



1. Convert the following *CFG* to *Chomsky Normal Form (CNF)*:

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$$S \rightarrow ASB$$

$$A \rightarrow aAS \mid a \mid \epsilon$$

$$B \rightarrow SbS \mid A \mid bb$$

2. Construct a *Push Down Automata (PDA)* for the following languages:

3+4

a) $L = \{ c^{2n} \% d^{3n} \mid n \geq 1 \}$ where, $\Sigma = \{c, d, \%\}$

b) $L = \{ 0^m 1^n 2^k \mid m, n, k \geq 1, \text{ where } m=k \text{ or } n=m \}$