

1: Regular Expressions

(a) Give two strings that are in the following languages and two that are not in the language. The alphabet is $\Sigma = \{0, 1\}$

- $L_1 = 0\Sigma^*1$
- $L_2 = (10)^*$
- $L_3 = \Sigma^*1\Sigma^*0$

(b) Give regular expressions for the following languages over alphabet $\Sigma = \{0, 1\}$

1. All binary strings with exactly two 0s

(c) Describe the language of the following regular expressions over alphabet $\Sigma = \{0, 1\}$

1. $0^*(10^*10^*)^*$
2. $\epsilon \cup \Sigma \cup \Sigma^*(01 \cup 10 \cup 11)$

2: Regular Expressions to NFA

Convert the following RE to an NFA using the procedure shown in class. You must show the intermediate NFAs similar to how it was built in the slides.

$$(0 \cup (01)^*)^*$$

3: NFA to Regular Expression

Convert the following NFA to a regular expression. Show the details of your work.

