Final Exam Reviews

(**Final Exam on 6/27/Wednesday, 7:00pm~9:30pm, in MH206**)

Your name:	Grade:

Final Exam questions will be much like the following questions (of the assignments):

Assignment#1:

- **24/25**. Explain how base 2, base 8, base 16 are related.
- **26** and **27.** Expand the following table to include the **decimals** and **hexadecimals** from 11 through 16 (in one table).

Binary	Octal	Decimal
0	0	0
1	1	1
10	2	2
11	3	3
100	4	4
101	5	5
110	6	6
111	7	7
1000	10	8
1001	11	9
1010	12	10

- **28**.~34: Conversion among binary, octal, decimal, and hex numbers.
- **37~40: additions/subtractions of binary, octal, and hex numbers.**

Assignment#2:

- **44**. Convert the following real (decimal) numbers to binary (five binary places).
    a. 0.50
    b. 0.25
    c. 0.10 (**Bonus: 5 points**)

- **47**. How many bits would be needed to represent a character set containing 45 characters? Why?
- **49**. What is the main difference between the ASCII and Unicode character sets?

500. Complete the following table

Decimal numbers (given)	Signed binary numbers (6 bits)	2's complement numbers (6 bits)
-31		
-14		
-8		
-7		
-1		
0		
1		
4		
8		
9		
24		
31		

Assignment#3:

- **32**. What are the three notational methods for describing the behavior of gates and circuits?
- **37**. Give the three representations of an AND gate and say in words what AND means.
- **39**. Give the three representations of an XOR gate and say in words what XOR means.
- **43**. Give the Boolean expression for a three input AND gate, then show its behavior with a truth table.
- **55**. Draw a circuit diagram corresponding to the following Boolean expression:

  (A + B)(B + C)

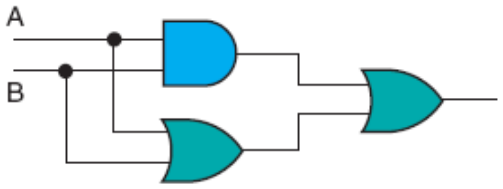
- **56**. Draw a circuit diagram corresponding to the following Boolean expression:

  (AB + C)D

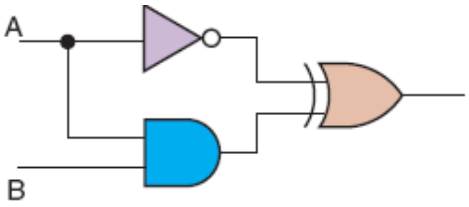
- **57**. Draw a circuit diagram corresponding to the following Boolean expression:

  A'B + (B+C)'.

- **59**. Show the behavior of the following circuit with a truth table:



- **60**. Show the behavior of the following circuit with a truth table:



Assignment#4:

- Do **NOT** use any calculators for the conversion/calculation questions.
- **For exercises 1- 16, match the power of ten to its name or use.**
- **A.** 10^{-12}
- **B.** 10^{-9}
- **C.** 10^{-6}
- **D.** 10^{-3}
- **E.** 10^{3}
- **F.** 10^{6}
- **G.** 10^{9}
- **H.** 10^{12}
- **I.** 10^{15}

6. Giga
7. Kilo
8. Mega

27. What does it mean to say that memory is 133MHz?

28. How many bytes of memory are there in the following machines?

    a. 512MB machine

    b. 2GB machine

30. What is the stored-program concept and why is it important?

31. What does "units that process information are separate from the units that store information" mean in terms of a computer architecture?

32. Name the components of a von Neumann machine.

33. What is the addressability of an 8-bit machine?

34. What is the function of the ALU?

35. Which component in the von Neumann architecture would you say acts as the stage manager. Explain.

37. What is an instruction register, and what is its function?

38. What is a program counter, and what is its function?

43. Compare and contrast RAM and ROM memory.

48. What is a cylinder?

54. How many different memory locations can a 16-bit processor access?

Assignment#5:

29. Distinguish between the IR (instruction register) and the PC (program counter).

44. Write a pseudocode algorithm that reads in three values and writes out the result of subtracting the second value from the sum of the first and the third values.

4. Using the LMC simulator (accesses via the course website), compile and test the following LMC program.

```
000:    INP
        STA  N1
        INP
        STA  N2
        SUB N1
        BRP LOOP
        LDA  N1
        OUT
        HLT
LOOP  LDA N2
        OUT
        HLT
N1      DAT  0
N2      DAT  0
```

1) 1). Describe in English the function of the above code segment (what does it do)?

2) Record the values of the Program Counter and Accumulator for each of the following 2 sets of inputs: (1) 3, 9; and (2) 9, 3?

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1. Write a LMC program that adds 3 input integers and out the sum.

Assignment#6:

40. Apply the problem-solving strategies to the following situations. Solutions are not unique.

c. Buying a dress or suit for an awards banquet at which you are being honored.

42. What is an algorithm?

For Exercises 11–24, match the question with the appropriate translation or execution system.

A. Interpreter
B. Assembler
C. Compiler
D. Machine code

11. What translates a high-level language into machine code?

12. What translates a Java program into Bytecode?

13. What executes Bytecode?

14. What translates an assembly language program?

15. What is the output of an assembler?

69. Define the following data types: integer, real, character, Boolean.

Assignment#7:

For Exercise 24 - 26, match the following software type with its definition.
A. Systems software
B. Operating system
C. Application software

24. Programs that help us solve real-world problems.

25. Programs that manage a computer system and interact with hardware.

26. Programs that manage computer resources and provide an interfaces for other programs.

27. Distinguish between application software and system software.

For questions 61~68, use the following two tables:

Table 1 (i.e., Figure 12.7): *Movie*:

MovieId	Title	Genre	Rating
101	Sixth Sense, The	thriller horror	PG-13
102	Back to the Future	comedy adventure	PG
103	Monsters, Inc.	animation comedy	G
104	Field of Dreams	fantasy drama	PG
105	Alien	sci-fi horror	R
106	Unbreakable	thriller	PG-13
107	X-Men	action sci-fi	PG-13
5022	Elizabeth	drama period	R
5793	Independence Day	action sci-fi	PG-13
7442	Platoon	action drama war	R

Table 2 (i.e., Figure 12.8): *Customer*

CustomerId	Name	Address	CreditCardNumber
101	Dennis Cook	123 Main Street	2736 2371 2344 0382
102	Doug Nickle	456 Second Ave	7362 7486 5957 3638
103	Randy Wolf	789 Elm Street	4253 4773 6252 4436
104	Amy Stevens	321 Yellow Brick Road	9876 5432 1234 5678
105	Robert Person	654 Lois Lane	1122 3344 5566 7788
106	David Coggin	987 Broadway	8473 9687 4847 3784
107	Susan Klaton	345 Easy Street	2435 4332 1567 3232

61. Specify the schema for the database table of Figure 12.8 (Table 2).

63. Define an SQL query that returns all attributes of all records in the `Customer` table.

64. Define an SQL query that returns the movie `MovieId` and title of all movies that have an R rating.

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31. What is the Turing Test?

48. What is an example of a human expert system?

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12. Provide an operational definition for computers.

16. What are the four major phrases of software life cycle?