

Karim Ben Amara

<https://kariyum.github.io/>
Software Engineer II

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Experience

Cognira - Software Engineer II

July 2023 – Present

Scala - Akka - Spark - Python - Cassandra - Postgres - gRPC - Polars

Tunis, Tunisia

- Led the migration of model inference workflows from a monolith to a distributed microservice architecture, improving end-to-end latency by 30% and reducing compute resource utilization.
- Analyzed bottlenecks in the core forecasting engine through extensive load testing, implementing optimizations that increased maximum load capacity by 3x.
- Built a full-stack internal app to extensively profile a remote service with negligible overhead.
- Built a configurable schema and data validator performing custom multi-column and multi-file checks.
- Significantly enhanced the event notification workflow, decreased their latency to sub-milliseconds for real-time notifications.
- Took the initiative in building an internal Python command-line tool that streamlined local debugging and validation, accelerating team feature delivery cycles.

Cognira - Intern

6 Months, February 2023 – June 2023

Scala - Akka - Cassandra - Redis - Python - Matplotlib - Numpy

Tunis, Tunisia

- Benchmarked different caching strategies, measuring server throughput, time to first byte, latency, cache hit & miss rates, database read and write response times.
- Developed and implemented the testing app and various caching strategies, resulting into 18 different configurations.
- Built an automated benchmarking suite that simulated highly concurrent user workloads, utilizing statistical hypothesis testing to dynamically rank and report the throughput and cache-miss efficiency of 18 architectural configurations.

Cognira - Summer Internship

2 Months, June 2022 – August 2022

Scala - Spark - Akka Http - Html - Canvas

Tunis, Tunisia

- Developed an efficient and generic hierarchy data generator using Spark lazy transformations.
- Provided a web interface for inputting and validating hierarchy configurations, accelerating the implementation and testing phases for the development team.

Projects

nfrelanci.tn <https://github.com/kariyum/nfrelanci.tn>

Sep 2024 – Ongoing

Rust - Sveltekit - Postgresql - Docker - Nginx - Sqlx

- Designed and deployed a full-stack freelance platform featuring real-time, event-driven architecture for in-app messaging and state updates.
- Implemented secure authentication via Google SSO and configured a robust CI/CD pipeline using GitHub Actions to deploy containerized services onto a self-managed VPS.

Combinatorial Optimization Solver https://github.com/kariyum/single_machine_scheduling_problem

Jan 2023

Python - Matplotlib - Numpy - Metaheuristic

- Engineered an optimization engine to solve the NP-Hard Single Machine Scheduling problem, implementing multiple algorithmic approaches including a Branch and Bound exact method and meta-heuristics.
- Formulated and integrated a custom heuristic bounding function to dramatically prune the search tree, achieving optimal timelines for large-scale job criteria.
- Designed and tuned an Ant Colony Optimization and a Genetic Algorithm approach to compare convergence rate.

Education

National School of Computer Science

September 2020 – June 2023

Computer Science Engineering Degree; Operations Research and AI field

Manouba, Tunisia

Awarded graduation prize for achieving 1st place

Preparatory Institute for Engineering Studies of Bizerte

September 2018 – June 2020

Preparatory Diploma in Math and Physics; Linear Algebra - Advanced Calculus - Physics

Bizerte, Tunisia

Skills

Areas of Expertise: Software Architecture And Development - Data Structures - System Design - Networking - Data Generation - Data Processing

Languages & Technologies: Scala - Python - Rust - Svelte - Bash - Awk - Typescript - Spark - DuckDB - Polars - Prometheus - Grafana - Docker - Kubernetes - Git