

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  $-16 \rightarrow 15$  5

b) Represent the number -15 in 2's complement format using 6 bits

The number 15    001111

Inverting bits    110000

Adding 1    110001

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c) Can we jump to any arbitrary memory location (32 bits) in RISC-V? Yes/NO \_\_\_\_\_  
Explain how or why not?

Yes we can. Although the instruction is 32-bit, and the jump location must be less than 32-bits to fit in the instruction, we can use a register to jump to any address.

## Question 2 - 4 points

Consider a processor that spends 40% of its time doing floating point operations. If I want to reduce the running time by 30%, By how much I should speedup the floating point operations.

Before improvement

$$T_b = 0.4 + 0.6$$

After improvement

$$T_A = 0.7T_b = 0.7(0.4 + 0.6) = T_{\text{float\_after}} + 0.6$$

$$T_{\text{float}} = 0.1$$

I must speed it up by  $\frac{0.4}{0.1} = 4$

