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Tutorial – 7
(PDA - Pushdown Automata)

1. Design a PDA for the following grammar and find the Language.
   $S \rightarrow 0A$
   $A \rightarrow 0AB/1$
   $B \rightarrow 1$
   And trace the string 00001111.

2. Design a PDA for the following grammar and find the Language.
   $S \rightarrow aSa,$
   $S \rightarrow bSb,$
   $S \rightarrow c$
   And trace the string abbcbba.

3. Construct the PDA and find language corresponding to the given grammar
   $S \rightarrow aABB \mid aAA$
   $A \rightarrow aBB \mid a$
   $B \rightarrow bBB \mid A$

4. Consider a pushdown automata P =({q0, q1, q2, q3}, {0, 1}, {X, Y, Z}, δ, q0, Z, { q3}) has the following rules defining δ:

(1)	δ(q0, ε, Z) = {(q1, XZ)}	(6)	δ(q2, 0, Y) = {(q2, ε)}
(2)	δ(q1, 0, X) = {(q1, YX)}	(7)	δ(q2, ε, X) = {(q2, ε)}
(3)	δ(q1, 0, Y) = {(q1, YY)}	(8)	δ(q1, ε, Z) = {(q3, Z)}
(4)	δ(q1, 1, Y) = {(q2, Y)}	(9)	δ(q2, ε, Z) = {(q3, Z)}
(5)	δ(q2, 1, Y) = {(q2, Y)}		

   I. Give an execution trace showing that input string 0110 is in L (P) or not.
   II. Give the contents of the stack after P has read $0^3 1^5 0^3$ from its input.
   III. Informally describe L (P).