PR 8 TBFO

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Ex. 6.3.1

Convert the grammar to a PDA that accepts the same languag by emty stack

$S \rightarrow 0S1 \mid A$
$A \rightarrow 1A0 \mid S \mid \epsilon$

PDA : $(\{q\}, \{0,1\}, \{0,1,A,S\}, \delta, q, S)$

$\delta \rightarrow$
- $\delta(q, \epsilon, S) = \{(q, 0S1), (q, A)\}$
- $\delta(q, \epsilon, A) = \{(q, 1A0), (q, S), (q, \epsilon)\}$
- $\delta(q, 0, 0) = \{(q, \epsilon)\}$
- $\delta(q, 1, 1) = \{(q, \epsilon)\}$

EX 6.3.2

Convert the grammer to a PDA that accepts the same language by empty stack.

$S \rightarrow aAA$
$A \rightarrow aS \mid bS \mid a$

PDA : $(\{q\}, \{a,b\}, \{S,A,a,b\}, \delta, q, S)$

δ :
- $\delta(q, a, a) = \{(q, \epsilon)\}$
- $\delta(q, b, b) = \{(q, \epsilon)\}$
- $\delta(q, \epsilon, S) = \{(q, aAA)\}$
- $\delta(q, \epsilon, A) = \{(q, aS), (q, bS), (q, a)\}$

EX 6.3.3

Convert the PDA $P = (\{p, q\}, \{0,1\}, \{X, Z_0\}, \delta, q, Z_0)$ to a CFG if δ is given

- $\delta(q, 1, Z_0) = \{(q, XZ_0)\}$
- $\delta(q, 1, X) = \{(q, XX)\}$
- $\delta(q, 0, X) = \{(p, X)\}$
- $\delta(q, \epsilon, X) = \{(q, \epsilon)\}$
- $\delta(p, 1, X) = \{(p, \epsilon)\}$
- $\delta(p, 0, Z_0) = \{(q, Z_0)\}$

S = Start String, e = empty string, $Z = Z_0$

In $S \rightarrow [qZq] \mid [qZp]$

(1)
- $[qZq] \rightarrow 1[qXq][qZq]$
- $[qZq] \rightarrow 1[qXp][pZq]$
- $[qZp] \rightarrow 1[qXq][qZp]$
- $[qZp] \rightarrow 1[qXp][pZp]$

(2)
- $[qXq] \rightarrow 1[qXq][qXq]$
- $[qXq] \rightarrow 1[qXp][pXq]$
- $[qXp] \rightarrow 1[qXq][pXp]$
- $[qXp] \rightarrow 1[qXp][pXp]$

(3) - $[q \times q] \longrightarrow 0\,[p \times q]$

- $[q \times p] \longrightarrow 0\,[p \times p]$

(4) - $[q \times q] \longrightarrow \epsilon$

(5) - $[p \times p] \longrightarrow 1$

(6) - $[p \geq q] \longrightarrow 0\,[q \geq q]$

- $[p \geq p] \longrightarrow 0\,[q \geq p]$