Assignment 1

(Please work in groups of two or three and submit one answer sheet for the group.)

1. Give an FA which accepts only binary strings of length 3.

2. Construct an FA that accepts all strings of \{a, b\} that contain either ab or bba (or both) as substrings.

3. For the alphabet \{a, b, c\}, let \(L\) be the language of all nonempty strings \(x\) such that:
   - if \(x\) starts with the symbol \(a\), then it ends with the symbol \(b\),
   - if \(x\) starts with the symbol \(b\), then it contains no \(c\), and
   - if \(x\) starts with the symbol \(c\), then it has even length.
   Give an FA for \(L\).

4. Construct an FA that accepts all binary strings with an even number of 0’s and the number of 1’s is a multiple of 3.

5. For each RE, state which of the following strings is in the language of the RE: \(\varepsilon, abba, bababb\) and \(baaaa\).
   
   (a) \((a + b)^*ab(a + b)^*\)
   (b) \(b^*ab^*ab^*\)
   (c) \(a + (a^*b)^*\)

Due: Friday September 1