Online Banking System

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Summary

The banking system is split into a client application and a server application which run separately and communicates through UDP by default. The client is designed similarly to a basic terminal in that it displays information from the server and transmits user input. The server handles most of the processing functions and maintains the database. This design allows for quick changes to be deployed as a developer would only need to modify the server to implement new functionality.

The communications between the client and server, as well as the information in the database file, are encrypted following an algorithm shared by both the client and server.

Assumptions

- The server will be running before a client attempts to connect.
- The server will only be required to handle one client at a given time.
- Once connected, the client will not close or exit unless the server shuts down.
- A "manager" account contains the same information as a "customer" account (as displayed on page 1 of the project description).
- No new "manager" accounts are to be created through this product.
- No deposits or withdrawals are to be completed using this product.

Data Structures

One data structure was constructed to store the user's information. The data structure contains:

- User's first name (*firstName*)
- User's last name (*lastName*)
- Username (*username*)
- Password (*password*)
- Account Number (*acctNum*)
- User Type (*userType*)
- Account Balance in cents (*balance*)
- Last known IP address (*ipAddr*)
- Time of last login (*lastLogin*)

This structure exists only in the server and is used to represent both "manager" and "customer" accounts.

```
struct User
{
    char firstName[MAX_NAME_LEN];
    char lastName[MAX_NAME_LEN];
    char username[MAX_NAME_LEN];
    char password[MAX_NAME_LEN];
    unsigned int acctNum;
    char userType;
    unsigned int balance;
    char ipAddr[MAX_IP_LEN];
    time_t lastLogin;
    struct User *next;
};
```

Instructions

1. Start the server.
    - The server requires two command line arguments, the path to the database and the port number.

    Example: > BankServer.exe database.bin 300

2. Start the client.
    - The client requires two command line arguments, the server's IP address and the server's port number.

    Example: > BankClient.exe 192.168.1.2 300

3. Log in using a known user name and password. The username is case insensitive.
    - The default database contains a "manager" user.

    Username: admin
    Password: password

4. Select your desired option from the main menu. A "manager" user will have 8 options while a "customer" user will have 4 options. Each option will prompt for the required information. Follow the requests displayed.

Additional Features

- All data transmitted between the server and client is encrypted using a shared encryption key in a custom algorithm.
- User input is changed to asterisks when entering a password.
- Added a function which prompts the user for confirmation for added usbability. This is used during transfers and when a manager checks an account balance.
- Added password confirmation when changing a password or creating a new account (with up to three attempts).
- Added some basic server messages which display time and IP address when a user logs in and logs out.
- Added ability to enter starting amount for newly created customer account.