

Project Name: Internet Messaging

Course Name: Basic Computer Science Practice

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1820222030 – 林哲豪 Wilbert Jaya Sucipto

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Individual Reflection

Name : 1820222041 - 溫富勝 Alexander Darryl Kristiawan

Learning Process

This project was a valuable learning experience. Initially, I familiarized myself with Apache NetBeans, which played a crucial role in streamlining the development process. Using this IDE allowed me to efficiently manage the project structure, compile, and debug the code.

Throughout the development, I faced various challenges, particularly in understanding the different components required for networking in Java. Concepts like sockets, threads, and handling input/output streams were critical to enabling real-time communication between clients. There were also significant considerations for concurrency, ensuring that multiple client windows could communicate without causing system conflicts or delays.

Project Outcome

Despite the limited time available, we successfully implemented a basic version of the instant messaging application. The chat app allows for two client windows to be created, which can chat with each other. Additionally, the system supports the expansion to chat with other users beyond just the initial two clients.

The development of this messaging system presented several hurdles, especially regarding real-time message handling and ensuring smooth communication between clients. However, by breaking down the project into manageable sections and learning step by step, I was able to overcome these issues. Overall, the project was both challenging and rewarding, and it gave me a deeper understanding of Java programming and networking concepts.

Challenges and Conclusion

The development of this messaging system presented several hurdles, especially regarding real-time message handling and ensuring smooth communication between clients. However, by breaking down the project into manageable sections and learning step by step, I was able to overcome these issues. Overall, the project was both challenging and rewarding, and it gave me a deeper understanding of Java programming and networking concepts.

Name: 1820222021 – 郑国强 Darren Tejaatmaja

Individual Reflection on Instant Messaging Application Project

Over the past month, I've worked on developing an instant messaging application using Java, which has been a highly rewarding and educational experience. The main goal of the project was to create an application where users can create profiles, chat with each other, and receive messages instantly. As part of the development process, I focused on both the backend and frontend, using Java for the logic and Java Swing for the user interface.

One of the key challenges I encountered was learning Java more comprehensively. While I had some foundational knowledge, this project required a much deeper understanding of Java, particularly in areas such as handling sockets and threads to enable real-time messaging. Additionally, this was my first time working with Java Swing to design the user interface, which initially seemed complex but ultimately proved to be a powerful tool for the task.

Another major technical hurdle was understanding how messaging systems work. I had to learn how to send and receive messages through network ports, which involved researching and implementing socket programming. This required ensuring that each user could send and receive messages instantly without any noticeable delays. Managing these communications and synchronizing the exchange of data in real-time between users was more challenging than I anticipated, but it was a crucial part of making the app functional.

Despite these challenges, the final result exceeded my expectations. The application is fully functional, allowing seamless real-time communication between users. The entire process has significantly expanded my knowledge, especially in network programming, Java's capabilities, and the importance of a well-thought-out user interface.

Ultimately, this project has been an incredibly valuable learning experience. It pushed me out of my comfort zone and equipped me with new skills that I hadn't anticipated mastering. The process of overcoming technical issues and creating a product that works as intended has been highly rewarding, motivating me to continue improving my software development abilities.

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Challenges

The development of the instant messaging app using NetBeans as the IDE, MySQL as the database, and Tomcat as the web server was a significant learning experience. Using java swing as the main UI, I found some limitations as Java Swing is pretty outdated compared to JavaFX but serves as the fundamentals of UI design for application developments. Hence, It's a pretty big challenge to make the UI look professional with these limitations.

Lessons

Implementing real-time message delivery highlighted the importance of socket programming and managing asynchronous events for smooth communication between users. Setting up Apache Tomcat for the server-side logic and handling requests helped me understand how to manage HTTP requests, serve data, and maintain session persistence. Developing the user interface required careful design of panels, buttons, and layouts to ensure a smooth and responsive experience. Managing components and event listeners taught me the importance of structure and user interaction flow. While building the app, I encountered various errors, which helped me learn more about debugging, exception handling, and improving app resilience.

Conclusion

The experience that I've learned from this project will be the start of my academic journey in the future. Working alongside my colleagues and learning to combine all of the codes into a product is very challenging. Using Java Swing allowed me to design a simple, user-friendly interface for the messaging app. Understanding layout managers and event handling was crucial for creating smooth interactions. Apache Tomcat helped manage server-side requests efficiently. It taught me how to set up a web server for handling user requests and managing real-time communication. Integrating MySQL for user authentication and message storage was essential. I learned how to manage databases, write SQL queries, and maintain data consistency. Implementing real-time messaging between users required handling sockets and maintaining stable connections, improving my understanding of networking in Java. Designing an application based on the client-server model emphasized the importance of clear communication protocols and secure data transmission.

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Reflection on Internet Messaging

Developing an internet messaging application using Java greatly expanded my knowledge of network programming and the complexities involved in real-time client-server communication. This project provided a hands-on opportunity to apply fundamental Java concepts in a practical setting while also pushing me to enhance my problem-solving skills and adopt more effective software design strategies.

One of the main challenges I faced was implementing a multi-threaded server to handle communication from multiple clients simultaneously. Initially, I discovered that using a single-threaded server created performance bottlenecks, as it processed client messages sequentially, leading to inefficiency. To address this, I utilized Java's threading capabilities, enabling concurrent processing and allowing the server to manage multiple clients smoothly, without slowdowns or interruptions.

Throughout the project, I gained deeper insights into key Java programming and networking concepts, particularly thread management and optimizing multi-client communication. A significant lesson I learned was the importance of resource management, especially in real-time data transmission across a network, where proper handling of resources is critical to maintain performance and stability.

Additionally, this project greatly enhanced my technical proficiency in Java and strengthened my ability to design scalable and efficient applications. Looking ahead, I plan to improve the application further by incorporating modern libraries like JavaFX to create a more user-friendly interface and implementing encryption techniques to ensure secure client communication.