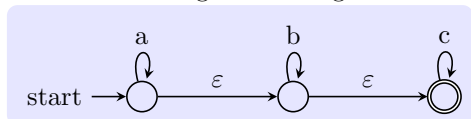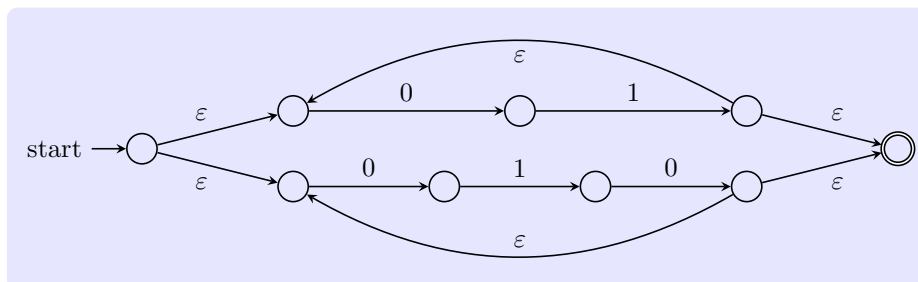# Homework 2

1. Design ε-NFA's for the following languages. Try to use ε-transitions to simplify your design.

    a) The set of strings consisting of zero or more a's followed by zero or more b's, followed by zero or more c's.
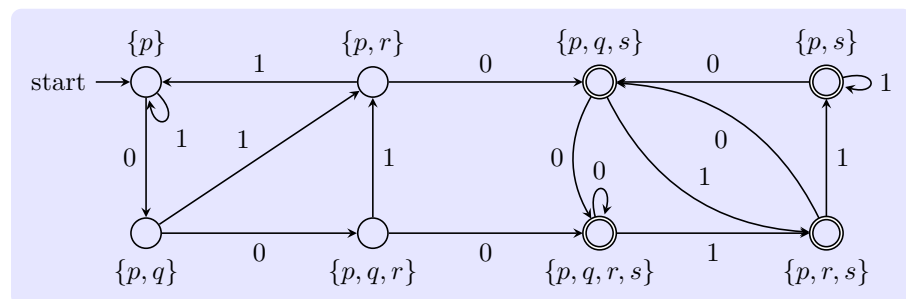

    b) The set of strings that consist of either 01 repeated one or more times or 010 repeated one or more times.

2. Convert to a DFA the following NFA:
   (Note: Give *transition table* or *transition diagram*, DFA states should be labeled with subset of the NFA states if you choose transition diagram.)

	0	1
$\to p$	$\{p,q\}$	$\{p\}$
q	$\{r\}$	$\{r\}$
r	$\{s\}$	$\emptyset$
$*s$	$\{s\}$	$\{s\}$

3. Give regular expression: the set of all strings of 0's and l's not containing 101 as a substring.

   $0^*(1+000^*)^*0^*$　or　$(0+\varepsilon)(1+000^*)^*(0+\varepsilon)$　or　$(0+\varepsilon)(1+00+000)^*(0+\varepsilon)$

4. Give regular expression: the set of all strings with an equal number of 0's and l's, such that no prefix has two more 0's than l's, nor two more l's than 0's.

   $(01+10)^*$

5. Give regular expression: the set of all strings of 0's and 1's, such that the number of 0's and the number of 1's are both even.

   $(00+11+(01+10)(00+11)^*(01+10))^*$