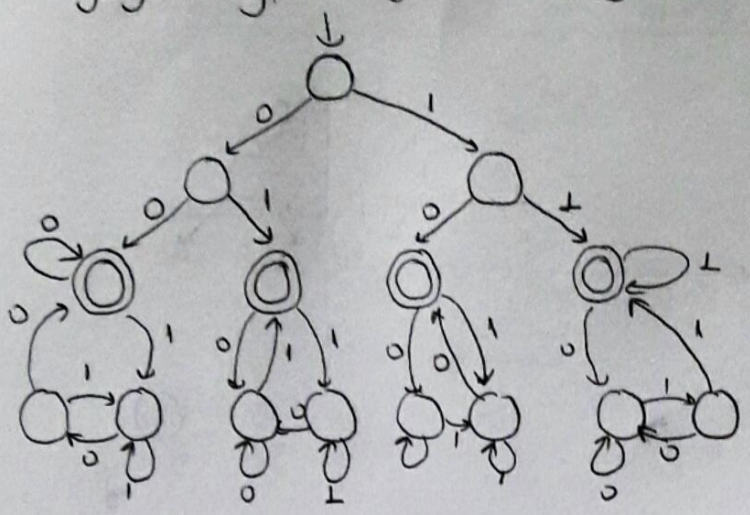
CSE205 Midterm Homework

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

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