

科目：資料結構與演算法

適用：資工系三

編號：711

考生注意：

1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

本 試 題  
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1. How many different binary searching trees can be made from 5 nodes? Draw and explain your answer. (20%)
2. Explain the Prim's method. (20%)
3. The sequence  $F(n)$  of Fibonacci numbers is defined by the recurrence relation:  
$$F(n) = F(n-1) + F(n-2),$$
with seed values  
$$F(0) = 1, \text{ and } F(1) = 1.$$
  - a. If using the recursion method to calculate the value of  $F(12)$ , how many times of additive operations will be performed?  
Explain your answer briefly. (20%)
  - b. If using the dynamic programming method to calculate the value of  $F(12)$ , how many times of additive operations will be performed?  
Explain your answer briefly. (20%)
4. Give the average number of exchanges needed for Selection Sort.  
Explain your answer in detail. (20%)