

ZACK LIGHT

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Work Experience (3.5+ YOE in Full-Time)

Susquehanna International Group

Bala Cynwyd, PA

Software Engineer, Nanosecond-level Market Data Deserialization and Ingestion

03/2023 - Present

- [C++] Implemented binary & exponential search to read in-house recording format, improved random access to mid-day trading data on SSD by **98.6% to 24 ms** and **CPU utilization by 95% to 0.01** via suppressing NFS read-ahead
- [Python, C++, C#] Added support for recursive references in internal “compiler” to turn FIX/SBE specs into parsers
- [C++] Wrote order book, reconciler, 13 low-latency parsers, Wireshark dissectors, using patterns like stashing iterator
- [.NET] Performance engineered a pub-sub framework by halving heap allocations and eliminating pinvoke to C++, achieving **1k quotes/ms (33x from before) at sub-15 ms latency (62% less) & 1.5 GB RAM (98.5 % less)**
- [C++, memory pool] Created utility to conflate last unique packet/message for looping intervals (eg. every 5 min), supporting capture and display filters (like Wireshark’s) of arbitrary Python/CPython expression on FIFO inputs

Amazon Web Services

Seattle, WA

Software Engineer, Multi-tenant Search Service

07/2021 - 02/2023

- [Python] Architected a durability and capacity solution to parallelize stream processing for **10x scalability increase**
- [Java, Lucene, DDB, S3] Created read-through cache proxy to lower cold start (**P99.9**) **service latency by 85%**
- [Java, Lucene] Increased fault tolerance via thread-lock coordination, **reducing 79% of deployment-caused tickets**
- [Python, Scikit] Analyzed latencies with clustering algorithms to uncover patterns and optimization opportunities
- [Typescript, React] Implemented React components by WAI-ARIA standards and test interactions with Puppeteer

Nokia Bell Labs, Deepfield Networks

Ann Arbor, MI

Software Engineer Intern, Networking

05/2020 - 08/2020

- [C] Extended high-volume (petabytes) networking data pipeline (SDN) for 6.1 billion subscriptions’ instant analytics
- [Cython, Kafka C APIs] Converted data three-way among network layer packets, data structures, and Kafka brokers
- [Linux Kernel APIs, Pandas] **Reduced time (52%)** and memory of mapping BGP IPv4&6 routes using vectorization

Software & Application Innovation Lab

Boston, MA

Software Engineer Intern

05/2019 - 08/2019

- [Java] Expanded functionalities in genetic design codebase with Spring, Neo4j, RESTful APIs, and microservices
- [Bash, CV/ML, Python] Automated pose estimation of mice with transfer learning (ResNet) for 17 TB of videos

China Minsheng Banking Corp. (36th largest bank globally - S&P)

Beijing, China

Algorithm Engineer Intern, Robo-Advising Team

06/2018 - 08/2018

- [Python] Built context-aware chatbot with Neo4j to chat with security buyers, facilitating 200+ employees’ daily work
- [Python] Engineered scalable program to rank, classify, and summarize news to publish on WeChat using modified TF-IDF and MMR algorithms (processing **33,582 word/s** on average, 5 people’s daily workload)

Projects for Fun

Online Library with Real-time Ranking, Tech Lead among 7, studytogether.com

11/2020 - 07/2021

- [Redis, Python] Created a real-time system from scratch to rank **510K+ members’** study time, **totaling 3 centuries**
- [MySQL, Python] Developed a database logging users’ time records and backend for websites & dashboards

End-to-end distributed C++ Search Engine

01/2021 - 04/2021

- [GCP, C++ **without using STL** or external libraries] Created 18K LOC search engine
- [POSIX **message queues**, C++] Scraped 105M pages (**203 page/s**) using 9 distributed web scrapers in 6 days
- [C++] Built 235GB inverted indexes with HTML parser, query optimizer for Boolean & set operators, bloom filter

Skills

Languages: C++, C, Bash, Python, JavaScript/TypeScript, Java, C#, .NET, R, OCaml

Tools: SQL, NoSQL, Linux, RDTSC, Wireshark, CMake, message queues, Pandas, Matplotlib, Grafana, Git, Vim

Cloud/DevOps: AWS (Solution Architect Associate), Infrastructure as Code, Docker, Kafka, Redis, gRPC, ECS, IAM

Libraries/Frameworks: Lucene, Hadoop Ecosystem, TensorFlow, Scikit-learn, React, Angular, Flask, CI/CD pipelines

Education

University of Michigan, College of Engineering, Ann Arbor, MI

Graduated: 05/2021

Cumulative GPA: **3.956/4.0**

BSE, Double Major in Computer Science & Data Science, Minor in Mathematics

Classes: Computing Systems, Databases, Computer Security, Programming Languages, Computer Vision, NLP, Computational Finance, Search Engine, Bayesian, Real Analysis, Stochastic Processes