

CSI 2334 Introduction to Computer Systems

Exam 1

score:

Name: _____

Section: _____

True / False (4 pt each)

____(F) 1. The value $11A5_{16}$ is equivalent to 4512_{10}

____(F) 2. The word length 2's complement representation of -55_{10} is FFE6

____(T) 3. Parity flag is set when there is an even number of 1's in a resulting value.

____(T) 4. The following two commands will store the same value when this memory is allocated:

```
Ch1 BYTE 'F'
Ch2 BYTE 70
```

____(F) a 5. CSI 2334-01 has 23 students and CSI 2334-02 has 17 students. Assume, `ax` register holds the number of students in section 1, `all2334` (WORD allocated) holds the number of students in section 2, and the address of `allstudent` is `0000 0502h`. After the instruction “`add all2334, ax`” is executed, memory will have the following contents:

0F BA	00 28	DE FF	01 54	8A F2
0000 0500h	0000 0502h	0000 0504h	0000 0506h	0000 0508h

Multiple Choice (2 pt each)

____ 1. How many different characters can be represented using ASCII codes?

- a. 256
- b. 128
- c. 127
- d. 255

____ 2. Which one is the De Morgan's first law?

- a. $x + xy = x$
- b. $\overline{xy} = \overline{x} + \overline{y}$
- c. $x\overline{x} = 0$
- d. $x + \overline{x} = 1$

____ 3. Which of the following statements about pipelining is not true?

- a. pipelining is the ability to execute instructions while previous instructions are still executing
- b. pipelining and prefetching are two different terms, but they refer to the same operation
- c. a stall may occur if a shared hardware component is currently in use
- d. the use of pipelining increases effective processor speed
- e. none of the above

____ 4. ESI and EDI registers are

- a. data register
- b. index register
- c. segment register
- d. flag register

____ 5. Which of the following statements about ENDianness is not true:

- a. Big ENDian machines store the most significant byte in the lowest memory address
- b. Little ENDian machines store the most significant byte in the lowest memory address
- c. The terms "Big ENDian" and "Little ENDian" originally came from Jonathan Swift's satirical novel, "Gulliver's Travels."
- d. Little ENDian machines store the least significant byte in the lowest memory address

____ 6. Which of the following is **not** a directive:

- a. `input prompt, string, 40`
- b. `.STACK 4096`
- c. `mov eax`
- d. `.DATA`
- e. a and c above

____ 7. Which one is a allowable label(name) in a statement?

- a. 2much
- b. add2
- c. EndIf
- d. repeat

____ 8. What will be initial value that the assembler will generate for the following directive?

```
byte1 BYTE 'm'
```

- a. 6D
- b. 6D 00
- c. 27 6D 27
- d. None of the above

____ 9. How long is the ASCII string that `wtoa` macro converts?

- a. 11 bytes
- b. 5 bytes
- c. 6 bytes
- d. None of the above

____ 10. The initial value (shown in hex) that the assembler will generate in the `.DATA` segment for the following directive is:

```
value WORD 8 DUP (-2)
```

- a. FE FF FE FF FE FF FE FF FE FF FE FF FE FF FE FF
- b. FE FF FE FF FE FF FE FF
- c. 2D 32 2D 32 2D 32 2D 32 2D 32 2D 32 2D 32 2D 32
- d. 2D 32 2D 32 2D 32 2D 32

Short Questions

1. (6pt) What are the three types of assembly language statements? Give example of each.

Instruction, Directive and Macro

2. (6pt) What is stored in memory when a user presses the “Enter Key”?

0D 0A
(CR LF)

3. (8 pts) How would the 32-bit value -10_{10} be stored, if it was stored in the doubleword space at address 00AE 5050 on a little endian machine?

F6	FF	FF	FF
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00AE 5050h

4. (10pt) For the following instructions, label each of the operands with the addressing mode that it represents:

	<i>Instruction</i>	<i>Destination Addressing Mode</i>	<i>Source Addressing Mode</i>
a.	mov ebx, ecx	Register	Register
b.	add value, 1	Direct	Immediate
c.	mov eax, [eci]	Register	Register Indirect
d.	mov char, '*'	Direct	Immediate
e.	add DWORD PTR [ecx], 10	Register Indirect	Immediate

5. (10pt) Write an SOP Boolean expression for the following truth table. Simplify the expression as much as possible, and draw a logic gate circuit equivalent to the simplified expression.

A	B	C	Output
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

Simplified expression: $a(b+c)$

6. (10pt) For the add instruction below, assume that EAX contains the given contents before the instruction is executed, and give the contents of EAX as well as the values of the CF, OF, SF, and ZF flags after the instruction is executed. Remember to show your work.

<i>Instruction Before</i>	<i>Instruction</i>	<i>Instruction After</i>	CF	OF	ZF	SF
EAX: 0000 0020h	add eax, -65	FFFF FFD5	0	0	0	1

<i>Instruction Before</i>	<i>Instruction</i>	<i>Instruction After</i>	CF	OF	ZF	SF
EAX: FF01 10F6h	sub ah, 16	FF01 00F6	0	0	1	0

7. (10pt) Below is a listing file. Add the missing item in (a), and answer the questions following the listing file.

```

; Program to add three numbers

.586
.MODEL FLAT

.STACK 4096 ; reserve 4096-byte stack

00000000 .DATA ; reserve storage for data
00000000 00000055 number1 DWORD 85
00000004 FFFFFFFD1 number2 DWORD -47

00000008 0000005B number3 DWORD 91

(a)
_____ 00000000 sum DWORD ?

00000000 .CODE ; start of main pgm code
00000000 main PROC

00000000 A1 00000000 R mov eax, number1 ; first number to EAX

00000005 03 05 00000004 R add eax, number2 ; add second number
0000000B 03 05 00000008 R add eax, number3 ; add third number
00000011 A3 0000000C R mov sum, eax ; sum to memory

00000016 B8 00000000 mov eax, 0 ; exit w/ return code 0
0000001B C3 ret
0000001C main ENDP

END ; end of source code

```

(a) 0000 000C

(b) What is the opcode for the instruction `add eax, number2` ?

03

(c) What is the object code for the instruction `add eax, number3` ?

03 05 00000008

(d) Explain in one line what "R" means in the listing file.

Relocatable

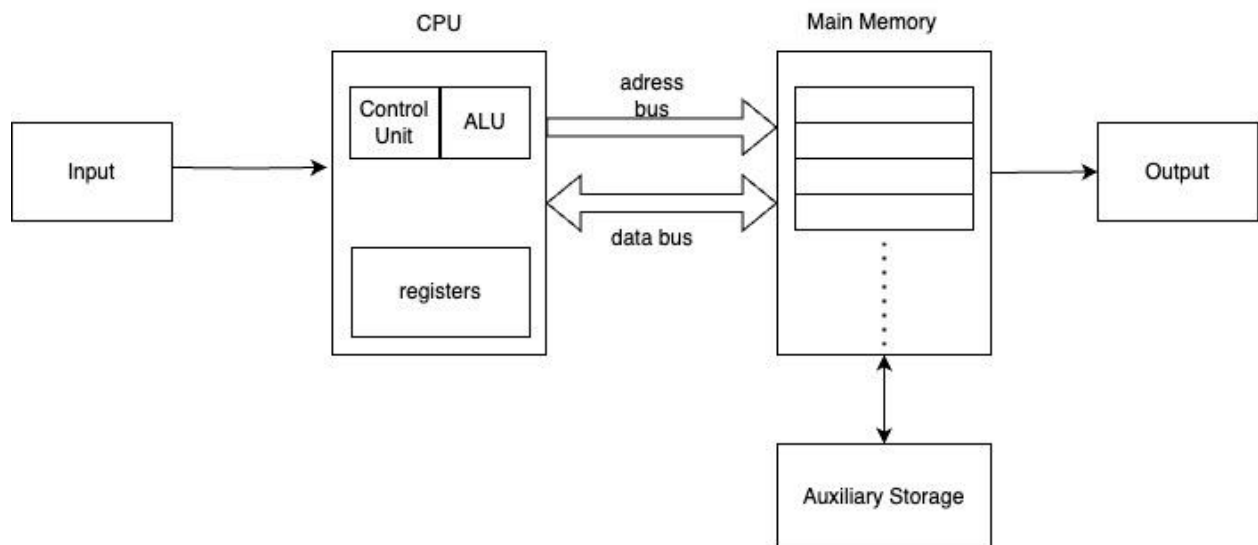
Extra credit (10pt):

9. (5 pt) Which of the following instructions is more efficient? (if one is more efficient than the other) Think in terms of the instruction execution cycle. Explain why.

```
sub eax, sum
```

```
sub sum, eax
```

10. (5 pt) Draw a diagram of the five basic components of the computer. Indicate where the following are located: Register, Arithment-logic unit, Address bus, Memory



(not a perfect one, but mostly what we need to know for this course)