

SSN COLLEGE OF ENGINEERING, KALAVAKKAM
Department of Computer Science and Engineering
CS6503 - Theory of Computation
Tutorial – 3 (UNIT III & IV)

1. Construct pushdown automata for the following languages. Acceptance either by empty stack or by final state.
 - a. $L = \{ a^n b^m c^n \mid n, m \in \mathbb{N} \}$
 - b. $L = \{ a^n b^m c^m \mid n, m \in \mathbb{N} \}$
 - c. $L = \{ a^i b^j c^k \mid i, j, k \in \mathbb{N}, i > j \}$

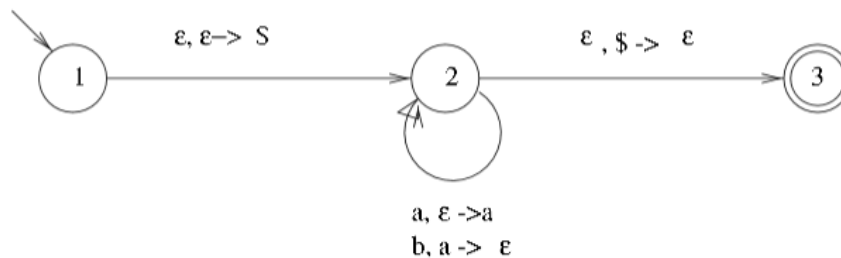
2. Construct a PDA from the following CFG.

$G = (\{S, X\}, \{a, b\}, P, S)$

where the productions are

$S \rightarrow XS \mid \epsilon, A \rightarrow aXb \mid Ab \mid ab$

3. Transform the following PDA into CFG



4. For each of the following languages, say whether the language is CFL or not.
 - a. $L = \{ a^n b^m c^{n-m} \mid n, m \geq 0 \}$
 - b. $L = \{ 0^n 1^{n+1} 2^{n+2} \mid n \geq 0 \}$
 - c. $L = \{ a^n b^n c^m \mid n, m \in \mathbb{N} \}$
 - d. $L = \{ 0^n 1^n 2^n \mid n \in \mathbb{N} \}$
5. Design a TM to recognize all strings consisting of an odd number of a 's.
6. Construct TM for the following Languages:
 - a. $L = \{ 0^n 1^n 2^n 3^n \mid n \in \mathbb{N} \}$
 - b. $L = \{ 0^n 1^n 2^{2^n} \mid n, m \in \mathbb{N} \}$