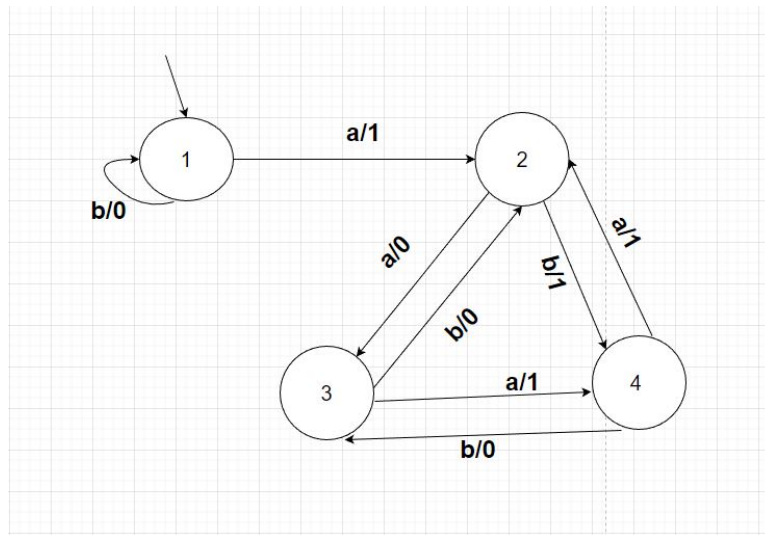# Lab #1

Check the equivalence of two given finite automata with 4 and 5 states.

1 automaton :
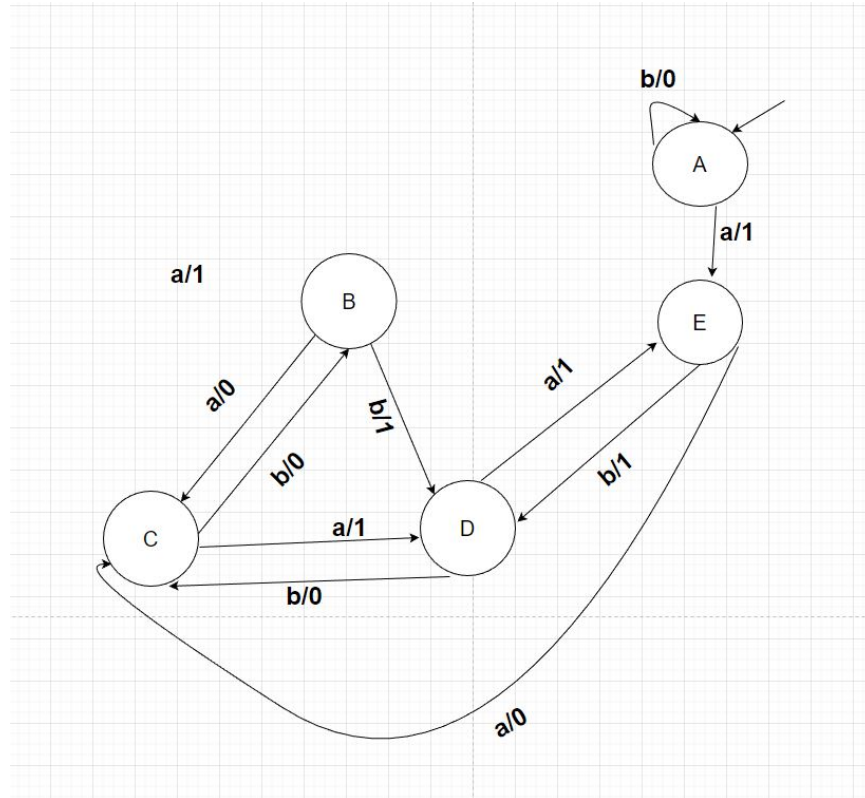
A = {a, b} ;   B = {0, 1} ;   S = {1, 2, 3, 4} ;   u0 = 1

Output/Transition Table	l	d
States	a b	a b
1	1 0	2 1
2	0 1	3 4
3	1 0	4 2
4	1 0	2 3

2 automaton:

A = {a, b} ;   B = {0, 1} ;   S = {A, B, C, D, E} ;   u0 = A

	I	d
	a b	a b
A	1 0	E A
B	0 1	C D
C	1 0	D B
D	1 0	E C
E	0 1	C D

Equivalence Check:

	I	d
	a b	
(1, A)	(1, 1) (0, 0)	(2, E) (1, A)
(2, B)	(0, 0) (1, 1)	(3, C) (4, D)
(3, C)	(1, 1) (0, 0)	(4, D) (2, B)
(2, E)	(0, 0) (1,1)	(3, C) (4, D)

(4, D)	(1, 1) (0, 0)	(2, E) (3, C)

S of the product automaton = {(1, A) , (2, B), (3, C), (2, E), (4, D)}

We observe that in all components, the output function is the same, either (0, 0) or (1, 1). There are no pairs (1, 0) or (0, 1). Therefore, the automata are equivalent.