

# 國立嘉義大學九十四學年度

## 資訊管理學系碩士班招生考試試題

### 科目：資料結構

#### 一、簡答題（每題 5%，共 20%）

- 已知某 binary tree 的後序追蹤為 HJBFGECA，而中序追蹤為 HBJAFDGCE，請繪出此二元樹。
- 就下列資料而言，你認為 merge sort、selection sort、quick sort、bubble sort、或 heap sort 那一個最為合適，為什麼？請說明你的理由與考量點。

4, 50, 47, 16, 24, 30, 32, 34, 38, 42, 46

- 有一個程式如下：

```
int F(int n) {
    if( n == 0 ) return 0;
    if( n == 1 ) return 1;
    if( n == 2 ) return 2;
    return (F(n-1) - F(n-2) + F(n-3));
}
```

(1)  $F(5)$  的回傳值是多少？

(2)  $F(n)$  共被呼叫多少次？（含  $F(5)$ ）

- We have an array  $A$  (as shown in the following table) which is used to represent the complete binary tree.

$i$	1	2	3	4	5	6
$A[i]$	22	14	9	6	11	2

Please answer these 3 questions :

(1) Draw the corresponding binary tree  $T$ .

(2) Is  $T$  a max heap or min heap? Why?

(3) Sequentially do three heap operations: INSERT(17), INSERT(29), DELETE on  $T$ . Show the results after each operation. (Draw the trees.)

#### 二、申論題（每題 20%，共 80%）

- Write a program (in C/C++) that can reverse a linked list. Explain the data structure of your linked list first.
- 請依序畫出下列資料所建構出的 B-Tree of order 3。  
20, 40, 10, 30, 15, 35, 7, 26, 18, 22, 5, 42, 13, 46, 27, 8, 32, 24, 45, 25
- The following matrix represents an undirected graph with weighted edges, please show

	A	B	C	D	E	F
A	0	11	0	0	25	12
B	11	0	22	17	0	26
C	0	22	0	28	0	15
D	0	17	28	0	13	14
E	25	0	0	13	0	20
F	12	26	15	14	20	0

- its adjacency list (without the weight values),  
(NOTE: the adjacent nodes are linked by the increasing order.)
- its dfs(F) spanning tree,  
(please mark the visited order with the number from 0 to 5.)
- its bfs(C) spanning tree,  
(please mark the visited order with the number from 0 to 5.)
- its minimum spanning tree.

- Write the status of the list  $L=\{13, 7, 5, 37, 11, 29\}$  after each phase of the following algorithms:
  - radix sort with radix=10,
  - quick sort,
  - merge sort with recursive version,
  - heap sort.