

國立臺灣科技大學103學年度碩士班招生試題

系所組別：電子工程系碩士班甲組

科目：計算機系統

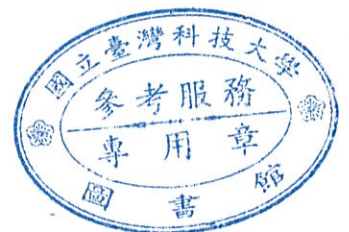
(總分為100分)

1. (10%) Assume that a MIPS processor with a five-stage pipeline.
 - (a) What is a five-stage pipeline? (5%)
 - (b) What are the advantages of the pipeline? (5%)

2. (21%) Please explain the following terms:
 - (a) Delay branch. (3%)
 - (b) Dynamic branch prediction (3%)
 - (c) Superscalar (3%)
 - (d) TLB (translation-lookaside buffer) (3%)
 - (e) Write back policy [hint: cache and memory] (3%)
 - (f) Conflict miss (3%)
 - (g) Set associative mapping (3%)

3. (9%) Please answer the following questions:
 - (a) What is data hazard? (3%)
 - (b) How to handle data hazard in a pipeline? (6%)

4. (10%) How to reduce cache miss? You will get more credits by giving methods as many as possible.



國立臺灣科技大學103學年度碩士班招生試題

系所組別： 電子工程系碩士班甲組

科 目： 計算機系統

(總分為100分)

5. (6%)

Assume the size of a two dimensional array $c[][]$ is 5×7 and the addresses of $c[0][0]$, $c[1][0]$, and $c[3][2]$ are 1,000, 1,008, and 1,104 in decimal, respectively, what is the address of $c[4][6]$? (6%)

6. (8%)

(a) What is a circularly linked linear list? (3%)

(b) What are its advantages compared to a linked linear list? (5%)

7. (12%)

The following numbers are inserted in order into an empty binary search tree.

50 25 75 22 40 60 80 90 15 30

(a) Draw the tree after inserting these numbers. (4%)

(b) Draw the tree after Node 50 is deleted. (4%)

(c) What is the postorder traversal sequence for the tree in (b)? (4%)

8. (16%)

Briefly explain the following terms:

(a) Breadth First Search (4%)

(b) Threaded Binary Tree (4%)

(c) Minimum Spanning Tree (4%)

(d) Hash Collision (4%)

9. (8%)

(a) Write down the code for Bubble Sort on a N-element array - $X[]$. (5%)

(b) Analyze the computation complexity of the Bubble Sort. (3%)

