Exercises for FLL, Fall 2015, sheet 1

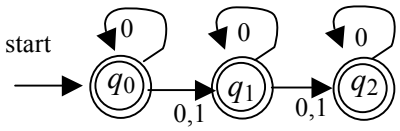
Return Tue Sep 15, in class

Note: you may work in teams of 2 if you wish. If you do, hand in a single solution with both names indicated.

Exercise 1 (a) How many words exist over the symbol set Σ = {1}? and over the symbol set Σ = {a, b}? **(b)** How many words of length *n* exist over a symbol set of size *k*? **(c)** How many languages exist over the symbol sets from (a) and (b)? **(d)** How many languages of words of length *n* exist over a symbol set of size *k*? **(e)** How many *finite* languages exist over Σ = {a, b}?

Exercise 2. Design a DFA which accepts the language $L = \{ w \in \{a, b\}^* \mid |w| > 0$, *and the last symbol in w is equal to the first*$\}$. Describe your DFA both by a complete transition table and through a graphical transition diagram.

Exercise 3. Describe the language accepted by the NFA shown below in plain English.



Exercise 4. Construct a DFA equivalent to the NFA depicted above, *using the subset construction*. Present your DFA by a transition diagram.