

國立臺灣科技大學 106 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：計算機概論

(總分為 100 分)

1. (10%) Convert the following numbers
 - (a) $7B3_{16}$ into base 8. (5%)
 - (b) 4753_8 into base 16. (5%)

2. (15%) Please explain the following terms with examples:
 - (a) Structure hazard. (5%)
 - (b) Data hazard. (5%)
 - (c) Control hazard. (5%)

3. (5%) Multi-core has become a popular technology for new generation processors. However, the amount of performance gained by the use of a multi-core processor does not increase as much as the core numbers inside the chip, why?

4. (10%) For the memory hierarchy, describe the two different types of locality.
 - (a) Temporal locality. (5%)
 - (b) Spatial locality. (5%)

5. (10%) For 1-bit full adder with inputs A, B, Cin and outputs SUM and Carry.
 - (a) Please write down its truth table and express SUM and Carry in sum-of-minterms. (5%)
 - (b) Please use K-map to obtain the minimal sum-of-product form. (5%)



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6. [16%] Please explain the following terms

- (a) Stack [4%]
- (b) Circularly Linked List [4%]
- (c) Binary Search Tree [4%]
- (d) Queue [4%]

7. [12%]

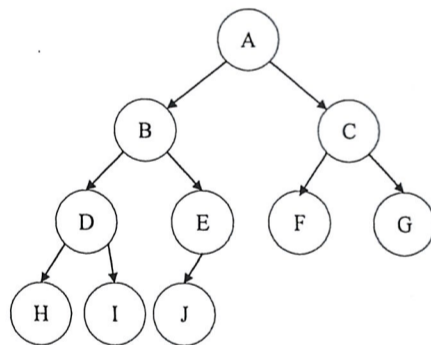
(a) What is the definition of the recursive function? [6%]

(b) Please write a recursive function to calculate $n!$.

(note: $n! = n * (n-1) * (n-2) * \dots * 1$) [6%]

8. [10%] Please write any one sorting algorithm and explain it.

9. [12%] The following figure is a binary tree.



- (a) What is its inorder traversal? [4%]
- (b) What is its postorder traversal? [4%]
- (c) What is its preorder traversal? [4%]

