Architecture Discussion Questions: 1-3

1. Explain in details the basics of the von Neumann architecture.
    a. Von Neumann architecture is made up of memory, a control unit, and a processing unit. The memory unit is further broken down into the MAR and the MDR. The Processing Unit is further broken down into the ALU and small temporary storage known as registers. The ALU is the Arithmetic and Logic Unit; in ARM this piece performs the ADD, AND, and NOT commands along with others. The control unit is further broken down into an Instruction Register and a Programming Counter. The instruction register holds the current working instruction that a chip is following. The Program Counter holds the memory address of the next instruction to load and then be executed.
2. Explain in details the purpose of the MAR and MDR.
    a. MAR stands for Memory Address Register. MDR stands for Memory Data Register. MAR will hold the address for any data that is about to be read or written. The MDR will hold the data from memory that is being read and will hold the data that is to be written to memory.
3. Explain in details the six steps for instruction processing.
    a. Fetch instruction from memory: This is pretty self-explanatory; The instruction has to be retrieved from the storage device.
    b. Decode instructions: Control unit interprets the instruction.
    c. Evaluate address: Pulls the address from the decoded instruction.
    d. Fetch operands from memory: Loads the preset operations from memory
    e. Execute operation: Executes operations that were loaded.
    f. Store result: Stores the results to memory.