淡江大學 105 學年度碩士班招生考試試題

46-1

系別：資訊管理學系 B 組　　科目：資料結構

考試日期：3 月 5 日(星期六) 第 2 節　　本試題共 5 大題， 1 頁

1. (a) Please list the special features of the representation of the expression in postfix notation compared to in the infix notation.
   (b) Please give the algorithm for evaluating a postfix expression. (20%)

2. (a) Give the definition of the max heap.
   (b) The max heap H contains four numbers 1, 2, 3 and 4. Please show all the possible configurations of H. (20%)

3. Please give an ***efficient*** algorithm to determine if a number exists in the sorted list a[0], a[1], …, a[n-1]. If the number exists, its location (index) is returned. Otherwise, -1 is returned. Analyze the time complexity of your algorithm. (20%)

4. Quick sort is a good sorting method and a recursive function quicksort is used to sort the list (23, 30, 16, 34, 17, 52, 9, 3, 42, 15, 8). Please give the intermediate result after each step (or each call of the function quicksort). The first number in the list or sub-list is chosen as the pivot key. (20%)

5. Nine numbers are inserted into initially empty binary search tree in the following order : 25, 12, 5, 42, 30, 86, 39, 38, 40. (20%)
   (a) draw the final binary search tree.
   (b) draw the binary search tree after deleting 30.