

# CS138 Section Week 3

April 15, 2016

## Practice Problems

1. Consider the language

$$L = \{w \in \{0,1\}^* \mid w \text{ contains two 1's such that there are even number of 0's between these two 1's}\}.$$

Write a regular expression for  $L$ . Construct an NFA that accept  $L$ .

2. Let  $\Sigma = \{0,1\}$  be the input alphabet, and  $\Delta = \{\epsilon, 1\}$  be the output alphabet. Construct Mealy and Moore machines that count the occurrences of “01” in unary. For example, on input 101101, your machine should output 11.

3. Write a regular expression for the language  $L = \{w \in \{0,1\}^* \mid w \text{ is divisible by } 3\}$ .
  - a. Construct a DFA for  $L$ .
  - b. Turn the DFA into a GNFA.
  - c. Find a regular expression for  $L$  from the GNFA.

4. Let  $L$  be a regular language, prove that  $\bar{L}$  is regular.