Your name: \_Lake Summers\_

1. Give the power of 10 associated with these prefixes.

mega \_10^6\_ milli \_10^-3\_ nano \_10^-9\_ peta \_10^15\_ pico \_10^-12\_ tera \_10^12\_

2. Give the power of 2 bytes associated with these prefixes.

KiB \_2^10\_ bytes MiB \_2^20\_ bytes GiB \_2^30\_ bytes TiB \_2^40\_ bytes

3. Find the execution time for a program that executes 80 million instructions on a processor with an avg. CPI of 2.5 and a clock frequency of 4 GHz.

Execution Time = 80 \* 10^6 (Instruction Count) \* 2.5 (CPI)

/

(4 \* 10^9 [Clock Frequency])

= .05 s

4. For the following workload and cycle values, find the average CPI.

|  |  |  |
| --- | --- | --- |
| Inst. Type | Inst. Freq. | Cycles |
| ALU | 0.6 | 1 |
| LD/ST | 0.3 | 4 |
| Branch | 0.1 | 2 |

= (.6\*1) + (.3\*4) + (.1\*2) = 2.0

5. If a processor redesign could reduce the average CPI of a benchmark workload from 2.5 to 2.0 and also reduce the clock cycle time from 2 nsec to 1.25 nsec, what is the total speedup?

Speedup = exec time old / exec time new = (IC old \* CPI old \* CCT old) / (IC new \* CPI new \* CCT new)

= (CPI old \* CCT old) / (CPI new \* CCT new) = (2.5 \* 2) / (2 \* 1.25) = 2

6. Explain why you can answer question 5 above without knowing the instruction count

The instruction count doesn’t change following the redesign so it can be cancelled out as a constant