

大同大學 98 學年度研究所碩士班入學考試試題

考試科目: 計算機組織

所別: 資訊工程研究所

第 全 頁

註: 本次考試 不可以 參考自己的書籍及筆記; 不可以 使用字典; 不可以 使用計算器。

1. (10%)

The number $(11\ 22\ 33\ 44)_{16}$ is stored in an aligned 32-bit word. Assume the word address is $(0008\ 0000)_{16}$.

- (a) Show the memory content of each byte using Big Endian. (3%)
- (b) Show the memory content of each byte using Little Endian. (3%)
- (c) Assume the content of R2 is $(0008\ 0000)_{16}$. If *ldbu R1, 0(R2)*, (load byte unsigned), is executed. What is the content of R1 if Big Endian is used? What is the content of R1 if Little Endian is used?

2. (10%)

Design a 4 by 4 combinational multiplier. That is to design a combinational circuit to do:

$$A_3A_2A_1A_0 \times B_3B_2B_1B_0$$

3. (20%)

- (a) What is stored program concept means in a computer system? (5%)
- (b) For a stored program computer, describe the steps to execute an instruction. (5%)
- (c) To full fill the needed steps in (b), what information must be included in an instruction?

4. (20%)

We wish to compare the performance of two different computers: M1 and M2. The following measurements have been made on these computers:

Program	Time on M1	Time on M2	Instruction executed on M1	Instruction executed on M2
1	2.0 seconds	1.5 seconds	5×10^9	6×10^9
2	5.0 seconds	10.0 seconds	12×10^9	25×10^9

- (a) Which computer is faster for each program, and how many times as fast is it? (6%)
- (b) Find the instruction execution rate (instructions per second) for each computer when running program 1. (6%)
- (c) Suppose that M1 costs \$500 and M2 costs \$800. If you needed to run program 1 a large number of times, which computer would you buy in large quantities? Why? (8%)

5. (15%)

- (a) Show the IEEE 754 binary representation of the number -0.075_{10} in a single precision form. Using hexadecimal form in your answer. (4%)
- (b) What decimal number is represented by this single precision floating point number: $C0\ A0\ 00\ 00_{16}$? (3%)
- (c) In IEEE 754 floating point system, fill in the following table:

Single precision		Object represented
Exponent	Fraction	
(1)	(2)	0
0	nonzero	(3)
(4)	(5)	floating-point number
(6)	(7)	infinity
255	nonzero	(8)

6. (10%)

- (a) What are the three methods to implement the control path of a processor? (3%)
- (b) What are the three hazards may happen when implement a processor? (3%)
- (c) Any relationships between (a) and (b)? (4%)

7. (15%)

LRU is used may places in a computer system. What is LRU means? Where are LRU used? How to implement LRU in hardware?