

# Karim Ben Amara

<https://kariyum.github.io/>

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## Education

### National School of Computer Science

Computer Science Engineering Degree; Operations Research and AI field  
Awarded graduation prize for achieving 1st place

September 2020 – June 2023

Manouba, Tunisia

### Preparatory Institute for Engineering Studies of Bizerte

Preparatory Diploma in Math and Physics; Linear Algebra - Advanced Calculus - Physics  
Ranked top 15% at the National Exam

September 2018 – June 2020

Bizerte, Tunisia

## Experience

### Cognira

*Software Engineer: Scala - Akka - Spark - Python - Cassandra - Postgres*

July 2023 – Present

Tunis, Tunisia

- Led the transition to a microservice-based model inference, optimizing resource utilization improving latency by 30%.
- Benchmarked and analyzed the forecast engine, achieved three times more increase in load sustain.
- Built a full-stack internal app to extensively profile a remote service with negligible latency leveraging the actor model.
- 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 a command-line interface that also serves as an internal dev tool, assisting the team in validating, debugging and working on new features efficiently.

### Cognira

February 2023 – June 2023

*End of Studies Intern: Scala - Akka - Cassandra - Redis - Python*

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.
- Used Python to implement user behavior simulator to apply different kind of workloads on the system.
- Automatic report generation and ranking justified with figures of harvested metrics during simulation.

### Cognira

June 2022 – August 2022

Tunis, Tunisia

*Backend Team Intern: Scala - Spark - Akka Http - Html - Canvas*

- Leveraged spark lazy transformations to develop an efficient and generic hierarchy data generator.
- Accelerated the dev team implementation and testing phases by providing a web interface to easily input and validate a hierarchy configuration with the ability to download generated data.

## Projects

### Freelancing Platform

Sep 2024 – Ongoing

*Rust - Sveltekit - Postgresql - Docker - Nginx*

- Studied functional requirements and designed data model of the system.
- Integrated a real-time in-app push events.
- Extracting context from job description for semantic searches.
- Setup github actions to build and deploy to a virtual private server on the cloud.

### Expenses Tracker App

June 2023 – Sep 2023

*Flutter*

- Started an open source project and implemented key features such as ability to add a new expense or income, tag an "item", view current balance, aggregate expenses by item and by month for a more statistical view, compute average daily and monthly expenses.
- Integrated firestore database to backup user's data at will.
- Added CI github workflow to build artifacts on merging.

### Single Machine Scheduling Problem

Dec 2022 – Jan 2023

*Python*

- Implemented brute-force deterministic approach for small number of jobs. Branch&Bound approach using EDD (earliest due date) with one problem constraint relaxed (EDD with job preemption as a heuristic function to limit the search space), comparing these approaches with meta-heuristic Ant Colony Optimization and Genetic Algorithm.

## Artificial drone pilot

Dec 2022 – Jan 2023

*Python - Pygame - Genetic Algorithm - Neural Networks*

- Implemented a bare bone neural network optimized by a genetic algorithm.
- Implemented the simulation environment (the physics of the drone, rotation, movements, animations and collision) where the neural network was trained to manoeuvre the drone and hold still.
- Analysed different methods of the evolution (crossover, mutation...) and plotted the error variation of the average population.

## Ant Colony Optimization simulation

Mai 2022 – June 2022

*Javascript - Html*

- Implemented ant colony optimization meta-heuristic approach solving particularly the Travel Salesman problem.
- Added key features for the user to extract meaningful results, ability to tune parameters and observe changes in real-time.
- Leveraged the canvas html element to draw algorithm's steps in real-time. Highlighting pheromone trails, best path found yet, current and best found score.

## Achievements

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- Took role within the Google Developer Groups of Manouba where I helped organizing various events (Women Techmakers - Google DevFest...) and exposing newcomers to the state of the art of Google technologies specifically.
- Google machine learning course: Linear Regression – Image Classification.
- Google could badge: Create and manage cloud resources (Virtual machines, Docker, Kubernetes, Nginx).
- Completed Introduction to TensorFlow for Artificial Intelligence, Machine Learning and Deep learning on Coursera. DeepLearning.AI - Year 2021

## Skills

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**Developer Tools:** Docker - Kubernetes - Git

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

**Languages & Technologies:** Scala - Python - Rust - - Svelte - Bash - Awk - Typescript - Spark - DuckDB - Polars