CMPSCI 201 – Spring 2004
Review and Study Guide for Midterm #1
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Machine Models
- One Address (e.g., 6502)
- Two Address (e.g., 8088)
- Three Address (e.g., ARM)
- RISC vs. CISC
- Little-Endian vs. Big-Endian
- Register-Memory operations
- Register-Register operations
- Fetch-Execute Cycle
- Program Counter
- RAM Memory Layout, Addressing
- Subroutine Return Address Styles
  - First Word of Subroutine
  - Pushed on Stack
  - Stored in Register

Numeric Formats & Conversions
- Conversions: decimal – hex – binary
- Naturals (unsigned integers)
- Integers (signed)
- Fixed Point
- Floating Point
  - Single Precision
  - Double Precision
  - Extended Precision

Binary Arithmetic
- Addition
- Subtraction
- Shifting Bits
  - Logical Shift
  - Arithmetic Shift
- Rotating Bits
- Negating (2's complement)
- Masking (AND, OR, EOR)
- Generation and Use of Carry
- Detection of Zero
- Detection of Negative
- Detection of Overflow

Storage Sizes
- Byte
- Word
- Floating Single
- Floating Double

Language Structures
- While loops
- Repeat loops
- If-Then
- If-Then-Else

Program Creation
- Editing Text
- Assembling
- Linking
- Running (in Emulator)

Subroutine Issues
- Return Address Management
- Register Transparency
- Passing Parameters
  - Through Registers
  - Through Memory

ARM Registers
- 16 Integer: R0-R15 (including LR, PC, …)
- 8 Floating: F0-F7
- CPSR (NZVC flags)

Storage Allocation
- DCD (word)
- DCFS (single, float)
- DCFD (double, float)

Instruction Formats
- Op Codes
- Conditional Execution
- Setting Status Flags
- Integer Constants (value plus right-rotate)
- Registers with Shift/Rotate

Memory Instructions
- LDR / STR
- LDFS / STFS
- LDFD / STFD

Integer Arithmetic and Test Instructions
- MOV / MVN
- ADD / ADC / SUB / SBC / RSB / RSC
- AND / ORR / EOR / BIC
- CMP / CMN / TST / TEQ
- MUL / UMULL

Floating Point Instructions
- ADF / SBF / MUF / DVF / RSF / RDF
- ABS / POW / RPW / SQT
- CMF / FLT / FIX
- Constants 0.0 – 5.0, 10.0, 0.5

Branches and Conditions
- B / BHI / BLS
- BEQ / BNE / BMI / BPL
- BCC / BCS / BVC / BVS
- BGT / BGE / BLT / BLE