

SE-101

Introduction to Software Engineering

*Project Name:*

*ATM (Automated Teller Machine)*

*Domain:*

*“Bank”*

*Submitted to:*

*Ms. Maryam*

*Submitted By:*

*Zujaja Rasheed (4668-FOC/BSCS/F22)*

*Sana Amin (4662-FOC/BSCS/F22)*

*Wania Khan (4677-FOC/BSCS/F22)*

We successfully crafted an ATM software employing robust SDLC methodologies for seamless functionality and security.

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TASK NO: 1

Q no 1: Identify user requirements comprising of 10 functional and 3 domain requirements.

Functional Requirements:

1. System must allow the user to withdraw cash from their accounts after specifying the amount.
2. System must display the current balance accurately and users can check their balance amount.
3. System shall allow the user to change their PIN for security purpose.
4. System should provide user a mini statement showing the last few transactions on their amount.
5. User should be able to choose the preferred language for interaction with ATM.
6. The ATM shall provide an option to print a recipient for each transaction.
7. The ATM shall allow user to deposit cash into their accounts.
8. System shall provide the facility to transfer funds between limited accounts for money management.
9. User shall be able to make Bill payments (e.g.: electricity, utility) through ATM.
10. ATM shall be well equipped to issue new debit card or replace the existing one.

Domain Requirements:

1. System shall include some security features like PIN authentication, card encryption and secure communication.
2. The system should maintain detailed transaction logs including date, time and account details.
3. The system must allow the user to withdraw the amount specified and deduct the amount from user’s account.

Q no 2: Find 5 non-functional with 3 product, 1 external and 1 organizational requirement.

Non-functional Requirement:

Product Requirement:

1. Performance: System must have the capability of 500 transactions per 15 minutes with response of 2 seconds for each transaction.
2. Usability: User interface should be according to the industry-standard accessibility guidelines to ensure usability for disable users.
3. Reliability: After failure, it should be recovered within 15 minutes.

Organizational Requirement:

System should be developed using JAVA.

External Requirement:

System is compliant with Anti-money laundry (AML) and Counter-Terrorism financing (CTF) regulations that are made by State Bank of Pakistan.

Q no 3: Convert 5 Functional Requirements into System Requirements.

System Requirements:

1. Withdraw Cash:

R1.1: System shall provide a user interface allowing customers to input the desired amount for cash withdraw.

R1.2: The system shall communicate with the bank databases to verify the user’s account balance.

R1.3: System shall generate receipt for the customer indicating the withdraw amount, time and data details.

1. Check Balance:

R2.1: The system shall display the user account balance accurately on screen.

R2.2: The system shall retrieve account information securely from bank’s databases.

1. Cash Deposit:

R3.1: The system shall accept cash and deposit from customers.

R3.2: The system shall generate a deposit receipt for the customer, indicating the deposit amount and transaction details.

1. Funds Transfer:

R4.1: The system shall allow user to input the recipient’s account details and amount to be transferred.

R4.2: The system shall validate the transaction by verifying the availability of sufficient funds in user’s account.

1. PIN change:

R5.1: System shall provide secure user interface for user to input and confirm the new PIN.

R5.2: The system shall authenticate the user identify before allowing PIN change process to proceed.

R5.3: The system shall ask the user to enter current PIN before changing PIN.

R5.4: The system shall update the user’s PIN information in the bank’s databases.

Q no 4: Write few metrices for NFR in order to verify Requirements.

* + - 1. Performance/speed: Processed transaction/second, Screen Refresh time.
      2. Ease of use/Usability: Training time, No. of help frames.
      3. Reliability: Mean time to failure, Rate of failure occurrence, Probability of unavailability, Availability.
      4. Robustness: Time to start after failure, percentage of events causing failure, probability of data corruption in failure.
      5. Probability: % of target dependent statements, no. of target systems.

Q no 5: Express 3 functional requirements into structural natural language.

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| --- | --- |
| Aspects | Description |
| Req ID | R1 |
| Req Name | Cash withdrawal |
| Priority | High |
| Source | User |
| Description | The system shall allow user to withdraw the cash from their account after specifying the amount. |
| Input | Enter valid card and valid PIN. |
| Output | Amount transaction |
| Pre-condition | ATM must be powered ON and connected to Banking network. |
| Post-condition | User receive cash and transaction is recorded in system log. |

|  |  |
| --- | --- |
| Aspects | Description |
| Req ID | R2 |
| Req Name | Balance check |
| Priority | High |
| Source | User |
| Description | The system shall allow user to check the account balance. |
| Input | Enter command of check balance. |
| Output | Statement of balance. |

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| --- | --- |
| Aspects | Description |
| Req ID | R3 |
| Req Name | PIN change |
| Priority | Low |
| Source | User |
| Description | The system shall allow user to change the PIN. |
| Input | Enter your previous PIN and command for PIN change. |
| Output | PIN change/New PIN. |

Q no 6: Develop a Tabular Specification for one functional requirement.

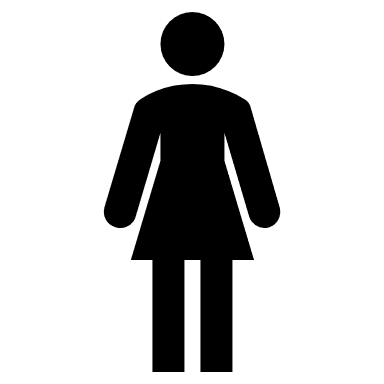
Cash Withdraw

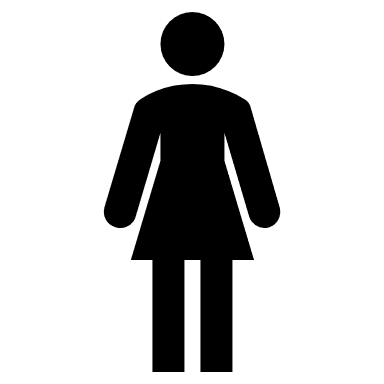
|  |  |
| --- | --- |
| Condition | Actions |
| 1. Amount > 50,000 | You can’t withdraw more than 50,000  Rs. |
| 1. Amount < 50,000 | Cash is withdrawn. |
| 1. Transaction no. > 5 | You can withdraw cash more than 5 times a day. |
| 1. Transaction no. <5 | Cash is Withdrawn |
| 1. Transaction from another bank ATM | Amount of 7Rs is deducted. |

TASK NO: 2

Prepare the following system models.

1. Use-Case Diagram:





Customer

2. Class Diagram:

Bank Account

Member Functions

Data Members

Transaction

Member Functions

Data Members



1 0:\*

3. State Diagram:

3.1. Cash Withdrawal:

Start input Correct PIN

Operation

Waiting

Disable

Enable

Card

Incorrect PIN Exceed Amount

End Correct Amount

Operation

Waiting

Cash withdrawal Receipt

3.2. Cash Transfer:

Start input Correct PIN

Operation

Waiting

Disable

Enable

Card

Incorrect PIN Exceed Amount

End Correct Amount

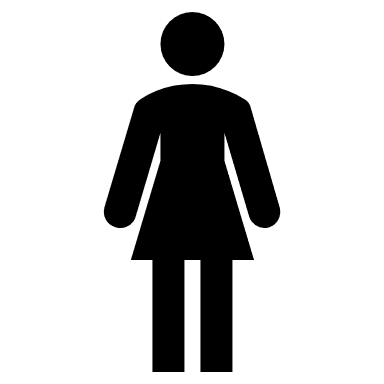
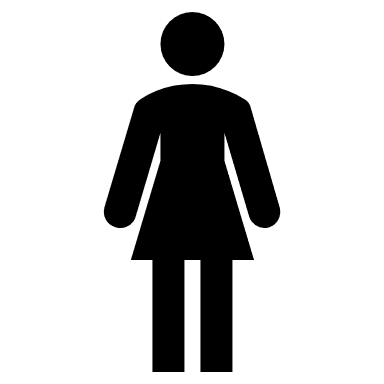
Operation

Waiting

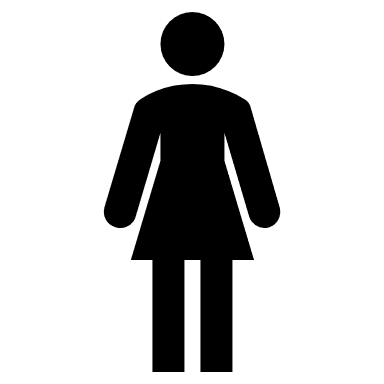
Cash transfer Receipt

4. Sequence Diagram:

4.1. Cash Withdrawal:

Waiting Waiting



Secure-connect software

Transaction processing software

Customer

Input card Checking Card

OK (Login) OK (Verify)

Enter (Cash Withdrawal) Checking Application

Ok OK

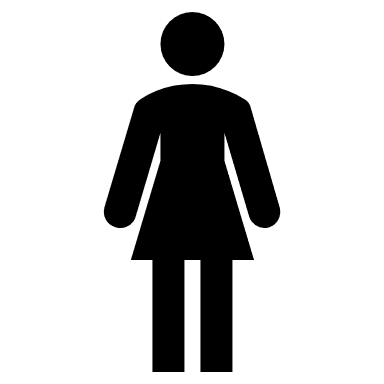
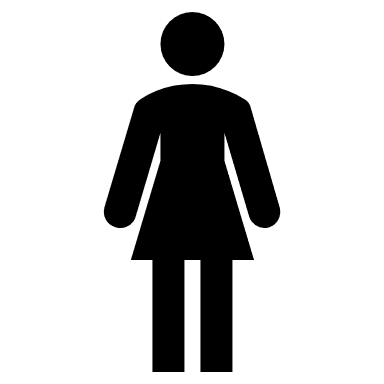
Enter PIN Checking PIN

OK OK

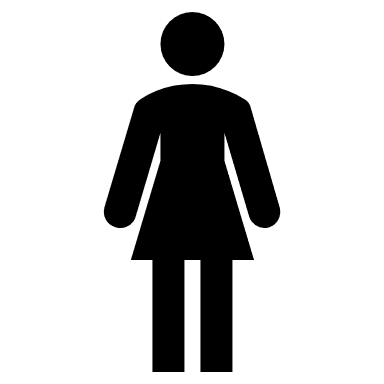
Enter Amount Checking Amount

OK OK

4.2. Card Replacement:

Waiting Waiting



Secure-connect software

Transaction processing software

Customer

Input card Checking Card

OK (Login) OK (Verify)

Enter (Card Replacement) Checking Application

Ok OK

Enter PIN Checking PIN

OK OK

Enter Card Type Checking Card Type

OK (Card Release) OK

5. Activity Diagram:

5.1. Money Transfer:

PIN Checkingg

PIN Invalid

Valid

Amount Checking

Invalid Amount

valid

5. Activity Diagram:

5.2 Cash Withdrawal:

PIN Checkingg

PIN Invalid

Valid

Amount Checking

Invalid Amount

valid

TASK NO: 3

Write a test case for cash withdrawal activity.

Test 1: Withdrawal Amount Checking:

Input: A number in Rs. representing the amount for withdrawal during one transaction.

Tests: 1) Test for the input where the amount of transaction is above 50,000 Rs.

2) Test for the input where the amount of transaction is just 10,000 Rs.

Output: OK or error message that the entered amount is outside the transaction range.