Formal Languages and Automata Theory, SS 2018. Homework 8 (due Week 10)

0. Remaining exercises from Homework 7.

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) $L = \{w | w \text{ is binary string of the form } 0^m1^n,\ m < n; m \geq 0, n \geq 0;\ m, n \text{ integer numbers}\}$;

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

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

   (f) $L = \{0^m1^n0^{m+n} | m \geq 1,\ n \geq 1\}$.

2. Consider the DFA from Course 8 - slide 20 (`https://merascu.github.io/links/SS2018FLAT/Course8_RegularLanguageProperties.pdf`). 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
$\rightarrow A$	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.