

國立高雄第一科技大學 101 學年度 碩士班 招生考試 試題紙

系 所 別：系統資訊與控制研究所

組 別：資訊組

考科代碼：2152

考 科：資料結構

注意事項：

- 1、本科目可使用本校提供之電子計算器。
- 2、請於答案卷上規定之範圍作答，違者該題不予計分。

1. Translate the following prefix expression to infix. (10%)  
-\*A/+BC-DEF
2. Give a tree representation and evaluate the value of the prefix expression.(10%)  
+-\*235/\*236
3. What are the advantages and disadvantages of representing a group of items as an array versus a linear linked list?(10%)
4. Please illustrate the following data structures
  - (a) General tree (5%)
  - (b) Binary tree (5%)
  - (c) Threaded binary tree (5%)
  - (d) Binary search tree (5%)
5. The data are inserted in the sequence of 4,2,6,5,1,7,3,8.
  - (a) Construct the corresponding max heap and binary search tree. (5%)
  - (b) If the above data are the first data of eight runs sorted in increasing order, construct the corresponding selection tree. (5%)
6. Please answer and explain the following questions?
  - (a) The worst-case time complexity of searching in a binary search tree of n elements? (5%)
  - (b) The worst-case time complexity of searching in an AVL tree of n elements? (5%)
  - (c) The average time complexity of searching in an unsorted array of n elements? (5%)
  - (d) The average time complexity of searching in a sorted linked list of n elements? (5%)

7. Suppose we want to transmit the message

“ADFBACGEECADFGACEDCCEEGFFBACDABBCAA”

(a) Draw a Huffman tree and write its code.

(5%)

(b) If Huffman code is used to encode the message, how many bits are required? (5%)

8. Please show detail process on the follows ten numbers

“21, 13, 30, 25, 18, 9, 99, 33, 55, 16” with increasing sort by

(a) Bubble Sort (5%)

(b) Quick Sort (5%)