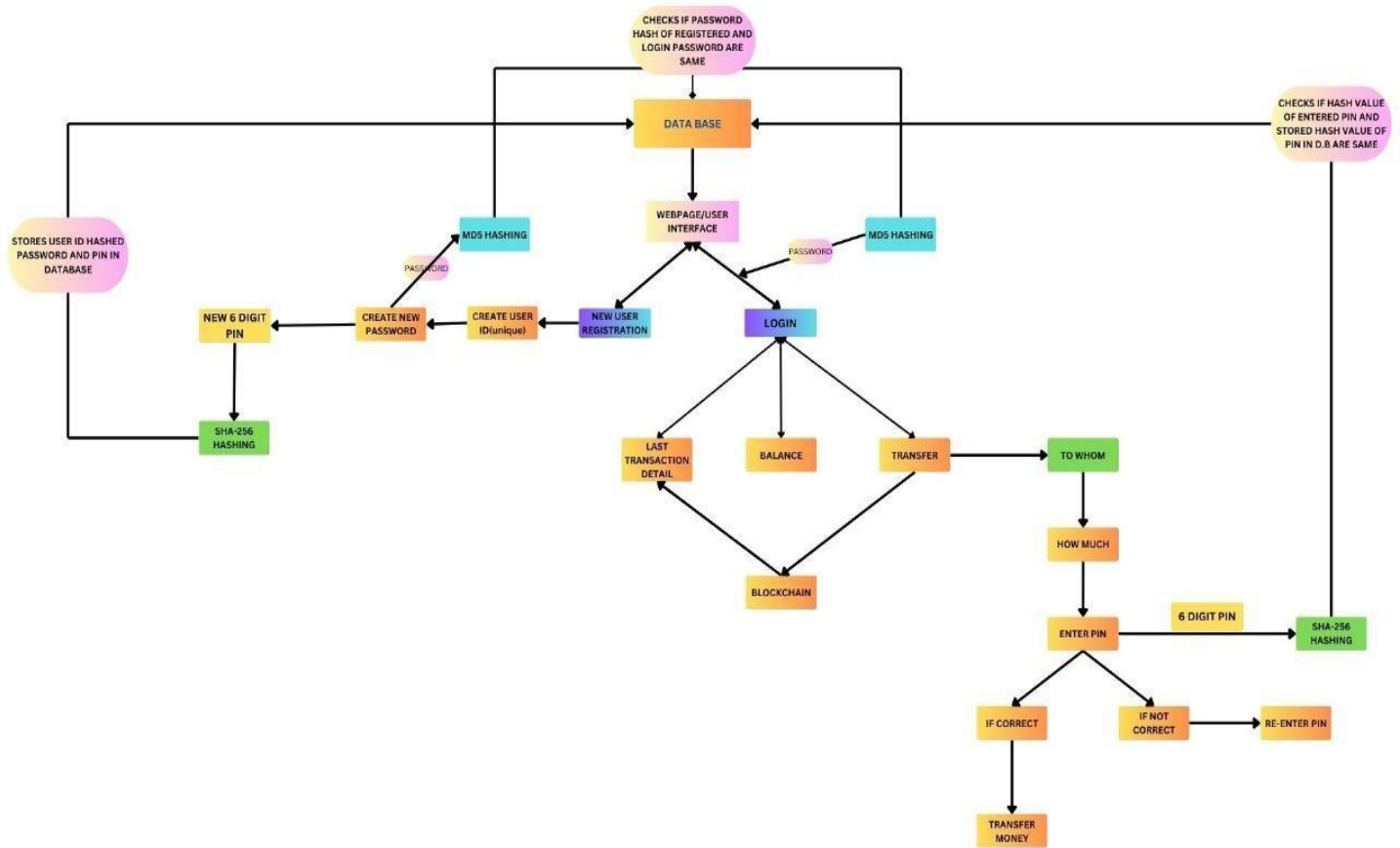


Block Diagram



User Interface and Blockchain Transactions

We have created a friendly User Interface for our bank users to register and login to our banking system.

The users can create an account in the bank that are facilitated with features like Balance Checking, Last Transaction and Funds Transfer. These are encrypted with our implemented MD5 and SHA-256 algorithms.

When transferring money, users are constrained to keep a minimum balance of 2000 so as to never run out of money. SQL is used as a backend data storage database to keep track of our users and their transactions along with their hashes.

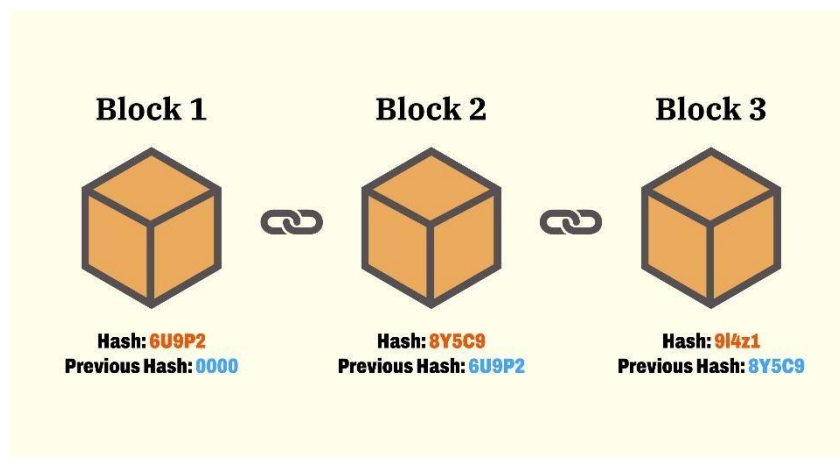
Blockchain

All the transactions that are performed by the users are created and referenced as blockchain's blocks. Every transaction is Hashed securely with SHA-256 and referenced with newer transactions as their "*Previous_Hash*". A block's hash is created with its variables: *previous_hash*, *senders_name*, *receiver's_name*, *timestamp*, *transaction_details*, *nonce*.

So, an attempt to tamper with data will cause the hash value of the block to be changed. Thus, our blockchain is secured from unauthorized change.

Last Transaction shows us the last transaction made by that user, extracted from the Database. This way we create a simple Blockchain Application for User Wallet Banking System.

Key



Technologies in Blockchain:

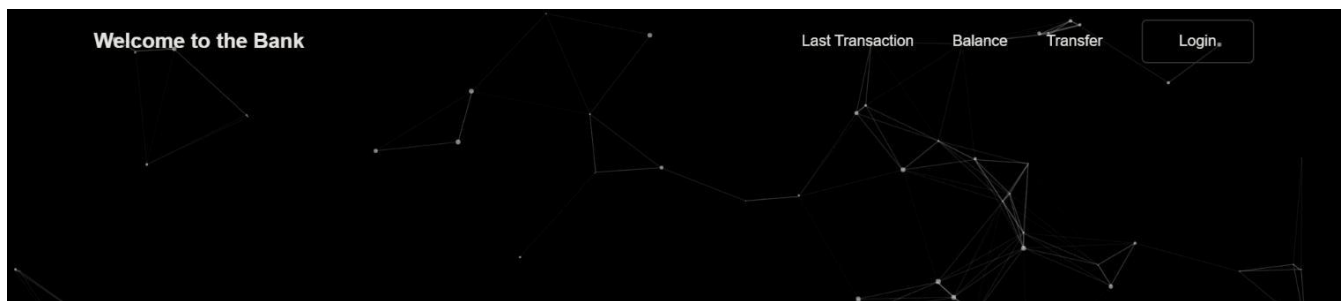
1. **Distributed Ledger Technology (DLT):** Enables decentralized and synchronized ledger access.
2. **Consensus Mechanisms:** Ensures agreement on transaction validity (e.g., PoW, PoS, PBFT).
3. **Smart Contracts:** Self-executing contracts automating agreement terms without intermediaries.
4. **Peer-to-Peer (P2P) Networking:** Direct communication and data sharing between blockchain participants.

Results

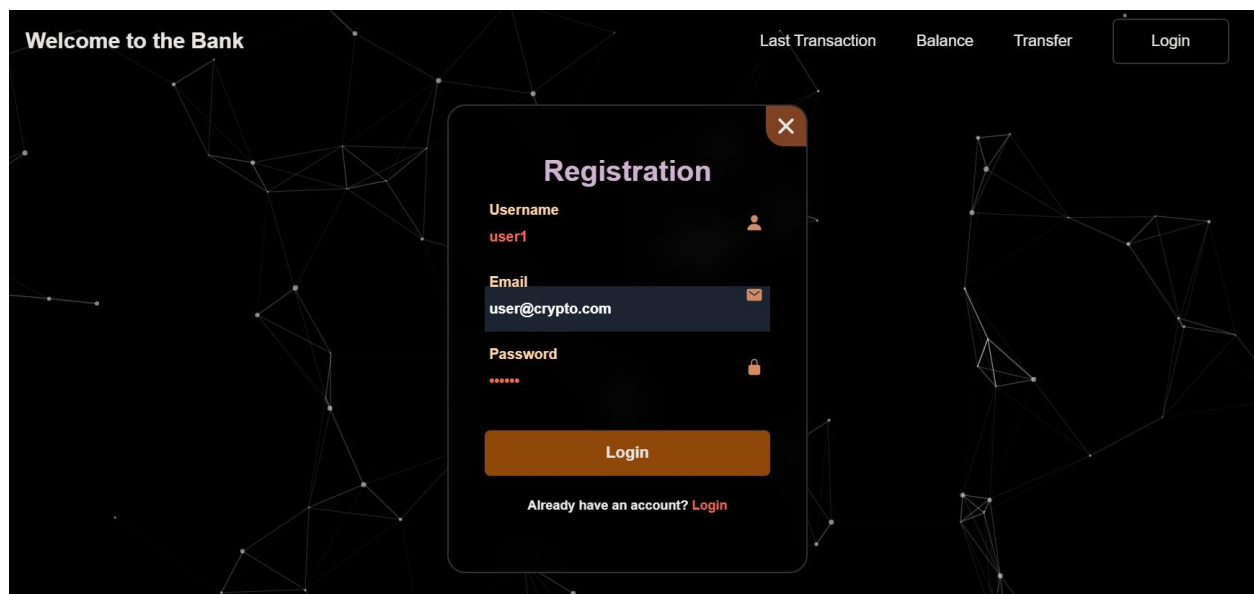
Server Running:

```
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with watchdog (windowsapi)
* Debugger is active!
* Debugger PIN: 107-040-127
127.0.0.1 - - [27/Dec/2023 07:08:23] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [27/Dec/2023 07:08:23] "GET /static/style.css HTTP/1.1" 304 -
127.0.0.1 - - [27/Dec/2023 07:08:23] "GET /static/back.js HTTP/1.1" 304 -
127.0.0.1 - - [27/Dec/2023 07:08:23] "GET /static/script.js HTTP/1.1" 304 -
127.0.0.1 - - [27/Dec/2023 07:08:23] "GET /favicon.ico HTTP/1.1" 404 -
█
```

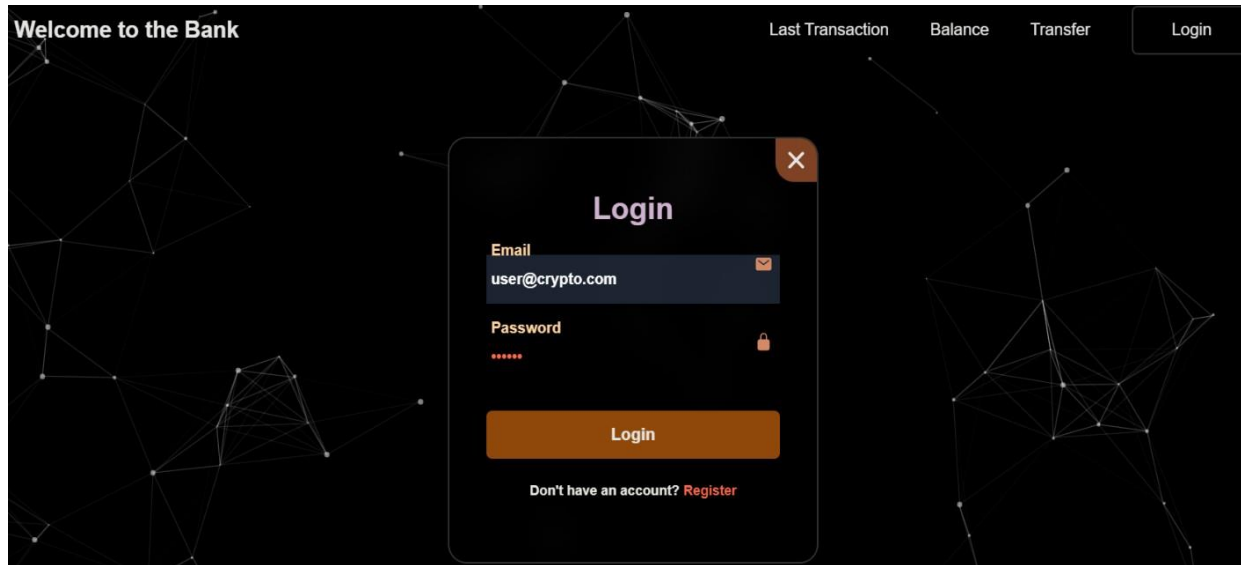
Login Page:



Registration Popup:

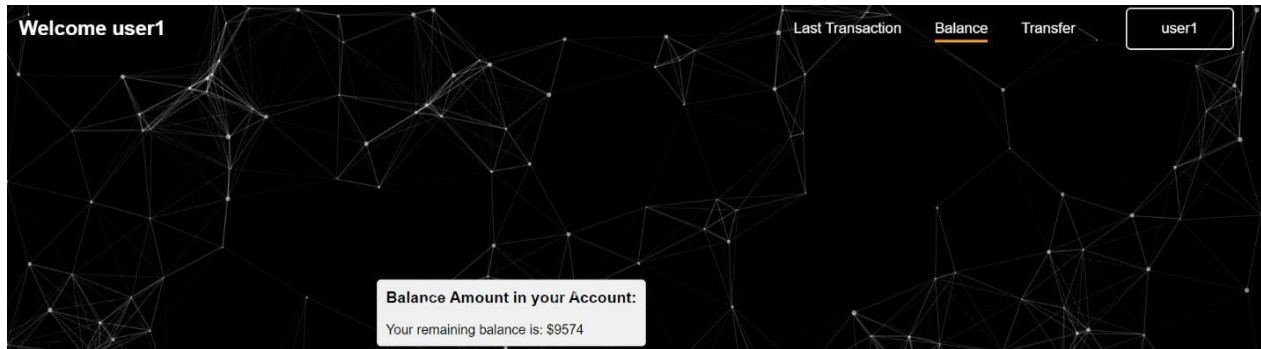


Logging In:



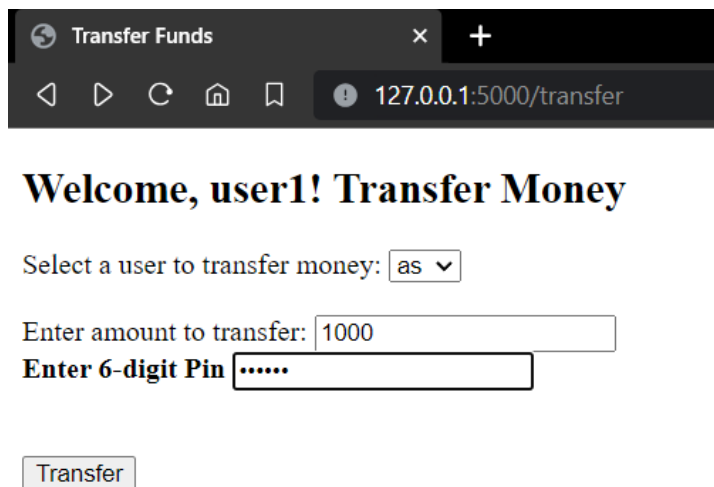
The image shows a web application interface for logging into a bank. The background is dark with a white geometric pattern of lines and dots. At the top left, it says "Welcome to the Bank". At the top right, there are links for "Last Transaction", "Balance", "Transfer", and a "Login" button. In the center, there is a "Login" modal box with a close button (X) in the top right corner. Inside the modal, there are two input fields: "Email" with the value "user@crypto.com" and "Password" with masked characters "*****". Below these fields is a blue "Login" button. At the bottom of the modal, there is a link that says "Don't have an account? Register".

Balance Check:



The image shows a web application interface for checking a balance. The background is dark with a white geometric pattern of lines and dots. At the top left, it says "Welcome user1". At the top right, there are links for "Last Transaction", "Balance" (which is underlined), "Transfer", and a button labeled "user1". In the center, there is a white box with the text "Balance Amount in your Account:" and "Your remaining balance is: \$9574".

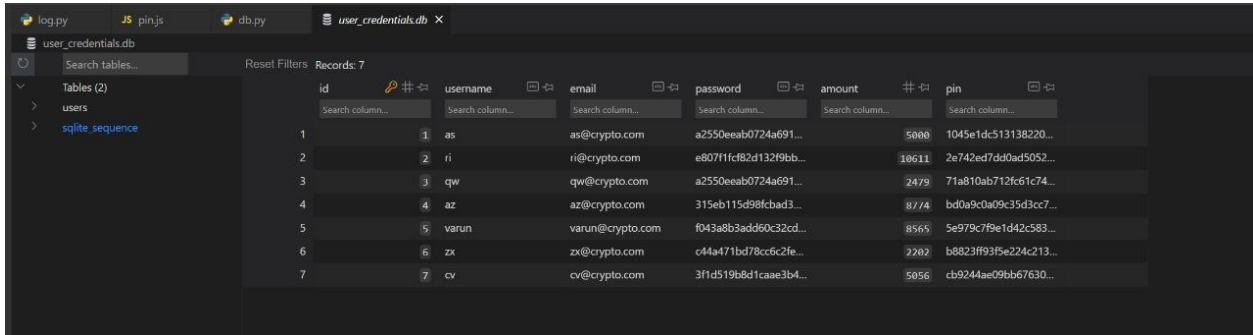
Transfer Funds:



The image shows a web application interface for transferring funds. At the top, there is a browser-like header with a globe icon, the text "Transfer Funds", a close button (X), and a plus button (+). Below the header, there is a navigation bar with icons for back, forward, refresh, home, and bookmarks, followed by a URL bar showing "127.0.0.1:5000/transfer". The main content area has a heading "Welcome, user1! Transfer Money". Below the heading, there is a form with three input fields: "Select a user to transfer money:" with a dropdown menu showing "as", "Enter amount to transfer:" with the value "1000", and "Enter 6-digit Pin" with masked characters "*****". At the bottom, there is a blue "Transfer" button.

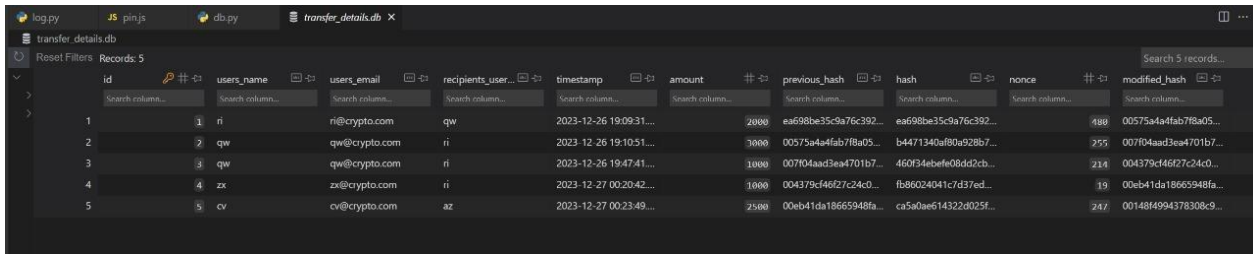
Database:

User Credentials DB:



id	username	email	password	amount	pin
1	as	as@crypto.com	a2550eeab0724a691...	5000	1045e1dc513138220...
2	ri	ri@crypto.com	e80711fcfb2d132f9bb...	10611	2e742ed7dd0ad5052...
3	qw	qw@crypto.com	a2550eeab0724a691...	2479	71a810ab712fc61c74...
4	az	az@crypto.com	315eb115d98fcbad3...	87/4	bd0a9c0a09c35d3cc7...
5	varun	varun@crypto.com	f043a8b3add60c32cd...	8565	5e979c7f9e1d42c583...
6	zx	zx@crypto.com	c44a471bd78cc6c2fe...	2202	b8823ff93f5e224c213...
7	cv	cv@crypto.com	3f1d519b8d1cae3b4...	5056	cb9244ae09bb67630...

Transfer Details DB:

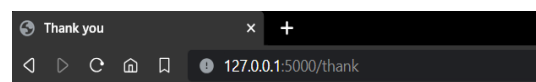
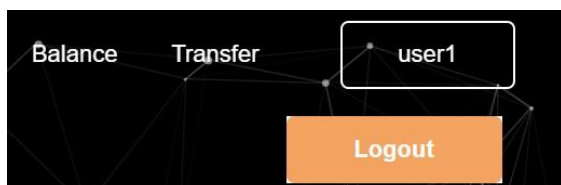


id	users_name	users_email	recipients_user...	timestamp	amount	previous_hash	hash	nonce	modified_hash
1	ri	ri@crypto.com	qw	2023-12-26 19:09:31...	2000	ea698be35c9a76c392...	ea698be35c9a76c392...	480	00575a4a4fab718a05...
2	qw	qw@crypto.com	ri	2023-12-26 19:10:51...	5000	00575a4a4fab718a05...	b4471340a80a928b7...	255	007f0aad3ee4701b7...
3	qw	qw@crypto.com	ri	2023-12-26 19:47:41...	1000	007f0aad3ee4701b7...	460f34ebef08dd2cb...	214	004379cf46f27c24c0...
4	zx	zx@crypto.com	ri	2023-12-27 00:20:42...	1000	004379cf46f27c24c0...	fb86024041c7d37ed...	19	00eb41da18665948fa...
5	cv	cv@crypto.com	az	2023-12-27 00:23:49...	2500	00eb41da18665948fa...	ca5a0ae614322d025f...	247	00148f4994378308c9...

Last Transfer:

```
{
  "amount": 1000,
  "hash": "fb86024041c7d37ed7c60d7441565c12ba9a0cdcb79e26538843becbba283711",
  "id": 4,
  "modified_hash": "00eb41da18665948faabaf949ebdd1153f686a91b7a3f208b365206892ad69bd",
  "nonce": 19,
  "previous_hash": "004379cf46f27c24c0ea886a5fd55cce12b25a32aba7a241b02c8e17907e94c7",
  "recipients_username": "ri",
  "timestamp": "2023-12-27 00:20:42.249384",
  "users_email": "zx@crypto.com",
  "users_name": "zx"
}
```

Logout Page:



Thank You user1 visit Again!!

Reference Links:

<https://www.simplilearn.com/tutorials/cyber-security-tutorial/sha-256-algorithm>

<https://blog.passwork.pro/how-sha256-works/>

<https://builtin.com/blockchain/create-your-own-blockchain>