<u>Principal</u> Areas for Mid-Term Questions

1. Binary number representation, including:
    (a) "Unsigned", or Non-Explicitly-Signed Numbers
    (b) Ones'-Complement
    (c) Two's-Complement
    (d) Signed-Magnitude
    (e) Biased, or Excess-N Representation (N is <u>usually</u>, but not necessarily, 2^{n-1})
    (f) Floating-Point

    (g) Under what circumstances, or to represent what, is each of these representations used in a digital computer?

    (h) Number of possible values, smallest (i.e., most negative) value representable, and largest value representable, according to each representation scheme, for n bits.

2. Fixed-Point or Integer Arithmetic, and the four principal status bits: Z,N,V,C
    (a) "Unsigned", or Non-Explicitly-Signed Numbers
    (b) Ones'-Complement
    (c) Two's-Complement

3. Digital Logic
    (a) Combinational Circuits: "Sum of Products" and "Product of Sums"
    (b) NAND-NAND and NOR-NOR
    (c) Encoder, Decoder, Multiplexor, Demultiplexor, Half-Adder, Full-Adder, Ripple-Carry Adder
    (d) Latches and Flip-Flops: S-R, J-K, T, D

4. Structure, Organization and Architecture of Null & Lobur's "MARIE", and the machine instructions and Assembly Language for it

5. Understanding Microcode:
    (a) The Fetch-Decode-Execute Cycle
    (b) Register-Transfer Language (RTL)
    (c) Where and how do Interrupts come into play within the Fetch-Decode-Execute Cycle?
    (d) Be able to trace the passage of data through the various registers of the machine as the various lines of microcode are executed.

6. I expect that there will be AT LEAST one group of questions related to the material from Andrews.

7. Please note that EVERYTHING included in the assigned reading could appear on the mid-term, regardless of whether or not it was also covered in the classroom. Also EVERYTHING that was covered in the classroom could appear on the mid-term, regardless of whether or not it was also covered in the assigned reading.

8. Be sure to review all Quizzes, in conjunction with the answer sheets that were distributed for them.

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