Assignment 1. Consider the following language $L$ over the alphabet \{a, b, c\}:

$$L = \{a^{2n}b^m c^{3n+m} | m > 0, n \geq 0\}.$$

a. Give a recursive specification over SA for the language $L$.

b. Construct a push-down automaton for the language $L$. Motivate the construction by indicating what the stack contents and states represent.

Assignment 2. Consider the following recursive specification over SA

$$S = a.A \cdot B + b.A \cdot F + S \cdot D,$$

$$A = A \cdot B \cdot A + B + a.1 + 1,$$

$$B = b.B + 1,$$

$$C = a.A + B,$$

$$D = d.D \cdot E,$$

$$E = a.S + 1,$$

$$F = F + a.0 \cdot B.$$

a. Simplify the recursive specification using language equivalence by applying the following procedures (if possible) to remove: zeroes, 1-summands, unreachable variables, single variable summands, head recursion, and non-productive variables. Give intermediate steps of this simplification by showing the result of each procedure.

b. Transform the simplified recursive specification in Greibach normal form.

c. Give a derivation that shows that $abba \in L(S)$.

d. Show whether the recursive specification of (b) is ambiguous or not.