

國立中央大學 106 學年度碩士班考試入學試題

所別： 資訊管理學系 碩士班 甲組(一般生)

共 1 頁 第 1 頁

科目： 資料結構

本科考試禁用計算器

*請在答案卷 內作答

參考用

1. Please describe the concept of binary tree sort in data structure. (13%) Then, please use the following data {23, 68, 1, 38, 10, 45, 25, 89} to build a binary search tree and its sorting result. (20%)
2. Given the postfix representation of an expression: $abcd-*+ef/g*+$
 - (a) Construct the expression tree for the given postfix by using the concept of stack. To get more credits, you are supposed to show the construction step by step including the content of the theoretical stack. (10%)
 - (b) Find the equivalent prefix expression by using the result of (a). (10%)
3. There are N random numbers in an array. All of the numbers are unique.
 - (a) Is it necessary to sort the array for finding the k-th small element where $1 \leq k \leq N$ (3%)
 - (b) Suppose you have an array $A[9]=\{3,1,7,6,4,8,5,2,9\}$. Prove your answer for (a) by showing how to find the 6th small element in array A. (10%)
4. You are given pseudo codes for a computer program named 'ABC' and a function named 'A', as shown in Figures 1 and 2, respectively.
 - (a) Calculate the exact number of times the function A() will be executed. Explain your answer. (24%)
 - (b) Calculate the time complexity of 'ABC'. Explain your answer. (10%)

```
for k ← 1 to n
  for i ← 0 to k-1
    for j ← 1 to k
      if i≠j then A();
    end
  end
end
end
```

Figure 1.

```
function A()
  for ii ← 1 to s
  end
return
```

Figure 2.