1.   4.5 The following table represents a small memory. Refer to this table for the following questions.

a. What binary value does location 3 contain? Location 6?

b. The binary value with in each location can be interpreted in many ways. We have seen that binary values can represent unsigned numbers, 2's complement signed numbers, floating point numbers, and so forth.
(1) Interpret location 0 and location 1 as 2's complement integers.
(2) Interpret location 4 as an ASCII value.
(3) Interpret locations 6 and 7 as an IEEE floating point number. Location 6 contains number[15:0]. Location 7 contains number[31:16].
(4) Interpret location 0 and location 1 as unsigned integers.

c. In the von Neumann model, the contents of a memory location can also be an instruction. If the binary pattern in location 0 were interpreted as an instruction, what instruction would it represent?

d. A binary value can also be interpreted as a memory address. Say the value stored in location 5 is a memory address. To which location does it refer? What binary value does that location contain?

Address	Data
0000	0001 1110 0100 0011
0001	1111 0000 0010 0101
0010	0110 1111 0000 0001
0011	0000 0000 0000 0000
0100	0000 0000 0110 0101
0101	0000 0000 0000 0110
0110	1111 1110 1101 0011
0111	0000 0110 1101 1001

简答题 (7 分)   6 分

a. location 3 : 0000 0000 0000 0000'b (= 0'd)

location 6 : 1111 1110 1101 0011'b (= 65235'd)

b. location 0: 0001 1110 0100 0011 is its own 2's complement integers

location 1: 1111 0000 0010 0101 is 1000 1111 1101 1011 2's complement integers

e

8.20007582581e-35

location 0: 7747

location 1: 61477

c. addition function : add r1,r2,r3;   r1 = r2+ r3

d. location 5 refer the location 6 its binary value is 1111 1110 1101 0011.

教师评语:

c

2. 4.8 Suppose a 32-bit instruction takes the following format: If there are 225 opcodes and 120 registers,

a. What is the minimum number of bits required to represent the OPCODE?

b. What is the minimum number of bits required to represent the destination register (DR)?

c. What is the maximum number of UNUSED bits in the instruction encoding?

OPCODE	DR	SR1	SR2	UNUSED

简答题 (3 分)   3 分

1. because opcodes up to 225,so the minimum number is 8;
2. because registers up to 120,so the minimum number is 7;
3. the maximum number of UNUSED is 3.

3. 5.2 A memory's addressability is 64 bits. What does that tell you about the size of the MAR and MDR?

简答题 (2 分)   1 分

MAR contains 64bits so the memory address space is 2^64 memory locations
MDR contains 64 bits ,so memory location contains 64bits.

教师评语:

MAR

4. 4.4 What is the word length of a computer? How does the word length of a computer affect what the computer is able to compute? That is, is it a valid argument, in light of what you learned in Chapter 1, to say that a computer with a larger word size can process more information and therefore is capable of computing more than a computer with a smaller word size?

简答题 (2 分)　　1 分

> "Word length" refers to the number of bits processed by a computer's CPU in one go (these days, typically 32 bits or 64 bits), eg address size and instruction size; the more bigger word length, the more bigger number that computer is able to compute; a larger word size can process the larger number compute, but it couldn't deal with more data ,so i think the larger word size can process more bigger data and is capable of computing equal to a computer with a smaller word size.

教师评语:
后两问