Week 1 Handwritten Assignment 2

Section 2.1.5 questions 1, 2 and 3

1. The central processor unit (CPU) contains registers and what other basic elements?
   1. A high-frequency clock, a control unit, and an arithmetic logic unit.
2. The central processor unit is connected to the rest of the computer system using what three buses?
   1. The data bus, the control bus, and the address bus.
3. Why does memory access take more machine cycles than register access?
   1. Reading a single value from memory involves four separate steps:
      1. Place the address of the value you want to read on the address bus.
      2. Assert (change the value of) the processor’s RD (read) pin.
      3. Wait one clock cycle for the memory chips to respond.
      4. Copy the data from the data bus into the destination operand.

Section 2.2.4 questions 1, 2, and 4

1. What are the x86 processor’s three basic modes of operation?
   1. Protected mode, real-address mode, and system management mode.
2. Name all eight 32-bit general-purpose registers.
   1. EAX, EBP, EBX, ESP, ECX, ESI, EDX, EDI
3. Name all six segment registers.
   1. CS, ES, SS, FS, DS, GS
4. What special purpose does the ECX register serve?
   1. Loop counter