

Talal Khan

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Toronto, ON

EDUCATION

University of Toronto

BSc in Computer Science, Specialist

Toronto, ON

Expected Graduation: 2028

Relevant Coursework: Data Structures & Algorithms, Software Engineering, Algorithm Analysis, Database Management, Systems Programming, Computer Organization, Software Design.

PROJECTS

Brew — Café Map | *Next.js, TypeScript, FastAPI, MapLibre GL JS, OpenFreeMap*

- Engineered a full-stack café discovery platform using Next.js and FastAPI, integrating MapLibre with OpenFreeMap tiles for a zero-cost, high-performance mapping stack.
- Implemented performant map layers and custom HTML markers to render curated collections, ensuring smooth interactivity and responsive UI design via Tailwind CSS.
- Developed robust backend APIs for image handling and data retrieval, optimizing response times for global location datasets and containerizing the architecture with Docker.

Lossless File Compression | *Python, Algorithm Design, Entropy Encoding*

- Architected a lossless compression engine grounded in Huffman coding theory, implementing tree construction, canonical code generation, and optimized symbol tables for high-throughput encoding/decoding.
- Engineered custom bitstream management routines to handle variable-length codes and ensure byte alignment, achieving deterministic decompression with zero data loss.
- Optimized algorithmic performance via priority queue-based node selection and in-place table updates, yielding up to 50% file size reduction and 30% faster processing.

Personal Portfolio | *TypeScript, Next.js 16, Framer Motion, Vercel*

- Developed a high-performance personal platform using Next.js 16 App Router, leveraging React Server Components (RSC) to minimize client-side bundle size and maximize SEO visibility.
- Orchestrated complex micro-interactions and page transitions using Framer Motion, implementing staggered animations to enhance user engagement without compromising Core Web Vitals.
- Automated deployment pipelines via Vercel, utilizing CI/CD for instant preview environments and seamless production rollouts.

TECHNICAL SKILLS

Languages: Python, Java, TypeScript, JavaScript, HTML/CSS, SQL (PostgreSQL)

Frameworks: Next.js, React, FastAPI, Node.js, Tailwind CSS, Framer Motion

Developer Tools: Git, Docker, Vercel, Render, Turso, Postman, MapLibre GL JS

Libraries: Pandas, NumPy, Pydantic, SlowAPI, Pillow