

**Problem 1:** Suppose the *base* and *result* (*peak*) SPEC CINT2000 benchmark scores were identical on company  $X$ 's new processor. Make up an advertising slogan based on the fact that they were identical. A catchy tune is optional.

**Problem 2:** According to the CPU performance equation increasing the clock frequency ( $\phi$ ) by a factor of  $x$  without changing instruction count (IC) or cycles per instruction start (CPI) will reduce execution time by a factor of  $x$ . Find two SPEC CINT2000 disclosures (benchmark results) that provide good evidence for this.

(a) Give the CPU, clock frequency, and the base and result CINT2000 scores.

(b) Explain why for these disclosures  $\phi$  is different (obvious) but IC and CPI are probably the same (requires some thinking). It may not be possible to determine this for certain and it may not be possible to find a pair for which they are exactly the same, it's sufficient to find a pair in which they are arguably close.

(c) Based on the assumption of IC and CPI equality, show how closely the CPU performance equation predicts the performance of one of the systems. Suggest reasons for any difference.

**Problem 3:** In section 1.2 of the SPEC CPU 2000 run and reporting rules, <http://www.spec.org/cpu2000/docs/runrules.html>, there is a bullet item that states, "The vendor encourages the implementation for general use." Explain what that means and why it is there. Why would it be bad if the "implementation" were not "for general use."