

國立彰化師範大學 102 學年度碩士班招生考試試題

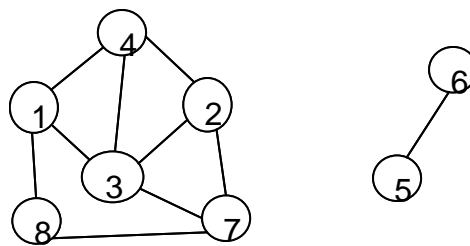
系所：資訊管理學系數位內容科技與管理碩士班

科目：資料結構

☆☆請在答案紙上作答☆☆

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1. If a 2-3 tree has 63 nodes, then what is the maximum height of this tree? (10%)
2. (a) Please define a simple data structure that can be used as a doubly linked list. (7%)
(b) Design a simple algorithm to insert a node X in the right of node P in a doubly linked list. (8%)
3. Considering a two dimensional array A. If the address of A(1, 1) is 644 and the address of A(3, 3) is 67, what is the address of A(14, 14)? (10%)
4. Please use an adjacency list to represent the following undirected graph. (15%)



5. (a) Please write a bubble sort pseudo code for sorting numbers stored in an array. (10%)
(b) Analyze and calculate the time complexity (*Big-O*) of your bubble sort code. (10%)
6. Assume you are maintaining a big data set containing millions of records with “*search*” being the major operation.
 - (a) If the data set remains static (i.e., no record may be deleted from and no new record may be inserted into the data set), what kind of pre-processing and data structure would you suggest to use for your data set to ensure efficient *search* operation? (15%)
 - (b) If, on the other hand, the records may be deleted from and new records may be inserted into the data set very frequently, what kind of pre-processing and data structure would you suggest to use for your data set to ensure efficient *search* operation? (15%)
(Please explain in more details regarding your answers)