West Chester University

CSC468 Project
Chess Game

https://github.com/EmiQuin/JuLuMcPaQu-468

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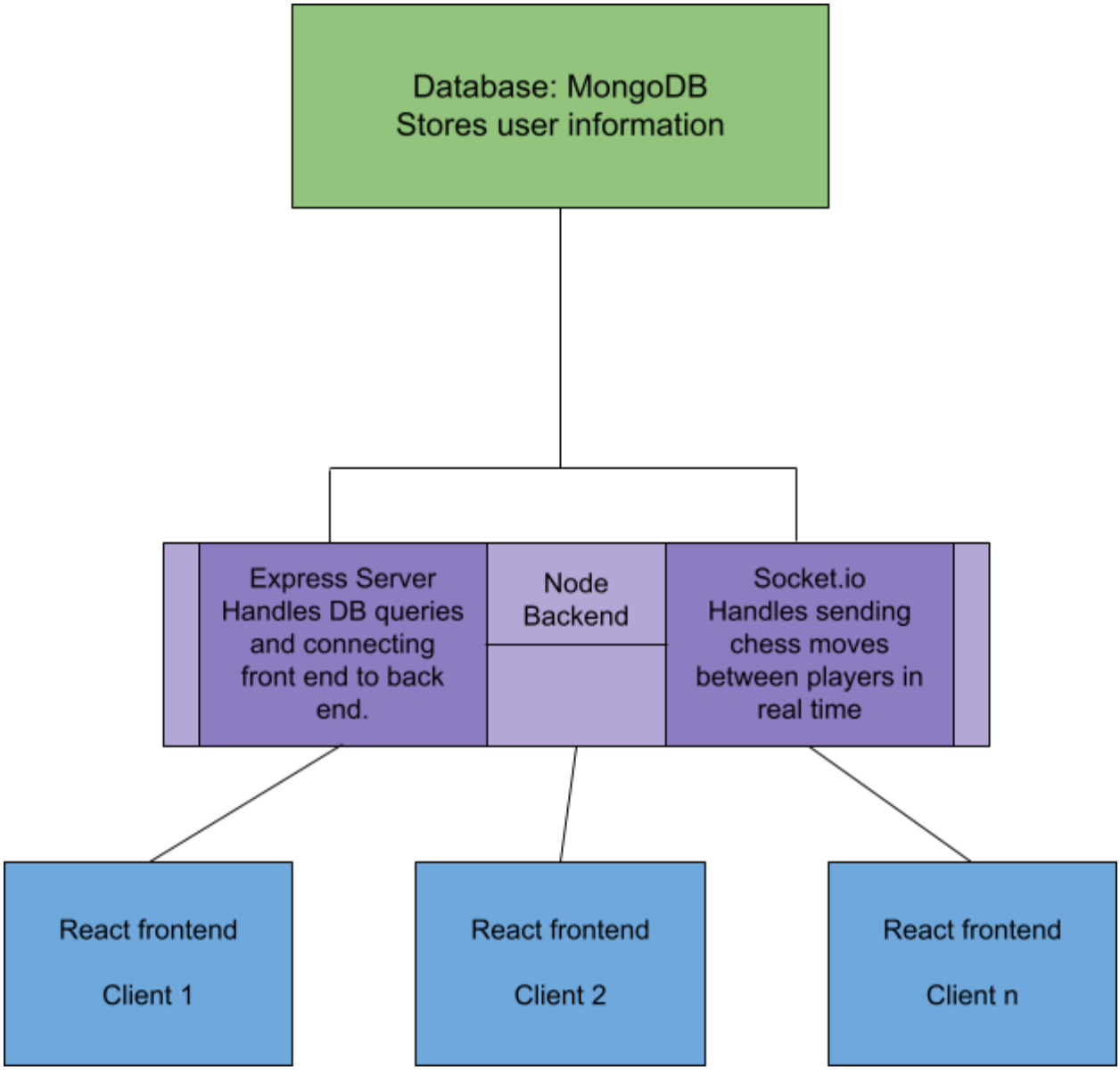
Summary

Our project is a chess website which allows users to play chess and chat in real time with one another. Users will first create an account on the website which will then be stored in our database. Once logged in, users can begin searching for a game. They can choose to either start a private match, which then allows them to send a link to their friend so they can join, or a public match where they will be randomly paired with an opponent. In a private game, the host of the lobby can choose what color they wish to start as, or if the choice should be randomized. The user can also choose to go against the computer. The computer has five different difficulty options: beginner, easy, medium, hard, and expert.

Once the game begins, the white player is allowed to make their move. Once made, the move is immediately shown to the opposing player who can then make their move. The game is played in real time, and each player has their clock counting down when it is their turn. In addition to the game itself, there is a chat box where the two players can message back and forth. Our site also features the ability to offer draws, which your opponent can choose to either accept or decline. Each player can also choose to resign the game at any time. The last big feature that the game screen features is a history of every move in the game. Users can step through the game move by move if they wish, and also jump to the beginning or end.

Once a game is finished, the result is then saved to the database. Users can go to their profile page and see their statistics such as the amount of wins, losses, and draws they have. They will also be able to see a history of each of their games. The details that are included are their opponent, what color they played, the time control, the result, how many moves the game lasted, and what date the game was played on. A user is able to click on any of the games in the list and are brought to a review board where they can replay the game move by move to study.



Vision & Design

Our goal is to build a project to allow people to play chess online against other players and computer opponents. Our project will include user profiles with logins, a profile page where statistics and match history can be seen, and live chat between opponents. We plan to integrate technologies such as Docker to improve management and scalability, as well as a CI/CD pipeline.

Technical Requirements

For this project, we plan to use the MERN stack. Using this stack will simplify the process of developing and implementing the game. Since the technologies involved are designed to work together, much of the complexity can be reduced.

For the UI, we will be using React.js, the R in MERN. The front end will need to handle user logins, as well as the display and functionality of the chess board and all legal moves. Any time a login, new game, or move is attempted, our application will need to communicate with the server.

On the server side, we will be using Express and Node.js. Our server will communicate with the database in order to register and log in accounts as well as fetch user data. Our server will handle interfacing between clients to allow for real time chess playing with Socket.io.

Our database of choice is MongoDB, which will facilitate fast communication with the application. This database will store all information related to user logins and profiles. Since MongoDB stores information in JSON-like files, it is ideal for use alongside the rest of the MERN stack.

We will use a Jenkins server to implement our CI/CD pipeline. This allows for continuous updates without unexpected or lengthy disruptions in service, as well as an option for visualizing the status of our components.

Intermediate Milestones

At this point in the project we have a functional Minimum Viable Product. Players can log in and play games by searching for their opponent under whatever time constraints they choose. Players' stats are tracked and viewable with their profile and there is a live chat between players during games.

We are using MongoDB to store player profiles as well as their moves and outcomes of games. This allows players to create accounts so they can keep track of their games and any statistics that they might care about. This allows for very fast and lightweight transfer of data so users do not have to deal with slow loading times caused by connections between the database and the server.

We also used express and Node.js to facilitate communication between the database and the user. By combining these technologies with Socket.io we enabled users to play games in real time seamlessly. These middleware technologies allow the users to interact with one another without directly referencing the database. This way, the database only needs to be interacted with at the end of the game to record the results, which avoids delays that could happen when many players are interacting with the database simultaneously. There are still a few errors in this section related to private lobbies and players having the wrong time constraints. We believe the best way to resolve this will be by modifying what information gets brought in with the player when they join a lobby versus what information the lobby would carry to give to the player.

The UI uses React.js and specifically the Mantine library. This has hundreds of components that will look familiar to users. This allows both for easier development of the design of our webpage as well as making it very intuitive for users. Currently the front end is mostly used through the side bar which has links to look at your profile, find a match, or set up a private match. Some next steps will be to add these same links on the main page and to work to make both the main page as well as game lobbies more visually appealing.

Project Progression

At its final stage, our project is fully integrated into the cloud. We use three Jenkins pipelines for our CI/CD needs, and the whole system is orchestrated by Kubernetes. The application supports an account system, both public and private matches with other players, private matches against the computer, and a profile page where past games can be tracked and examined.

Our front end uses React.js and the Mantine library to make development easier and to make the UI intuitive to users. The navigation on the site is easy with the home page directing users to the side bar where they will find any links that they need, including signing on and playing a game.

Our front end was connected to the backend using node.js combined with socket.io and express. Express allows us to communicate with the database quickly and seamlessly while socket.io allows for constant feedback between players and updating of information without a need to refresh the page. We experienced some errors when trying to build these systems into our project. One persistent problem was issues with private matches. We were getting time constraints mixed somewhere in the communication between the users and this was causing players to have different constraints which ruins the game. We were eventually able to solve this when we realized that we were not sending the information of what the constraints were supposed to be to the 2nd player. So, when we used socket.io to create the room we had to initialize it with the proper time control or else it would default to the lowest value.

Our backend used MongoDB to store player profiles. These profiles would consist of the login information as well as their match history and the specific moves played within those matches. This allows players to have a record of the moves they have played so they can learn from their previous games and also monitor their progression.

One important challenge we faced while converting the infrastructure to work with the CI/CD pipelines was that we had a configuration file which was necessary for the backend to connect to the database, but which could not be saved on Github. Previously this was not a problem as we could add the file manually before deploying the infrastructure, but the move to Jenkins necessitated a programmatic solution: using the Jenkins agent environment variables to build the required file during the “Publish” stage of the pipeline.

Our project fully meets technical requirements. The application is currently publicly available to use and play chess with, and we have succeeded in implementing all the features and technologies that we had planned.

Kevin L. Jusino

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Professional Summary

A skilled computer scientist with 3-years of coding and development experiences; organized and strategic team player and project manager capable of guiding a team; independent and able to prioritize multiple projects.

Education

West Chester University of Pennsylvania. 2020 – 2023, B.S. Degree to be awarded May 2023
Dean's List FA2020, SP2021. Grade Point Average: 3.935
Major: Computer Science with focus on program development.
Related courses:

- Basic, Intermediate, and Advanced Java Language Computer Programming
- Intro C Language Computer Programming
- Computer Systems, Data Structures and Algorithms Penn State University Park, 2019 - 2020

Dean's List FA2019, SP2020. Grade Point Average: 3.87
Major: Computer Science Engineering
Related courses:

- Engineering Design and Development
- Intermediate Python Language Computer Programming

Experience

CAP 2 (Stocking) Team Associate (Part Time) Aug. 2020 – Present, Wal-Mart
Duties included loading and unloading freight from trucks, pallets, and carts, lifting 40lbs or more daily, stocking and organizing shelves, providing customer service and assistance as needed.

Burger King Cashier (Part Time), June 2018 – Aug. 2019, HMS Host Hickory Run Service Plaza
Duties included taking and delivering orders to customers, navigating the register screen and drawer, working efficiently during busy hours, training new hires, providing customer service and assistance, and replenishing stock of condiments and utensils.

Snow-Tubing Attendant (Part and Full-Time), Dec. 2016 – Jan. 2020, Jack Frost Big Boulder

Duties included directing guests up and down the snow slopes, radio communication with my coworkers, preparing equipment and electric carpets, inflating, and deflating, snow tubes, and digging pathways for guests and associates to move through.

Skills

General: Mathematically Inclined, Team Player, Project Planner, Leader
Computer: Products of: Microsoft Office, Google, Adobe, Apple, Windows, PC. jGRASP, IDLE3, Terminal, Visual Studio Code
Coding Languages: Python, Java, C, Haskell
Languages: English (Primary), Basic Spanish

References

References are available upon request.

Emilia Quintana

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emiliaquintana97@gmail.com - (484) 844-5337

Education

West Chester University of Pennsylvania, West Chester, PA — Graduation: May 2022
Bachelor of Science in Computer Science — Current GPA: 3.9
Computer Security Certificate — Major GPA: 3.9
Dean's List: Fall 2019; Spring 2020; Fall 2020; Spring 2021
Notable Courses: Software Security; Computer Security; Operating Systems

Work Experience

Endevor, LLC, Wilmington, DE — Dec 2021 - Present
Software Developer/Analyst Intern

- Work within an agile framework on large software products.
- Develop front and back-end systems for multiple clients.

West Chester University of Pennsylvania, West Chester, PA — Sept 2020 - Dec 2021
Peer Writing Mentor & Writing Center Tutor

- Guided students with interpreting and following writing assignments.
- Worked one-on-one with a diverse student body on writing skills.

Languages

French (intermediate)
English (native)

Technical Skills

Programming Knowledge

- Java
- Python
- C
- C#
- Haskell

SQL
Linux
Microsoft Office Suite

Projects

Command Line Interpreter: a basic shell, written in C, capable of running built-in commands as well as those found on a path.

Benjamin McFalls

484.667.7294 | bmcfalls1@gmail.com
1114 Wilderness Trail, Downingtown, PA 19335

Education

West Chester State University | College of Sciences and Mathematics, — West Chester, PA
Computer Science, GPA **3.83** — December 2022

The Pennsylvania State University | College of Information Sciences and Technology — University Park, PA
Aug 2017- May 2018

Professional Experience

SAP — Newtown Square, PA
Student Training and Rotation (SAP STAR) Internship program — May 2021 - current

- Multi-year rotational program with structured training in technical skills, business acumen, and soft skills.
- In collaboration with Innovation Center, coded, tested, and developed solutions in alignment with project requirement.
- Leveraged and built knowledge in Java, Javascript, NodeJS etc. to meet business requirements for frontend and backend development.

USLI — Wayne, PA
College Help Intern - Technical Infrastructure Team — Nov 2020 - Apr 2021

- Diagnose and resolve technical hardware and software issues leveraging active directory and Dameware.
- Configure new systems to meet corporate standards and user requirements.

United Postal Service — West Chester, PA
Supervisor, promoted from package handler in Nov. 2019 — Oct 2019 - Sept 2020

- Trained and supervised a team of 10 package handlers ensuring the team meets safety and productivity objectives.
- Contributes to the growth of UPS by providing effective leadership, customer service and communication.

iD Tech - West Chester University — West Chester, PA
Lead Instructor summer 2019, promoted from Instructor following summer 2018 — *May 2018 - Feb 2020*

- Prepared lesson plans on a variety of topics including: cyber security, encryption, artificial intelligence, machine learning, coding, game design, and mobile application development.
- Lead a team of instructors in the day to day program operations as well as overnight supervision of students.
- Taught STEM classes to middle school and high school students applying behavior management techniques to encourage motivation, teamwork and a fun learning environment.
- Selected and served as a brand ambassador at events during the year

West Chester, PA
Feb 2019 - June 2019

Volunteer Experience

Global Leadership Summit West Chester, PA
Technology Assistant 2017 Event Assistant 2015, 2016, 2018 *Summer 2015 -2018*

- Coordinated local, live HD simulcast technology for a 2 day leadership event in coordination with over 200 national sites, and serving over 400,000 people. Worked with a four person technology team at local site.

Awards, Skills

- JAVA, Python, Linux, HTML, Javascript, SAP S/4 HANA, SAP Ui5
- Machine Learning and AI: Tensorflow: Image classification, reinforcement learning with Open AI Gym
- Microsoft Office, Excel, Word, PowerPoint Proficient

Hilary Lumeh

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Education

West Chester University of Pennsylvania Exp Graduation: May 2023
Bachelor of Science in Computer Science
GPA: 3.4

Delaware County Community College Graduated: December 2020
Associate of Science in Information Technology
GPA: 3.6

Work Experience

Amazon, West Deptford, NJ February 2021 - present

Picker, Amnesty certified

- Pick items ready to be processed, while working with others to reach a set goal
- Amnesty certified, troubleshoot the robots on the AR (autonomous robot) floor, remove fallen items from view of the ARs, manually or digitally change paths of the ARs, and make sure the employees (stowers/pickers) have a continuous flow of ARs coming to their stations

InfoCision, Philadelphia, PA September 2020 – February 2021

Customer Support Representative

- Helped xfinity customers with problems relating to their internet or mobile devices
- Upgraded customers' internet and mobile services

United Parcel Service (UPS), Philadelphia, PA January 2019 – January 2020

Hazardous Material Handler

- Sorted, scanned, loaded/unloaded packages and made sure that Hazmats were properly documented
- Helped to teach new employees the company's standards for handling and loading packages

Skills

- **Technologies -** Bootstrap, react
- **Languages -** Python, SQL, Java, Ocaml