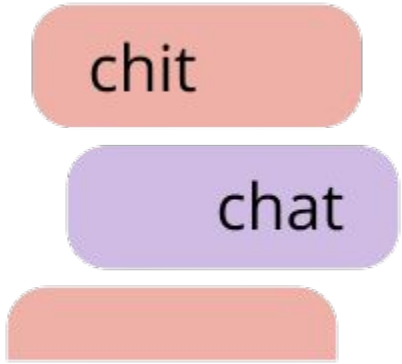


A web app by
Colin Snow, Maia Materman, and Shirin Kuppusamy

Introduction

Architecture and Challenges

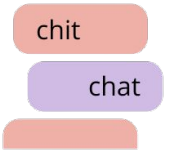
Demo

What We Learned

chit

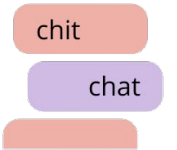
chat

INTRODUCTION



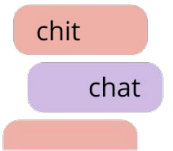
Motivation

There are a billion chat apps on the market right now. Why not make one more?



Overall Goals

We wanted to build a beautiful website that had nontrivial frontend, backend, and database components. We also wanted to ensure that we wrote a chat app that actually worked!

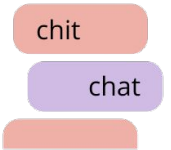


Learning Goals

Maia: I hoped to improve my React skills and really understand and execute on design and front-end development!

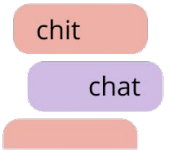
Shirin: I wanted to learn more about SQL and work with information on the backend to create a coherent product!

Colin: I hoped to learn about sockets and frontend/backend communication.



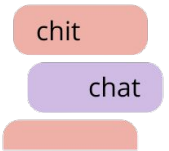
Features

- Synchronous communications between users and continuously updating pages
- Branded and aesthetically pleasing (at least we think!)
- Comprehensive error checking

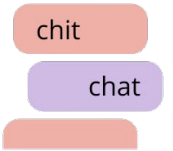


Functions

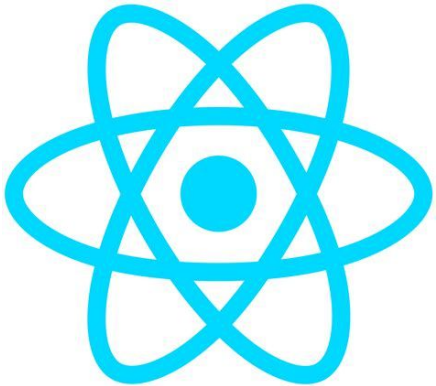
- Create new user accounts
- Update user profile information
- Delete user accounts
- Render and open all chats and messages
- Write new messages in real time
- Login to multiple accounts at same time



ARCHITECTURE AND CHALLENGES



Technology Stack



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chat

Our Designs: Login and Profile

Maia Materman

BACK

Name: Maia Materman EDIT

Username: webdevchamp23 EDIT

Password: ********** CHANGE

DELETE MY ACCOUNT

Create Account

Username

Password

LOGIN

Forgot Password?

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Our Designs: Create Account and Forgot Password

BACK

Name

Username

Password

Confirm Password

CREATE ACCOUNT

BACK

Sorry, that's too bad.

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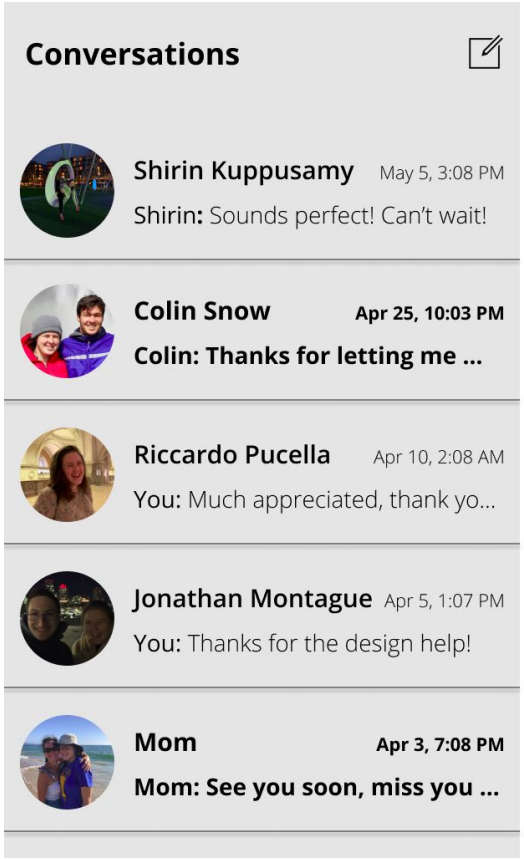
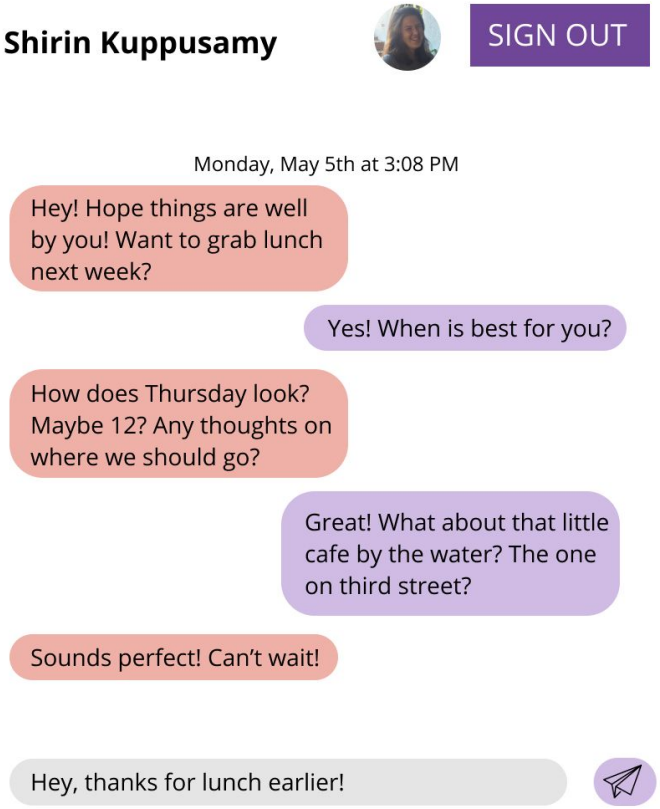
Our Designs: Main Chat Page





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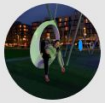
Our Designs: New Message

Conversations



Shirin Kuppusamy May 5, 3:08 PM

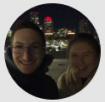
Shirin: Sounds perfect! Can't wait!

Colin Snow **Apr 25, 10:03 PM**

Colin: Thanks for letting me ...

Riccardo Pucella Apr 10, 2:08 AM

You: Much appreciated, thank yo...



Jonathan Montague Apr 5, 1:07 PM

You: Thanks for the design help!

Mom **Apr 3, 7:08 PM**

Mom: See you soon, miss you ...

To: Sh

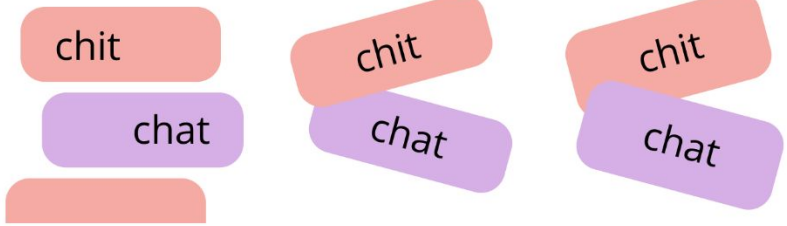
SIGN OUT

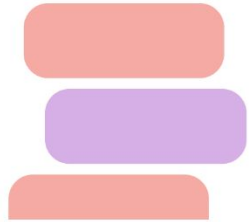
Hello!

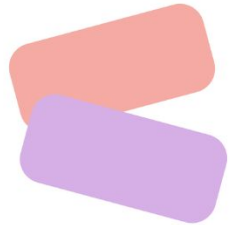
chit

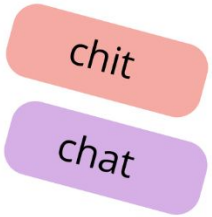
chat

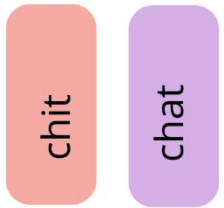
Our Designs: Logo

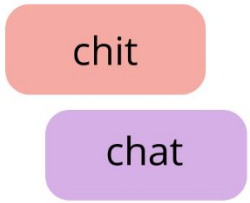


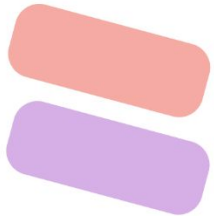


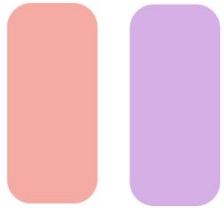


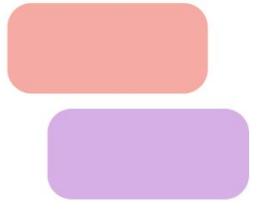


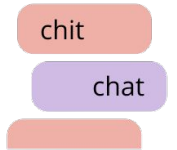




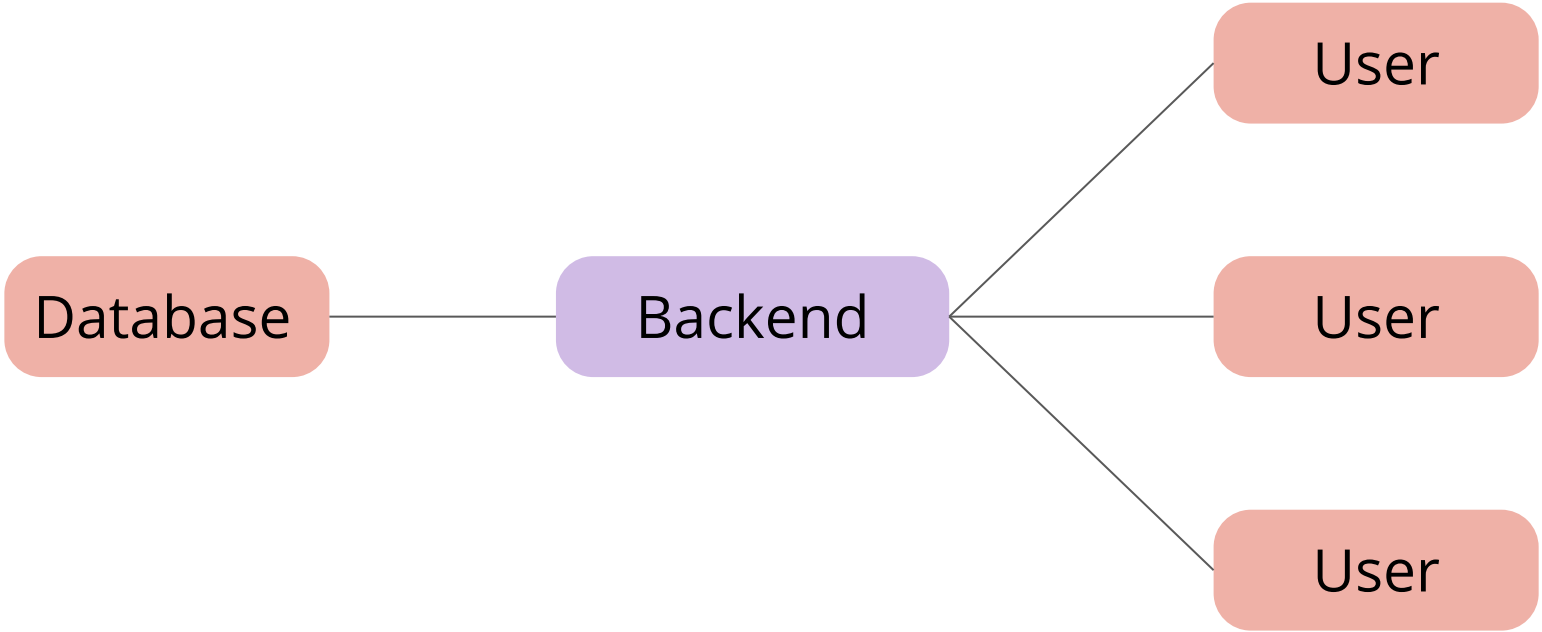








System Diagram



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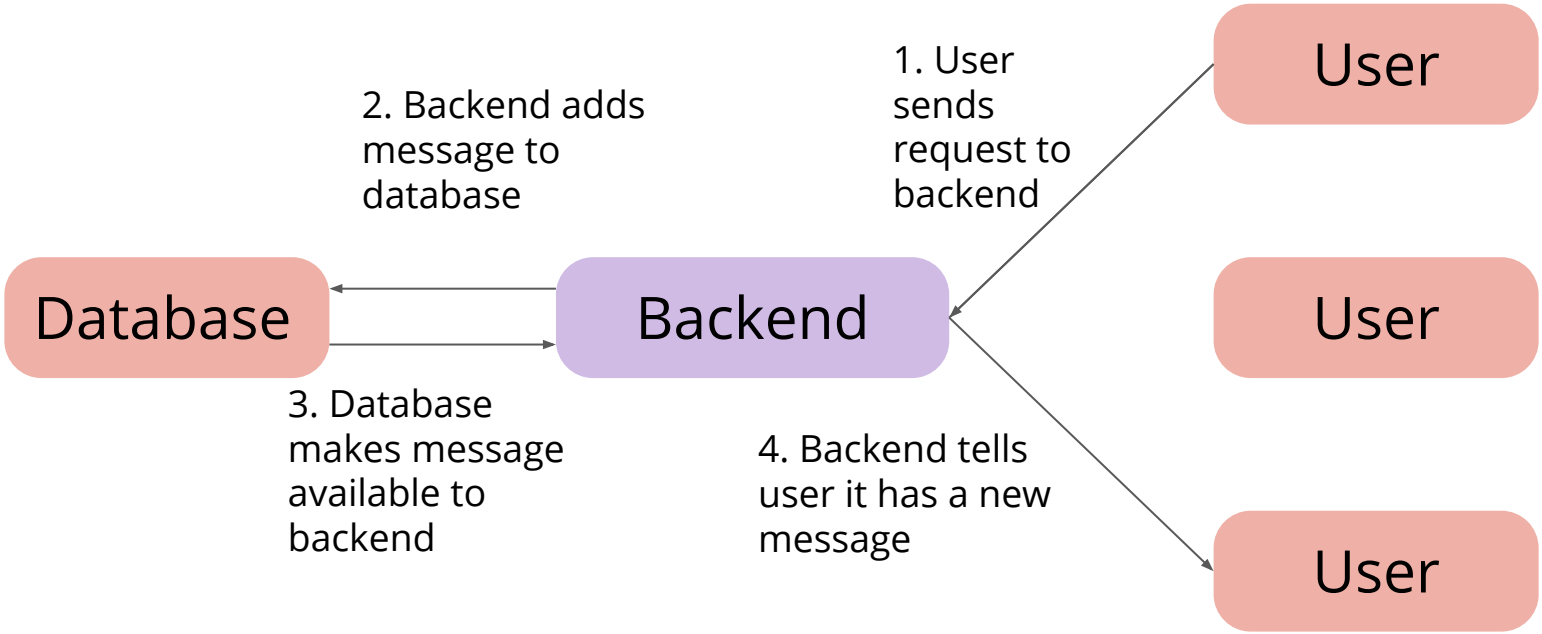
New Message Process



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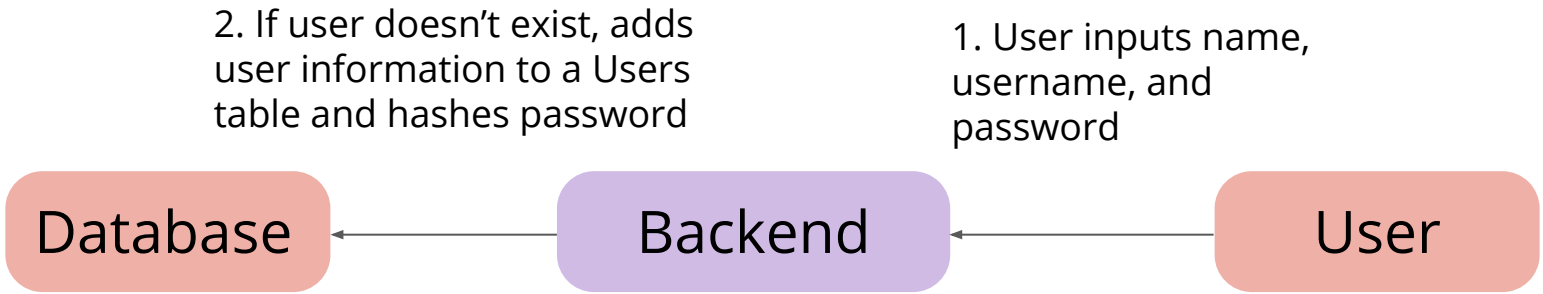
chat

New User Creation Process



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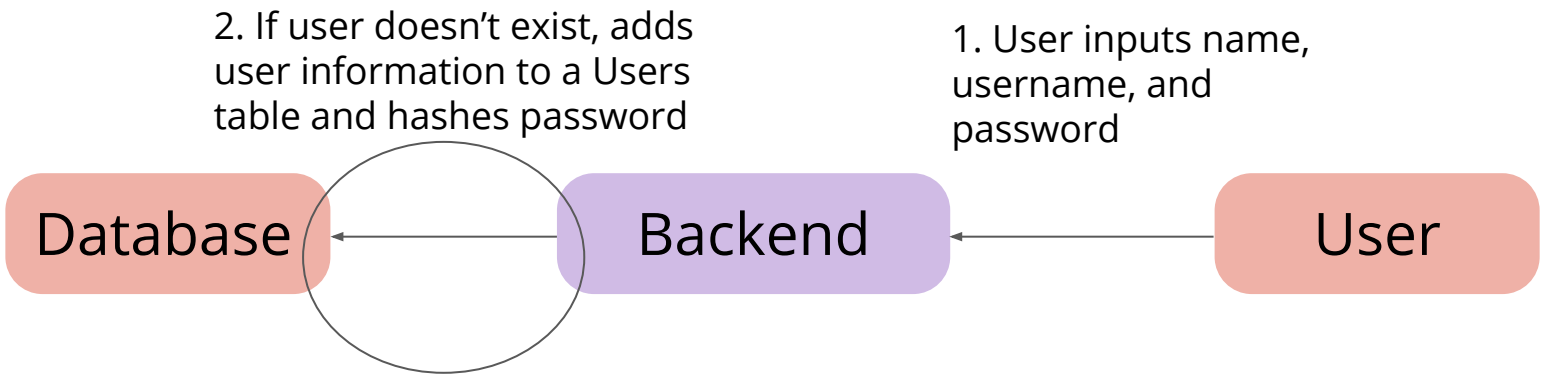
New User Creation Process



Let’s zoom in on checking if the username exists!

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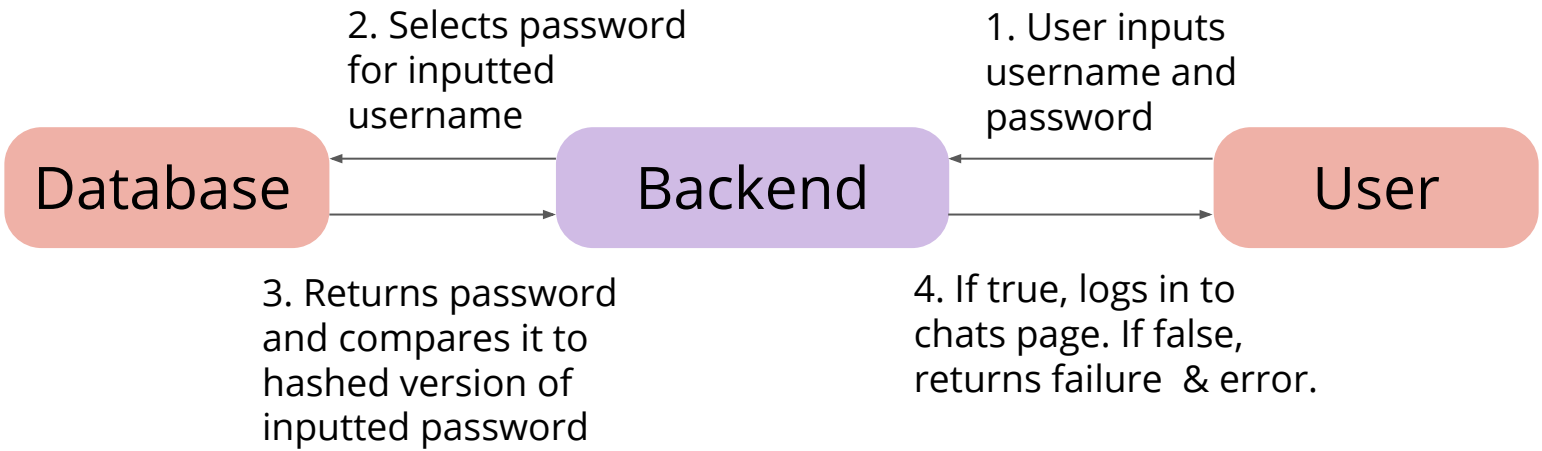
Login Process



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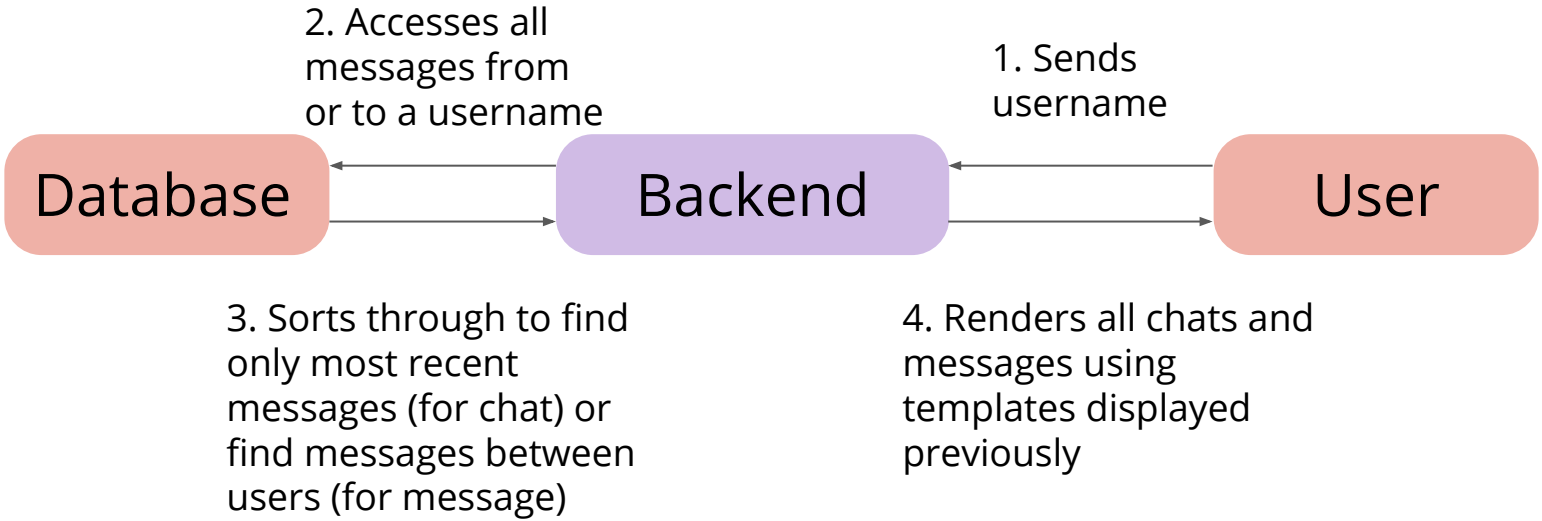
Get Message/Chat Process



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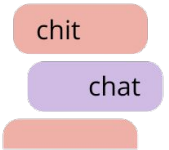
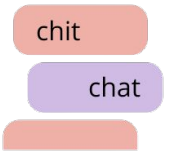
Challenge 1: Real Time Communication

- HTTP protocol was never meant for real-time communication
- A server usually only responds when requested
- Frontend would have to ask constantly for messages



Solution: Websockets

- More modern protocol, defined in 2011
- Enables full two-way communication
- Either client or server can send a message to be read by the other



Solution: Websockets

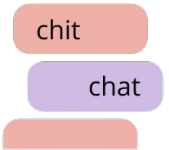
Frontend:

```
socket.emit("login", {data})
```

```
socket.on("login_response", data => {
      ...
});
```

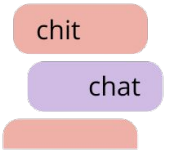
Backend:

```
@socketio.on('login')
def login(data):
    ...
    emit("login_response", data)
```



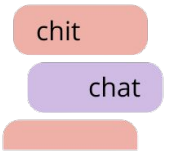
Challenge 2: Dynamic Rendering

- Need to handle everything from new user with no chats to users with many chats and messages
- Page has to update every time there is a new message without obviously reloading



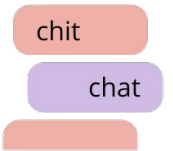
Solution: React and Conditional Rendering

- Update only components which change
- Use state to signal user actions



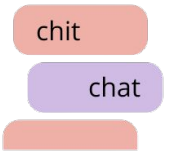
Challenge 3: Database Communication

- Need to ensure thread-safety
- Need to find users quickly
- Data size gets large



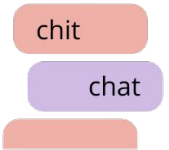
Solution: MySQL

- Guaranteed thread safe
- Can store users and messages in structured form
- Sort messages with username as primary key



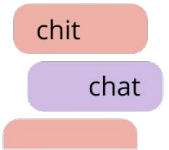
Challenge 3: Database Communication

- The syntax of using mySQL statements in a python script has nuances that can be hard to pinpoint
- Making sure the emit is different from the route is important or routes are called repeatedly
- Handling large amounts of data



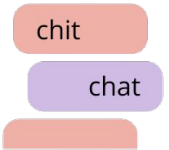
Solution: Database Communication

- Asking for help from more experienced SQL users!!
- Making sure to use unique, understandable, and consistent naming conventions
- Using multiple tables and primary keys to keep data sortable and accessible



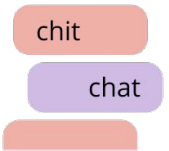
Challenge 4: Ensuring Security

- Passwords stored in a database can be a major security hazard
- A user can input a username that another user already has

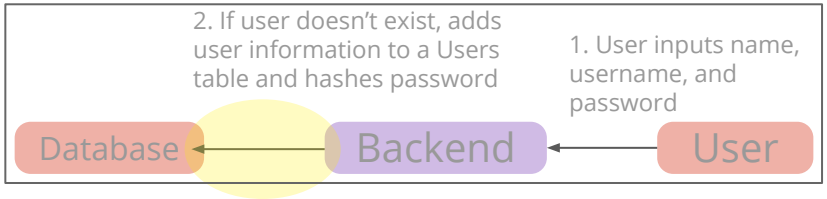


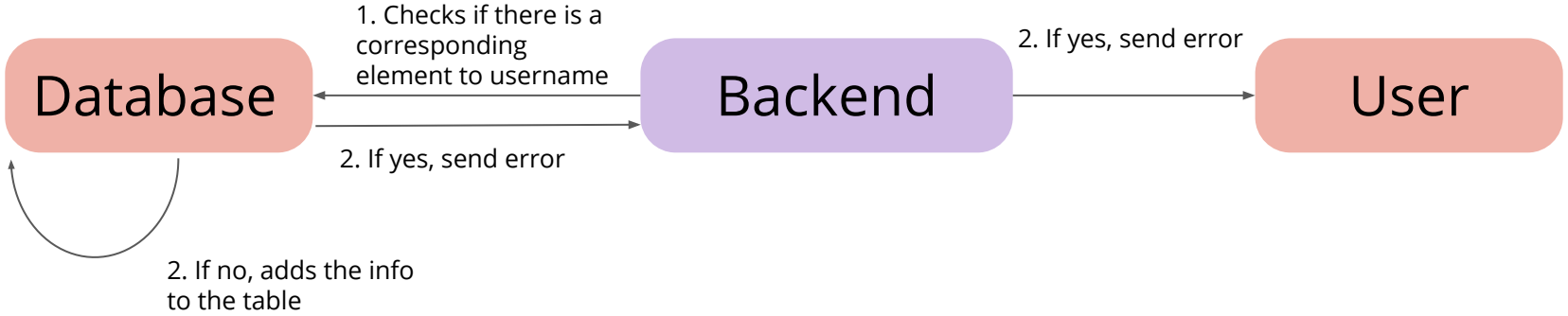
Solution: Ensuring Security

- md5 hashing for passwords
- Checks to see if user exists
- Reroute to login on username change



User Checking Process





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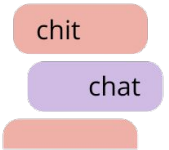
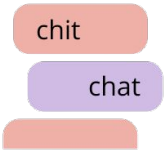
Challenge 5: Testing Edge Cases

- There are many ways a user can interact with our interface
- Sometimes a user may try to incorrectly interact with the interface
- Many errors more than what are useful for the user are thrown

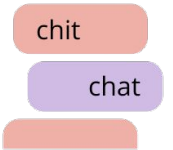


Challenge 5: Testing Edge Cases

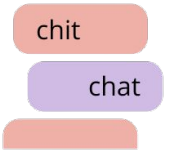
- We did a full run-through of our chat server several times
- We logged in with multiple users at different “stages” of messaging
- Flagging errors that are useful to the user and creating pop-ups



DEMO

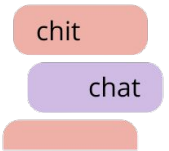


WHAT WE LEARNED



Insight 1: New languages

- Learned a lot of new terminology in order to communicate with one another and ask for help
- New languages are hard to pick up and use in a few weeks!
- Writing code and writing efficient code are two different things, and sometimes you make trade-offs



Insight 2: Siloed Work/Overscoped

- We took on a lot of work in a lot of different fields
- To get it done, all needed to be independent and work on own time
- Being clear about what we want and what we are working on
- Integrating often and thoroughly

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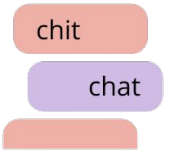
chat

Insight 3: Little things, big impacts

- Small inconsistencies in our CSS caused big, hard to debug issues
- Minor issues with ordering in the database or syntax errors can cause long chains of error messages
- Once the database and socket were integrated, hard to test one without the other, so lot of “test case” development either in SQL server or sockettest file



QUESTIONS?