

# 南華大學九十六學年度 碩士班 招生考試試題卷

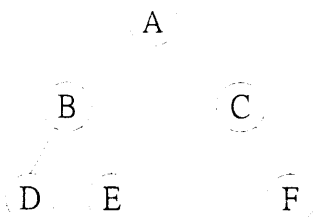
系所別： 資訊管理學系碩士班

科目編號：8404-4

科目： 資料結構(含演算法)

試題紙第    / 頁共    / 頁

1. Explain the following terminology: (20%)
  - (a) ADT
  - (b) Complete Binary Tree
  - (c) Heap
  - (d) Spanning Tree
2. According to the definition of big "oh" function,  $f(n)=O(g(n))$  iff there exist positive constants  $c$  and  $n_0$  such that  $f(n)\leq cg(n)$  for all  $n, n\geq n_0$ . Show that the following equalities are correct: (12%)
  - (a)  $n! = O(n^n)$
  - (b)  $\sum_{i=0}^n i^2 = O(n^3)$
3. Write both a recursive C++ function and an iterative C++ function to compute the sum  $\sum_{i=0}^{n-1} a[i]$ . Analyze the time and space requirements of your algorithm. (15%)
4. Transform the infix expression into its postfix equivalent:  $A/B-C+D*E-A*C$ . Show the stacking sequence of your algorithm. (10%)
5. Consider the following binary tree:



- (a) List the terminal nodes, the nonterminal nodes, and the height of the binary tree. (6%)
  - (b) Write out the inorder, preorder, and postorder traversals for the binary tree. (9%)
  - (c) Draw the internal memory representation of the binary tree using sequential and linked representations. (8%)
6. Write the status of the list  $F=(26, 5, 77, 1, 61, 11, 59, 15)$  at the end of each phase of HeapSort. (10%)
  7. Obtain a minimum-cost spanning tree of the following connected undirected graph using Prim's Algorithm. Write out the stages of the algorithm. (10%)

