國立中央大學105學年度碩士班考試入學試題

所別： 企業管理學系 碩士班 企業電子化與大數據庚組(一般生) 共2頁 第1頁

科目： 資料結構

本科考試禁用計算器 ＊請在答案卷(卡)內作答

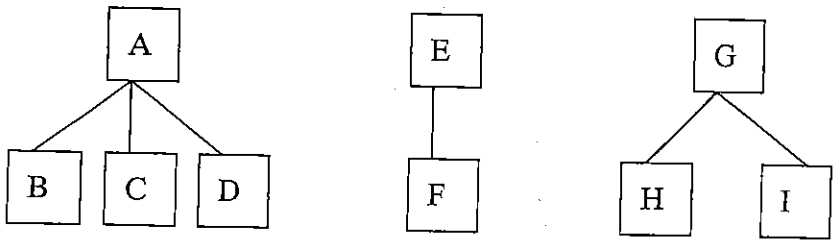
1. (20 points) Write the postfix and prefix expression for the following infix expressions based on Java programming language.
   (1) *A/B-x+y*z-A*B* *(10 points)*
   (2) *A*(B+r)/s-t* *(10 points)*

2. (10 points) Suppose the preorder and inorder traversals of a binary tree are ABCDEF and DCBEAFG respectively. What is the postorder traversal?
   (A) CDEBGFA
   (B) DCEBGFA
   (C) CDBEFGA
   (D) DCEBFGA
   (E) none of the above.

注意:背面有試題

3. (30 points) If $T_1, \ldots, Tn$ is a forest of trees, then the binary tree corresponding to this forest, denoted by $B(T_1, \ldots, Tn)$ is defined as follow:
   - *is empty, if n=0*
   - *has root equal to root (T_1); has left subtree equal to $B(T_{11}, T_{12}, \ldots, T_{1m})$, where $T_{11}, T_{12}, \ldots, T_{1m}$ are the subtrees of root (T_1); and has right subtree $B(T_2, \ldots, Tn)$.*

   (A) Draw binary tree representation of the following forest (10 points)



   (B) Define the inverse transformation of the one that creates the associated binary tree from a forest. Are these transformations unique? If not, use the example in (1) to show it.(20 points)

4. (20%) A complex –valued matrix X is represented by a pair of matrices <*a*, *b*>, where *a* and *b* contain real values. For a function that computes the product of two complex-valued matrix <*a*, *b*> and <*d*, *e*>, where <*a*,*b*>*<*d*,*e*>=(*a*+*ib*)*(*d*+*ie*)=(*ad*-*be*)+*i*(*ae*+*bd*). Please determine the number of additions and multiplications if the matrices are all *n*n*.

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5. (20%) Stacks and Queues can be implemented as Static (Array-Based) or as Dynamic (Reference-Based) in a given programming language. Explain the differences, advantages and disadvantages between the two implementations.

注意:背面有試題