Tutorial No.7

Context Free Grammar

1. What language is generated by following CFG: (CO1)
   a. S → aSa|bSb|∧
   b. S → aSa|bSb|a|b
   c. S → aSb|bSa| ∧
   d. S → aSa|bSb|aAb|bAa
      A → aAa|bAb|a|b| ∧
2. Find CFG generating following language: (CO4)
   a. L = { XcX^R | X ϵ {a,b}*}
   b. L = { $a^m b^n$ | m>n and n>0}
   c. The set of odd length string in {a,b}* with middle symbol a.
   d. The set of even length string in {a,b}* with middle two symbols equal.
   e. The set of odd length string in {a,b}* whose first, middle and last symbols same.
   f. L= {$a^i b^j c^k$|j=i or j=k}
   g. L= {$a^i b^j c^k$|i= j+k}
   h. L= {$a^i b^j$|i ≤ 2j }

3. Show following grammar as ambiguous grammar: (CO4)
   a. E → E+E|E*E|a
   b. S → aAS|a
      A→ SbA|SS|ba
   c. S → aS| ∧
      S → aSbS

4. Convert Following Grammar to CNF form: (CO4)
   a. S → PQP
      P → 0P| ∧
      Q → 1Q| ∧
   b. S → AACD
      A → aAb| ∧
      C → aC|a
      D → aDa|bDb| ∧

5. Write Regular Grammar for: (CO4)
   a. L = { x | n_0(x) and n_1(x) are even}
   b. L = { $a^n b^m$ |n,m >= 0 }
   c. r = a* + b*