Lab #2
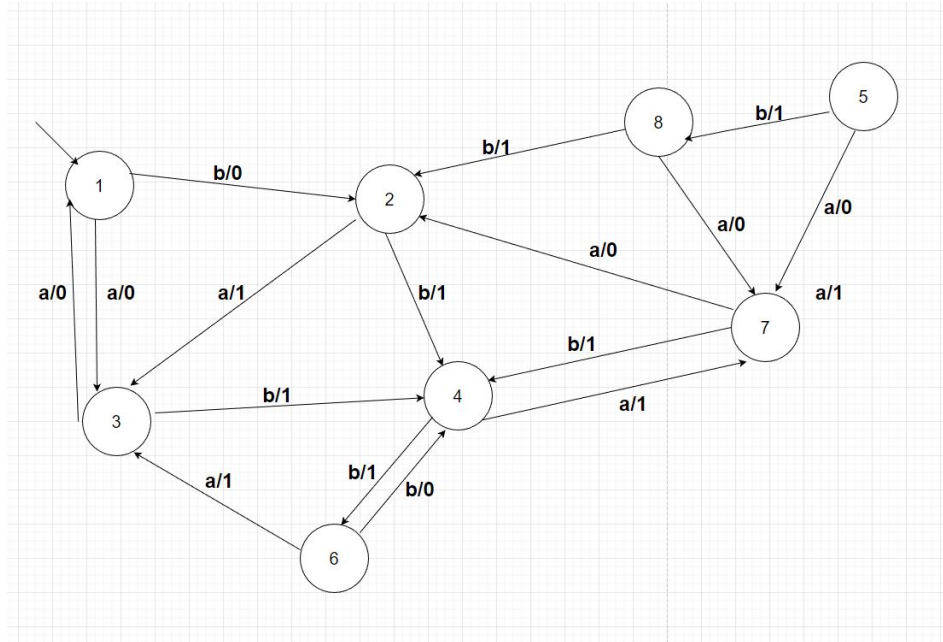
Minimize a given automaton with 8 states.

A = {a, b}   B = {0, 1}   S = {1, 2, 3, 4, 5, 7, 8}   u0 = 1

Output/Transition Table	l	d	d1	d2	d3	d4	d5
States	a b	a b	a b	a b	a b	a b	a b
1	0 0	3 2	B1 A1	B2 A2	B3 C3	C4 B4	C5 B5
2	1 1	3 4	B1 A1	B2 C2	B3 A3	C4 A4	C5 D5
3	0 1	1 4	C1 A1	A2 C2	D3 A3	A4 A4	A5 D5
4	1 1	7 6	B1 D1	D2 A2	B3 C3	D4 B4	F5 B5
5	0 1	7 8	B1 B1	D2 A2	B3 A3	D4 A4	F5 D5
6	1 0	3 4	B1 A1	B2 C2	B3 A3	C4 A4	C5 D5
7	0 1	2 4	A1 A1	A2 C2	C3 A3	B4 A4	B5 D5
8	0 1	7 2	B1 A1	D2 A2	B3 C3	D4 B4	F5 B5

K1 = { A1 = { 2, 4} B1 = {3, 5, 7, 8}, C1 = {1}, D1 = {6} }

K2 = { A2 = {1, 2 , 6, 8} B2 = {3}, C2 = {4} , D2 = {7}, E2 = {5} }

K3 = { A3 = { 4, 5, 8} B3 = {3, 7} , C3 = {2, 6}, D3 = {1} }

K4 = { A4 = {1, 4, 8} B4 = {2, 5, 6} C4 = {3} , D4 = {7} }

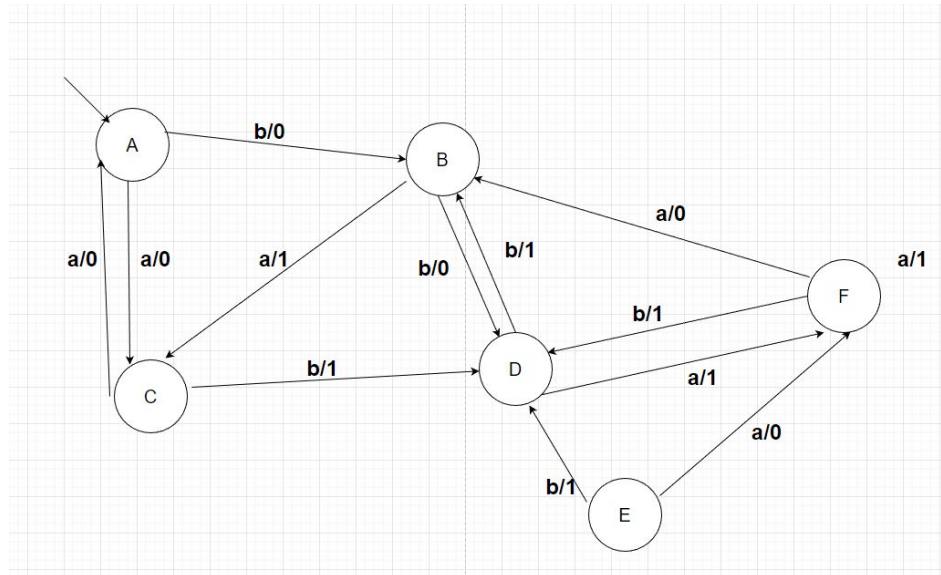K5 = {A5 = {1}, B5 = {2, 6} , C5 = {3}, D5 = {4, 8}, E5 = {5}, F5 = {7} }

K6 = {A6 = {1}, B6 = {2, 6} , C6 = {3}, D6 = {4, 8}, E6 = {5}, F6 = {7} }

S min = { A, B, C, D, E, F} u0min = A

	l min	d min

	a b	a b
A	0 0	C B
B	1 0	C D
C	0 1	A D
D	1 1	F B
E	0 1	F D
F	0 1	B D

The minimized automaton:

Checking for equivalence:

	l	d
	a b	a b
(1, A)	(0, 0) (0, 0)	(3,C) (2,B)
(3, C)	(0, 0) (1, 1)	(1, A) (4, D)
(2, B)	(1,1) (1,1)	(3, C) (4, D)
(4, D)	(1,1) (1,1)	(7, F) (6,B)
(7, F)	(0, 0) (1, 1)	(2, B) (4, D)

We see that in all components the output function is the same (0, 0) or (1, 1) - there are no pairs (1, 0) or (0,1). Therefore, automata are equivalent.