Formal Languages and Automata Theory, SS 2019. Homework 8 (due Week 11)

1. Prove that the following languages are not regular:

    (a) $L = \{0^i | i \geq 1 \text{ is a perfect square}\}$;

    (b) $L = \{w | w \text{ is binary string with equal number of } 0's \text{ and } 1's\}$;

    (c) $L = \{w | w \text{ is binary string of the form } 0^m 1^n, \ m < n; m \geq 0, n \geq 0; \ m, n \text{ integer numbers}\}$;

    (d) $L = \{0^{2^n} | n \geq 1\}$;

    (e) $L = \{0^n | n \text{ is a prime numbers}\}$;

    (f) $L = \{0^m 1^n 0^{m+n} | m \geq 1, \ n \geq 1\}$.

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

3. Consider the following transition table for a DFA:

	0	1
→ 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.

4. Minimize the following DFA using state equivalence method:

	0	1
→ 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