Lab assignment 4:

Nios V multiprocessor implementation, parallel programming, and performance evaluation

Computer Architecture (40969)
Computer Science School (EII)
University of Las Palmas de Gran Canaria

Main goals

- Implement parallel programs on two Nios V multiprocessors with the goal of significantly reducing the execution time of the programs.
- Measure and compare the execution times of the parallel programs with the corresponding sequential versions using the DE0-Nano board.
- Evaluate the performance of the Nios V multiprocessors for different amounts of processed data.
- Compare the performance of the various Nios V multiprocessors.
- Implement the parallel programs on the DE0-Nano board.
- Keywords: multithreaded programming, parallelism, multiprocessors, thread synchronization, performance evaluation, Nios V, DE0-Nano.

Scheduling: 3 weeks

- Sesion 1:
  - Microarchitecture of Nios V-based parallel SoC computer + memory hierarchy + software tolos + Nios V Command Shell.
  - Tutorial 1: Hi_guys (0.5 h).
  - Tutorial 2: Hi_mutex (0.5 h).
- Sesion 2:
  - Tutorial 3: Matrix × Vector.
  - Proposal: Matrix × Matrix.
- Sesion 3:
  - Implementation of Matriz × Matriz algorithm using Dual-core Nios V/m multiprocessor
- Optional (Objetive 3-4)
  - Implementation of Matrix × Vector and Matrix × Matrix using Dual-core Nios V/g multiprocessor

Soft SoC based on Nios V dual-core multiprocessors