

國立交通大學 100 學年度碩士班考試入學試題

科目：計算機概論(5121)

考試日期：100 年 2 月 17 日 第 2 節

系所班別：資訊管理研究所

組別：資管所甲組

第 ( 1 ) 頁, 共 3 頁

【不可使用計算機】\*作答前請先核對試題、答案卷(試卷)與准考證之所組別與考科是否相符!!

1. Consider a computer equipped with 4M Bytes main memory and 256k Bytes cache, and the size of each block is assigned as 64 Bytes. Please depict the arrangement of address bits which include Tag bits, block/set bits, displacement/offset for the following conditions:
  - (a) (3%) Direct-mapped cache
  - (b) (3%) Fully associative-mapped cache
  - (c) (4%) 4-way set associative-mapped cache (i.e., each set has 4 blocks)
2. Number system, IEEE 754
  - (a) (5%) Determine the base of the number system for the following operation to be correct:  
 $25+34+57+48 = 176.$
  - (b) (5%) Find the smallest normalized positive floating-point number in the IEEE 754 double-precision representation.
3. (7%) Please explain how RAID 10 (redundant array of independent disks) works, its benefit and disadvantage.
4. (6%) Please explain the differences between big endian and little endian. If there is a data: Long NCTU\_Data = 0x12345678, how does memory store it from the 0x0000 address for both systems?
5.
  - (a) (3%) What is von Neumann bottleneck?
  - (b) (4%) Describe the methods you know (or suggest ways) on how to alleviate the problem (i.e., von Neumann bottleneck).
6.
  - (a) (2%) What is the distinction between the following two techniques?
    - deciding which half of list to consider when performing a binary search
    - deciding which branch to pursue when performing a heuristic search
  - (b) (6%) What heuristic do you use when solving the eight-puzzle from the following start state?  
Please name two heuristics and briefly describe and compare them with each other.

1	2	3
5	7	6
4		8

Fig-1a.Start

1	2	3
4	5	6
7	8	

Fig-1b.End

