招 生 學 年 度	105	招 生 類 別	碩士班
系 所 班 別	資訊工程學系碩士班（資工甲組）		
科 目 名 稱	資料結構		
注 意 事 項	本考科禁止使用掌上型計算機		

1. (20%) Let A = [1..8, 2..9, 3..7] be a three dimensional array.

    A. How many elements are there in A.

    B. If each element take 3 bytes and the starting address of A is 1000, what is the address of $A[5, 5, 5]$ in row major?

2. (20%) There is a sequence of numbers and we want to insert them into a data structure one by one. To make sure that the data should be in an increasing order for each insertion. For each of the following cases, what data structure should be? Please explain your answer.

    A. The number of data movements should be as small as possible.

    B. The number of data comparisons should be as small as possible.

3. (10%) Given an array with eight elements (4, 1, 6, 5, 2, 3, 8, 7), please use it to create a max-heap. What is the final result of the max-heap?

4. (20%) Construct the minimum cost spanning tree for the following weighted graph G.

    A. Write a Kruskal's algorithm to find the Minimum Spanning Tree of a graph G.

    B. Write out each weight of the edges added to the tree in the sequence of applying Kruskal's algorithm.

G
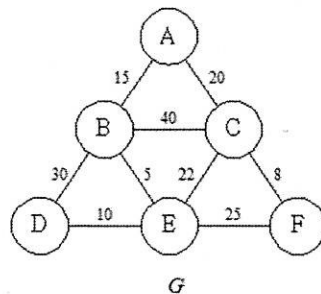
5. (10%) Give a deap deap_tree[10]={5, 45, 10, 8, 30, 40, 15, 19, 9, 10}. What would the tree be if the minimum node is deleted?

6. (20%) Read the following data in the given order, and show the corresponding trees. 19,13,16,22,6,17,25,37,8,31,2,28,33.

    A. Please give a definition of Min-max heap and draw a Min-max heap tree.

    B. Please give a definition of AVL tree and draw a AVL tree.