1. Using the method from class, transform the following right regular grammar into an NFA

\[
S \rightarrow 0S \mid 1S \mid 0T \\
T \rightarrow 0T \mid 1U \\
U \rightarrow 1
\]

2. Read Definition 2.8, Theorem 2.9 and Example 2.10 in the textbook (third edition) concerning Chomsky Normal Form and then put the following grammar into Chomsky Normal Form.

\[
S \rightarrow T \mid TaS \\
T \rightarrow aTb \mid bTa \mid TT \mid \varepsilon
\]


4. Give PDAs that recognize the following languages:
   
   (a) \( \{0^n1^n \mid n \geq 0\} \);
   (b) \( \{0^n1^m \mid n \geq 2m\} \);
   (c) \( \{w \# u \mid w, u \in \{0, 1\}^* \text{ and } |w| < |u|\} \);
   (d) \( \{x_1 \# x_2 \# x_3 \mid x_1, x_2, x_3 \in \{a, b\}^* \text{ and } x_2 = x_3^R\} \).

5. Let \( G \) be the grammar

\[
S \rightarrow T \mid VaT \mid VaS \\
T \rightarrow \varepsilon \mid aUbT \mid bVaT \\
U \rightarrow \varepsilon \mid aUbU \\
V \rightarrow \varepsilon \mid bVaV
\]

(a) Using the method from class, give a PDA \( M \) with \( L(M) = L(G) \).
(b) Show an accepting computation for \( M \) on the string \( babaaba \) by giving a chart with the state, tape contents, and stack contents after each step.