

Computation Theory (COMP 170), Fall 2020
Recitation 03

[1] **Regular**

Show that the following language is regular, by giving an NFA for it:

$$L_{01} = \{(01)^k \mid k \geq 1\}$$

Now, consider the pumping length p , referred to in the Pumping Lemma:

- a. Is it possible that $p = 1$? Why or why not?
- b. Is it possible that $p = 2$? Why or why not?
- c. Is it possible that $p = 3$? Why or why not?

[2] Not Regular

Use the Pumping Lemma to show the following is not regular:

$$L_{010} = \{0^j 1^k 0^j \mid j > 0, k \geq 0\}$$

For best results, use the [pumping lemma proof paradigm resource](#) to help structure your proof.

[3] Not Regular... Again...

Show that the following language is not regular:

$$L_{\text{not pal}} = \{u \mid u \text{ is not a palindromic binary string}\}$$

Note: a palindromic string is one that reads the same backwards and forwards; so, 101101 is palindromic, but 10010 is not.

For best results, use the [pumping lemma proof paradigm resource](#) to help structure your proof.

[4] **Regular Expressions**

Recall problem 2 on from week 2's recitation: F is the language of all strings over $\{0,1\}$ that contain a pair of 1s that are separated by an odd number of symbols. That problem asked you to give an NFA for F . For this problem, construct a regular expression for F . Try to simplify as much as you can, and give an explanation for your solution.