

# 國立彰化師範大學 102 學年度碩士班招生考試試題

系所：工業教育與技術學系數位學習碩士班

科目：資料結構

☆☆請在答案紙上作答☆☆

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1. Please finish the following code which initializes a linked-list which contains 3 nodes and prints the content "cat" of the linked-list. (Note. Each node contains only a char type variable.) (8%)

```
#include <stdio.h>
#include <stdlib.h>
typedef struct node
{
    char data;
    _____;
} LNODE;
void show_list(LNODE *ptr);
main()
{
    LNODE *n1, *n2, *n3;
    n1 = malloc(sizeof(LNODE));
    n2 = malloc(sizeof(LNODE));
    n3 = malloc(sizeof(LNODE));
    n1->data = 'c';
    n1->link = n2;
    n2->data = 'a';
    n2->link = n3;
    n3->data = 't';
    _____;

    printf("The linked list is as follows: ");
    show_list(    );
}
void show_list(LNODE *ptr)
{
    while(ptr != NULL)
    {
        printf("%c", ptr->data);
        _____;
    }
    printf("\n");
}
```

2. Please order the following time complexity from the best to the worst, suppose n is sufficiently large. (8%)

$O(1)$ ;  $O(n)$ ;  $O(\log n)$ ;  $O(n \log n)$ ;  $O(n^2)$ ;  $O(n^3)$ ;  $O(2^n)$ ;  $O(n!)$ .

3. Please give brief answers: (10%)

- (a) What is a skewed tree? What is the main disadvantage of skewed tree?  
(b) What is a full binary Tree? What is a complete Binary Tree?

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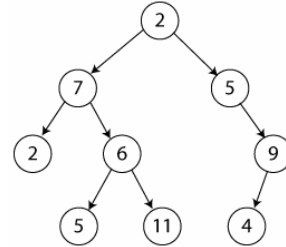
科目：資料結構

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共 2 頁，第 2 頁

4. Write the traversal result of the following binary tree: (12%)

- (a) pre-order;
- (b) in-order;
- (c) post-order;
- (d) breadth-first search.



5. Compare the worst-case search times for a 256-element block of data. How many comparisons are required for (a) sequential search (b) binary search (c) ideal hash function.(12%)

6. 請精簡敘述何謂基本的資料結構(陣列結構、堆疊結構、算術運算、佇列結構、串列結構、遞迴結構、樹狀結構、圖形結構)? (20%)

7. 資料結構可分為哪兩部分?請說明。(10%)

8. 資料結構有靜態的(static)表示法與動態的(dynamic)表示法，請分別說明之。(10%)

9. 有一個程式如下：(10%)

```
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));
}
```

請問：

- (a) F(5)的回傳值是多少?
- (b) F(n)共被呼叫多少次? (含 F(5))