Chapter 6

Processors: Microcode, Protection, and Processor Modes
Topics

• Introduction
• CPU complexity
• Modes of execution
• Changing modes
• Backward compatibility
• Privilege and protection

A central processor

Dr. Rajesh Subramaniam, 2005
Topics

- Multiple levels of protection
- Microcoded instructions
- Microcode variations
- The advantage of microcode
- Making microcode visible to programmers
- Horizontal microcode
- Vertical microcode
- Example horizontal microcode
- Microcode instructions
- Multiple levels of protection
Topics

• A horizontal microcode example
• Operations that require multiple cycles
• Horizontal microcode and parallel execution
• Look-ahead and high-performance execution
• Conditional branches and branch prediction
• Out-of-order instruction execution
• Parallelism and execution order
• Summary

Consequences for programmers