

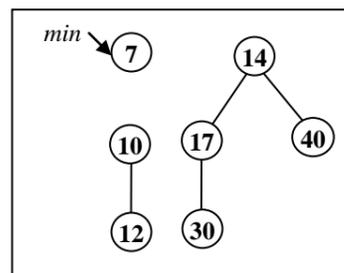
# 國立嘉義大學100學年度

## 資訊管理學系碩士班 (乙組) 招生考試試題

### 科目：資料結構

1. What is ADT (Abstract Data Type)? If you want to develop an E-commerce system to handle customers' orders for goods, show your ADT of order. (5 分)
2. In what situation the quick sort will face the worst case that results in the highest time cost when sorting data? Why? (10 分)
3. Draw the heap trees after each phase of Heap sorting with the input list  $L=\{22, 7, 44, 101, 33\}$ . (5 分)
4. (1) What is "AVL tree"? Why do we need it? (5 分)  
 (2) Draw the AVL tree(s) after the following binary-search-tree operations performed in sequence :  
 INSERT(30) 、 INSERT(50) 、 INSERT(10) 、 INSERT(60) 、 INSERT(20) 、 INSERT(55) 、 and DELETE(30). (10 分)

5. Given a min B-heap on the right side, show the new B-heap after inserting 5. (5 分)



6. The factorial function  $n!$  has value 1 when  $n \leq 1$  and value  $n*(n-1)!$  when  $n > 1$ .  
 (1) Complete the recursive C function to compute  $n!$ . (5 分)  
 (2) Does your function need extra memory space during execution time? Why? Analyze the space complexity of executing your Fac(n)? (10 分)

```

int Fac(int n) {
    }
    
```

7. Given six ordered runs which lengths are 23, 7, 15, 10, 8, and 18, please construct the Huffman tree. When do you use this merging strategy, and what benefit do you have? (10 分)
8. Given the candidate answers: (a) Binary search tree. (b) Minimum spanning tree. (c) Min heap. (d) Biconnected graph. (e) Articulation point. (f) AOV graph. (g) Biconnected component. (h) Directed acyclic graph., please select the best one.  
 (1) The topology of Ethernet switched networks is \_\_\_\_\_. Why? (5 分)  
 (2) The topology of reliable routed internets should be \_\_\_\_\_, but not complete graph. Why? (5 分)
9. Given the expression  $5*3+(8-4)/2$ , answer the following questions as detail as possible.  
 (1) Translate the infix expression to a postfix form with STACK. (5 分)

Token	Stack					Output
	[0]	[1]	[2]	[3]	[4]	
5						5
...	...	...	...	...	...	...

- (2) Why does the computer prefer the postfix form before evaluating the expression? (10 分)

10. Given a directed graph as the right side, what is the shortest path from vertex 0 to 4? (Show the detailed steps you calculate.) (10 分)

