1. Transform the following CFG into CNF:
   $S \rightarrow XY$
   $X \rightarrow abb \mid aXb \mid \varepsilon$
   $Y \rightarrow c \mid cY \mid W$
   $Z \rightarrow aY \mid cX$

2. Pumping lemma (for RL)

3. Provide a PDA for the following language:
   $L = \{wcw^{-1} \mid w \in \{a, b\}\}$

4. Pumping lemma for CFL (Bar-Hillel lemma)

5. Use the CYK algorithm to determine if *she eats a fish with a fork* $\in L(G)$
   holds, where $G = \{\{S, VP, PP, NP, V, P, N, D\}, \{a, eats, fish, fork, with\}, R, S\}$,
   and the productions of R are

$$S \rightarrow NP\ VP$$
$$VP \rightarrow VP\ PP$$
$$VP \rightarrow eats$$
$$PP \rightarrow P\ NP$$
$$NP \rightarrow D\ N$$
$$V \rightarrow eats$$
$$P \rightarrow with$$
$$N \rightarrow fish$$
$$N \rightarrow fork$$
$$D \rightarrow a$$

6. Turing Machines