1. Introduction
    1.1. Goals and Objectives
        1.1.1. This documentation describes the important aspects of client and server connections between a client ATM or Teller with its banking Server.
    1.2. Statement of Scope
        1.2.1. Priorities are the maintainability, usability, portability, and efficiency of the system such that they can be easily reproduced at a different environment.
    1.3. Software Context
        1.3.1. Connections between client and server will be made through TCP connections as they are bound and connected through a given port.
    1.4. Major Constraints
        1.4.1. Keeping a constant connection between the client and server. Drop connection if the client is hanging the port to free up for other client requests to connect in.
2. Data Design
    2.1. Client Side
        2.1.1. PrintWriter will be used for socket outPutStream to send server messages in regards to the client's account (i.e. deposit, withdraw, or transfer). Messages will be multithreaded due to many clients.
        2.1.2. BufferStream will be needed to receive messages from the server after validation before sending to the UI for display.
    2.2. Server Side
        2.2.1. Server will be listening on a specific socket while reusing the address for future connections from other clients.
        2.2.2. Server socket will be listening for client's messages to validate a user account before proceeding with any transactions.
        2.2.3. ClientSock thread will be handling each client message separately
        2.2.4. getClient(msg) will be called to retrieve client's information from Customer[] customers.
        2.2.5. Information retrieved from customers will be used to process further incoming messages for impending transactions or balance checking.
3. Architecture Diagram
    3.1. Description of Client
        3.1.1. Client Processing Narrative
            3.1.1.1. ATM Client: ATM will wait for ATM user to insert ATM card into machine and will connect to listening socket on server to establish ATM Connection. Client will be able to login and only after login will customer be allowed to have access to performing specific operations.
            3.1.1.2. Teller Client: Teller will send and receive messages directly from server after establishing a teller customer connection and these messages will carry instructions for an operation to be carried out.
        3.1.2. Client Interface Description

3.1.2.1. ATM Client: A GUI that displays buttons(for transaction operations) will be displayed and the ATM user will be able to interact with the interface allowing him/her to perform authorized operations on account. The buttons displayed will be “Deposit”, “Transfer”, “View Balance”, “Withdrawal” and “Logout”. When an operation is chosen a series of JOption Input or Option Dialog boxes that will be shown so as to collect information from the atm user that will allow for the successful completion of the operation chosen.

3.1.2.2. Teller Client: Similar GUI design to ATM Client but will display more buttons as Teller has access to more operations. It will also display information about the customer that has given the teller employee the permission to do so.

3.1.3. Client Processing Details

3.1.3.1. ATM - Server: There will be a socket in the server that will listen to ATM connections. An ATM connection will be initiated once an ATM user inserts a card into the ATM. When that happens the server socket will authorize connection which then allows the ATM User to login. While this connection is established, the ATM performs operations for the user by sending messages to the server who then accepts these messages and lets the ATM know if the operation was successful or not by passing a message. If the operation is successful then the server records whatever operation it was. The operations Deposit, Withdrawal, Transfer, View Balance and Logout are all processed for the ATM user the same way.

3.1.3.2. Teller - Server: There will also be a socket in the server that will listen to teller customer connections. A teller connection will be initiated once a teller sends a message to server to verify login and when the server sends a success message back to the teller the connection will be established. This connection gives the teller access to several user’ accounts. The teller can send messages to the server to complete operations on behalf of an account owner and when these operations are complete the teller accepts a success message from the server which will be displayed to the teller as well as updates on the account. When a teller logs out, the connection will close. The supervisor will have access to the teller’s “special” operations that a regular employee does not have access to as well as all the operations the employee can perform. These “special” operations include creating or deleting an employee’s account or shutting down and switching on the server.

3.2. Description of Server: The server will have sockets that are listening to any attempt at a connection from both ATM and teller clients. When a connection is established it gives the client's authority to perform operations through the server

provided the rules set by the server for the operation to be carried out have been met. These clients communicate these operations by sending messages to the server. The server is responsible for analyzing the data and performing heavy tasks by itself. These tasks include, storing data, updating data, and managing connections.

3.3. Software Interface Description

3.3.1. External Interfaces

3.3.2. Internal Interfaces -

3.3.2.1. Check Validation

3.3.3. Human Interfaces

4. User Interface Design

4.1. ATM

4.1.1. Login: Two Input dialog boxes appear in succession. One asking for ATM ID and the other asking for ATM pin.

4.1.2. Operations: After and only after login a option dialog box with the following operations will appear side by side. “Deposit”, “Withdrawal”, “Transfer”, “View Balance”, “Logout”.

4.1.2.1. Deposit: When clicked, one(1) option dialog box is shown and it asks the user to choose between savings or checking. Another input dialog box appears after that requesting the amount. After the transfer request is sent, a message dialog box is created to notify the user on the status of the operation.

4.1.2.2. Withdrawal: When clicked, one(1) option dialog box is shown and it asks the user to choose between savings or checking. Another input dialog box appears after that requesting the amount. After the transfer request is sent, a message dialog box is created to notify the user on the status of the operation.

4.1.2.3. Transfer: When clicked, one(1) option dialog box is shown and it asks the user to choose between savings or checking. Another input dialog box appears after that requesting the amount which is followed but yet another input dialog box asking for the account the money will be sent to. After the transfer request is sent, a message dialog box is created to notify the user on the status of the operation.

4.1.2.4. View Balance: When clicked, one(1) option dialog box is shown and it asks the user to choose between savings or checking. After the transfer request is sent, a message dialog box is created to notify the user on the status of the operation.

4.1.2.5. Logout: When clicked, one(1) option dialog box is shown and it asks the user to choose between savings or checking. Another input dialog box appears after that requesting the amount. After the transfer request is sent, a message dialog box is created to notify the user on the status of the operation.

4.2. Teller

4.2.1. Teller Login: One login option dialog box is displayed with a login button for whenever Teller user wants to login. When login button is clicked, User is prompted for Username and password with two consecutive input dialog boxes.

4.2.2. Operations: After and only after login a option dialog box with the following operations will appear. These operations will be “Customer Login”, “New Customer”, “Remove Customer”, “Deposit”, “Withdraw”, “Transfer”, “Add Savings account”, “Add Checking Account”, “Remove Account”, “Dismiss”, “Logout”. Text concerning a customer’s account will also be displayed on the left of the frame. This information includes Customer’s name, account numbers and their respective account balances.

4.2.2.1. Customer Login: When clicked, one(1) input dialog box is displayed asking the teller operator which Customer’s account he/she wants to access. After the customer is found, the text on the left of the frame will display the customer’s information.

4.2.2.2. New Customer: When clicked on input dialog boxes will be displayed prompting customer for different important information needed to complete the operation.

4.2.2.3. Remove Customer: When clicked on an input dialog box will be displayed prompting the teller operator which customer they plan on removing. A success/error message will be displayed using the JOption Show message method.

4.2.2.4. Deposit: When clicked, one(1) option dialog box is shown and it asks the Teller to choose the amount the customer wants to deposit . After the deposit request is sent, a message dialog box is created to notify the teller operator on the status of the operation.

4.2.2.5. Withdraw: When clicked, one(1) option dialog box is shown and it asks the Teller to choose the amount the customer wants to deposit . After the withdrawal request is sent, a message dialog box is created to notify the teller operator on the status of the operation.

4.2.2.6. Transfer: When clicked on, an option dialog box is shown and it asks the Teller to choose the amount the customer wants to deposit and another option dialog box to enter the account they want the money to be sent to. After the transfer request is sent, a message dialog box is created to notify the teller operator on the status of the operation.

4.2.2.7. Add Savings Account: When clicked on input dialog boxes will be displayed prompting customers for different important information needed to complete the operation.

4.2.2.8. Add Checking Account: When clicked on input dialog boxes will be displayed prompting customers for different important information needed to complete the operation.

4.2.2.9. Remove Account: When clicked on an input dialog box will be displayed prompting the teller operator which account they plan on removing. A success/error message will be displayed using the JOption Show message method.

4.2.2.10. Dismiss: When clicked on, the customer that is currently being accessed by the teller will be dismissed.

4.2.2.11. Logout: Teller operator will logout when a button is pressed. A success/error message will be displayed using the JOption Show message method.

5. Restrictions, Limitations, and Constraints
   - 5.1. Restrictions
     - 5.1.1. Only the Java language can be used
     - 5.1.2. No Web Browser technologies
     - 5.1.3. Internet connections must be over TCP/IP
   - 5.2. Limitations
     - 5.2.1. Only Teller and ATM use cases
     - 5.2.2. No actual banking systems will be utilized (counterfeit, check validation, ATM cards, physical ATM, real currency)
   - 5.3. Constraints
     - 5.3.1. Zero funding for this project
     - 5.3.2. Only a staff of 3 working part time (with some consultation)
     - 5.3.3. Project must be completed in 6 weeks
     - 5.3.4. Only personally owned on-hand hardware and residential networking
6. Testing Issues
   - 6.1. File Handlers could not find the file they were working on
   - 6.2. ATM/Teller could not test server related functions due to dependency on the Internet
   - 6.3. ATM/Teller tests could not access server related objects for messages
7. Appendices N/A