

Dept. of Electrical Engineering and Computer Science
EECS2021
Computer Organization
Quiz 1 – 25 minutes
Oct. 11 2017

Name _____

ID _____

Question 1 – 6 points

a) What should be n (number of bits to represent a binary number if I want to represent numbers in the range ± 40 7 bits

b) Represent the number -22 in 2's complement format using 6 bits, if 6 bits are not enough, explain why?

22 in 6 bits = 010110

Inverting bits 101001

Adding 1 101010

What does the following instruction do?

jal x1, address

Jump to a location address and stores PC+4 in x1

Question 2 – 4 points

A processor spends 10% of its time doing integer operation, 30% doing memory load/store, 25% doing floating point operations, and 35% in branching instructions.

What is the speedup if we reduce integer operations time by 50% and memory by 10%

$$T_{\text{before}} = 0.1 + 0.3 + 0.25 + 0.35 = 1$$

$$T_{\text{After}} = 0.1 * 0.5 + 0.3 + 0.25 + 0.35 = 0.95$$

$$\text{Speedup} = 1/0.95 = 1.05$$

