Hardware Systems

Hardware Organization:

- buses
  - carry bytes of info between componenets
  - words: fixed sized chunks of bytes (4 bytes/32 bits or 8 bytes/64 bits)
- I/O devices
  - system's connection to outside world by controller or adapter
  - display, disk, mouse
  - controller: chip sets in device itself or motherboard
  - adapter plugs into slots on motherboard
- Main Memory
  - temporary storage for both program and data it manipulates
  - physically dynamic random access memory (DRAM)
  - logically organized as linear array of bytes each with its own unique address
- Processor
  - central processing unit (cpu)
  - interprets (or executes) instructions stored in main memory
  - at its core is a word sized register called program counter (PC)
    - At any point points at machine language instruction in main memory
  - executes instruction and updates pc to next instruction
  - instructions revolve around main memory, register file, and arithmetic/logic unit
    - reigter file small storage device with word sized registers each with its own unique name
    - ALU computers new data and address values
  - Simple operations CPU carries out at the request of an instruction
    - Load: Copy a byte or a word from main memory into a register, overwriting the previous contents
    - Store: Copy a byte or a word from a register to a location in main memory, overwriting the previous contents
    - Operate: Copy the contents of two registers to the ALU, perform an arithmetic operation on the two words, and store the result in a register, overwriting the previous contents
    - Jump: Extract a word from the instruction, copy that word into the program counter (PC), overwriting the previous value

sources:

- Computer Systems: A Programmers Perspective pg 7-10