COSC 341 – Tutorial 10

1. Design context-free grammars for following languages on the alphabet $\{a, b\}$:

   (a) $a^*b^+ = \{a^n b^k \mid n \in \mathbb{N}, k \in \mathbb{N}, k > 0\}$

   (b) The language PALINDROME consisting of all strings that can read the same forwards as backwards

   (c) The language of strings that contain at least one occurrence of aa as a substring

2. If possible, design Pushdown Automata and context-free grammars for following languages:

   (a) $L = \{a^n b^n c^m \mid n, m \geq 0\}$

   (b) $L = \{a^n b^n c^m \mid m \geq n\}$

   (c) $L = \{a^i b^j c^k \mid i + j = k\}$

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.