

# Wenyuan Ma

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## Education

### Cornell University, Ithaca, NY Expected May 2020

Bachelor of Arts in Computer Science and Mathematics; GPA: 4.022/4.3; Dean's List, every school semester

## Professional Experience

### Research on Java JRIF Type System

Jun. 2019-present.

- Worked on extending the language of JRIF(Reactive Information Flow Control for Java), which is used to specify confidentiality and integrity policies by RIF automata labels on variables in a Java program;
- Used KAT expressions to replace RIF automata labels to make the language more succinct and expressive; implemented Java program that compares two KAT expressions using techniques like Binary Decision Diagram and Symbolic Derivatives.

### Software Engineering Intern, Monja Corporation, San Francisco

May.-Aug.2019.

- Worked with 5 engineers to develop features for a Python-based loan trading platform, which automates the process of loan underwriting for banks and credit unions.
- Helped set up Jenkins Build Server and Docker Image on AWS; Used Python Luigi module to build file processing jobs, including generating loan portfolio files, comparing files of different versions, and filtering eligible loans
- Maintained the staging database with pgAdmin; Fixed SQL queries due to update in source data format.

### Teaching Assistant, Cornell CS4410: *Operating Systems*.

Aug.-Dec.2019.

- Helped students with their programming assignments and problem sets;
- Graded homework and exams.

## Projects

- **Course Management System (School Project Team):** Helped develop the backend of Course Management System (CMSX), a website used by more than 2000 Cornell students in over 40 courses in Computer Science and Information Science. The system enables multiple tasks in running a large course, such as course creation, grading, and online submission of homework. The codebase uses Java with JPA/MySQL for the backend, and JSP with JavaScript/HTML for the frontend. My responsibilities include implementing new GET/POST actions, modifying UI, refactoring deprecated functions, testing and fixing bugs.
- **Traffic Accident Detector (Cloud Computing Course):** Worked with 3 engineers to build a car collision detection system with multiple Microsoft Azure Cloud services, including Cosmos DB, Azure VM, and IoT Hub. It collects traffic image data from street camera sensors and trains a Faster R-CNN model in the cloud to detect collisions in an image (reference to the CADP paper by Ankit Shah). If a collision is detected, the cloud will send alarm messages back to console to warn people about the accident.
- **Optimization of Bike-sharing System (Research Project):** Designed a simulation model for New York's Citi Bike bike-sharing system. Analyzed real-world data to determine patterns for bike demand and customer's behavior. Optimized the site choice for bike charging stations with GRASP and Genetic Algorithms in Python Gurobi.
- **Three-phase Commit, Paxos, and COPS (Distributed System Course):** Worked with 2 teammates to implement a distributed music playlist using Three-phase Commit Protocol, a distributed chat room with consistent message ordering using Paxos Protocol, and a distributed key-value store that guarantees causal+ consistency using the dependency tracking mechanism COPS. Simulated distributed servers with Python-based processes which communicate by sockets. Supported fault tolerance in multiple cases.
- **SQL Interpreter (Database Practicum course):** Worked with 2 engineers to build a Java-based SQL interpreter capable of performing basic SQL statements. Used Java NIO package to efficiently read and store table data. Used Dynamic Programming to find the best query plan for a given SQL query. Built an operator tree to generate the results of the query. Improved query efficiency by 54 percent by applying static B+ tree Indexing Algorithms.

## Other CS-related Activities

### Team Lead, Cornell ACM-ICPC Club (International Collegiate Programming Contest)

Sept. 2016-Present

- Discussed and designed creative ways to solve real-world problems using algorithms, data structures, and mathematical methods during weekly training sessions, mainly in C++.
- Solved 6 challenging algorithm problems and helped Cornell team place 11th among 50 universities at the ICPC Greater New York Regional 2016 and place 6th in Greater New York Regional 2017

### Team Lead, Midwest Trading Competition 2018, Chicago, IL

Apr. 2018

- Worked with two team members to design strategies for two quantitative trading cases:
- For the case of Portfolio Management, used a Linear Regression model to find relationship between 12 market signals and stock prices and predict their returns; minimize stocks' risk exposure based on the prediction;
- For the case of Pairs Trading, wrote C++ program based on Mean Reversion Algorithm to make trading decisions on Gold and Silver futures.

## Skills

- Programming languages: Java, Python, C++, MATLAB, Julia, SQL, Ocaml, LaTeX, Coq
- Software: Microsoft Azure, MySQL, PostgreSQL, Gurobi, IntelliJ IDEA, Eclipse, Postman, VS Code, Jupyter Notebook