Fall, 2024 – CS 226 - Final Exam Topics - Computer Organization and Design

Types of computers by application

Architectural categories (RISC, CISC)

How all computers are similar

Two things required for computer to work (instructions, data)

Assembly language syntax(opcode, operands)

Signed, unsigned, binary, hexadecimal, decimal numbers

Fundamental data sizes (byte, halfword, word, doubleword)

assembler, simulator, compiler

Moore's Law, Amdahl's Law

alignment restriction

sign extension

registers (General Purpose Registers, Program Counter, Stack Pointer, Floating Point)

instruction formats, addressing modes

Types of instructions (arithmetic & logic, control, memory access, external call)

Floating-point representation

Instruction cycle (Fetch, Decode, Execute, Memory Access, Write Back)

Exceptions (what are they, what causes them, control and status registers used)

Pipelining, types of hazards, methods of preventing or resolving hazards

Memory hierarchy, DRAM, SRAM, cache memory, associativity, cache mapping, cache writes, block replacement, AMAT metric for memory performance

3 C's of caches (compulsory, conflict, capacity)

I/O bus architecture, disk drives & performance (rotational latency, seek time)

Computer performance, CPU time, CPI, clock rate, clock cycle time, benchmarks

Analyze a short program to determine what it does or if it has syntax errors.

Discussion questions based on Blackboard articles located in the folder named Articles for Final Exam.

Exam: Friday, Dec. 6, 11:30 AM – 2:00 PM