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# 國立臺北科技大學九十六學年度博士班入學考試

系所組別： 2150 電機工程系博士班戊(計算機)組

## 第一節 計算機理論 試題

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### 注意事項：

1. 本試題共六題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、(5%) The following numbers are entered into an empty sorted binary tree:

3, 6, 9, 12, 8, 15, 5, 10, 14

Draw the resulted tree

二、(5%) Trace out the following algorithm as it computes  $X_1(6)$ .

```

Procedure  $X_1(n)$ 
  if  $n < 2$  then return( $n$ )
  else return( $X_2(2, n, 1, 1)$ )
endif
end  $X_1$ 

```

```

Procedure  $X_2(i, n, a, b)$ 
  if  $i \leq n$ 
  then call  $X_2(i+1, n, b, a+b)$ 
  endif
  return( $a$ )
end  $X_2$ 

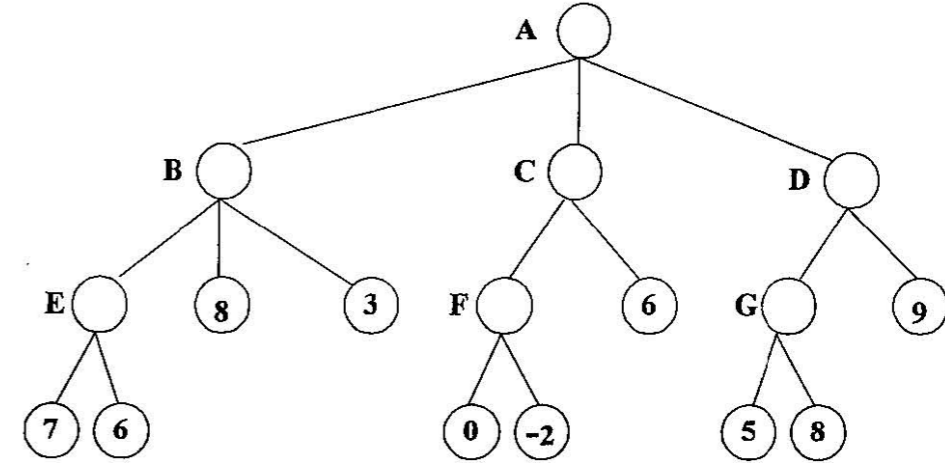
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三、(5%) Write a recursive function to find the greatest common divisor of two nonnegative integers.

四、(5%) Convert the expression  $A + B * (C - D + E) - F * G$  to the postfix form.

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五、Consider the following game tree. In this tree, high numbers represent good boards for X, and it is currently X's move.



1. (7%) Using the min-max technique obtain the value of each node.
2. (3%) What move should X make on node A?

六、Briefly describe the following terms:

1. (5%) algorithm
2. (5%) divide and conquer algorithm
3. (5%) greedy algorithm
4. (5%) knapsack problem
5. (5%) traveling salesperson problem
6. (5%) NP-complete problem
7. (5%) inheritance
8. (5%) polymorphism
9. (5%) deque
10. (5%) hash table
11. (5%) heap
12. (5%) binary search tree
13. (5%) round robin scheduling
14. (5%) critical section