

國立彰化師範大學九十一學年度碩士班招生考試試題

系所：資訊管理學系 碩士班

科目：計算機概論

☆☆請在答案紙上作答☆☆

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1. What is locality of reference? (5%) What is its impact to memory hierarchy? (5%)
2. About Ethernet.
 - (a) Please describe its technology of medium access control. (5%)
 - (b) How can an IP address be recognized on an Ethernet LAN? (5%)
 - (c) What are the benefits of using *switching* hubs on an Ethernet LAN? (5%)
3. Please describe the required internal processing of using Internet Phone over the communication networks. (15%) (Hint: Describe from sound input at one site to sound output at the other site.)
4. Please write an algorithm that converts a decimal real number into binary in a Pascal-like format. (15%)
5. Several algorithms have been proposed to implement critical regions and mutual exclusion in distributed systems. Among them, the centralized algorithm, the distributed algorithm, and the token ring algorithm are the most common design principles. Compare the three algorithms in terms of (i) the number of required messages for each entry/exit and (ii) the delay in message time before entry into the critical region. Also explain the possible problems of each algorithm. (Note: Message time means measuring the length of time according to the number of message transmission.) (15%)
6. When designing a paging system, it is critical but difficult to decide how big the page size should be. As a technical consultant to the designing team, please propose your advice and considerations. (15%)
7. Describe the time complexity of the following operations, in terms of the Big-O notation.
 - (a) Locating the first element in a list of length n . (1%)
 - (b) Locating an element in a sorted list of length n by binary search. (2%)
 - (c) Building a list of length n . (2%)
 - (d) Sorting a list of length n using comparisons. (2%)
 - (e) Adding two square matrices of size n . (2%)
 - (f) Multiplying two square matrices of size n . (2%)
 - (g) Listing all subsets of a set of size n . (2%)
 - (h) Listing all permutations of a set of size n . (2%)