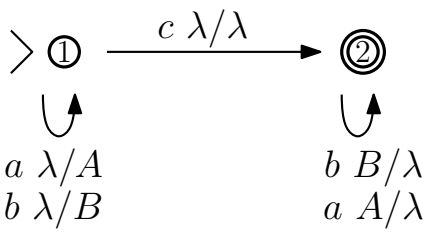
COSC 341 – Tutorial 10

1. Design context-free grammars for following languages on the alphabet $\{a, b\}$:
   (a) The language PALINDROME consisting of all strings that can read the same forwards as backwards
   (b) The language of strings that contain at least one occurrence of aa as a substring
2. Which language does the following Pushdown Automaton recognise? Design a context-free grammar for that language.



3. If possible, design Pushdown Automata and context-free grammars for following languages:
   (a) The language of all words having the same number of a's as b's in any order.
   (b) $L = \{a^n b^n c^m \mid n, m \geq 0\}$
   (c) $L = \{a^n b^n c^m | m \geq n\}$
   (d) $L = \{a^i b^j c^k | i + j = k\}$

Homework

1. Let G be following context-free grammar:

$$S \to abSc,\ S \to T,\ T \to cTd,\ T \to cd$$

   Describe the language of G (for example by using the set notation) and construct a Pushdown Automaton for that language.