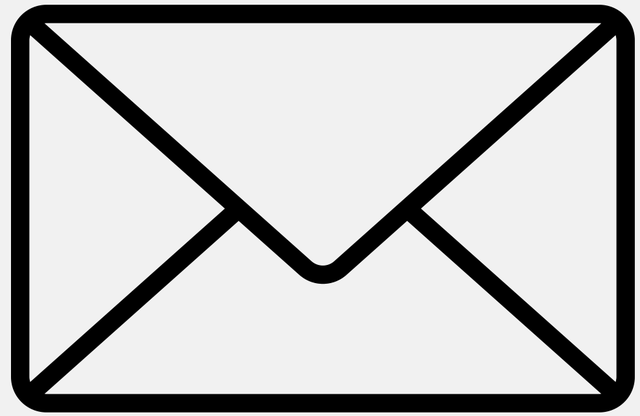
01

SECURE CHAT APPLICATION



Networks & Communication

MEMBERS

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BSCS - CS3B

Group 1

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PROJECT OVERVIEW

Secure Chat Application

This project develops a simple encrypted chat application that allows users to message securely. The goal is to send messages from one client to another with security features such as encryption and authentication.

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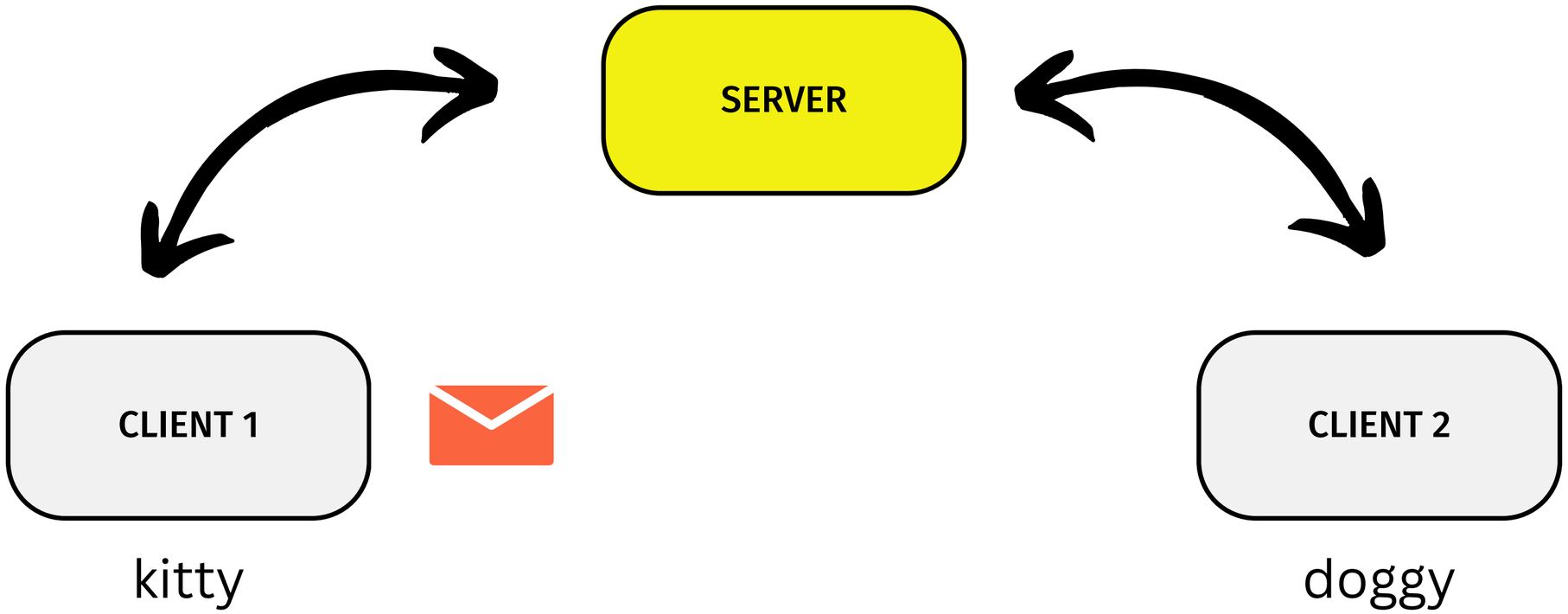
SOFTWARE COMPONENTS

Secure Chat Application



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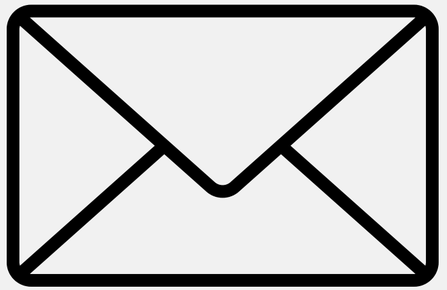
SOFTWARE ARCHITECTURE

Secure Chat Application

- Initializes the Connection
- Connects to the Server via Authentication
- Sends an encrypted message to the other clients through server
- Receives messages and decrypts it
- Displays messages in the chat box

CLIENT



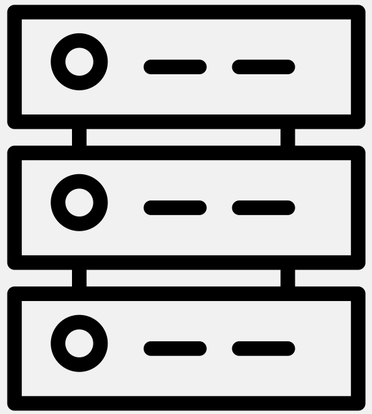
03

SOFTWARE ARCHITECTURE

Secure Chat Application

- Opens the server and listens to the connection
- Authenticates Client through successful credentials
- Receives encrypted messages and forwards to the recipient if they’re online
- Offers secure chat transfer between the clients

SERVER



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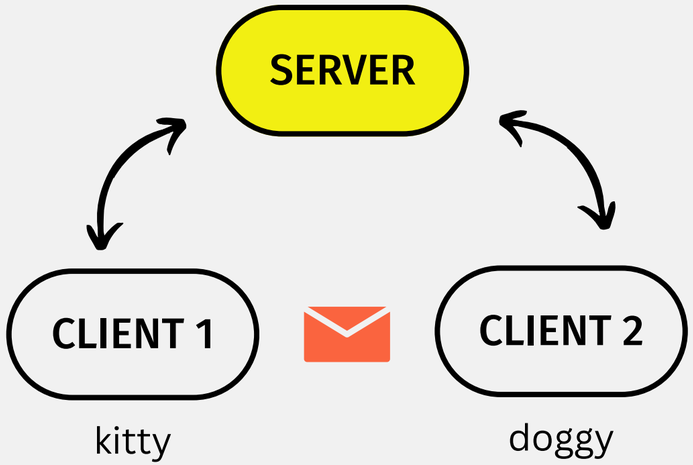
Initialization

- A **key** is generated for both client and server to use.
- Account is made with its password being **hashed** in the system to provide more security
- **Hash** codes are stored in **JSON file** for the server to read.

Secure Chat Application



Libraries

Secure Chat Application

import socket	Provides a networking interface to create and manage connections between the server and clients.
import threading	Allows concurrent handling of multiple client connections using threads. For client, it allows background message reception without blocking the GUI.
import json	Handles encoding and decoding of data in JSON format for user credentials.
import bcrypt	Implements secure password hashing and verification for authentication
from cryptography.fernet import Fernet	Provides secure encryption and decryption for the messages sent and received, ensuring security.
import tkinter as tk	Used to create the graphical user interface (GUI) for the chat application
from tkinter import scrolledtext	Extends tkinter by providing a scrollable text box for displaying chat messages.

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IMPLEMENTATION

Secure Chat Application

Client Authentication

```
Username: kitty
Password: 1234
kitty authenticated successfully!
```

Server Feedback

```
Server is running...
Authenticating user: kitty with password: 1234
Stored hash for kitty: $2b$12$tgaTAkjitZUr0uo1Kk6H7uEqzwxNd5q7kQHwPMnoHc5EfS2cLF
C6y
Authentication successful!
User kitty authenticated
```

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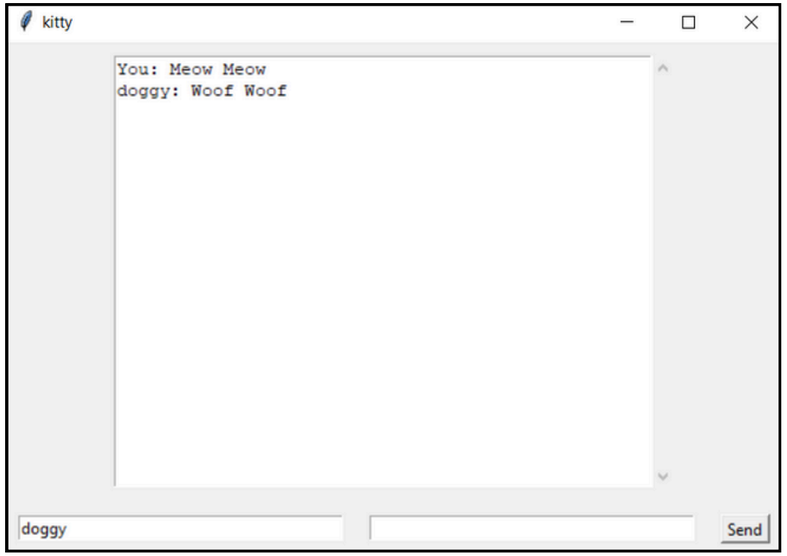
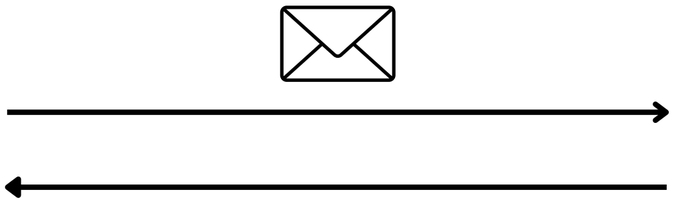
IMPLEMENTATION

Secure Chat Application

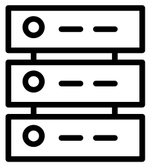
Client - kitty



Client - doggy



```
Sending to server: doggy||from kitty||gAAAAABnX-dOQoeEnJbF5Pk0m4HCN6WTpbIdz6pV84
mAzXT88qZSziCFJwm991gwQGqXu_VNiOupyNHDMYqwOZDwqSQRGJ5skw==
Received from server: doggy||from doggy||gAAAAABnX-dSnCKri9NRwHvY08yRiSRoBOitNNh
8-aHG00PPXI8RVaZEaNoEKYvAMF6d3NtPs-S3x2FgjW8EzB7U2fjwh6_C9g==
Decrypted message from doggy: Woof Woof
```



```
Received from server: kitty||from kitty||gAAAAABnX-dOQoeEnJbF5Pk0m4HCN6WTpbIdz6p
V84mAzXT88qZSziCFJwm991gwQGqXu_VNiOupyNHDMYqwOZDwqSQRGJ5skw==
Decrypted message from kitty: Meow Meow
Sending to server: kitty||from doggy||gAAAAABnX-dSnCKri9NRwHvY08yRiSRoBOitNNh8-a
HG00PPXI8RVaZEaNoEKYvAMF6d3NtPs-S3x2FgjW8EzB7U2fjwh6_C9g==
```

Server Feedback

```
Received encrypted message for doggy: from kitty||gAAAAABnX-dOQoeEnJbF5Pk0m4HCN6WTpbIdz6pV84mAzXT88qZSziCFJwm991gwQGqXu_VNiOupyNHDMYqwOZDwqSQRGJ5skw==
Received encrypted message for kitty: from doggy||gAAAAABnX-dSnCKri9NRwHvY08yRiSRoBOitNNh8-aHG00PPXI8RVaZEaNoEKYvAMF6d3NtPs-S3x2FgjW8EzB7U2fjwh6_C9g==
```

DEMO

Thank you!