

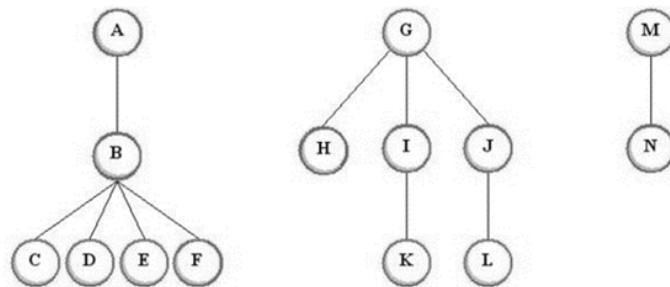
Assignment 3

Due date: 4 December 2024

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1. (25%) Transforming the forest into a binary tree using the rule:

- If T_1, \dots, T_n is a forest of trees, then the binary tree corresponding to this forest, denoted by $B(T_1, \dots, T_n)$;
- Root equal to $\text{root}(T_1)$
- Left subtree equal to $B(T_{11}, T_{12}, \dots, T_{1m})$, where T_{11}, \dots, T_{1m} are the subtrees of root (T_1); and has right subtree $B(T_2, \dots, T_n)$



2. (25%) Rewrite the postorder tree traversal algorithm in the lecture to be an iterative one.

Note: You can submit a C *function* or a *pseudo-code*.

3. (25%) Write a C function to test if a doubly linked list forms an arithmetic progression (等差級數) (Please consider the following doubly linked list ADT implementation).

```
typedef struct node *nodePointer;
typedef struct node {
    nodePointer llink;
    int data;
    nodePointer rlink;
};

struct list {
    nodePointer pHead; // points to the head of the list
    nodePointer pTail; // points to the tail of the list
};

int isArithmetic(list &L) { // Please complete this function
    ...
}
```

4. (25%) Write a C function which searches for an arbitrarily given key (i.e., integer key in the lecture) in a **max heap**. Also analyze the computing time of your function.