1. Rewrite the BNF grammar above to give + precedence over * and force + to be right associative.

2. Using the grammar provided above, show a parse tree and a leftmost derivation for each of the following statements:
   a. \( A = ( A + B ) * C \)
   b. \( A = B * ( C * ( A + B ) ) \)

3. Prove that the following grammar is ambiguous:

   \[
   \begin{align*}
   \langle S \rangle & \rightarrow \langle A \rangle \\
   \langle A \rangle & \rightarrow \langle A \rangle + \langle A \rangle + \langle A \rangle | \langle id \rangle \\
   \langle id \rangle & \rightarrow a | b | c
   \end{align*}
   \]

4. Consider the following grammar:

   \[
   \begin{align*}
   \langle S \rangle & \rightarrow \langle A \rangle \ a \ \langle B \rangle \ b \\
   \langle A \rangle & \rightarrow \langle A \rangle \ b | b \\
   \langle B \rangle & \rightarrow \ a \ \langle B \rangle | \ a
   \end{align*}
   \]

   Which of the following sentences are in the language generated by this grammar?
   a. \( \text{baab} \)
   b. \( \text{bbbab} \)
   c. \( \text{bbaaaaa} \)
   d. \( \text{bbaab} \)

5. Write a grammar for the language consisting of strings that have \( n \) copies of the letter \( a \) followed by the same number of copies of the letter \( b \), where \( n > 0 \).
6. Write an attribute grammar whose BNF basis is the grammar below 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.

<assign> -> <var> = <expr>
<var> -> A | B | C

7. Compute the weakest precondition for each of the following:
   a. \( a = 2 \times (b - 1) - 1 \) \{a > 0\}
   b. \( a = 2 \times b + 1; \)
      \( b = a - 3; \)
      \{b < 0\}