INF2080
Oblig 2

Deadline: February 23, 2018

Hand-in and deadline

Hand in a single PDF file in Devilry. Deadline is **February 23, at 23:59**.

Problem 1: Pumping Lemma

In the lecture, we saw that the language

$$L = \{ab^n c^n \mid n \geq 0\} \cup \{a^k w \mid k \neq 1, w \in \Sigma^* \text{ does not start with an } a\}$$

satisfies the pumping lemma for regular languages (Theorem 1.70 in the book), yet we claimed that this language was not regular. In this exercise you will complete this proof.

Problem 1a

Use the pumping lemma to show that the language

$$L_1 = \{ab^n c^n \mid n \geq 0\}$$

is non-regular.

Hint: adapt pumping lemma examples seen in the lecture or book to language L_1.

Problem 1b

Argue why L must then be non-regular and explain why this is not a counter-example to the pumnping lemma.

Problem 2: Context-Free Languages

Consider the language from Problem 1:

$$L_1 = \{ab^n c^n \mid n \geq 0\}$$

Problem 2a

Construct a CFG that generates L_1.

Problem 2b

Sketch a state diagram for a PDA that recognizes L_1.