Automata and formal languages
Exercise

Answer the following questions and submit your report by next week.

1. **Construct NPDA's that accept the following languages**

   (a) $L(r)$ **where** $r = abb^*aba^*$

   (b) $L = \{a^n b^{2n} : n \geq 0\}$

2. **Given NPDA** $M = (Q, \Sigma, \Gamma, \delta, q_0, z, F)$ **where** $Q = \{q_0, q_1, q_2\}$**,** $\Sigma = \{a, b\}$**,** $\Gamma = \{0, 1, z\}$**,** $F = \{q_2\}$**, and the transition function** δ **is given by**

$$\begin{aligned}
\delta(q_0, a, z) &= \{(q_1, 0), (q_2, \lambda)\}, \\
\delta(q_1, b, 0) &= \{(q_1, 1)\}, \\
\delta(q_1, b, 1) &= \{(q_1, 1)\}, \\
\delta(q_1, a, 1) &= \{(q_2, \lambda)\}
\end{aligned}$$

   Find the language $L(M)$ **that accepted by** M**.**

3. **Construct an NPDA corresponding to the grammar**

$$\begin{aligned}
S &\longrightarrow aABB|aAA, \\
A &\longrightarrow aBB|a, \\
B &\longrightarrow bBB|A
\end{aligned}$$