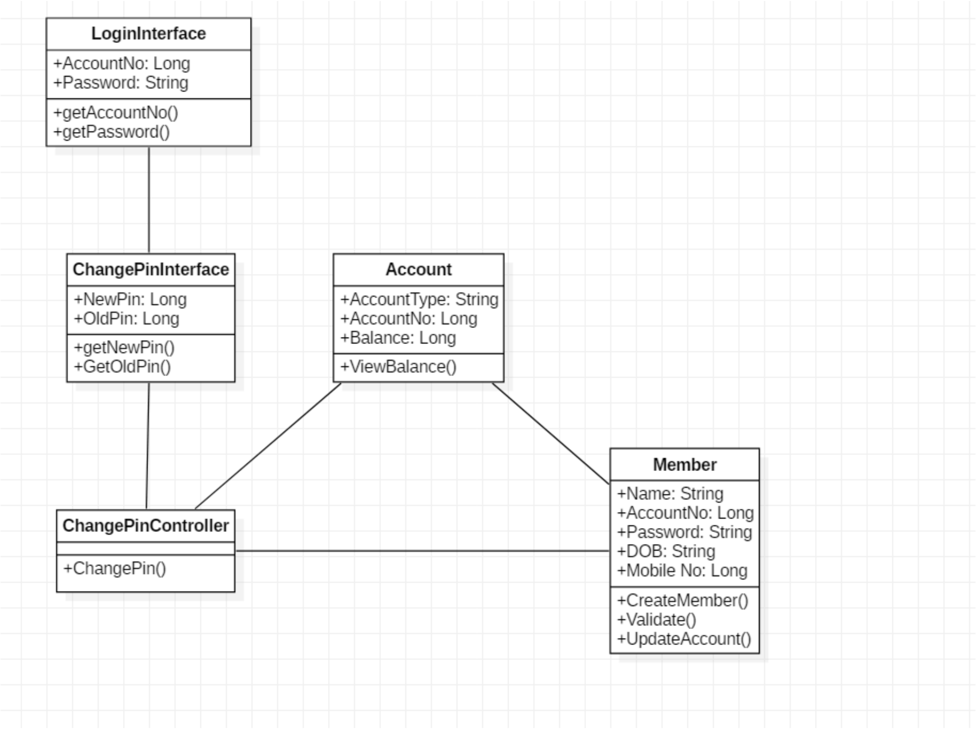
In the diagram, classes are represented with boxes that contain three compartments:

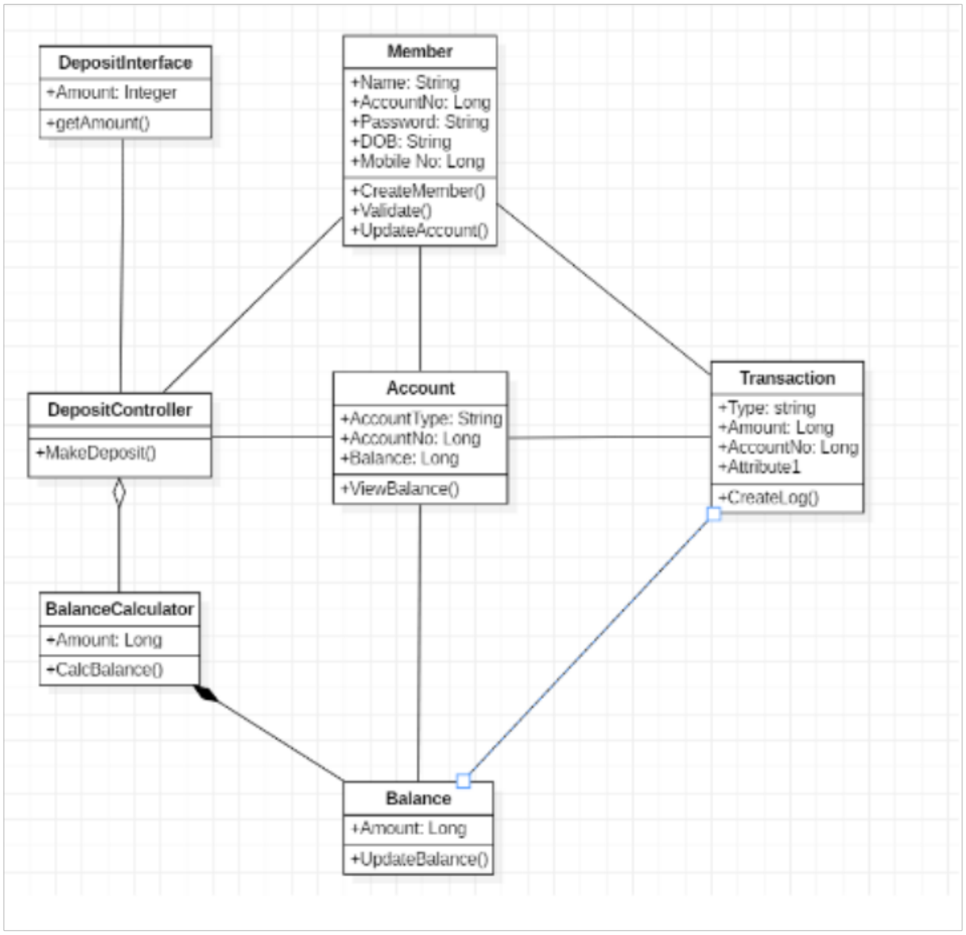
- The top compartment contains the name of the class. It is printed in bold and centered, and the first letter is capitalized.
- The middle compartment contains the attributes of the class. They are left-aligned, and the first letter is lowercase.
- The bottom compartment contains the operations the class can execute. They are also left-aligned, and the first letter is lowercase.
- A class with three compartments.

In the design of a system, several classes are identified and grouped together in a class diagram that helps to determine the static relations between them. With detailed modelling, the classes of the conceptual design are often split into several subclasses.

RESULT:







DISCUSSIONS: We learnt to draw the Class diagram of the "ATM System" case study by identifying use cases, Actors and relationships between them.

CONCLUSION: Class diagram Descriptions for ATM system has been implemented.

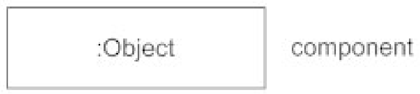
EXPERIMENT - 6

AIM: To prepare Sequence Diagram for ATM system.

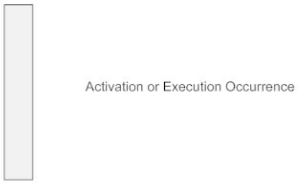
THEORY: A sequence diagram is an interaction Diagram that shows how objects operate with one another and in what order. It is a construct of a message sequence chart.

A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Sequence diagrams are sometimes called event diagrammes or event scenarios.

Class Roles or Participants Class roles describe the way an object will behave in context. Use the UML object symbol to illustrate class roles, but don't list object attributes.

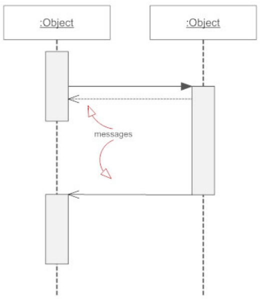


Activation or Execution Occurrence Activation boxes represent the time an object needs to complete a task. When an object is busy executing a process or waiting for a reply message, use a thin gray rectangle placed vertically on its lifeline.



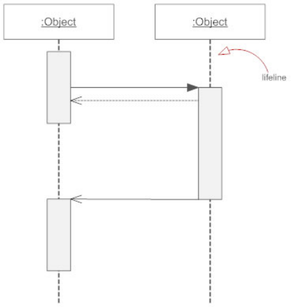
Messages

Messages are arrows that represent communication between objects. Use half-arrowed lines to represent asynchronous messages. Asynchronous messages are sent from an object that will not wait for a response from the receiver before continuing its tasks. For message types, see below.



Lifelines

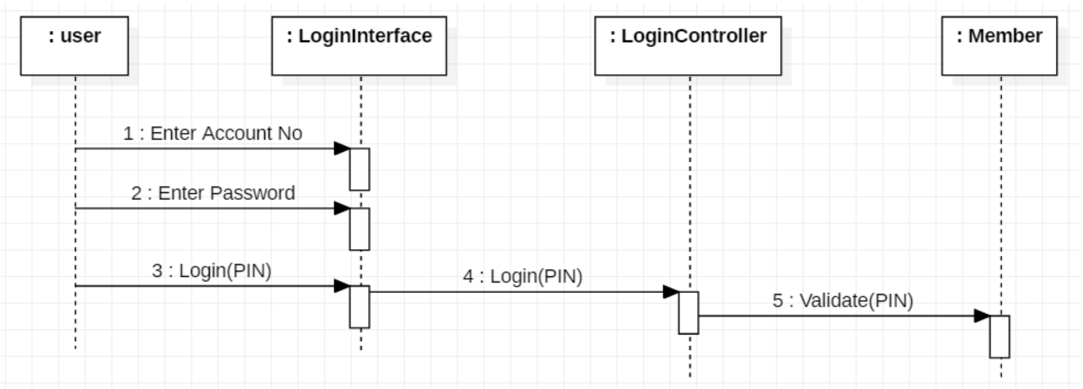
Lifelines are vertical dashed lines that indicate the object's presence over time.

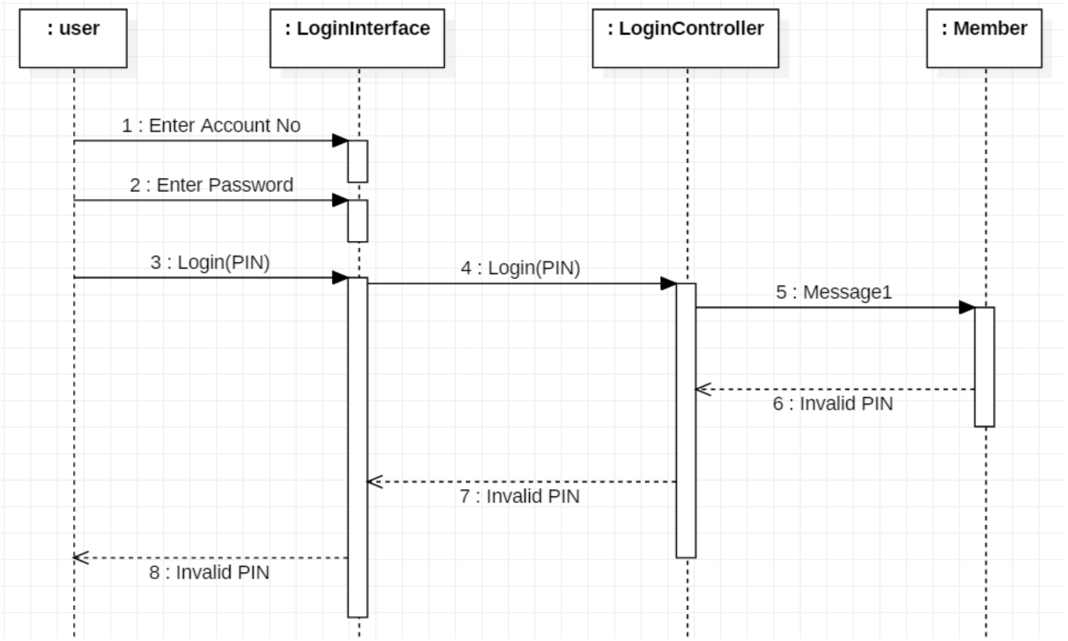


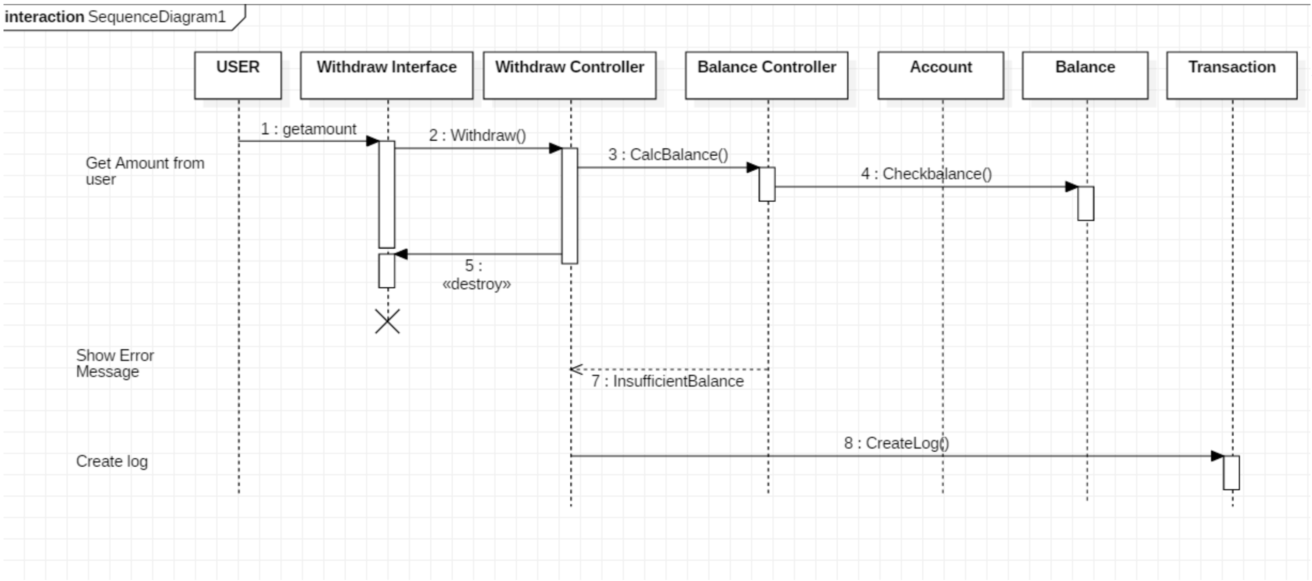
Destroying Objects

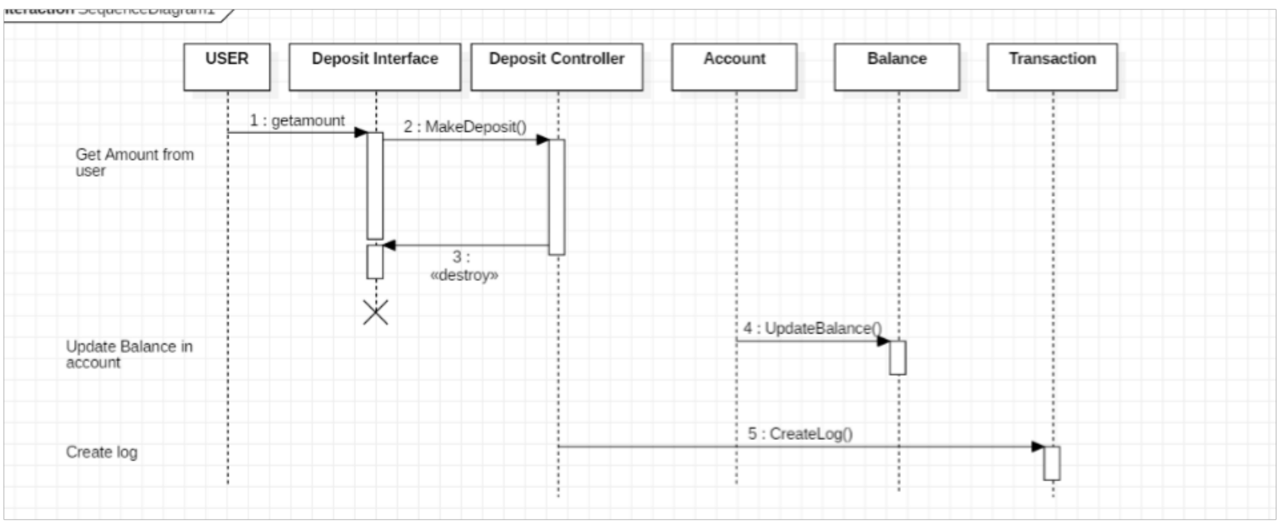
Objects can be terminated early using an arrow labeled "<< destroy >>" that points to an X. This object is removed from memory. When that object's lifeline ends, you can place an X at the end of its lifeline to denote a destruction occurrence.

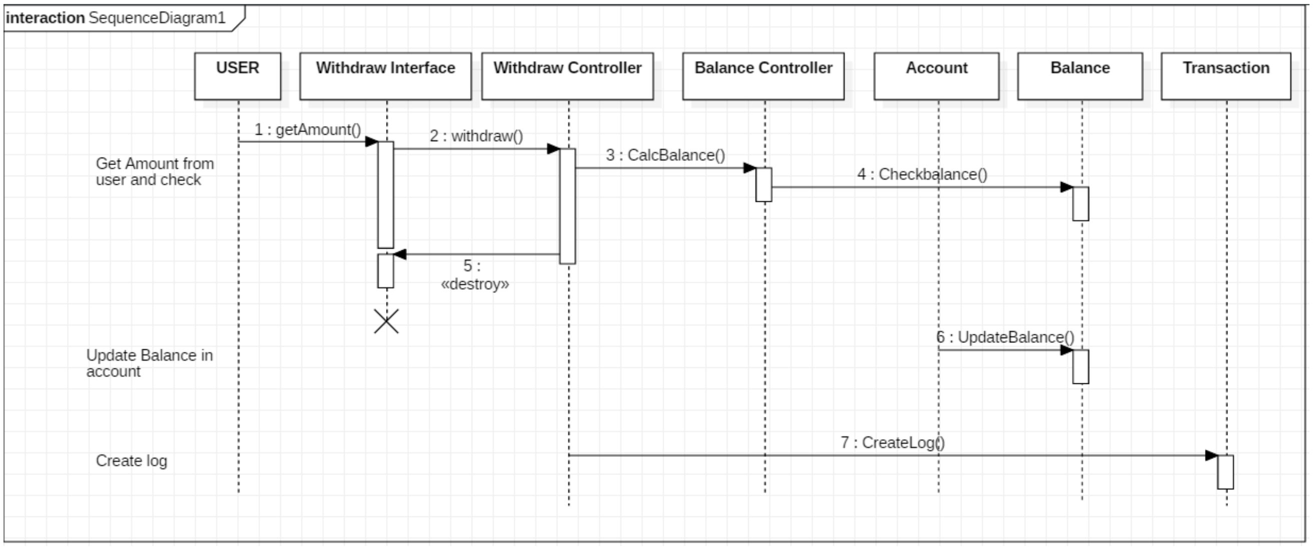
RESULT:

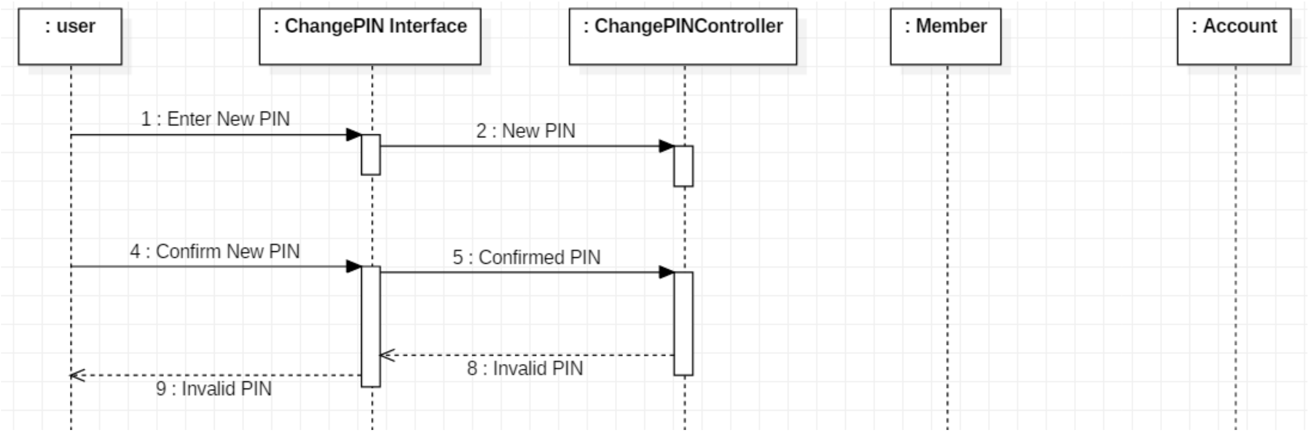


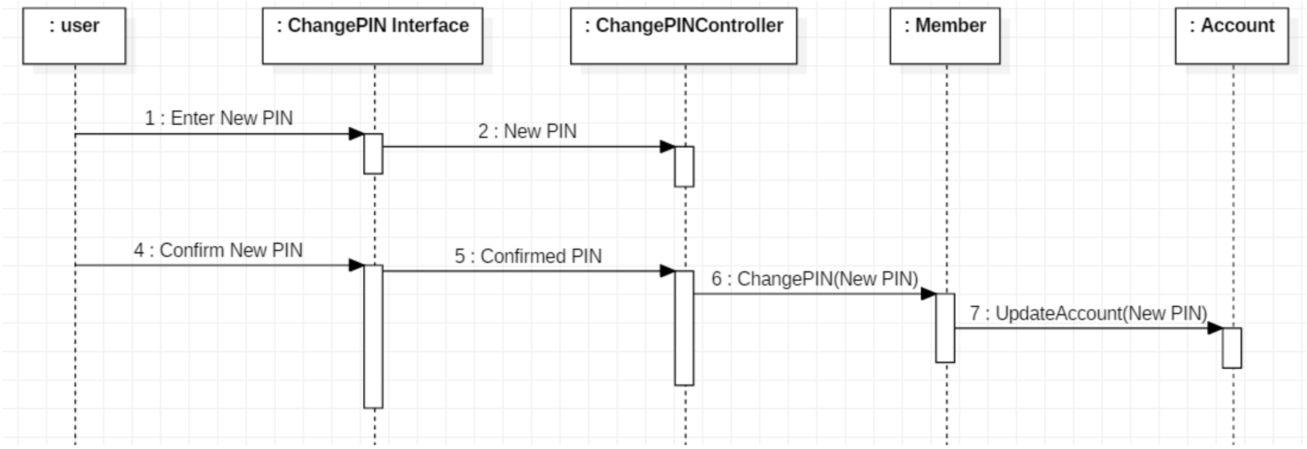



interaction SequenceDiagram1
USER
Withdraw Interface
Withdraw Controller
Balance Controller
Account
Balance
Transaction
1 : getamount
2 : Withdraw()
3 : CalcBalance()
4 : Checkbalance()
5 : «destroy»
7 : InsufficientBalance
8 : CreateLog()
Get Amount from user
Show Error Message
Create log


USER
Deposit Interface
Deposit Controller
Account
Balance
Transaction
1 : getamount
2 : MakeDeposit()
3 : «destroy»
4 : UpdateBalance()
5 : CreateLog()
Get Amount from user
Update Balance in account
Create log


interaction SequenceDiagram1
USER
Withdraw Interface
Withdraw Controller
Balance Controller
Account
Balance
Transaction
1 : getAmount()
2 : withdraw()
3 : CalcBalance()
4 : Checkbalance()
5 : «destroy»
6 : UpdateBalance()
7 : CreateLog()
Get Amount from user and check
Update Balance in account
Create log


: user
: ChangePIN Interface
: ChangePINController
: Member
: Account
1 : Enter New PIN
2 : New PIN
4 : Confirm New PIN
5 : Confirmed PIN
8 : Invalid PIN
9 : Invalid PIN


: user
: ChangePIN Interface
: ChangePINController
: Member
: Account
1 : Enter New PIN
2 : New PIN
4 : Confirm New PIN
5 : Confirmed PIN
6 : ChangePIN(New PIN)
7 : UpdateAccount(New PIN)

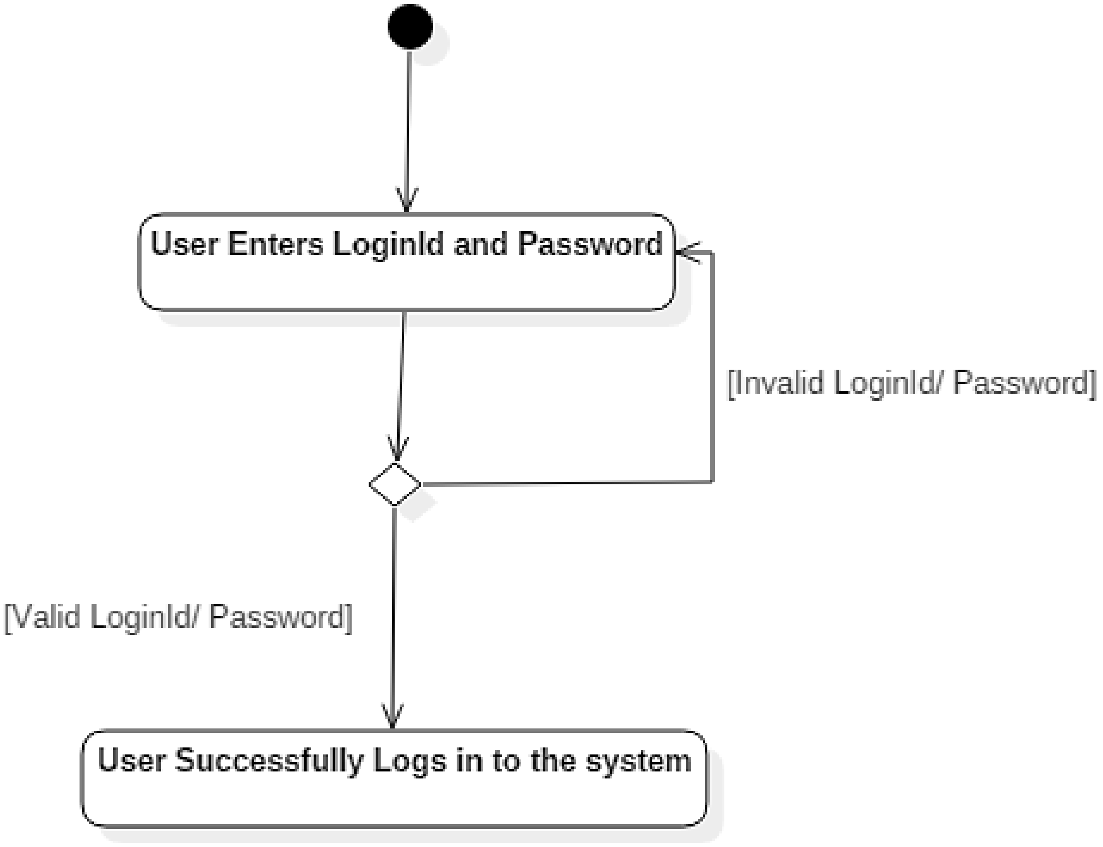
EXPERIMENT - 7

AIM: To draw the Activity diagram for the ATM Management System project.

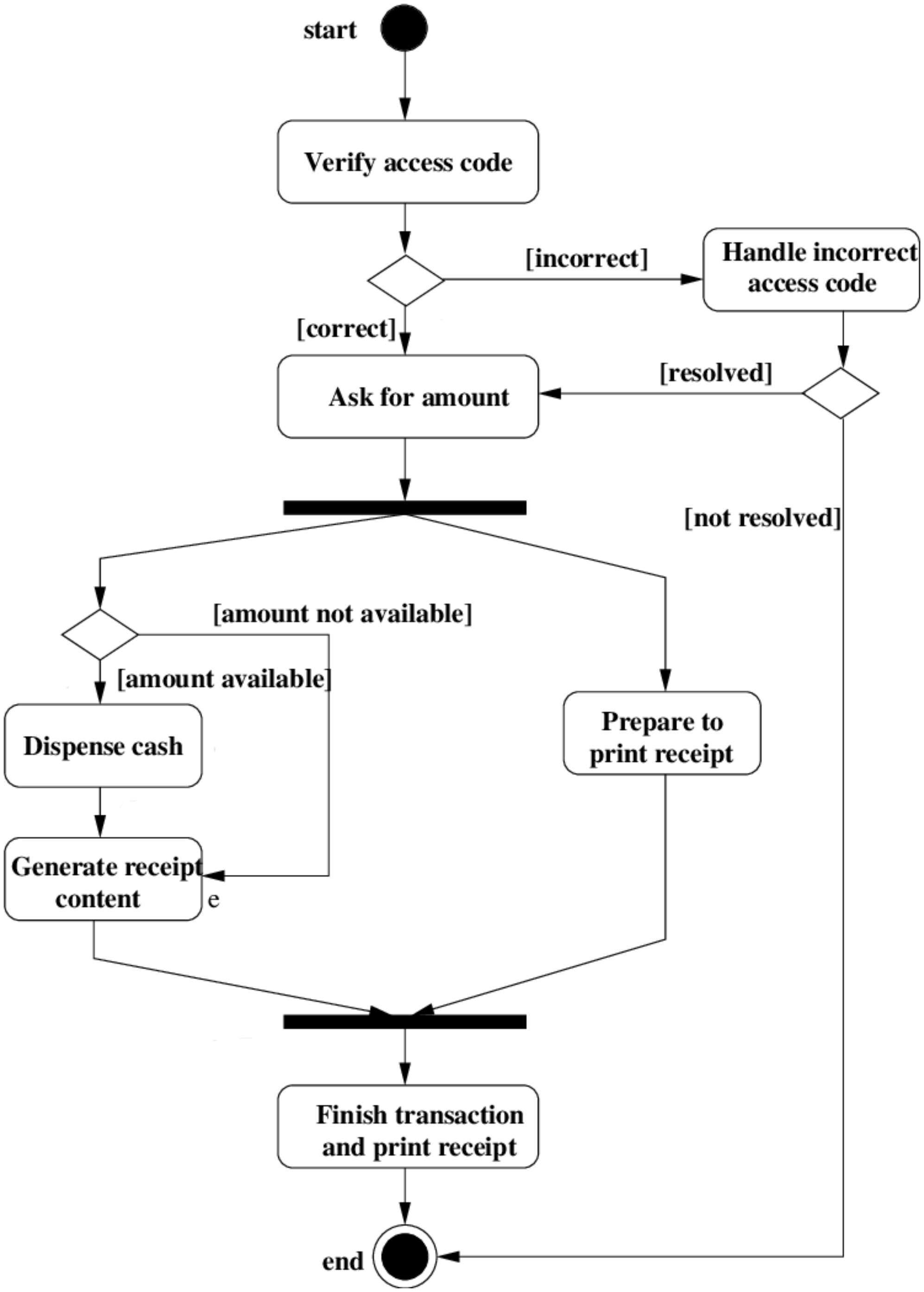
THEORY: An Activity diagram is a visual representation of any system's activities and flows of data or decisions between activities. They provide a very broad view of a business process. They represent the dynamics of a system. These are flow charts that are used to show the work flow of a system. They show what activities can be done in parallel, and any alternative paths through the flow.

RESULT:

LOGIN


User Enters LoginId and Password
[Invalid LoginId/ Password]
[Valid LoginId/ Password]
User Successfully Logs in to the system

Withdraw



DISCUSSION: From this practical we have learnt how to identify flow of control from activity to activity in the application and draw the Activity diagram.

CONCLUSION: Activity diagram for ATM Management system has been implemented.