

Tutorial 06

UNIVERSITY OF VICTORIA

CSC 320 - SPRING 2023

FOUNDATIONS OF COMPUTER SCIENCE

Teaching Team

Learning Outcomes:

- Become familiar with Context Free Languages.
- Use the Context Free Language Pumping Lemma.
- Gain understanding of High Level description of a Turing Machine.

Interesting Article:

"Regular Patterns, Regular Languages and Context-Free Languages" [1]

February 28th, 2023

Question 6.01

Show that the following language is not CFL using the CFL pumping lemma:

$$A = \{a^i b^j c^k \mid 0 \leq i \leq j \leq k\}$$

Question 6.02

Show that the following language is not CFL using the CFL pumping lemma:

$$B = \{0^n \# 0^{2n} \# 0^{3n} \mid n \geq 0\}$$

Question 6.03

Give a high level description of a Turing Machine which decides:

$$C = \{0^{2^n} \mid n \geq 0\}$$

Hint: Review page 143 in the Textbook.

Bibliography

- [1] S. Jain, Y. S. Ong, and F. Stephan, “Regular patterns, regular languages and context-free languages,” English, *Information processing letters*, vol. 110, no. 24, pp. 1114–1119, 2010, ISSN: 0020-0190.