

TAREK HIRECHE

Software Engineer | Backend, Systems and DevOps

B.Sc. Computer Science, Université de Montréal (DIRO) | Graduating December 2026

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EXPERIENCE

Software Developer | Crono Design Inc., Montréal (Hybrid)

Mar 2026 - Present

- Built and shipped a bespoke PHP content platform replacing a third party CMS: append only activity log and per document version history for a reconstructable audit trail, safe upload handling, lossless compression cutting page weight 45%.
- Cut newsletter production from 1-3 hours to roughly 30 minutes across 10+ campaigns by automating assembly in Python and JavaScript for three locales and replacing ad hoc PDF mockups with a fixed asset spec.
- Own hosting, DNS, TLS, deployment and content releases as the only engineer on staff, and wrote the runbook the client now operates from, replacing undocumented manual deploy steps.

Teaching Assistant, IFT1015 Programmation 1 | Université de Montréal (DIRO)

Jan - Apr 2024

- Ran weekly lab sessions for 120 first year students, debugging unfamiliar code live and under time pressure.

Technical Ambassador, Cap Campus UdeM | Mathematics Tutor, Math Plus

2024 - Present

- Deliver computer science presentations to high school audiences in French and English; two years tutoring mathematics one on one through university level.

PROJECTS

sentinel | container init supervisor | C++17, Linux, Docker Compose, Prometheus, Grafana, GitHub Actions 2026

github.com/htarek-bytes/sentinel

- Cut container shutdown from the 10 s grace period Docker waits before SIGKILL to a measured 3 ms, by running as PID 1, forwarding SIGTERM to the child's process group, escalating to SIGKILL after 5 s, and closing the fork-to-handler race with sigprocmask.
- Eliminated zombie accumulation under PID 1 by registering as a child subreaper and reaping every adopted orphan, the failure mode that exhausts a container's PID limit.
- Added supervised restart on a 1, 2, 4, 8, 16 s backoff and exposed restart, crash and failure counters for Prometheus, served from a dedicated thread with signals masked so shutdown still lands on the main thread.
- Gated every merge behind 5 GitHub Actions jobs and 13 CTest cases; CI stands the full Compose stack up on each push and fails unless Prometheus is scraping, both alert rules loaded and Grafana serving the dashboard.

Mutation Testing Quality Gate for GraphHopper | Java, PIT, Mockito, Maven, GitHub Actions

2025

- Added a PIT mutation job that fails the build when the score drops below a baseline committed in the repo, so the pipeline checks whether the tests are any good, not just that they pass.
- Split the pipeline so ordinary builds stay fast and mutation runs on the core module only; proved the gate fires by breaking a test on purpose, watching the score fall 92% to 91% and the build go red.

Three Allocators in Zig | Zig, GDB

2025

- Wrote a bump allocator, a tagged allocator with per block headers, and a first fit allocator reusing freed blocks, doing alignment and pointer arithmetic by hand with no GC; debugged an alignment panic that appeared only on ARM because the code aligned a buffer offset, not the absolute address.

Hospital Directory and Registration Platform | Java, Spring Boot, PostgreSQL, Docker, Nginx

2026

- Containerized a three tier stack so one docker compose command brings up Nginx, a Spring Boot REST API and PostgreSQL in the same state on any machine, persistence behind Spring Data JPA interfaces.

NorthSec Cybersecurity CTF | team competition, top 30 of roughly 93 teams

2025

TECHNICAL SKILLS

Languages: C, C++, Python, Bash, Zig, Java, SQL, JavaScript, PHP

DevOps and CI/CD: GitHub Actions multi job pipelines, merge gating and required status checks, branch protection, CTest, PIT mutation testing, shellcheck, Compose based integration jobs

Containers and deployment: Docker, multi stage builds, PID 1 and container init semantics, Docker Compose, Nginx, DNS and TLS

Observability and operations: Prometheus metrics endpoints, counter and gauge instrumentation, alert rules, Grafana dashboards, graceful shutdown, restart policy with backoff, runbooks, incident debugging

Linux and systems: fork/exec/wait, POSIX signals and async signal safety, process groups, subreapers, concurrency, virtual memory, manual memory management; Fedora daily driver

Backend and data: REST API design, Spring Boot, Spring Data JPA, PostgreSQL schema design, indexing, query writing

Tooling: Git, GDB, strace, CMake, Make, x64dbg

Spoken languages: English, French and Arabic

EDUCATION

B.Sc. Computer Science | Université de Montréal (DIRO)

Expected Dec 2026

- DIRO Excellence Scholarship. Coursework: operating systems, concurrency, security, databases, algorithms.