Mahad Ahmed

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Education

Carleton University — Ottawa, ON, Canada
Bachelor of Engineering in Software Engineering — Sep. 2021 – April 2026

Technical Skills

Languages: C, Java, Python, JavaScript, SQL
Tools/Frameworks: Linux/Unix, AWS, Git, React, Flask, Docker, Pandas, Spring/SpringBoot, Jenkins, Kubernetes
Courses: Operating Systems, Embedded Programming, Object Oriented Programming, Data Structures, Real Time Systems, Database Management

Experience

DevOps Software Engineer Intern — May 2024 – Present
Communications Research Centre Canada — Ottawa, ON, Canada

- Implemented a Python Flask API across company applications to capture and transmit real-time JSON usage data to an SQS queue, enhancing data collection efficiency and accuracy.
- Engineered an AWS Lambda function to autonomously process queued messages, dynamically appending insights to annual CSV and QuickSight reports stored in S3 buckets for comprehensive usage analytics and reporting within S3 buckets.
- Developed cloud applications in form of AWS CDK projects to implement infrastructure as code (IaC) principles, ensuring seamless deployment and reproducibility of cloud resources.

R&D Software Engineer Intern — January 2024 – April 2024
Communications Research Centre Canada — Ottawa, ON, Canada

- Spearheaded a research initiative aimed at democratizing spectrum licensing in Canada by developing an innovative Python-based automated environment type classification tool
- Leveraged advanced spatial analysis techniques such as geohashing and GeoPandas to design and implement a robust software solution capable of classifying environmental types based on geographic coordinates.
- Employed QGIS and Matplotlib for comprehensive data collection, processing, and visualization of shapefiles, enabling the accurate representation of geospatial information and further enhancing the interpretation of environmental characteristics

Projects

IPC and Signal Handling in Unix/Linux | *C, Linux, Ubuntu*

- Emulated a Cyber-Physical System (CPS) by creating processes for ECG and image data transmission, utilizing Named Pipes (FIFOs) for communication with edge-cloud servers.
- Implemented data integrity checks by tracking and comparing byte counts sent and received, with appropriate signaling for successful or failed transmissions.

Simulated Linux Completely Fair Scheduler (CFS) Using Threads | *C, Linux, Ubuntu*

- Simulated a Linux Completely Fair Scheduler (CFS) using multi-threading, incorporating multi-priority queues (RQ0, RQ1, RQ2) and handling different process types (SCHED_FIFO, SCHED_RR, SCHED_NORMAL).
- Developed a producer-consumer model with mutex locks for queue synchronization, efficiently managing process scheduling and execution. Implemented dynamic time slice adjustments and priority recalculations, tracking detailed output for process states and scheduling metrics.

HyperSonic | *Python*

- Developed an Discord music bot in Python, leveraging the Discord API for seamless communication with Discord servers. Utilized asynchronous programming techniques to ensure efficient handling of user requests and responses, enhancing the bot's responsiveness and scalability.
- Implemented REST API integration and utilized the youtube-dl library to enable the bot to parse and play user-requested songs from YouTube in real-time. Employed streaming techniques to ensure smooth playback and minimize latency, enhancing the overall user experience.

Health and Fitness Club Management System | *Java, SQL*

- Engineered a Health and Fitness Club Management System with PostgreSQL integration for streamlined data storage and management, enabling efficient user registration, profile management, and scheduling functionalities.
- Implemented JDBC connectivity within the system, ensuring seamless interaction with PostgreSQL databases for robust user data handling, facilitating essential features for club members, trainers, and administrative staff.