Class Practice

Theory of Computation

Construct the CFG for the following languages for $\sum = \{a, b\}$

  i. $A=\{\ w\ |\ w$ has even number of **a**'s$\}$

  ii. $A=\{\ w\ |$ each **a** in **w** is followed by at least one **b** $\}$

  iii. $A=\{\ w\ |$ w contains exactly 2 **a**'s and atleast 2 **b**'s $\}$

  iv. $A=\{\ w\ |\ w$ has even number of **a**'s and each **a** in **w** is followed by at least one **b** $\}$

Convert the following CFG to CNF

$S \rightarrow XaX\,|\,bX\,|\,Y$

$X \rightarrow XaX\,|\,XbX\,|\,\in$

$Y \rightarrow ab$

Draw parse tree and leftmost derivation for the expression ab#baab using following CFG:

$S \rightarrow CB$

$C \rightarrow aCa\,|\,bCb\,|\,\#B$

$B \rightarrow AB\,|\,\in$

$A \rightarrow a\,|\,b$

What is ambiguous grammar? Prove that the following grammar is ambiguous.

$S \rightarrow 0A\,|\,1B$

$A \rightarrow 0AA\,|\,1S\,|\,1$

$B \rightarrow 1BB\,|\,0S\,|\,0$