Chapters 3, 3a & 4 Study Points

Chapter 3

- Boolean logic for OR, AND, XOR, NOT, NOR, NAND – know truth table for each.
- Boolean functions
- Why do we want to simplify Boolean functions?
- Know how to apply DeMorgan's law to a given function/algebraic expression.
- Ther are two 'canonical' forms of Boolean expressions – name and define each.
- I supply a truth table; you show the function in sum-of-products form for all products whose values are = 1.
- Logic gates – I supply truth table; you draw the gate.
- I draw combinational gates with input values (0/1) – you show the value/s which will result.
- Which Boolean operators are known as 'Universal' gates, and why?
- Name and define the purpose of (what would they be used for) three types of combinational circuits.
- Sequential circuits – define an example of where this type of circuit is necessary, and explain why a combinational circuit would not 'do the job' in this example.
- Explain the basic difference between a combinational and sequential circuit.
- Name two types of flip flops.
- What type of circuit are registers made up of?
- What type of circuit is RAM made up of?
- I supply a 'skeleton' of the SR flip-flop truth table; you fill it in.
- What 'problem' does the JK flip-flop fix?

Chapter 3a

- What is the point of using a Karnaugh map?
- Define the steps you take to do Kmap simplification.
- I supply a skeleton Kmap; you fill in all the minterm values (e.g., w'x'yz').
- I supply truth table and skeleton Kmap; you fill in 0's and 1's in Kmap; show the grouping/s of 1's following the proper rules; show the algebraic expression defining each group, and simplify the expression using the rules we discussed in class. You may need to also draw the simplified circuit. See three page handout we went thru after we finished chapter 3a.
- I draw a combinational circuit; you supply the algebraic expression and its corresponding truth table. See three page handout we went thru after we finished chapter 3a.

Chapter 4

- Name and define the two major types of buses we discussed.
- Name and define the 3 types of *lines* buses are made up of.
- Define bus arbitration and the four types we discussed.
- I a memory (RAM) chip is defined as a 4M X 16 RAM chip, what does this mean?
- If you have 4MB memory locations, how many address lines would you need? Why?
- What is an interrupt? What happens when an interrupt occurs? Give two examples of interrupts.
- What are nonmaskable vs maskable interrupts?
- In the MARIE ISA, What is the MAR used for? The PC?
- I give a simple MARIE program and a skeleton table for one of the instructions – you fill in the values for PC, IR, MAR, MBR & AC (see slides 43 & 44 – you fill in the register values for slide 44).
- Define what happens during each of the two passes when you *assemble* a program.
- What is the purpose of the control unit?
- Know what all the MARIE registers are used for – matching answers.
- A control unit can be implemented two ways – hardwired or microprogrammed. What are the differences between the two?
- A microcode instruction is retrieved and executed (decoded) during each _____ _____.
- Define two characteristics each for the CISC & RISC machines.