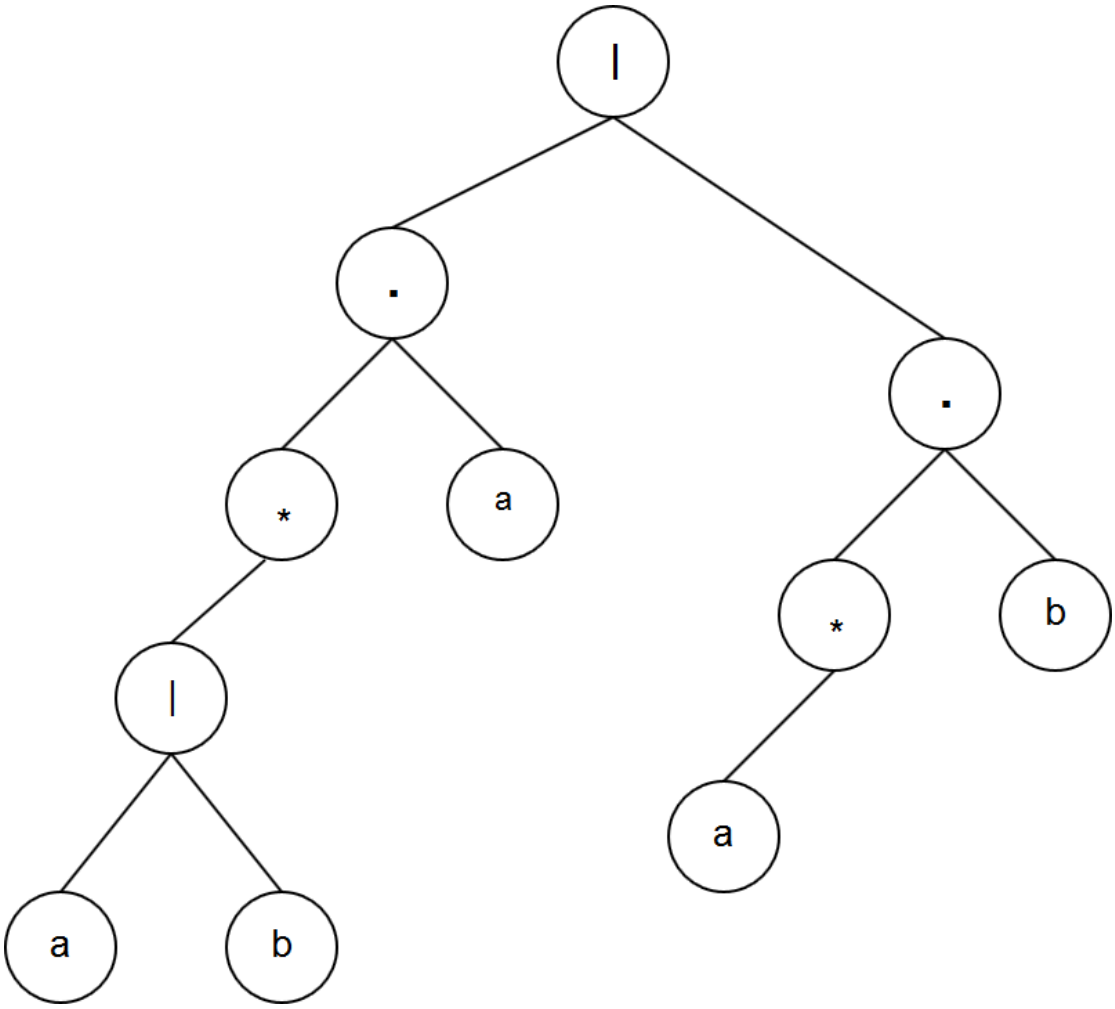
Assignment 3

Automatic Conversion from Regular Expressions to Finite Automata

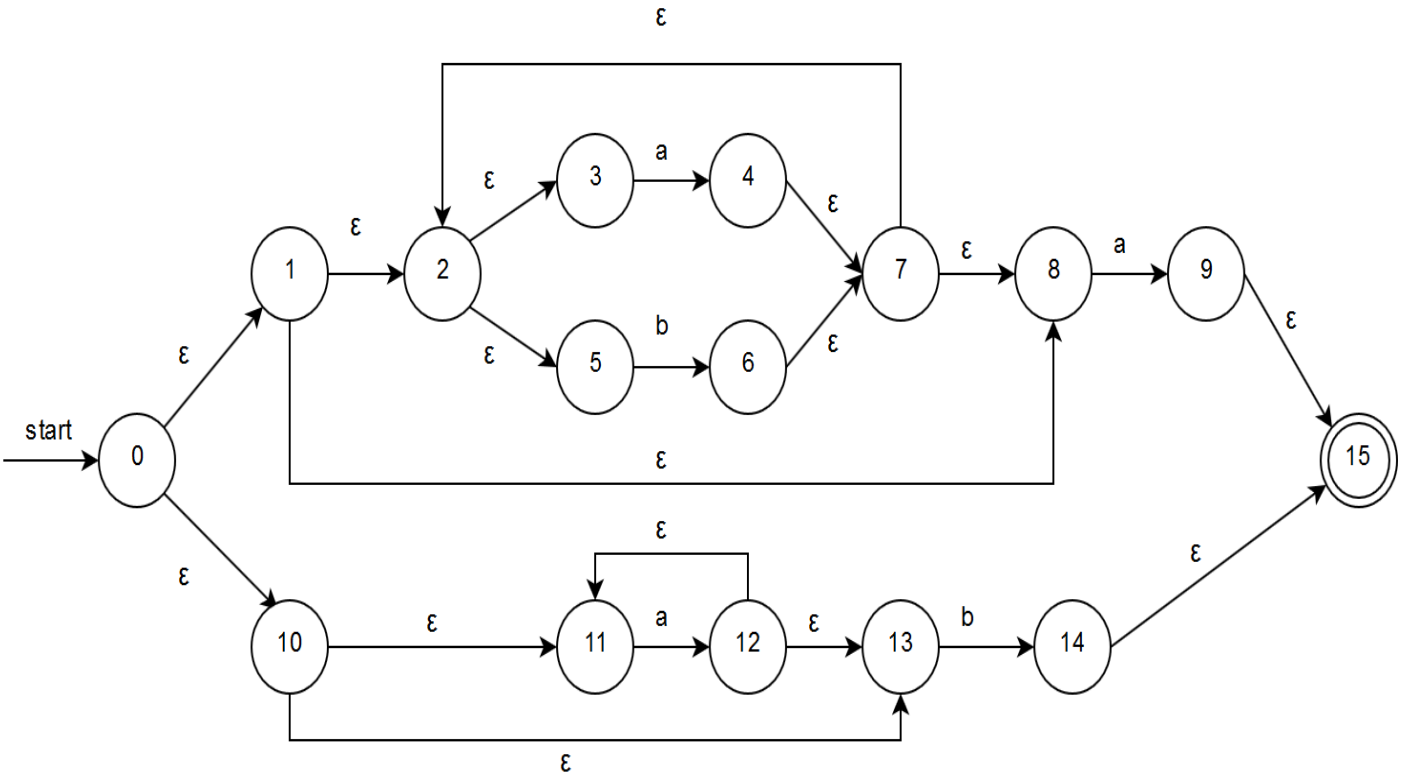
1.

(10%) Construct the expression tree for the following regular expression (a | b)* a | a* b



2.

(40%) Construct a nondeterministic finite automaton (NFA) for the regular expression using the Thompson's construction algorithm



3.

(50%) Convert the NFA into a deterministic finite automaton (DFA) using the subset construction algorithm

ε -*closure*({0}) = {0,1,2,3,5,8,10,11,13} = A

ε -*closure*(*move*(A, *a*)) = ε -*closure*({4,9,12})

= {2,3,4,5,7,8,9,11,12,13,15} = B

ε -*closure*(*move*(A, b)) = ε -*closure*({6,14}) = {2,3,5,6,7,8,14,15} = C

ε -*closure*(*move*(B, a)) = ε -*closure*({4,9,12}) = B

ε -*closure*(*move*(B, b)) = ε -*closure*({6,14}) = C

ε -*closure*(*move*(C, a)) = ε -*closure*({4,9}) = {2,3,4,5,7,8,9,15} = D

ε -*closure*(*move*(C, b)) = ε -*closure*({6}) = {2,3,5,6,7,8} = E

ε -*closure*(*move*(D, a)) = ε -*closure*({4,9}) = D

ε -*closure*(*move*(D, b)) = ε -*closure*({6}) = E

ε -*closure*(*move*(E, a)) = ε -*closure*({4,9}) = D

ε -*closure*(*move*(E, b)) = ε -*closure*({6}) = E

State	Input Symbol	
	a	**b**
A={0,1,2,3,5,8,10,11,13}	B	C
B={2,3,4,5,7,8,9,12,13,15}	B	C
C={2,3,5,6,7,8,14,15}	D	E
D={2,3,4,5,7,8,9,15}	D	E
E={2,3,5,6,7,8}	D	E