CMSC 331: Principles of programming language

Homework - 1

1. Derive the string using leftmost derivation and draw the parse tree for the following grammar.

   i) String : aabbababba

   Grammar:
   S→ aB | bA
   A→ a | aS | bAA
   B→ b | bS| aBB

   ii) x = sin(y) + exp(z)

   Grammar:
   S → V = E | E
   V → x | y | z
   E → E + T | E - T | T
   T → T * F | T / F | F
   F → (E) | V | fun(V)
   fun → sin | cos | exp

2. Demonstrate if the grammar is ambiguous or unambiguous. (Note: Both are different questions)

   i) S → aSa | bSb | a | b | **ε** (Here 'ε' represents empty string)

   ii) S → aB | ab
   A → AB | a
   B → Abb | b

3. Determine which of the following words are accepted by the given simple regular expression. (Each question may have one or more correct answers)

   i) (a+b)(a+b)a(a+b)*
   a) aabbabab
   b) bababaab
   c) abaabbab
   d) bbaaabba

ii) (a+b)*b(a+b)(a+b)(a+b)

a) abababbaaabb
b) babbabbbabb
c) abababbaaba
d) bbbabababab

4. Construct the regular expression for the following language.
   L = { $a^m b^n$ | m+n is even }

5. Convert the following EBNF to BNF:

   S → A{bA}
   A → a[b]A