MAHMOUD ABUMANDOUR

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EDUCATION

MSc in Computer Science, Simon Fraser University — Sep 2022 - May 2024 (expected)

BSc in Computer and Communication, Mansoura University (Ranked first, 3.96/4 CGPA) Oct 2017 - Jul 2022

EXPERIENCE

Graduate Research Assistant — Sep 2022 - Present
Simon Fraser University (Memory Architecture Group, Professor Alaa Alameldeen) — *BC, Canada*

- Quantified accuracy degradation for non-uniform compression strategies for deep neural networks
- Explored the effect of model and data compression on the accuracy of membership inference attacks

Software Engineering Intern — May 2022 - Aug 2022
Google Summer of Code, RTEMS — *Remote*

- Analysed the performance of RTEMS release notes generation. Achieved 8x speedup over the previous design
- Automated Markdown and reStructuredText to PDF generation after fetching release data from RTEMS issue tracker

Software Engineering Intern — Oct 2021 - Feb 2022
Master Micro — *Cairo, Egypt*

- Designed a binary serialization format for the Design Database and a random-access de-serialization driver
- Participated in code review and testing of the serialization and data querying subsystem

Software Engineering Intern — May 2021 - Aug 2021
Google Summer of Code, QEMU — *Remote*

- Implemented a QEMU multi-core, multi-level cache modeling plugin to evaluate the cache performance of userspace and full-system workloads and identify the most cache-thrashing blocks
- Improved the `strace` plugin by making its reports more script-friendly for post-processing

PROJECTS

Disk Oriented DBMS. Created a disk-oriented database management system with partial SQL-compliance, in-memory buffer pool caching, B+ Tree indexing, and JDBC driver

RISCV 64-bit Emulator. Implemented a RISC-V 64-bit bare-metal emulator with support to the 32-bit floating point and the atomic ISA extensions. Emulated a serial communication device

FPGA-efficient AES Encryption Core. Designed a low-power, low-area AES hardware core for FPGA with two key expansion implementations of key expansion for high performance and low power. Achieved 86% area and proportional power consumption improvements over a high-throughput pipelined design

Identifying Customer Segments. Cleaned and modelled the Arvato Financial Solutions customers dataset using unsupervised learning techniques to segment customers to help the company make more informed marketing decisions

Hyperthreaded, software-interlocked processor FPGA implementation. A Fine-grained multi-threaded, software-interlocked five-stage pipelined MIPS-32 processor for FPGA and a MIPS assembler.

SKILLS

Programming Languages	C++, C, x86 Assembly, Java, Python, Bash Scripting
Software Tools	CMake, Docker, Git, Valgrind, Wireshark
Platforms	Linux, QEMU, FPGA, ARM Cortex M4, AVR
Hardware Design tools	Xilinx Vivado, SystemVerilog, VHDL

OPEN SOURCE CONTRIBUTIONS

- SerenityOS: Defined a global OS versioning API. Improved userspace utilities POSIX compliance. Improved the SerenityOS DBMS SQL compliance
- QEMU: Modernizing the usage of locking and memory allocation APIs. Improved the command line interface of TCG plugins

VOLUNTEERING AND EXTRA-CURRICULAR ACTIVITIES

- Collaborated with the logistics and implementation teams of the Specific Programs Club at Mansoura University organizing orientation day for over 400 fresh students.
- Participated in multiple local and national programming competitions (Collegiate Programming Contests). Ranked third out of +20 teams in Mansoura CPC 2018 & 2019, top 25% in Egypt ICPC 2019
- Carried out data structures and algorithms sessions for 10 students for competitive programming.
- Volunteered in the Resala Charity Organization by digitally copying rare Arabic books, providing wider access to disabled people.