Advanced Computer Systems Architecture

Chip-Multiprocessors: Applications and Architectures

CSE 526M
Prof. Patrick Crowley

Plan for Today

• Introduction
• Preliminaries
• Course Goals, Topics and Structure
• The next several weeks
• Assignment
Administrivia

- Office location: Bryan 522-D
- Office hours:
  - TBD
- Newsgroup:
  - wu.cs.class.526
  - Post commentaries here

Course Goals

1. Cultivate first-hand experience in using a chip-multiprocessor to solve problems
2. Place classic and recent research literature in parallel computer systems in appropriate modern context
3. Prepare students for cutting-edge research and development
Course Topics
(in approx. order of appearance)

- Multiprocessors, Multicomputers and the Intel IXP
- Programming the IXP (I/O oriented tutorial)
- Modeling and Performance Optimization
- Programming the IXP (New apps, exploiting het resources)
- Projects
- Classic Machines and Projects
- (On-chip) Interconnects
- Memory: hierarchies, heterogeniety and technology
- Synchronization and data sharing
- Contemporary Machines and Project

Course Structure

- 50% lecture and discussion
- 30% design meetings
- 20% presentations
The Next Several Weeks

- **Introduction**
  - CMPs in the context of multiprocessors and multicomputers
  - Intro paper for Thursday
- **IXP Architecture and Programming Model**
- **Receiving, Processing and Transmitting Packets with the IXP2400/2800**
  - Tutorial
  - Programming experience
- **Other** problems

Potential Project Topics

- **Numerics/scientific**
  - transportation problem
  - decision trees
  - floating-point library
  - fixed-point library
  - dynamic programming
  - simplex algorithm
- **Networking**
  - Packet scheduling
  - Content search
- **String processing**
- **Search/sort**
Assignment

• HW #0, due this week
• Readings
  – Commentary: MPOC: A Chip Multiprocessor for Embedded Systems