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CSCI 361
Homework 2

1. Pure silicon is doped with either boron or phosphate in order for an electrical current to be able to travel through the substance. Channels are created in order for current to flow in a particular way.

2. 70/42 = 1.666. Computer Y is 1.666 times better than computer X.

3.
    a. Processor A, CPI is clock cycles per instruction so a lower value means better performance.
    b. A has $1.25x10^{10}$ cycles and executes 6578947368.42 instructions
       B has $1.5x10^{10}$ cycles and executes 7142857142.86 instructions
       C has $2x10^{10}$ cycles and executes 6896551724.14 instructions
    c. 4 second execution time and CPI of 2.185 should have a clock rate of 6.479 GHz.

4.
    a. (0.5 * 39*10^-9 * 0.8^2 * 3.4x10^9)/(0.5 * 32*10^-9 * 1.15^2 * 2.6x10^9) = 0.771. Thus, the power ratio is 0.771 meaning the newer processor uses about ¾ the power of the old one.

    b. Power = 0.5 * capacitive load * voltage^2 * frequency
       Processor A Power = 0.5 * 39*10^-9 * 0.8^2 * 3.4x10^9
       = 42.432 W