Formal Languages and Automata Theory, SS 2020. Homework 8 (due Week 10)

1. Design ε-NFAs 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 zero or more times.

2. Construct the ε-NFAs for the following r.e. Then transform them into DFAs.
   (a) $a|b|c$
   (b) $io|ma$
   (c) $(a|b)b^*$
   (d) $a^*b|c^*$
   (e) $(0|1)^*01(0|1)^*$

3. Specify the languages represented by the following regular expressions:
   (a) $(11|0)^*(00|1)^*$;
   (b) $(1|01|001)^*(\varepsilon|0|00)$;
   (c) $10|(0|11)0^*1$;
   (d) $((0|1)(0|1))^*$;
   (e) $01^*|1$;
   (f) $((11)^*|101)^*$.

4. Build the ε-NFAs that recognize the languages specified at the previous exercise.

5. Consider the DFA from Course 8 - slide 20. Minimize it using the Table Filling Algorithm. Show all the steps of the algorithm.

6. Consider the following transition table for a DFA:

	0	1
$\rightarrow A$	B	A
B	A	C
C	D	B
$^*D$	D	A
E	D	F
F	G	E
G	F	G
H	G	D

   Construct the minimum-state equivalent DFA.

7. Minimize the following DFA using state equivalence method:

	0	1
$\rightarrow A$	B	E
B	C	F
$^*C$	D	H
D	E	H
E	F	I
$^*F$	G	B
G	H	B
H	I	C
$^*I$	A	E