

### CMSC 132 Topic 3: Performance Evaluation Samples

1. (Relative Performance) Time taken to run a program, 15s on A, 30s on B. Which is faster and %speedup?

2. (CPU Time) Computer A: 2GHz clock, 10s CPU time Designing Computer B

- Aim for 5s CPU time
- Can do faster clock, but causes 1.25 x clock cycles

How fast must Computer B clock be?

3. (CPI Example)

	Cycle Time	CPI
Computer A	250 ps	2.0
Computer B	400 ps	1.6

\*Both computers have the same ISA

Which computer is faster and by how much?

4. Alternative compiled code sequences using instructions in classes A, B, C

Class	A	B	C
CPI for class	1	2	3
IC in sequence 1	2	1	1
IC in sequence 2	4	1	1

Find the average CPI for each sequence.

5. A certain microprocessor requires either 2, 3, 4, 8, or 12 clock cycles to perform various operations. Twenty-five percent of its instructions require 2 clock cycles, 20% require 3 clock cycles, 17.5% require 4 clock cycles, 12.5% require 8 clock cycles, and 25% require 12 clock cycles.

What is the average number of clock cycles per instruction for this microprocessor?

6. (Amdahl's Law) Let's say that most of your daytime processes spend 70% of their time running in the CPU and 30% waiting for service from the disk. Suppose also that someone is trying to sell you a processor array upgrade that is 50% faster than what you have and costs \$10,000. The day before, someone had called you on the phone offering you a set of drives for \$7,000. These new disks promise 2.5 times the throughput of your existing disks. Which one should you buy? Why?