1) Using the grammar in Example 3.2, show a parse tree and a leftmost derivation for this statement:
   a) \( A = A^* (B + (C^* A)) \)

2) Write a grammar for the language consisting of strings that have \( n \) copies of the letter followed by the same number of copies of the letter \( b \), where \( n > 0 \). For example the strings \( ab, aaaaabbb \), and \( aaaaaaaabbbbbbb \) are in the language but \( a, abbm, ba \) and \( aaabb \) are not.

3) Compute the weakest precondition for each of the following assignment statements and postconditions:
   a) \( a = 2 \cdot (b - 1) - 1 \) \{a > 0\}
   b) \( b = (c + 10) / 3 \) \{b > 6\}

4) Compute the weakest precondition for each of the following sequences of assignment statements and their postconditions:
   a) \( a = 2 \cdot b + 1; \)
      \( b = a - 3 \)
      \{b < 0\}

5) Write an attribute grammar whose BNF basis is that of Example 3.6 in Section 3.4.5, but whose language rules are as follows: Data types cannot be mixed in expressions, but assignment statements need not have the same types on both sides of the assignment operator.

6) Prove the following program is correct:
   \{n > 0\}
   count = n;
   sum = 0;
   while count <> 0 do
      Sum = sum + count;
      count = count - 1;
   end
   \{sum = 1 + 2 + ... + n\}