ElectroMechanical Controls II - Quiz # 3
(Chapters 1-4, 6-8, lectures, labs, and handouts)

-know what the terms: "SLC" (small logic controller), "CPU" (central processing unit), "PLC" (programmable logic controller), "slot", and "rack" mean and the name of the PLC software package we use ("Allen-Bradley RS Logix")
-know what a PLC is / what it is used for / when they originated (1969) and why
- know the 5 main parts of a PLC (rack, power supply, processor, I/O, and programming device) and the function of each
- advantages of PLC's over traditional hardwiring
- I/O section of a PLC: what it is, what it is used for, and how "I" and "O" are field wired (fig 2-11a and fig 2-16)
- fixed I/O vs modular I/O (fig 2-1a vs 2-4b)
- local I/O vs remote I/O (fig 2-5)
- what opto-isolation is and why it is necessary (Ex. fig 2-7)
- what is meant by I/O addressing (bottom of pg 14)
- discrete I/O vs analog I/O (pg 16 and 32)
- I/O status lights (pg 26)
- I/O keying (pg 27)
- sourcing vs sinking (fig 2-24 to 2-27)
- NEMA recommendation on Safety Circuit for PLC's (pg. 34) (NEMA recommends an external way of shutting down a PLC (like the ESR ("Emergency Stop Relay") shown in fig 2-31) as opposed to just depending on the safety features inside the PLC software
- Processor (CPU's) job (pg 45)
    - typical processor scan (fig 3-3) (… check status of inputs, solve ladder diagram, update the outputs… repeat)
        - self-diagnosis check / watchdog timer (pg 47)
    - memory storage
        - "data" memory (holds the status of devices) (pg. 79)
        - user memory (holds the main ladder diagram, all its instructions, any subroutine ladder diagrams, and their instructions) (pg. 79)
        - volatile vs non-volatile memory and battery back-up (pg. 48 and 49)
- the 2 main types of programming devices (handheld (fig 3-9 and 3-11) and laptop with brand's software (fig 3-10)) and the advantages and disadvantages of each
- memory words (16 bits) (fig 4-1)
- PLC 5 addressing (fig 4-2 to 4-6)
- SLC 500 (our PLC) addressing (Ex: "I:1/2" means: Input / in slot #1 / at terminal # 2
- addressing file abbreviations (top of pg. 76) (I, O, B3, T4, C5, etc.)
- memory organization
    - "data" memory (stores the status of inputs, outputs, timers, counters, etc.) (79)
    - "user" memory (stores the main ladder diagram program and subroutines (pg 79)
        * user memory takes up approx. 2/3 of available CPU memory capacity
    - the data memory tables can easily be accessed through the directory tree on the left of our software (fig 8-13 and 8-14)
- wiring diagrams (fig 6-1) vs ladder diagrams (fig 6-3)
- basic wiring diagrams rules (pg. 123)

- series (fig 6-5) vs parallel (fig 6-6)
- basic start stop station w/memory lock-in (fig 6-9 has the ladder diagram and 6-10 has the wiring diagram)
- sequenced motor starting (fig 6-11 → ladder diagram / fig 6-12 → wiring diagram) (we always look at ladder diagrams first because they quickly give us the logic of the circuit.)

(from Chapter 7) (with regard to our Allen-Bradley software) -- know the difference between "XIC" and "XIO" and how each works (Table 7-1, pg. 143)

- know what is meant by "configuring"
- know what "rung comments" and "address comments are
- be able to write a simple PLC program