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

2. Construct a PDA from the following CFG.
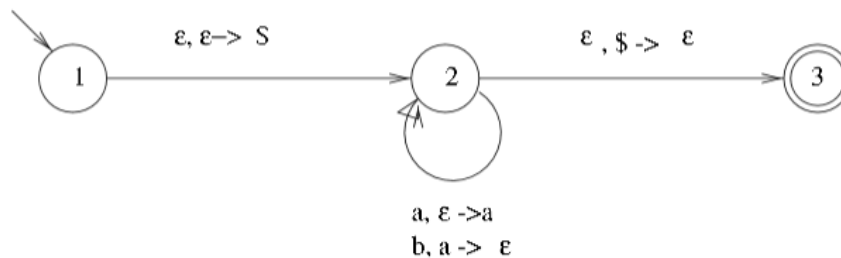   **G = ({S, X}, {a, b}, P, S)**
   where the productions are
   S → XS | ε , A → aXb | Ab | ab

3. Transform the following PDA into CFG

4. For each of the following languages, say whether the language is CFL or not.
   a. $L=\{ a^n b^m c^{n-m} \mid n,m >=0 \}$
   b. $L=\{ 0^n 1^{n+1} 2^{n+2} \mid n>=0 \}$
   c. $L=\{ a^n b^n c^m \mid n,m \in N \}$
   d. $L=\{ 0^n 1^n 2^n \mid n \in N \}$

5. Design a TM to recognize all strings consisting of an odd number of α's.

6. Construct TM for the following Languages:
   a. $L=\{ 0^n 1^n 2^n 3^n \mid n \in N \}$
   b. $L=\{ 0^n 1^n 2^{2n} \mid n,m \in N \}$