

Course- BTech
Course Code- CSET302
Year- Third

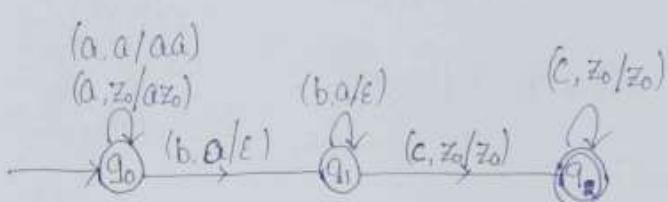
Type- Core
Course Name- Automata Theory & Computability
Semester- Odd Batch- BTech 5th Semester

Tutorial-10

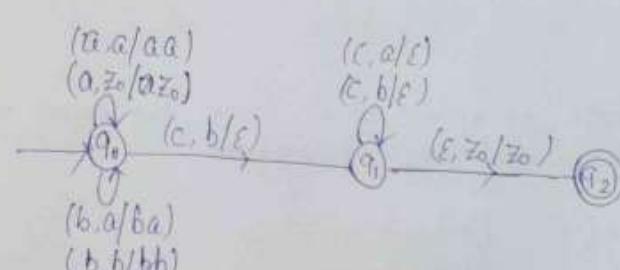
Tutorial No.	Name	CO1	CO2	CO3	CO4
10	Pushdown Automaton (PDA)	--	--	--	--

Objective: Construction of Pushdown Automaton (PDA)

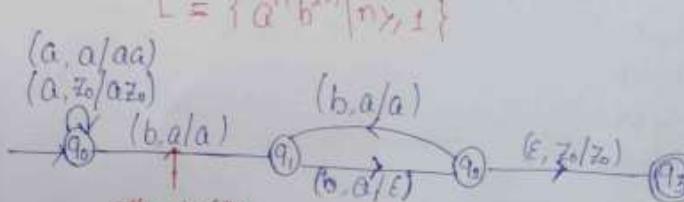
Q1. Construct a PDA that accepts a language $L = \{a^n b^n c^m | n, m \geq 1\}$ over $\Sigma = \{a, b, c\}$.



Q2. Construct a PDA that accepts a language L over alphabet $\Sigma = \{a, b, c\}$.
 $L = \{a^n b^m c^{n+m} | n, m \geq 1\}$



Q3. Construct a PDA that accepts a language L over alphabet $\Sigma = \{a, b\}$.
 $L = \{a^n b^{2n} | n \geq 1\}$

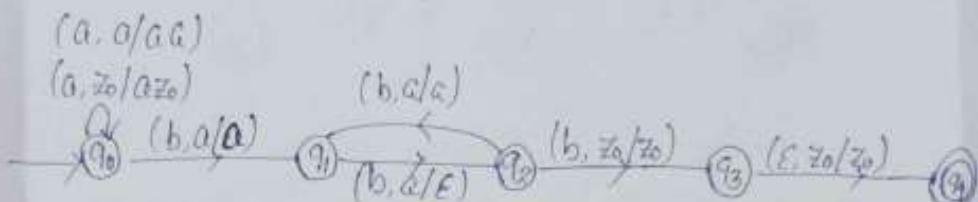


This NFA/SFA is to identify the end of all a's in the string a.

Q4 Construct a PDA that accepts the language L over alphabet $\Sigma = \{a, b\}$.

$$L = \{a^n b^{2n+1} \mid n \geq 1\}$$

Soln $L = \{a^n b^{2n} b \mid n \geq 1\}$

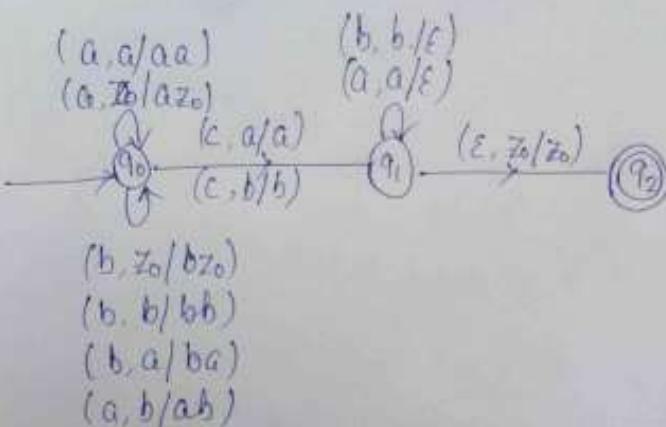


Q5 Construct a PDA for the language over $\Sigma = \{a, b, c\}$.

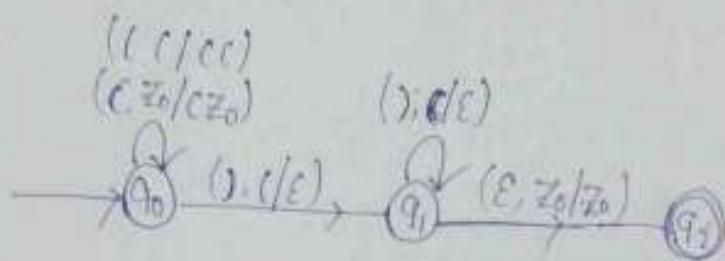
$$L = \{w c w^R \mid w \in (a+b)^*\}$$

Soln

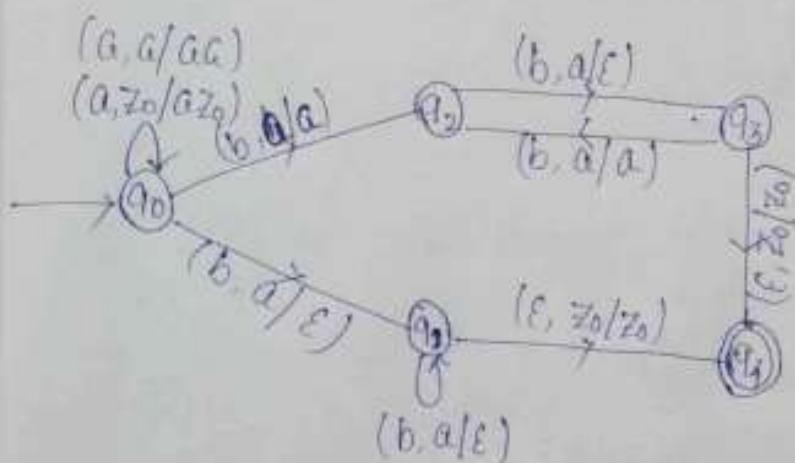
Center is known i.e. c , hence the every string is an odd length palindrome.



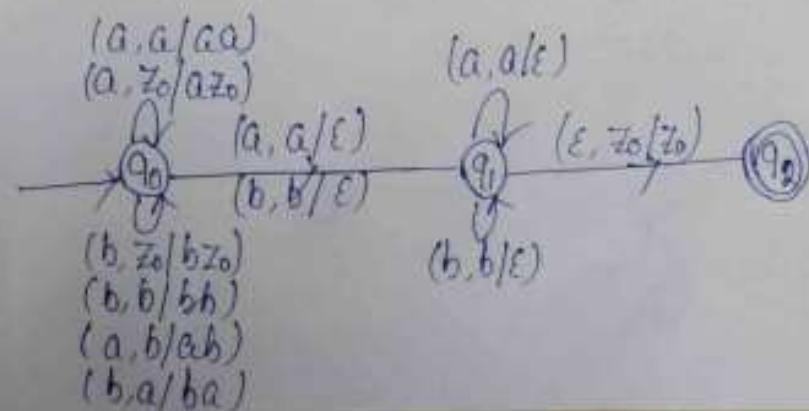
Q6. Construct a PDA for checking balanced parentheses
 $L = \{w | w = (u)u\} \text{ over } \Sigma = \{(,)\}$



Q7. Construct a PDA that accepts a language
 $L = \{a^m b^n | (m=n) \text{ or } (2m=n) \text{, } m, n \geq 1\} \text{ over } \Sigma = \{a, b\}$

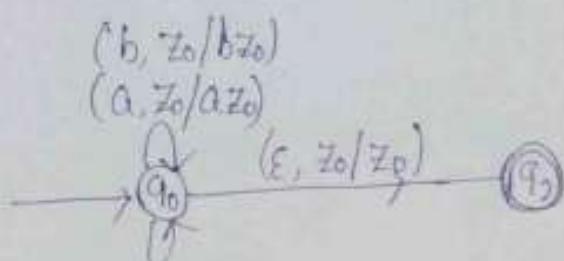


Q8. construct PDA for language L over $\Sigma = \{a, b\}$.
 $L = \{ww^R | w \in (a+b)^*\}$



Qn. Construct a PDA for checking number of a's and b's are equal in a string.

$$L = \{\omega \mid n_a(\omega) = n_b(\omega), n > 1\} \text{ over } \Sigma = \{a, b\}$$



- (a, a/aa)
 (b, b/bb)
~~(aabb/aabb)~~
 (b, a/ε)
 (c, b/ε)

$$L = \{a^m b^n \mid m < n\}$$

