

淡江大學九十二學年度碩士班招生考試試題

系別：電機工程學系

科目：計算機概論(含計算機組織)

准帶項目請打「○」否則打「×」
簡單型計算機
X

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本試題雙面印製

1. (20%) Explain the following terms as clearly as possible.
- (1). Embedded System
 - (2). Real Time Operating System (RTOS)
 - (3). Watermark Security
 - (4). Cache Coherence problem
 - (5). Minimum Cost Spanning Tree

2. (20%) Discuss the similarities or differences between
- (1) Paging and Segmentation
 - (2) Temporal Locality and Spatial Locality
 - (3) Call by Address and Call by Value
 - (4) Linked List Structure and Linear Array
 - (5) Combinational Circuit and Sequential Circuit

3. (20%) Consider the following page-address trace generated by a two-level cache-main-memory scheme that uses demand paging and has a cache capacity of four pages.

1 6 4 5 4 1 3 2 1 2

Assume a "hot" start, in which the cache initially has pages 1, 2, 3 and 4 allocated to it.

- (a) Which of the page-replacement policies FIFO or LRU is more suitable in this case? (10%)
- (b) Show your calculations, and give a short intuitive justification of your answer. (10%)

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4. (20%) Given a binary tree T,
- (a) Write an algorithm (in subroutine form) that counts the number of nodes in T.
 - (b) Write an algorithm (in subroutine form) that counts the number of leaves in T.
 - (c) Using the above two subroutines, write an algorithm that determines if T is a complete binary tree.

5. (20%) Answer the following two questions related to computer performance metrics.

- (a) The following figure shows the speedup factor as a function of the number of instructions that are executed in the instruction pipeline without a branch. Indicate the hiding information shown in this figure.
- (b) As a practical matter, the potential gains of additional pipeline stages will be lower than expected. Indicate the possible reasons as clearly as possible.

