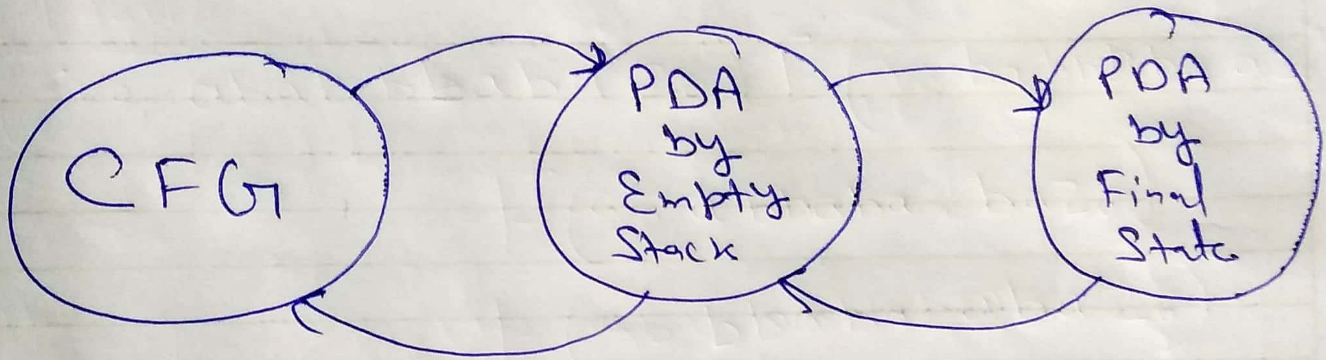
PDA

CFG to PDA :

There are three Classes of Languages accepted by PDA.

1) CFL defined by CFG
2) language accepted by Empty Stack
3) ,, ,, ,, Final State.



$G = (V, \Sigma, P, S) \Rightarrow P = (Q, \Sigma, \Gamma, \delta, q_0, Z_0, F)$

$Q = \{q\}$

$\Sigma = \{$ Input symbol (Terminals)

$\Gamma = (V \cup \Sigma)$

$\boxed{\begin{array}{c} q_0 \to q \\ Z_0 \to S \\ F \to \phi \end{array}}$

δ is defined by

$\boxed{q_0 \to q}$

1) For each non Terminal $\boxed{Z_0 \to S}$ $\boxed{F \to \phi}$

$\delta(q, \Lambda, A) = \{(q, \alpha \mid A \to \alpha$ is in Production P $\}$

2) For each Terminal

$$\left.\begin{array}{l}\delta(q,a,a) = \{(q,\wedge)\} \\ \delta(q,b,b) = \{(q,\wedge)\}\end{array}\right| \left.\begin{array}{l} a \in \Sigma \\ b \in \Sigma \end{array}\right\}$$

Ex 1:- Construct PDA equivalanet to following CFG.

$S \to 0BB$

$B \to 0S \mid 1S \mid 0$

Soln = $G = (\{S,B\}, \{0,1\}, P, S)$

$\Rightarrow (Q, \Sigma, \Gamma, \delta, q_0, Z_0, F)$

$\Rightarrow \{q, \{0,1\}, \{S,B,0,1\}, \delta, q, S, \phi\}$

1) For each Non-terminal :

δ :-

i) $\delta(q, \wedge, S) = \{(q, 0BB)\}$

ii) $\delta(q, \wedge, B) = \{(q, 0S), (q, 1S), (q, 0)\}$

2) For each Terminal :

iii) $\delta(q, 0, 0) = \{(q, \wedge)\}$

iv) $\delta(q, 1, 1) = \{(q, \wedge)\}$

in PDA There are 4 Tranlition.

Ans

Ex2: Construct PDA equivalanet following gramer.

$S \rightarrow 0S1 \mid A$

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

Soln:- $PDA = (\{q\}, \{0,1\}, \{S, A, 0, 1\}, \delta, q, S, \phi)$

* There is no Final State because we Construct acceptance of Empty Stack.

δ:- For Each Non-Terminal.

$\delta(q, \wedge, S) = \{(q, 0S1)(q, A)\}$

$\delta(q, \wedge, A) = \{(q, 1A0), (q, S)(q, \epsilon)\}$

δ:- For Each Terminal:

$\delta(q, 0, 0) = \{(q, \wedge)\}$

$\delta(q, 1, 1) = \{(q, \wedge)\}$

Ans

Ex 3: Construct PDA equivalent to following CFG.

$S \to aABB \mid aAA$

$A \to aBB \mid a$

$B \to bBB \mid A$

Sol^n: PDA $= (\{q\}, \{a,b\}, \{S, A, a, b\}, \delta, q, S, \phi)$

δ: For each Non Terminal:

$\delta(q, \wedge, S) = \{(q, aABB), (q, aAA)\}$

$\delta(q, \wedge, A) = \{(q, aBB), (q, a)\}$

$\delta(q, \wedge, B) = \{(q, bBB), (q, A)\}$

δ: For each Terminal:

$\delta(q, a, a) = \{(q, \wedge)\}$

$\delta(q, b, b) = \{(q, \wedge)\}$.

Ans