

## **COMP 222 Final Exam Review Topics**

**Mon 5/11 3PM-5PM JD 3508**

### **Comprehensive**

#### **Course Topics**

- Number Systems (q1, mt1)
- Programs in High Level, Assembly, Machine Languages (mt1)
- Cache (q2, mt1)
- Simple Circuits (mt1)
- RAM, DRAM vs SRAM, Chip Architecture, ECC (q3, mt1)
- Processes, Swap Space, Virtual Memory (mt2)
- IEEE 754 (q4, mt2)
- Hard Disks, Boot, File Systems (q5, mt2)
- Von Neuman Cycle, Opcodes, Addressing Modes, Instruction Pipelines (mt2)
- Booth's Algorithm for 2's complement multiplication (q6)
- Flash Memory
- Process Image and the Stack/Heap

## **Other Topics Not on Final, But Relevant**

### **RAID: Redundant Array of Independent Disks**

- Using arrays of disks for either (1) improved performance or (2) reliability. RAID level 0 (aka striping) is for performance only (no reliability enhancement). RAID level 1 (mirroring) provides the simplest of reliability scheme. Other standard RAID levels (2-6) distribute data and parity bits (Hamming codes) across multiple disks for quick recovery from a single failed disk. Failed disk is swapped out, new blank disk swapped in and quickly restored with data reconstructed from the redundant info on the other disks. Many hybrid and proprietary schemes have been proposed, naming convention is not uniform.

### **Interrupts**

- Certain tasks (classic example is I/O) are started by the CPU (move data from input device directly to RAM) but then are left to run without direct control by the CPU which turns its attention to other tasks. Interrupts get the CPU's attention when the task is finished. Interrupts more generally allow processes running with different priorities to get their fair share of the CPU.

### **Busses and Other Hardware Interconnections**

- Any computer system uses multiple busses to move data from one chip to another. These range from high speed busses that connect the CPU to RAM, to lower speed busses that connect external devices to various controllers on the motherboard.

### **Parallel Processing**

- One way that computer technology has kept up with speed demand is to devote multiple CPUs to the execution of a single program. But the program must be rearchitected Covered in COMP 620, note that undergraduates cannot use 600-level courses toward a BS degree, you can take it for extra units though

## **Next Course: COMP 322/L Operating Systems**

- The OS is the software that manages the hardware resources of a computer hardware platform on behalf of users and processes.
- Organization of OS code into kernel, device drivers, window manager front end
- Booting
- Processes and Threads
- CPU Scheduling and Task Management
- Virtual Memory
- Compilers, Assemblers, Linkers, Loaders
- Disks and File Systems
- Networking
- Security, including User Authentication
- Networked OSes
- Case Studies of Specific OSes
  - Microsoft Windows
  - Unix
  - Linux