Deterministic Multiprocessing System

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Overview

- Multiprocessing is usually nondeterministic
- Nondeterminism can be removed
- Sequential Ordering
- Weak Ordering
- Build a deterministic cache for a system
  - Storage Buffers
Storage Buffer

- Content Addressable Memory
- One read/write port
- One add/remove port
Arbitrator

- Commits memory during deterministic commit
- Fetches new data into storage buffer
- Controls CPU
CPU, Memory, Graphics

Micro8 from Class

Modified memory-mapped Lab 5 graphics

BRAMs
Demo

Modify clock per-core frequencies with buttons

Race Simulation

Highly contentious

• Reveals nondeterminism
Timeline

By 11/22 Storage Buffer Written & Tested

By 11/24 Arbitrator Written & Tested

By 11/30 System Integrated, sample code ran

By 12/7 Debugging + final program code written