COMP 273 Assignment 2
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Question 2:
    (a) 2GHz = 2*10^9 cycles per second
        Thus, CPU clock ticks 2*10^9 per second.
    (b) 2*10^-9 seconds / 1 cycle
         2*10^9 ticks / 1 second
         x ticks / 1 cycle
         x = (2*10^9 ticks / 1 second) * (2*10^-9 seconds / 1 cycle)
           = 4 ticks/cycle
        Thus, clock ticks 4 times per cycle.
    (c) A cycle is a series of processes that take to execute a single instruction. Thus,
        a cycle indicates an execution of one instruction.
    (d) Pipeline CPU:
        2*10^-9 seconds / (1 stage)
        4 stages / 1 pipeline
        1 pipeline/ 4 instructions
        1 second / (x instructions)
        x = (1 instruction * 1 second) / (2*10^-9 seconds)
           = 5 * 10^8 instructions
        Thus, in 1 second, CPU executes 5*10^8 instructions.
    (e) Classical CPU:
        2*10^-9 seconds / (1 stage)
        4 stages / 1 pipeline
        1 pipeline / 1 instruction
        1 second / x instructions
        x = (1 instruction * 1 second) / (4*2*10^-9 seconds)
          = 1.25 * 10^8 instructions
        Thus, in 1 second, CPU executes 1.25 * 10^8 instructions.
    (f) According to the results, pipeline CPU executes more instructions than
        classical CPU. Thus, pipeline CPU is faster than classical CPU and this is
        because pipeline CPU executes all 4 instructions in stages at the same time
        while classical CPU executes a single instruction at a time.