

**CS3330 Exam 1 – Spring 2014 – Practice Exam****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.

.....

**Question 1 [1 points]:** What is decimal 17 in hexadecimal? (answer with just the hex digits, no leading 0x)

Answer:

**Question 2 [1 points]:** Suppose the 32-bit value 0x12345678 is stored at address 0x24 of a little-endian computer. What byte is stored at address 0x23?

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

Answer:

**Question 3 [1 points]:** Which of the following x86 operations modifies two registers?

- A `popl %eax`
- B `pushl %eax`
- C `movl %eax, 10(%ebx,%ecx,4)`
- D `movl %eax, %ebx`
- E `addl %eax, %ebx`
- F `call Funname`
- G `ret`

Answer:

**Question 4 [1 points]:**  $a$  is the 8-bit value 00110010 and  $b$  is the 8-bit value 10101110. What is  $a \& b$ ?

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

Answer:

**Question 5 [1 points]:** What is a “callee-save” register?

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

Answer:

**Question 6 [1 points]:** Suppose that the value stored in byte  $b$  of memory is  $b + 16$ . What is the value in `%eax` after running the following Y86 instructions

```
mrmovl 0x20, %eax
mrmovl 0x34, %ebx
xorl   %ebx, %eax
```

(your answer should be two hex characters, like C3).

Answer:

**Question 7 [1 points]:** In what phase of the sequential Y86 implementation does the address of the next instruction get computed, assuming there is *not* a jump or procedure call?

- A Decode
- B Execute
- C Fetch
- D None of the above

Answer:

**Question 8 [1 points]:** `pushl`, `popl`, `call`, and `ret` all modify `%esp`, either increasing or decreasing it by 4. `pushl` makes the same change to `%esp` as:

- A `ret`
- B `popl`
- C `call`
- D None of the above

Answer:

**Question 9 [1 points]:** What is 11000011 in hexadecimal?

- A 0x183
- B 0xc3
- C 0x303
- D 0x63
- E 0x33
- F 0xd3
- G 0xb3

Answer:

**Question 10 [1 points]:** What bytes of memory are accessed by the x86 operation `movl 100, %ecx`?

- A 100, 101, 102, and 103
- B 100 and 99
- C 100 and 101
- D 100
- E 100, 99, 98, and 97

Answer:

**Question 11 [1 points]:** In what phase of the sequential Y86 implementation does the address of the next instruction get computed, assuming there *is* a jump or procedure call?

- A Fetch
- B Decode
- C Execute
- D None of the above

Answer:

**Question 12 [1 points]:** How many bits are in a byte?

- A 1
- B 32
- C 64
- D 4
- E 2
- F 16
- G 8
- H Which one of the above depends on the computer

Answer:

**Question 13 [1 points]:** Why does Y86's `ret` use the ALU?

- A To compute the address to return to
- B Trick question – `ret` doesn't use the ALU
- C To compute the return value of the procedure
- D To modify one of the program registers

Answer:

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

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

Answer:

**Question 15 [1 points]:** The PC of the next instruction (when there is not a jump) is either  $PC + 1$ ,  $PC + 2$ ,  $PC + 5$ , or  $PC + 6$ . Since this is addition, why is it not performed in the ALU?

- A The ALU might be busy doing something else
- B We need the ALU's output to decide what we are adding to the PC
- C Trick question – computing the PC is performed in the ALU
- D The ALU doesn't do addition
- E We need its output as an input to the ALU

Answer:

**Question 16 [1 points]:** How many bits are in a word?

- A 16
- B 8
- C 64
- D 32
- E Which one of the above depends on the computer

Answer:

**Question 17 [1 points]:** What is hexadecimal 0x30 in decimal?

Answer:

**Question 18 [1 points]:** The code  $(s \ \&\& \ a) \ || \ (!s \ \&\& \ b)$  implements

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

Answer:

**Question 19 [1 points]:** A C switch statement can be compiled into x86 as an array of code locations and a jump to an element of that array. Which of the following best describes how that would be implemented in Y86?

- A You can't do it: Y86 doesn't support arrays
- B The same as in x86: a jump with an element of the array as the target
- C You'd load the array element into a register, then jump to that register's value
- D You can't do it: Y86 only lets you jump to immediate values

Answer:

**Question 20 [1 points]:** The bias of any IEEE-style floating point number is  $2^{e-1} - 1$ , where  $e$  is the number of exponent bits. Suppose 111010 is a six-bit IEEE-style floating point number, but you don't know how many exponent bits there are. Which of the following is **not** a possible value for this number? Answers are written in binary.

- A NaN
- B  $-1010$
- C  $-100000000000$
- D  $-\infty$
- E  $-1000000$

Answer:

**Question 21 [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 fraction bits does this format have?

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

Answer:

**Question 22 [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 0x43
- B 0x56
- C A known value not listed here
- D 0x34
- E An unknown value because the number does not overlap address 0x25
- F 0x65

Answer:

**Question 23 [1 points]:** In what phase of the sequential Y86 implementation does the value of registers get read from the register file?

- A Fetch
- B Decode
- C Memory
- D None of the above

Answer:

**Question 24 [1 points]:** The named value `valE` in the sequential Y86 architecture is the value exiting the ALU. It is created by the various math operations (`addl`, `subl`, etc) and by which operation in the list below?

- A `mrmovl`
- B `halt`
- C `irmovl`
- D `nop`
- E `rrmovl`
- F `jne`

Answer:

**Question 25 [1 points]:** What is hexadecimal `0x1a` in binary? (answer with just the bits, no leading 0s)

Answer:

.....  
**Pledge:**

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

\_\_\_\_\_  
Your signature here