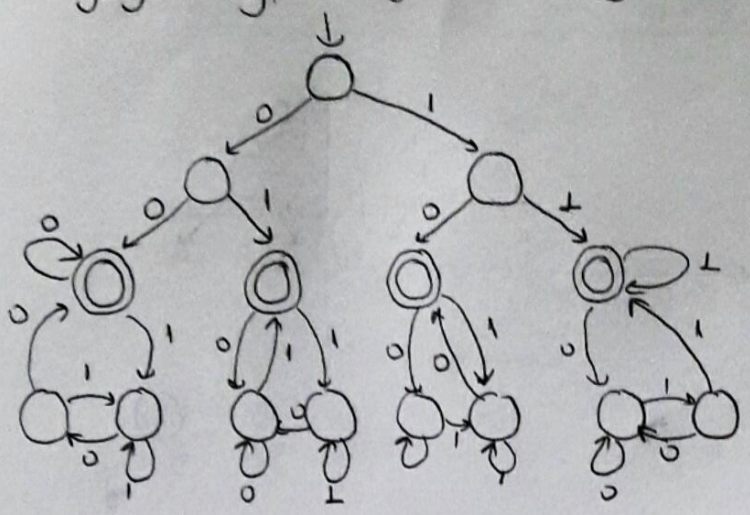
CSE205 Midterm Homework

Question-1

What is the language recognized by the following DFA?



Solution: A over alphabet $\Sigma=\{0,1\}$ where $|w|\geq 2$ and the first two and the last two digits of w are identical.

For example:

$10010010 \in A$ but $001 \notin A$

$00111100 \in A$ $100001 \notin A$

Question-2:

Give a CFG that generates the language $L_1=\{a^n b^{n+2} \mid n\geq 0\}$ over $\Sigma=\{a,b\}$

Solution: $G=\{(S),(a,b)\}$

$$S \rightarrow aSb^2 \mid b^2$$

Question-3

Give a CFG that generates the language $L_2=\{a^n b^m \mid m>n\}$ over $\Sigma=\{a,b\}$.

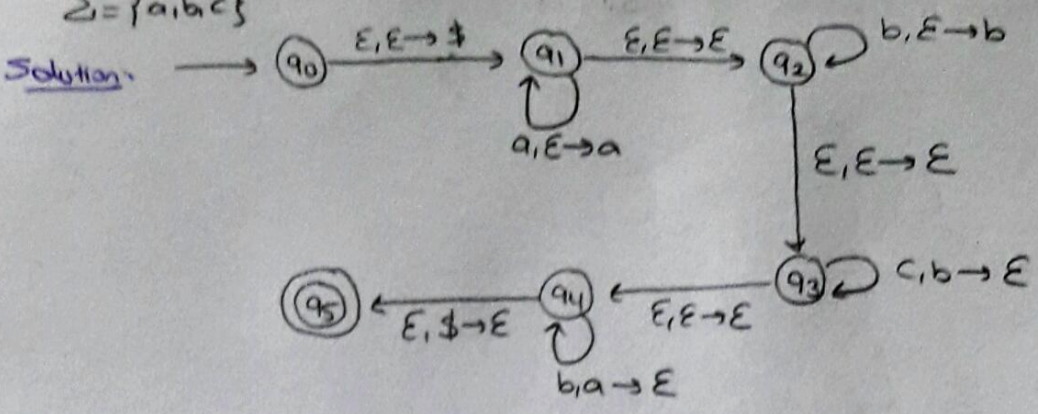
Solution: $G=\{(S,X),(a,b)\}$

$$S \rightarrow bX$$
$$X \rightarrow bX \mid bXa \mid b$$

Question-4

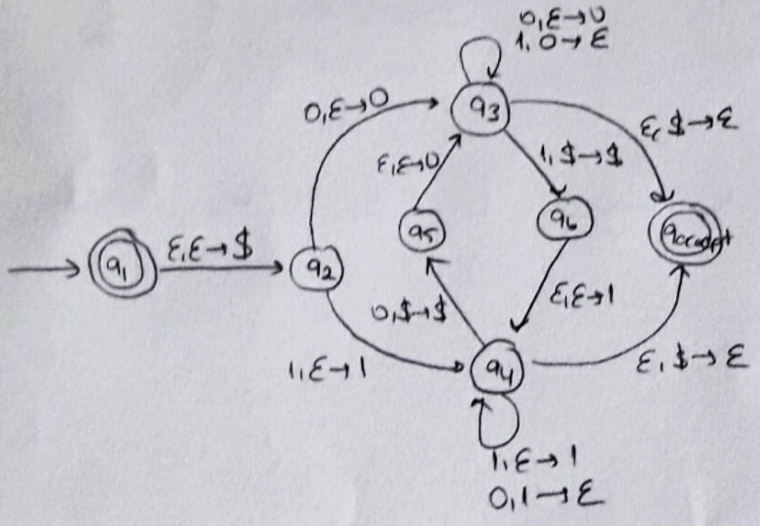
Give a PDA that generates the language $L = \{a^n b^m c^m b^n \mid n, m \geq 0\}$ over $\Sigma = \{a, b, c\}$

Solution:



Question-5

What is the language recognized by the following PDA?



Solution:

$\Sigma = \{0, 1\}$ made of strings that contains equal number's of 0's and 1's.

q_3 → more 0's than 1's arrived, Stack contains 0's.

q_4 → more 1's than 0's arrived, Stack contains 1's.