ASIC² Project:
A Profiling Framework for a Memristor-Based Architecture

Background: Computers nowadays are based on von Neumann architecture, in which the memory and the processor are completely separated. Many applications require executing complicated computations on a lot of data, which causes heavy transportation between the memory and the CPU. This transportation slows down the computation process and consumes a lot of energy.

In order to address this challenge, new memristor-based architectures which are not von Neumann have been developed recently. Memristors are new electronic devices which function as both memory elements and processing units. To support processing in memory, a profiling framework which determines which parts of the code are executed in-memory need to be developed.

Project Description:
• In this project, a profiling framework for a memristor-based architecture will be designed and implemented.
• The execution time, number of memory accesses and other parameters of different code functions will be examined.
• Finally, different classifiers based on these parameters will be evaluated to determine which yields the best performance speedup.

Prerequisites:
Logic Design (044262 or 044252), knowledge in scripting languages e.g. Python - advantage

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