System Lab CS-558

Banking System – Socket Programming Report

Group – 16

Sandeep Agri	214101047
Sanjeev Kumar	214101048
Sanket Sonowal	214101049

Banking System – Socket Programming

Project introduction

- The project is about Banking system using client-server socket programming.
- In this application, we are implementing two C programs, namely Client and Bank Server, and they communicate with each other based on TCP sockets.
- Initially, the client will connect to the bank server using the server's TCP port already known to the client. After successful connection, the client sends a Login Message (containing the Username and password) to the bank server. The client side, we can have three different types of user modes namely, Bank_Customer, Bank_Admin and Police.
- Once the Bank server receives the login request, it validates the information and performs the functionalities according to the user mode type.

Program flow & Logic

1) Server side

- Compile the client.c and run the output file as ". /<output_name> <port_address>".
- Server checks if the appropriate number of arguments are provided while running and displays appropriate errors.
- Server starts to listen for connection after successful binding.
- After accepting request from the client, child process is created with displaying verification on terminal - "Connection accepted for client with Ip address and port number".
- Then the credentials given by user is checked for at most three times and if verified then a verification message is printed on the terminal - "Verification for client with Ip address successful"
- Then service will be provided to the client according to the type of the clients (C-Customer, A-Admin, P-Police)

❖ Customer

- The customer can check balance and mini_statement, so the type of request will be checked from the buffer.
- The user file will get read with name "userId.txt" and the balance or mini-statement will get read from the file and will be sent to the client which will get printed in the client window (shown in below section) and a message will be printed - "Sending mini statement/balance of customer to client with Ip". Otherwise, error will be printed.

❖ Admin

- Admin can debit or credit from the any customer's account.

- User id will be received by the server from the client along with the type of request (debit or credit) and amount.
- User type will be checked from user id and transaction will be allowed only if the user type is customer.
- User file will be read, and transaction will be added to the user file along with the calculated balance.
- Message to the server window is printed - "Debit/credit request from client with Ip for customer successfully execution" and successful message also sent to client

❖ Police

- Police can see any customer's balance and mini statement.
- User id will be received by the server from the client along with the type of request (balance or mini_statement).
- User type will be checked from user id and transaction will be allowed only if the user type is customer.
- User file will be read for reading the balance or the mini_statement.
- Successful message will be printed on the server's window and client et acknowledged.

- After the execution of client requests, if client leaves, message will be printed on server window -" Connection closed for client with Ip address on port".

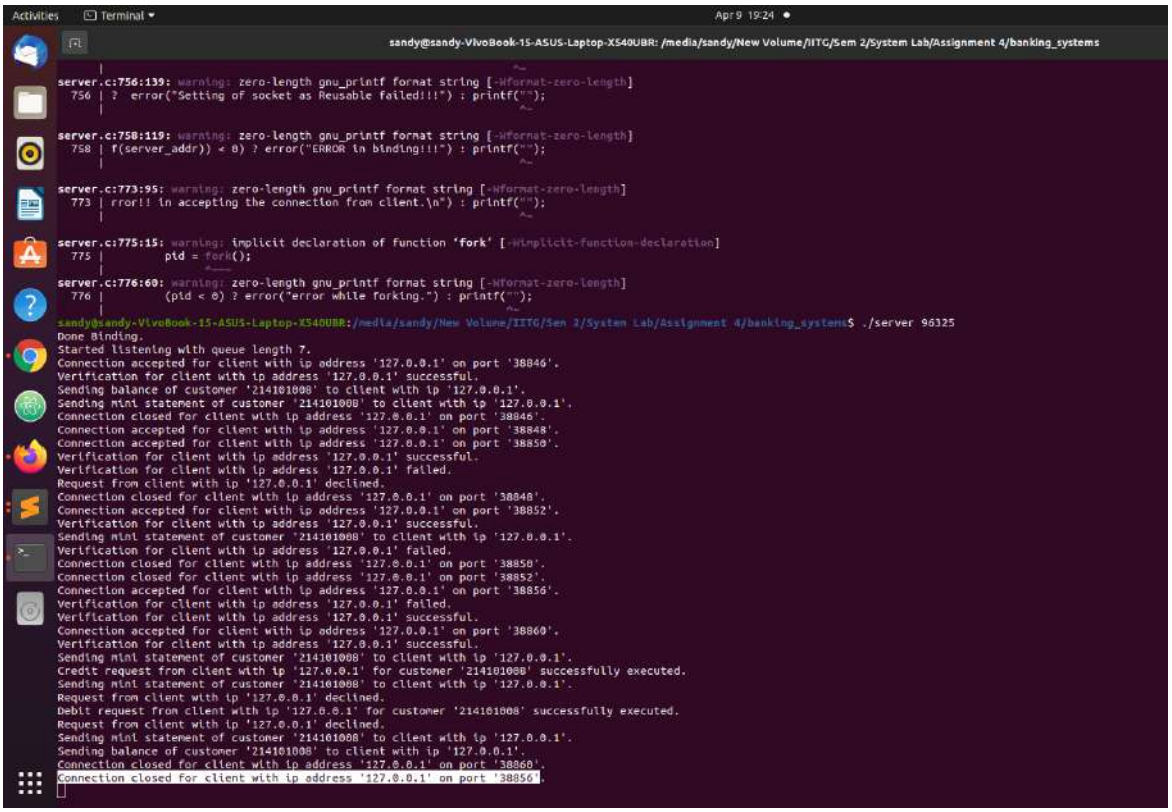

Figure 1: Server listening for active clients and handling operations

2) Client side

- Compile the client.c and run the output file with hostname and port address as ". /<output_name> <hostname> <port_address>.
- User can enter credentials for user authentication/login.
- Based on the details in the login file, the username and password entered by the user are assessed against.
- If the user is not found, the number of attempts re-login at max is three.
- If the user is found, based on the details found in the login file against user different welcome window will open.
- If the user type is "client"/"C", client window will open.
    - Options available for client:
        - **Balance(balance):** Client/Customer can see the available balance in his/her account.
        - **Mini statement(mini_statement):** Client/Customer can all the transactions such as "credit"/" debit" transactions of his/her account.
    - Client can perform any actions mentioned above after logging into his/her account.
- If the user type is "admin"/"A", admin window will open.
    - Options available for admin:
        - **Credit(credit):** Admin can credit money to any client's account.
        - **Debit(debit):** Admin can debit money in any client's account.
    - Admin can select any client's account by entering his/her user id. Admin can only update the balance of any client's account but cannot see the balance. In case, if the debit amount is greater than the available balance, then "Transaction failed" message will show.
- If the user type is "police"/"P", police window will open.
    - Options available for police:
        - **Balance(balance)**: Police can see the available balance of any client's account.
        - **Mini statement(mini_statement)**: Police can see the transaction history of any client's account.
    - Police can see available balance and transaction history of any customer's account without entering respective password of the customer's just by providing his/her user id.

Cases Input & Output

❖ Admin

➢ Scenarios:

- In case of successful login: If the credentials by the user(admin) matches with an entry in the login file, then admin window will open.

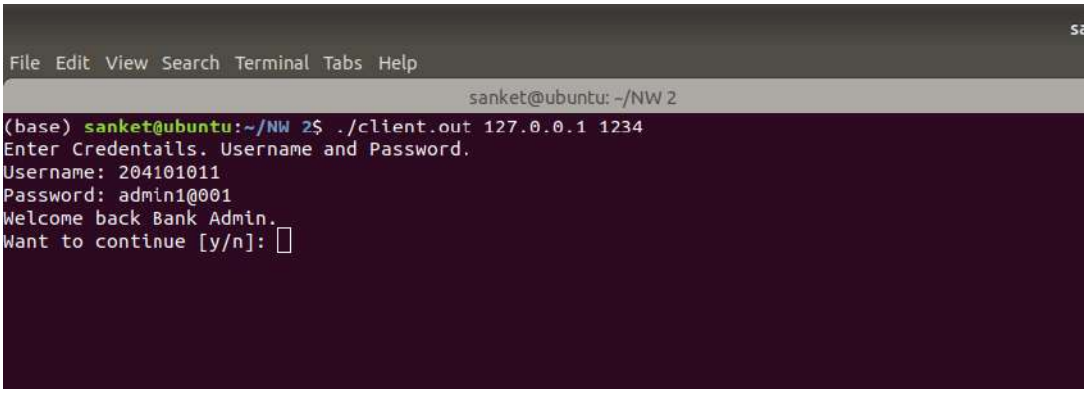

Figure 2: Successful admin login

- In case of unsuccessful login: If the credentials by the user(admin) did not matches with an entry in the login file, then user(admin) can try at max three times.

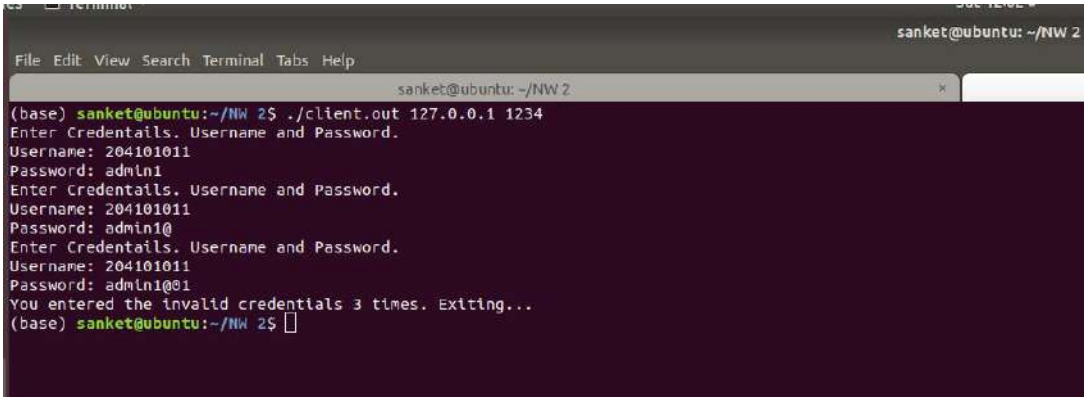

Figure 3: Unsuccessful admin login

- In case of "credit" transaction: Admin can credit / add money in the customer's account by his/her user id.

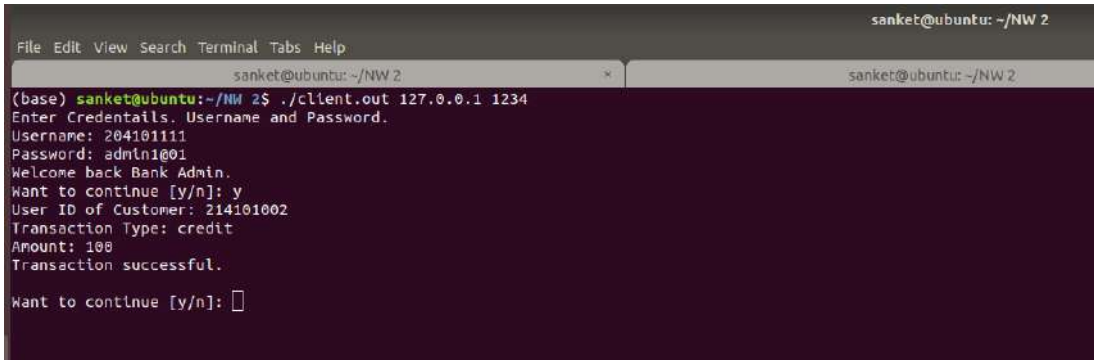

Figure 4: Admin credit operation

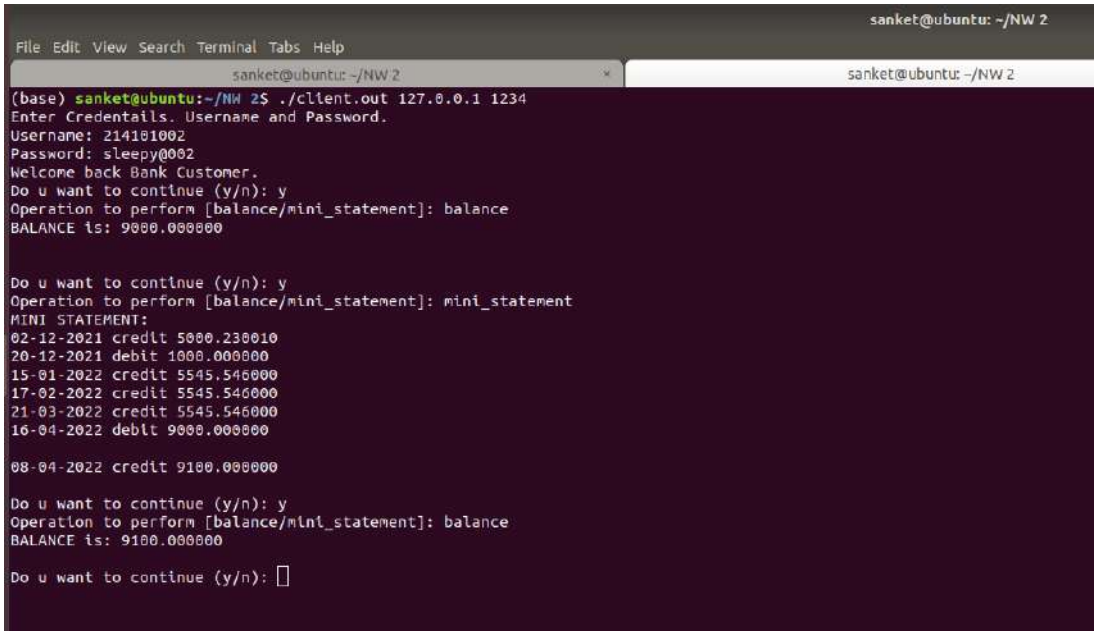

Figure 5: Customer's account balance after credit

- In case of successful “debit” transaction: Admin can debit money from the customer’s account by his/her user id.

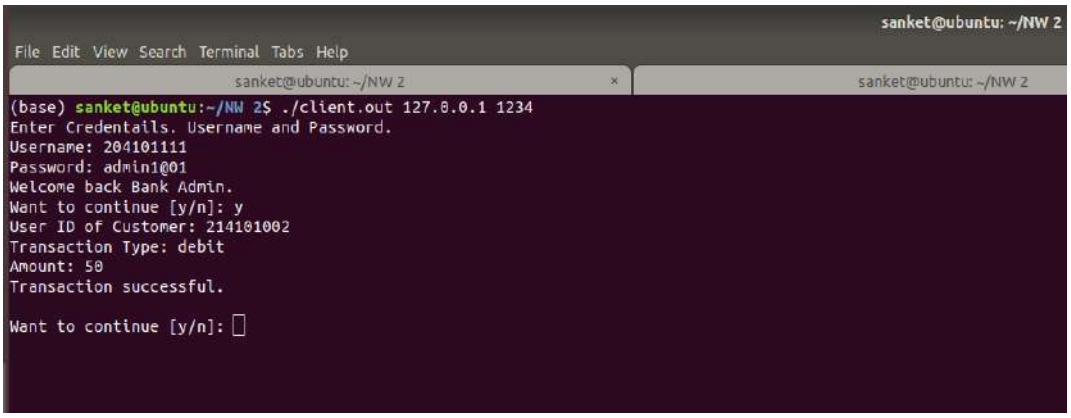

Figure 6: Admin debit transaction

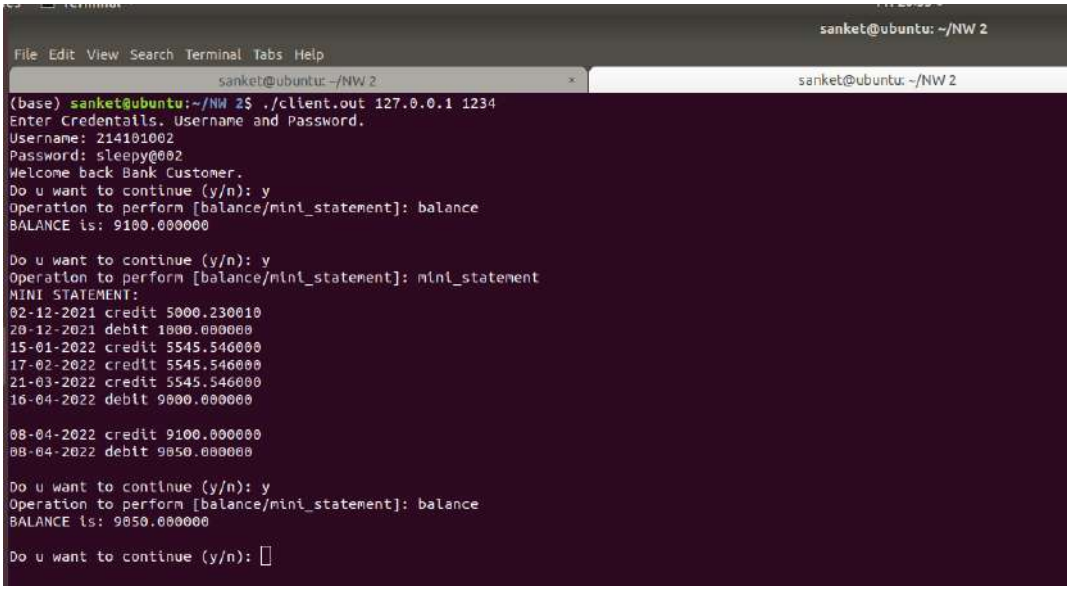

Figure 7: Customer's account balance after debit

- In case of failed “debit” transaction: If the available balance in the customer’s account is lower than the requested debited amount, then “Transaction denied” error will show on the screen.

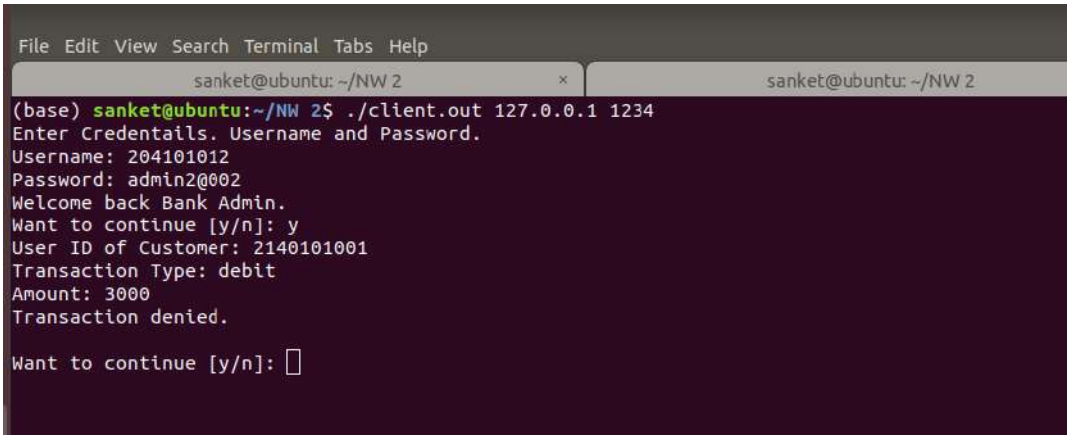

Figure 8: Admin failed debit operation

❖ Client/Customer

➢ Scenarios:

- In case of successful login: If the credentials by the user(client) matches with an entry in the login file, then admin window will open.

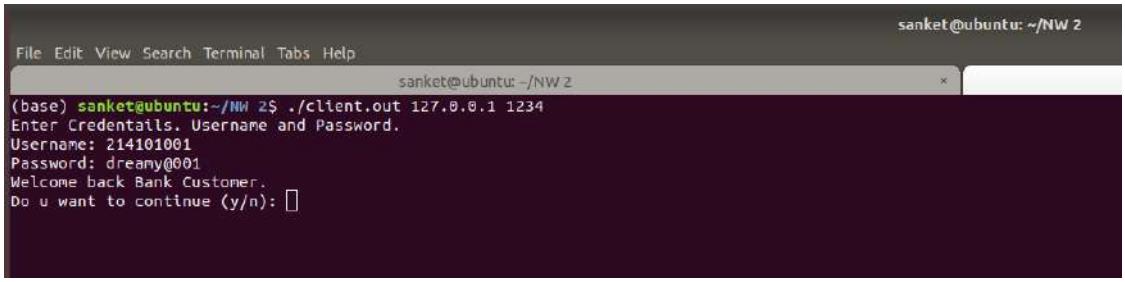

Figure 9: Successful client login

- In case of unsuccessful login: If the credentials by the user(client) did not matches with an entry in the login file, then user(client) can try at max three times.

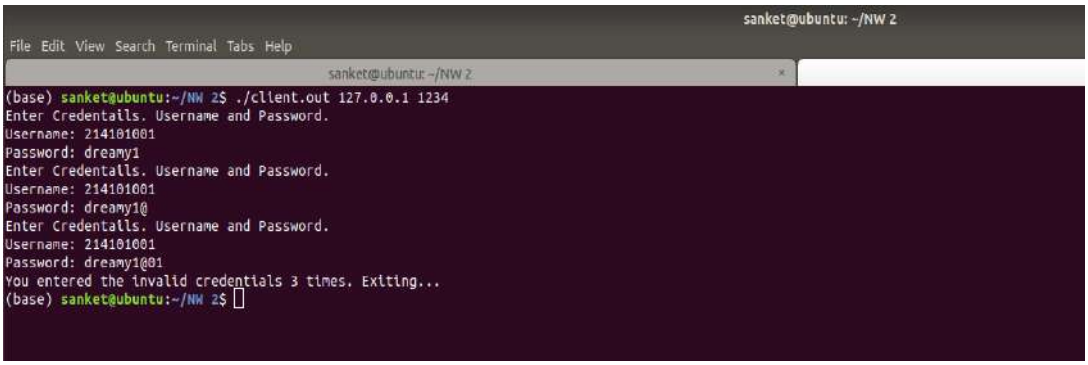

Figure 10: Unsuccessful client login

- In case of performing “balance” operation: Customer can check his/her available balance account by requesting for operation “balance.”

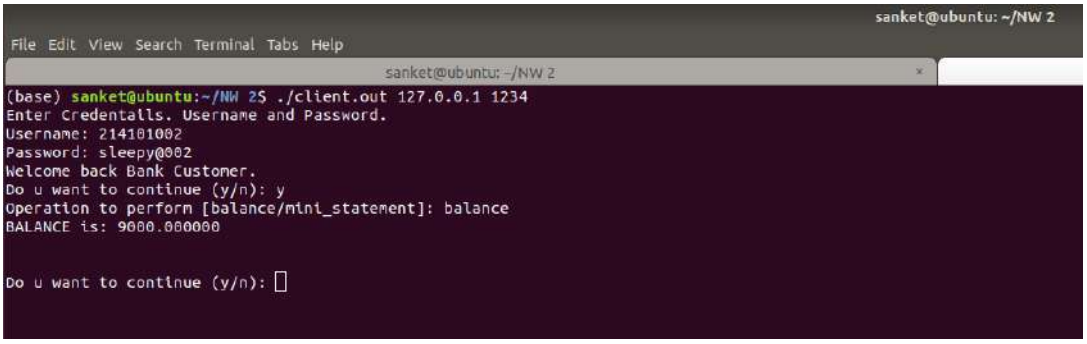

Figure 11: Client balance operation

- In case of performing "mini_statement" operation: Customer can check transaction history of his/her account.

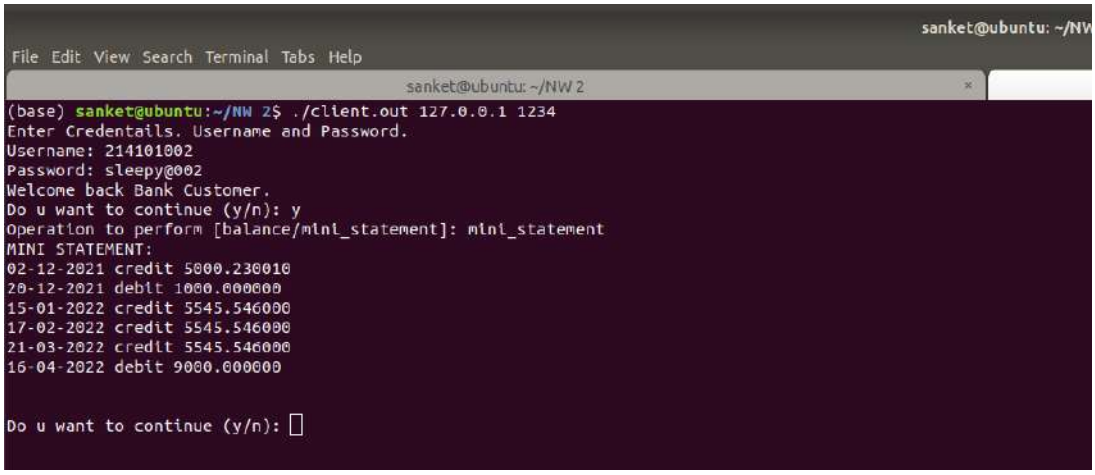

Figure 12: Client mini_statement operation

❖ Police

➢ Scenarios:

- In case of successful login: If the credentials by the user(police) matches with an entry in the login file, then admin window will open.

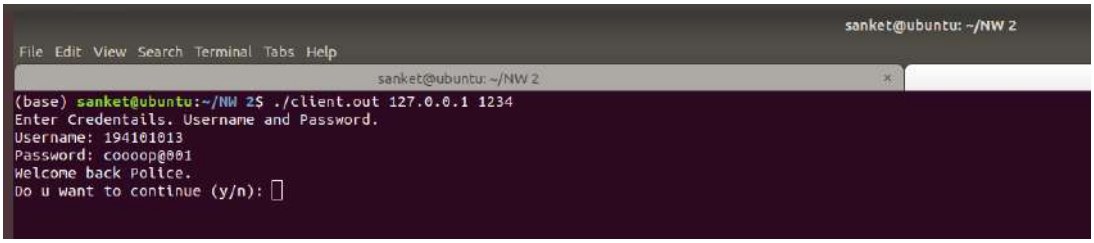

Figure 13: Successful police login

- In case of unsuccessful login: If the credentials by the user(police) did not matches with an entry in the login file, then user(police) can try at max three times.

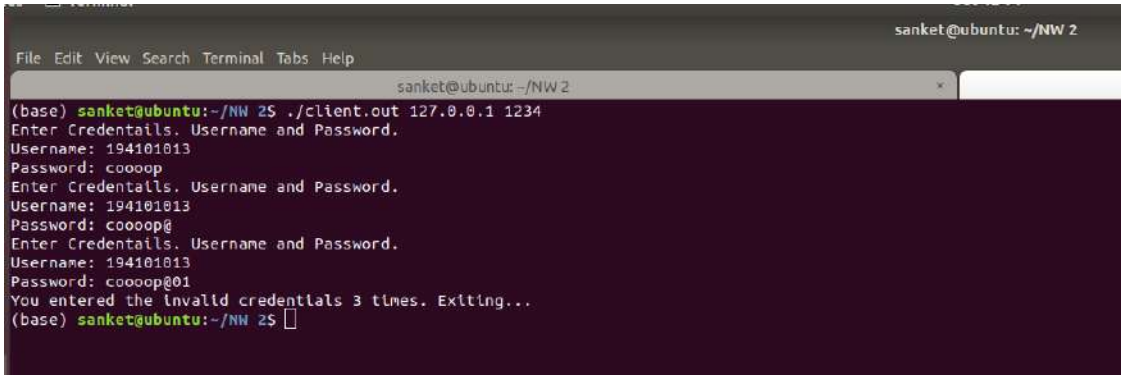

Figure 14: Unsuccessful police login

- In case of performing "balance" operation: Police can check any customer's account balance by entering his/her user id.

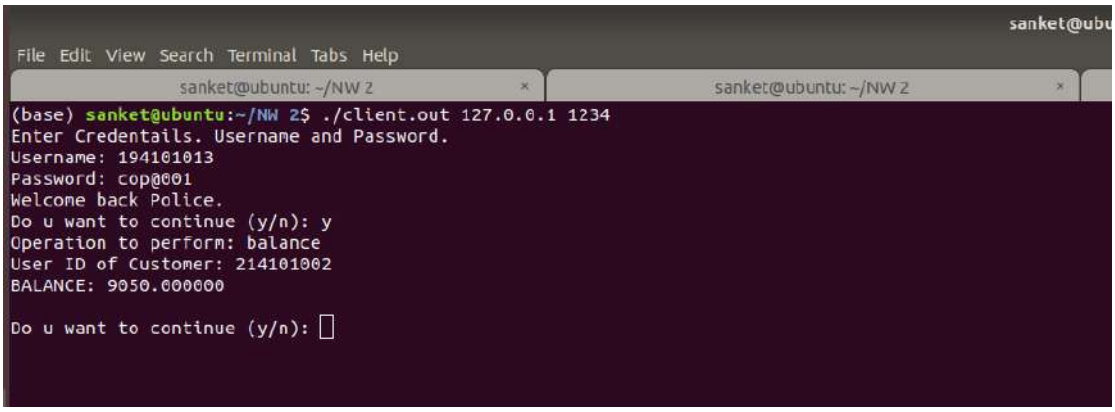

Figure 15: Police balance operation

- In case of performing "mini_statement" operation: Police can check transaction history of any customer's account.

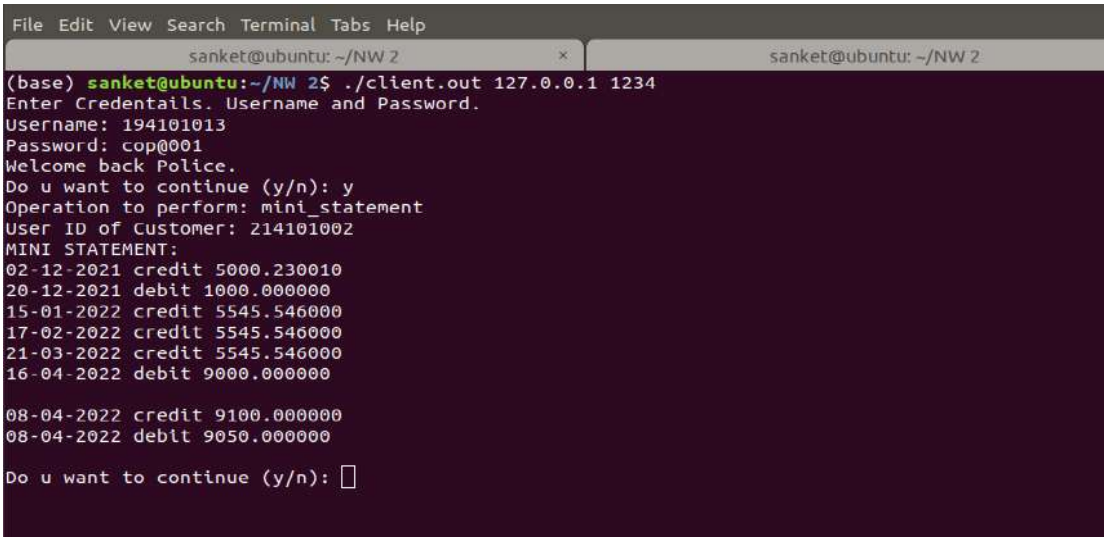

Figure 16: Police mini_statement operation