

Due Monday January 30 at the beginning of class.

1. A microcontroller is connected to a memory with 16 data lines and 22 address lines.
 - a. How many data bits will be read/written from/to each memory address?
 - b. How many bytes of data can be addressed?
2. Sketch and label a block diagram of a general computer (microprocessor) architecture. Include the following components: Memory, I/O devices, Address bus, Data bus, Control bus, CPU, ALU, Register file, Control unit.
3. a) Describe the differences between a microprocessor and a microcontroller.
b) Briefly describe an embedded system.
4. The 68HC11 microcontroller includes a Condition Code Register with flag bits C, H, N, V and Z. List the names associated with each of these status flags and describe the conditions that make each bit active (hi='1') and inactive (lo='0').
5. Determine the 8-bit result (in hex) for each of the following problems. Also, list the C, H, N, V, Z flag values after each operation. Assume numbers are in signed 2C form. The calculations must be done by hand (no calculators) and work must be shown.
 - a. \$DDE + \$42
 - b. \$A5 + \$5A
 - c. \$FA - \$8A
 - d. \$17 - \$3F
6. Write an example ASM instruction having all of possible ASM instruction format components and define each of these components (e.g., as label, mnemonic, etc.)
7. List and describe the main events of the instruction execution cycle in their sequence of operation.
8. Describe the function of each of the following ASM instructions. For each instruction, identify the CCR bits that could be changed or reset to zero when the instruction is executed.
 - a. EORB
 - b. LDY
 - c. DEC
 - d. CBA
 - e. SUBA
 - f. STAB
 - g. BSET