MPhil in Advanced Computer Science
Advanced Computer Design

Leader: Simon Moore
Timing: Lent
Prerequisites: Chip Multiprocessors
Some training in VHDL or Verilog HDL and computer architecture
Structure: 8 lectures + 8 practicals

AIMS
This module aims to provide an understanding of multithreaded multiprocessor architecture research using FPGAs as an emulation platform.

SYLLABUS
1. Introduction to Bluespec hardware description language (2L+1P)
2. Implementing a RISC processor in Bluespec (2L+1P)
3. Timing critical circuits and bus interfacing (1L+1P)
4. On-chip networks: implementation and analysis (1L+1P)
5. FPGA processor emulation techniques and a comparison with software simulation (2L+1P)
6. Analysis of multiprocessor designs (3P)

OBJECTIVES
On completion of this module students should:

- Understand how to design and implement a multiprocessor system.
- Appreciate how to instrument a design to obtain research results.
- Understand how to design using Bluespec.
- Appreciate the pros and cons of using FPGA emulation vs. software simulation.

COURSEWORK
Write a 10 page research paper including results from a computer architecture study based on the practical component of the course.
PRACTICAL WORK

Design and use processor emulation hardware using FPGAs in order to obtain research results.

ASSESSMENT

- The research paper will be graded (75%)
- The practical work will be reviewed with the student (a short oral) (25%)

RECOMMENDED READING


Last updated: January 2010