

大同大學 97 學年度研究所碩士班入學考試試題

考試科目: 計算機概論

所別: 資訊經營研究所

第 1/1 頁

註: 本次考試 不可以參考自己的書籍及筆記; 不可以使用字典; 不可以使用計算器。

A. Write a detailed answer to each of the following questions: (50%)

1. Why the stored-program concept is so important in the computer system? (10%)
2. List ten major functions of the system software of a computer system. (10%)
3. What is the basic idea of a multiprogramming system used in the computer system? Does the virtual memory technique apply generally in the multiprogramming system? (10%)
4. What are the major hardware components of the computer system unit? Why the I/O interface hardware is needed? (10%)
5. From the search engine to the Google cloud computing service, what would you see about Google future? (10%)

B. Answer following questions: (50%)

- (a) In what case a 2-3-4 tree has the minimum height? And what is the height? (5%)
- (b) Is a subtree of a red-black tree is itself a red-black tree? Is the sibling of an external node either external or red node? Why? (5%)
- (c) Given a red-black tree T . Is there a unique 2-3-4 tree T' associated with T ? And given a 2-3-4 tree G . Is there a unique red-black tree G' associated with G ? Why? (5%)
- (d) For the input $\{9, 5, 2, 4, 6, 8, 7, 3, 0, 1\}$, insert the items with this set of keys, in the order into an initially empty 2-3-4 tree. Draw the tree after each insertion (8%)
- (e) Draw the 2-3-4 tree resulting from the removal of the item with key 8 and then 9 from the tree of (e). (5%)
- (f) For the input $\{9, 5, 2, 4, 6, 8, 7, 3, 0, 1\}$, insert the items with this set of keys, in the order into an initially empty red-black tree. Draw the tree after each insertion (8%)
- (g) Draw the red-black tree resulting from the removal of the item with key 8 and then 9 from the tree of (g). (5%)
- (h) What are the differences among three kinds of parameter passing of functions? Describe by following examples, `swap1(int a, int b)`, `swap2(int* a, int* b)`, and `swap3(int& a, int& b)`. (9%)