Plan Towards Adapting ToUCH Modules

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CSCI 469: High Performance Computing

Topics covered

1. Parallel programing basics
2. Parallel hardware and parallel software
3. Distributed memory programming with MPI
4. Shared memory programming with OpenMP
5. **Heterogeneous computing with CUDA**

CSCI 469: High Performance Computing

Learning outcomes:

1. The understanding of basics of parallel architecture and parallel programming
2. The ability to write parallel programs using widely used APIs (e.g., MPI) and languages
3. Basic evaluation of parallel programming performance
4. Programming in C or Python (locally and on remote clusters)
5. **Write simple programs in CUDA**

CSCI 469: High Performance Computing

- Current: good amount of lectures on “parallel hardware and software” topics
- Plan: reduce effort on introductory topics, and introduce CUDA programming

CSCI 469: High Performance Computing

Lecture and lab plan

- Introduction to heterogeneous computing and GPGPU programming
- Lab#1: hello world using CUDA
- Lab#2: vector addition using CUDA

CSCI 212: Introduction to Computer Architecture

Topics covered

1. General overview of computer architecture
2. MIPS **and ARM** instruction set architecture – Assembly language paradigm
3. Floating point algorithms
4. Processor performance and design
5. Memory hierarchy

CSCI 212: Introduction to Computer Architecture

Learning outcomes:

1. Describe the microstructure of processor
2. Describe how conventional machine instructions operate in conjunction with the components of a computer
3. Demonstrate the ability to program a microprocessor in assembly language
4. Evaluate the performance of computers
5. **Describe some of the differences between the MIPS and ARM ISAs**

CSCI 212: Introduction to Computer Architecture

Course outline

- Current: good amount of lectures on “MIPS instruction set architecture”
- Plan: reduce effort on MIPS, and introduce ARM

CSCI 212: Introduction to Computer Architecture

Lecture and lab plan

- Introduction to ARM ISA and difference with MIPS
- Lab#1: compute factorial
- Lab#2: experiment tradeoffs between ARM and thumb modes
- CPUlator and Raspberry Pi

Thank you!