November 12

- 7 Classes to go!
- No Class on 21 November!
- Exam Review

1

How many bits are required to store a 10-digit number (i.e. a phone number) as a binary integer?

34 bits, 16G > 10 Billion.

As ASCII characters?

80 bits

35 lost some credit

2

Suppose the byte at location 1000 in memory contains the hex value 0x87. What is the content of register $t0 after the instruction "`lb $t0,1000($zero)`"? What is its content after the instruction "`lbu $t0,1000($zero)`"? We're comparing the "load byte" instruction to the "load byte unsigned" instruction.

The lb instruction will "sign extend" so the result is **`0xffffff87`** while the lbu will give **`0x00000087`**

24 missed

3

In a machine with 32 registers and instructions that specify 3 registers (like MIPS R-format). How many bits of the instruction are required to specify the registers?

15 bits (5 bits for each register)

18 missed

4

Which of the following can**not** be EXACTLY represented by an IEEE single-precision floating-point number?

(a) 0, (b) 10.2, (c) 10.25, (d) 10.5

10.2

26 missed

5

All of the following equations are true for the idealized numbers you studied in algebra. Which ones are true for IEEE floating point numbers? Assume that all of the numbers are well within the range of largest and smallest possible numbers (that is, underflow and overflow are not a problem)

a. A+B=A if and only if B=0 NO
b. (A+B)+C = A+(B+C) NO
c. A+B = B+A YES
d. A*(B+C) = A*B+A*C YES

35 missed

6

6. Which of the following instructions that will NOT copy the value of $t2 into $t1.

a. and $t1,$t2,$t2

b. add $t1,$t2,$t2 NO

c. or $t1,$t2,$t2

d. or $t1,$t2,$zero

15 missed

7

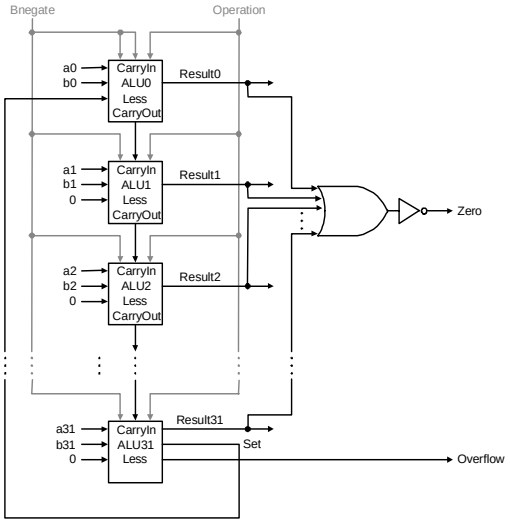
Make a truth table for a full adder. It should have 3 inputs (A, B, and CarryIn) and 2 outputs (Sum and CarryOut).

A	B	Cin	Sum	Cout
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

6 missed

8

How can the ALU we talked about in class be used to compare two values for equality?



35 missed

9

Using 2's complement arithmetic, negate 0x1234ffff. What is its value in hex?

0xedcb0001

7 missed

10

A certain program executes a variable number of floating-point operations and a fixed number of other operations. When the number of floating-point operations is 600×10^6 the program requires 4 seconds to run. When the number of operations is 1100×10^6 the program requires 7 seconds to run. What is the CPI for floating-point operations on this 500MHz computer?

You've got enough information here to set up 2 equations in 2 unknowns and to solve for both the time per floating-point operation AND the total time spent in the other operations. But you don't need to do all that since all I ask for in effect is the time per floating point operation. Since the other time is constant we can subtract the two times and the two FP operation counts (essentially subtracting the two equations eliminating the constant term) and we see that 500 million FP operations take 3 seconds. So 3 seconds divided by 500 million FP operation times 500 million cycles per second gives 3 cycles per FP operation.

24 missed

Grade Distribution

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average: 56.23
   0- 10:  0
  11- 20:  1
  21- 30:  2
  31- 40:  2
  41- 50:  9
  51- 60: 11
  61- 70:  4
  71- 80:  4
  81- 90:  4
  91-100:  1
```

6