

CS3330 Exam 1 – Spring 2014**Name:** _____

Directions: Put the letter of your selection or the number requested in the box. Write clearly: if we are unsure what you wrote you will get a zero on that problem.

If you do not sign the pledge on the last page you will get a zero on the entire quiz.

There are several variants of this exam being given at the same time. Copying from your neighbor is not only cheating, it is also foolish.

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Question 1 [1 points]: Suppose the 32-bit value 0x12345678 is stored at address 0x24 of a little-endian computer. What byte is stored at address 0x25?

- A A known value not listed here
- B 0x43
- C An unknown value because the number does not overlap address 0x25
- D 0x56
- E 0x34
- F 0x65

Answer:

D

Question 2 [1 points]: a is the 8-bit value 00110010 and b is the 8-bit value 10101110. What is $a \wedge b$?

- A 10111110
- B 11011100
- C 00100010
- D 10011100
- E 11100000
- F 00110010
- G 10101110
- H none of the above

Answer:

D

Question 3 [1 points]: The code $(a == b) \parallel (a == c) \parallel (a == d)$ implements

- A MUX
- B Equality
- C Decoder
- D Set membership
- E Adder
- F None of the above

Answer:

D

Question 4 [1 points]: Suppose the 32-bit value 0x12345678 is stored at address 0x24 of a big-endian computer. What byte is stored at address 0x23?

- A 0x65
- B 0x34
- C 0x43
- D A known value not listed here
- E An unknown value because the number does not overlap address 0x25
- F 0x56

Answer:

E

Question 5 [1 points]: Write 0x19 in binary. Do not include any leading 0s.

Answer:

11001

Question 6 [1 points]: Assume %eax contains the number 30 and %ecx contains the number 50 (both presented in decimal). What address is read by the x86 (or y86) operation `movl 4(%eax), %ecx`?

- A 54
- B 50
- C 34
- D 120
- E 200
- F 26
- G 46
- H 30

Answer:

C

Question 7 [1 points]: Suppose that the value stored in byte b of memory is $b + 16$. What is the value in %eax after running the Y86 command `mrmovl 0x24, %eax`?

- A 0x24
- B 0x40
- C 0x34
- D None of the above

Answer:

D

Question 8 [1 points]: What is a "caller-save" register?

- A A special register that saves who called the procedure
- B A program register that the called procedure may not modify
- C A program register that the called procedure may modify
- D None of the above

Answer:

C

Question 9 [1 points]: Suppose we are executing `addl %eax, %ebx`. Which two named values in the sequential Y86 architecture are fed into the ALU as its operands?

- A `%eax` and `%ebx`
- B `valA` and `valB`
- C 0 (`%eax` is register number 0) and 3 (`%ebx` is register number 3)
- D `regA` and `regB`
- E None of the above

Answer:

B

Question 10 [1 points]: The named value `valM` in the sequential Y86 architecture is the value read from memory. It is the input for a register in `rrmovl` and which operation in the list below?

- A `subl`
- B `nop`
- C `irmovl`
- D `jne`
- E `ret` *input to PC*
- F `halt`
- G `call`
- H `rrmovl`
- I `popl` *input to argument register*
- J `rmmovl`
- K `pushl`

Answer:

E or I

Question 11 [1 points]: Why does Y86's `cmovl` (the conditional move) use the ALU?

- A To compute if the value ought to move
- B Trick question – `cmovl` doesn't use the ALU
- C To compute where to move the value from
- D To compute where to move the value to
- E To compute the value being moved

Answer:

B

Question 12 [1 points]: What is two's-complement `11...1100` in decimal?

Answer:

-4

Question 13 [1 points]: We write labels in our assembly, but they are not part of the ISA (either x86 or Y86). Why not?

- A They're turned into addresses when we assemble the files
- B They're like comments: they only have meaning to us, not to the computer
- C They just change how other instructions are encoded
- D The assembler turns them into other instructions as a pre-processing stage

Answer:

A

Question 14 [1 points]: a is the 8-bit value 00110010 and b is the 8-bit value 10101110. What is $a - b$?

- A 10101110
- B 10011100
- C 11100000
- D 10111110
- E 11011100
- F 00100010
- G 00110010
- H none of the above

Answer:

H

Question 15 [1 points]: We can encode the C command $a ? b : c$, where all three variables are of type int, as

- A $(a \& b) | ((!a) \& c)$
- B $((-!a) \& b) | ((-!a) \& c)$
- C $((!!a) \& b) | (!!a) \& c)$
- D Any of the above
- E None of the above

Answer:

B

Question 16 [1 points]: The code $(a \&\& b) || (!a \&\& !b)$ implements

- A MUX
- B Adder
- C Set membership
- D Equality
- E Decoder
- F None of the above

Answer:

D

Question 17 [1 points]: What is binary 110010 in decimal?

Answer:

50

Question 18 [1 points]: Which of the following x86 operations reads values from two registers?

- A `addl %eax, %ebx`
- B `movl %eax, (%ebx)`
- C `movl %eax, %ebx`
- D `movl %eax, (%ebx,%ecx)`

Answer:

B or A

Question 19 [1 points]: Assume x is the most positive signed integer. What is $x + 1$?

- A $+\infty$
- B 0
- C -1
- D -x
- E none of the above

Answer:

E

Question 20 [1 points]: a is the 8-bit value 00110010 and b is the 8-bit value 10101110. What is a + b?

- A 10101110
- B 11011100
- C 10011100
- D 10111110
- E 11100000
- F 00100010
- G 00110010
- H none of the above

Answer:

E

Question 21 [1 points]: In general, which of the following is slowest?

- A moving from one register to another
- B comparing two numbers to decide where to jump
- C doing division
- D doing addition
- E accessing memory

Answer:

E

Question 22 [1 points]: Which of the following features of Y86 makes it like a RISC architecture?

- A Math ops only function on registers
- B Parameters are passed on the stack
- C Instructions have variable lengths
- D All of the above are RISC-like
- E None of the above are RISC-like

Answer:

A

Question 23 [1 points]: The bias of any IEEE-style floating point number is $2^{e-1} - 1$, where e is the number of exponent bits. If largest normalized binary number a particular IEEE format can hold is 1111.11, how many exponent bits does this format have?

- A 3
- B 5
- C 1
- D 2
- E 4
- F 9
- G 8

Answer:

A

Question 24 [1 points]: What is binary for the most negative five-bit two's-complement number? Answer in binary (i.e., with 5 bits, each either a 1 or a 0)

Answer:

10000

Question 25 [1 points]: Suppose the 32-bit value 0x12345678 is stored at address 0x24 of a big-endian computer. What byte is stored at address 0x25?

- A 0x56
- B A known value not listed here
- C 0x65
- D 0x43
- E An unknown value because the number does not overlap address 0x25
- F 0x34

Answer:

F

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Pledge:

On my honor as a student, I have neither given nor received aid on this exam.

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