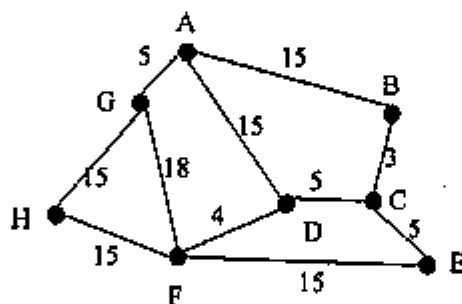


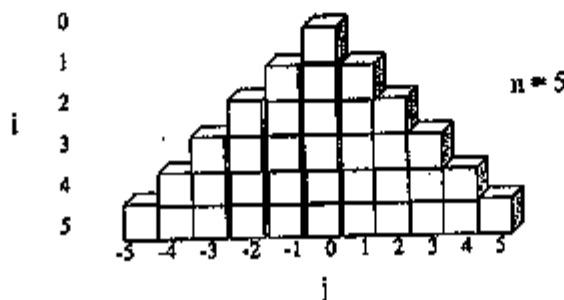
國立中央大學九十一學年度碩士班研究生入學試題卷

所別: 資訊管理學系 丙丁組 科目: 資料結構 共 1 頁 第 1 頁

- (10%) 舉例說明如何用 array 來製作 binary search tree。相對於動態 pointer 做法，其優缺點如何？
- (20%) 假設有 8 個 key，其值分別為 42, 20, 17, 13, 28, 14, 23, 15，我們希望把他們由小到大排序。(a) 試問這些 key 在甚麼樣的排列順序下，以 insertion sort 來排序，其資料交換動作的次數會最多，另外在甚麼順序下會最好？請解釋為甚麼？(b) 試問這些 key 在甚麼樣的排列順序下，以 quick sort 來排序，其資料交換動作的次數會最多，另外在甚麼順序下會最好？請解釋為甚麼？
- (20%) Insert a sequence of keys (27, 49, 17, 20, 61, 23, 92, 33) into a data structure that has no keys in the beginning. Depict the data structure after these insertions if it is (a) heap tree; (b) AVL tree; (c) 2-3 tree; (d) red-black tree.
- Write the expression
$$\{[(a + b) * c] * (d + e)\} - [f - (g * h)]$$
 as a tree and then express the result in operator prefix notation. (10%)
- Determine a railway network of minimal cost for the cities in the following figure. (10%)



- State the pigeonhole principle. (5%)
Give an example to explain its usage. (5%)
- Consider a table of the triangular shape shown in the following figure, where the columns are indexed from $-n$ to n and the rows from 0 to n .
(a) Devise an index function that maps a table of this shape into a sequential array. (10%)
(b) Write a function that will generate an access table for finding the first entry of each row of a table of this shape within the contiguous array. Indicate what kind of programming language you choose. (10%)



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