



3. Given that a program on a machine requires an average of 4 cycles per instruction, the machine has a 2 GHz clock rate, and the program executes a total of 50,000,000,000 instructions, what is the CPU time in seconds required by this program? (20 points)

4. How many gibibytes is 0.25 Tib? (10 points)

5. The portion of time a program spends performing floating-point operations is 30%. A new floating-point co-processor would perform floating-point operations five times as fast. Given that the execution time of a program required 50 seconds without the new floating-point co-processor, what would you expect the execution time of the program to be in seconds with the new floating-point co-processor? (20 points)

6. Suppose the clock period is 400 picoseconds. What is the clock rate in gigahertz (GHz)? (10 points)