

國立中央大學 109 學年度碩士班考試入學試題

所別： 資訊管理暨大數據分析類

共 2 頁 第 1 頁

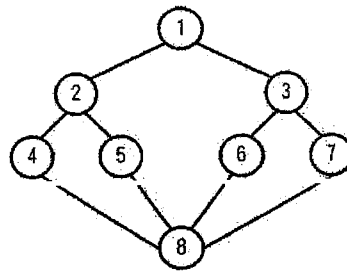
科目： 資料結構

本科考試禁用計算器

*請在答案卷(卡)內作答

*計算題需計算過程，無計算過程者不予計分

1. Please show the results of using the Bubble Sort and Selection Sort for the following data: 3, 2, 6, 4, 1, 5. (12%)
2. Please construct a binary tree based on the following data: 35, 47, 21, 5, 30 (10%). According to the binary tree, please illustrate the "PreOrder", "InOrder", and "PostOrder" tree traversal of the constructed binary tree. (12%)
3. According to the graph shown below, please describe the results by depth-first search (DFS) and the DFS spanning tree (8%) and the results by breadth-first search (BFS) and the BFS spanning tree (8%).



4. For each of the following requirement, please give a proper representation of graph $G=(V, E)$ in Fig 1.
 - (a) Find all vertices that are adjacent to a specified vertex V_i in time proportional to the number of vertices reported. (5%)
 - (b) Determine whether two specified vertices V_i and V_j are adjacent in constant time. (5%)
 - (c) How many paths whose length is 8 from node V_1 to node V_5 exists in the graph? (10%)

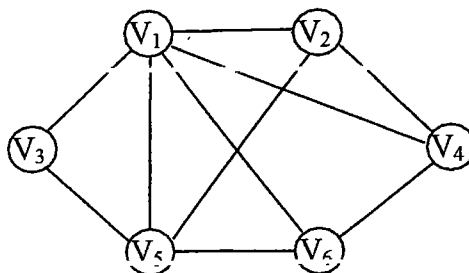


Fig. 1. Graph G

參考用

注意：背面有試題

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5. What kind of data structure is most suitable for the symbol table of an assembler? Explain your answer briefly. (5%)
6. Tower of Hanoi is a well-known mathematical puzzle.
 - (a) Please design a recursive function to solve the Tower of Hanoi puzzle **in C language** (15%)
 - (b) How many times of disk moving are necessary to solve the puzzle with n disks? (2%)
 - (c) Prove your answer in (b). (8%)

參考用

注意：背面有試題