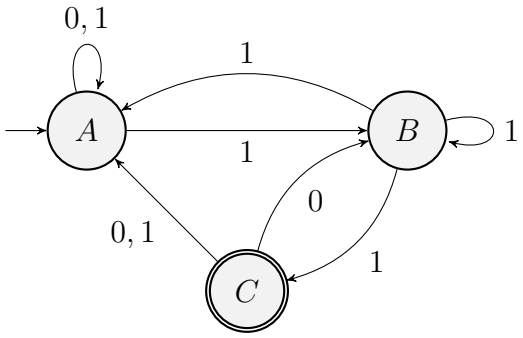
Basics of Information Systems

Winter Semester 2022–23

For discussion on Wednesday, November 30, 2022

1. Construct a binary "add by one" transducer. The input number shall be fed into the transducer starting with the least significant binary digit. The output shall be the input plus one, also starting from the least significant digit.

2. Consider the following non-deterministic FSA:



   (a) Write out a corresponding regular expression.

   (b) Convert the non-deterministic into an equivalent deterministic FSA.

3. Write regular expressions to match the following sets of binary strings. Use the classical regular expression syntax. Then draw the corresponding FSA.

   (a) 0 or 11 or 101,

   (b) ends with 00,

   (c) contains at least three 1s,

   (d) starts and ends with the same character.