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) DCBFGEA
   (C) CDBEFGA
   (D) DCBEFGA
   (E) none of the above.

3. (30 points) If \( T_1, ..., T_n \) is a forest of trees, then the binary tree corresponding to this forest, denoted by \( B(T_1, ..., T_n) \) is defined as follow:
   - is empty, if \( n=0 \)
   - has root equal to root \( (T_1) \); has left subtree equal to \( B(T_{11}, T_{12}, ..., T_{1m}) \), where \( T_{11}, T_{12}, ..., T_{1m} \) are the subtrees of root \( (T_1) \); and has right subtree \( B(T_{2}, ..., T_n) \).
   (A) Draw binary tree representation of the following forest (10 points)

   ![Binary Tree Diagram]

   (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 \( n*n \).
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.