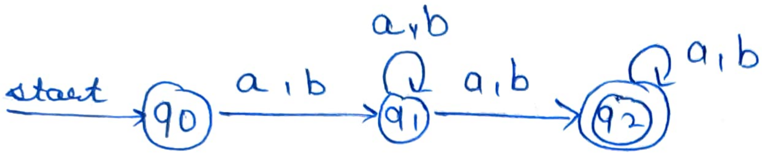
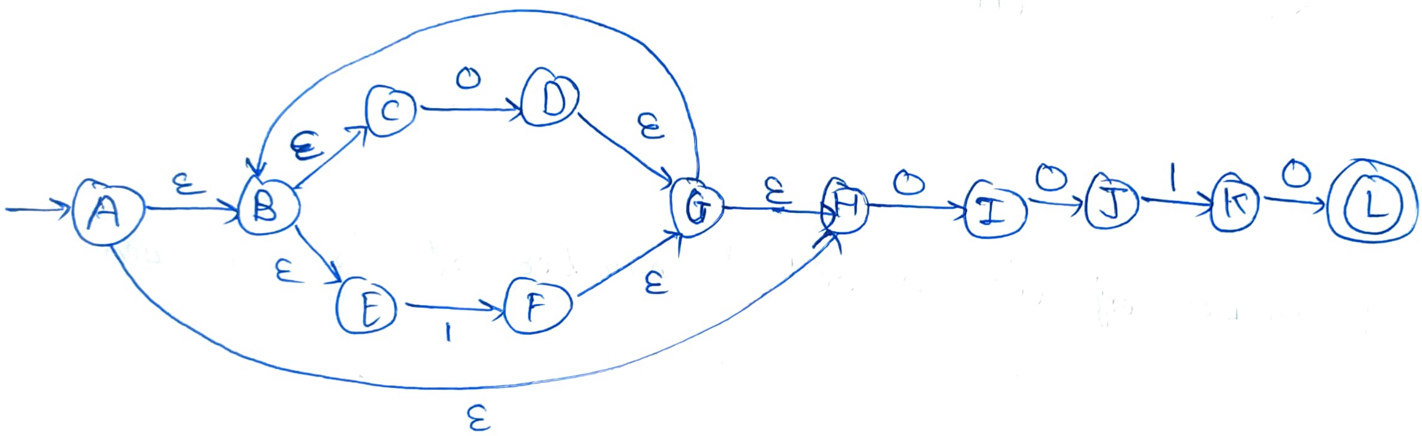
Q. Construct minimum state DFA for eq regular exp $(a|b)^* a(a|b)$.

→ $L = \{aa, ab, aab, aaa, bbab, \dots\}$



Q. Construct NFA for reg exp $(0|1)^* 0010$

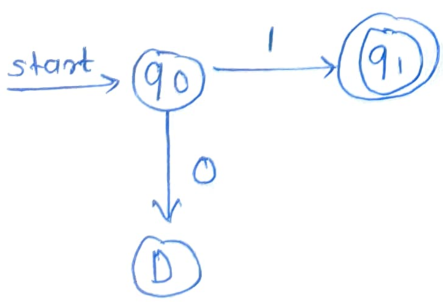
→



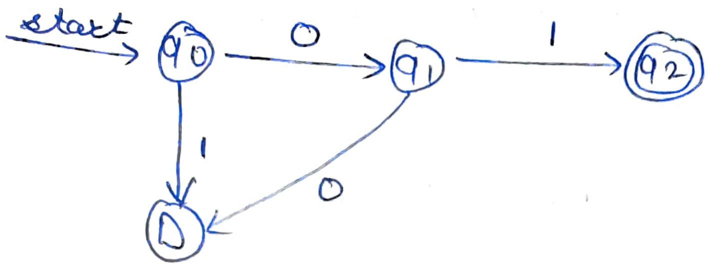
Q. Construct DFA for accepting the following language over an alphabet $\{0,1\}$.

i] accept only 1 as string.

$L = \{1\}$



→ accept string as 01.



3] number of 1's is even & number of 0's is even.

→ L = { 1100, 0011, 00001111, 11110000, ... }

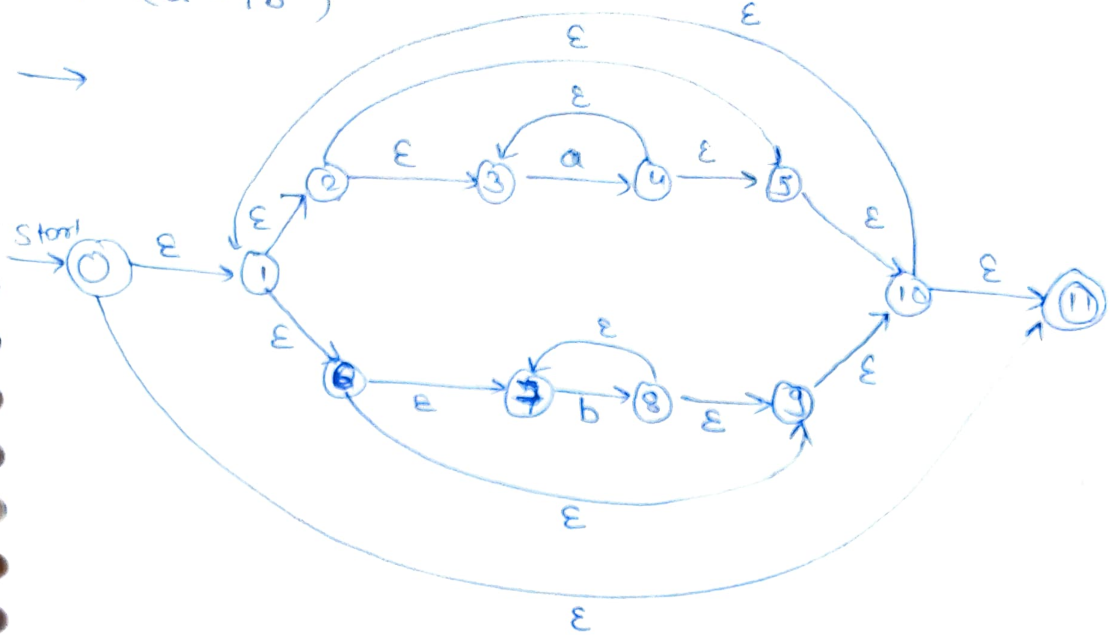
4] number of 0's is odd & number of 0's is even.

Q.

Q. construct NFA for following regular exp (using Thomson's rule).

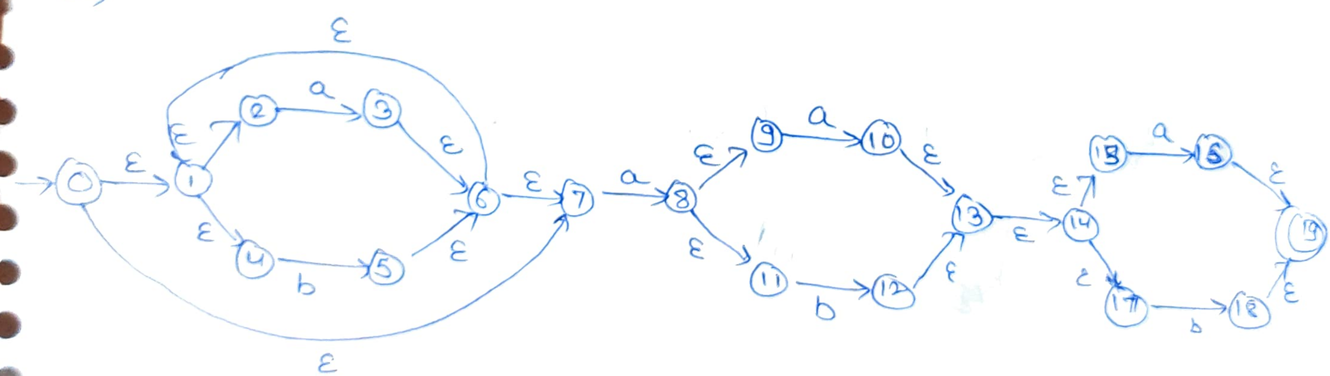
i] $(a^* | b^*)^*$

→



2] $(a|b)^* a(a|b)(a|b)$

→

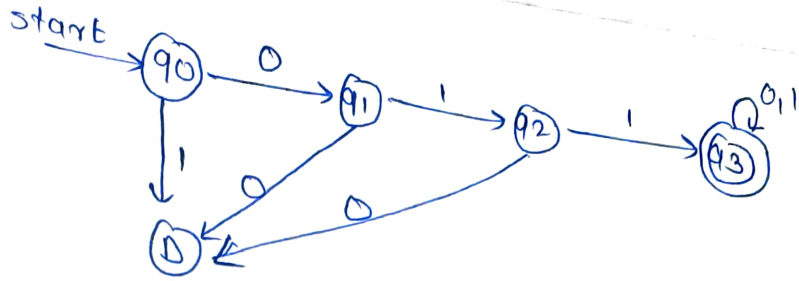


Q. construct DFA for following.

i] all strings starting with 011.

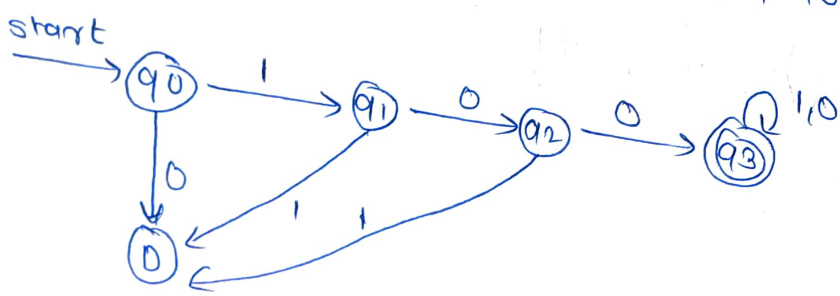
→ L = {011, 0110, 0111, 01101, 01110, ... }

.. diagram to represent



2] all strings starting with 100.

→ L = { 100, 1000, 1001, 10001, 10010, ... }

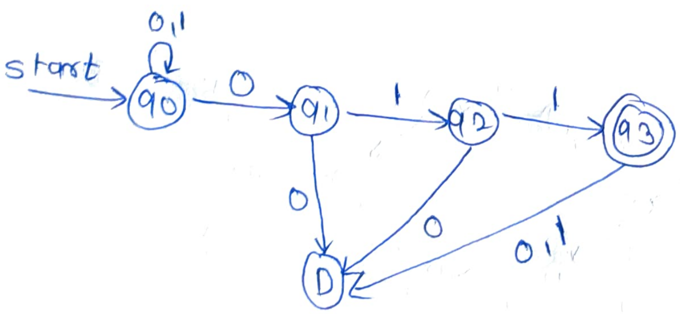


3] all strings ending with 011

101010

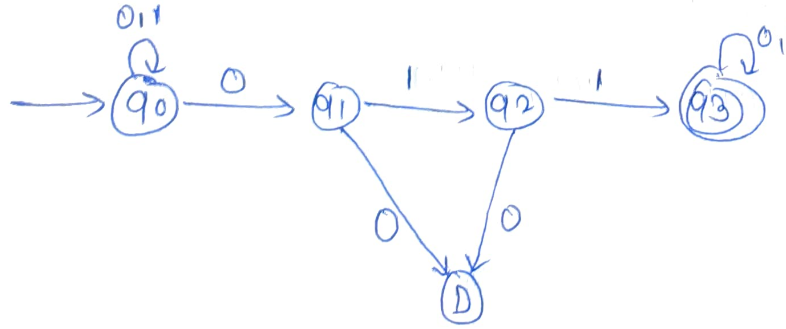
→ L = { 0011, 011, 01011, 10011, 00011, 11011, ... }

11001



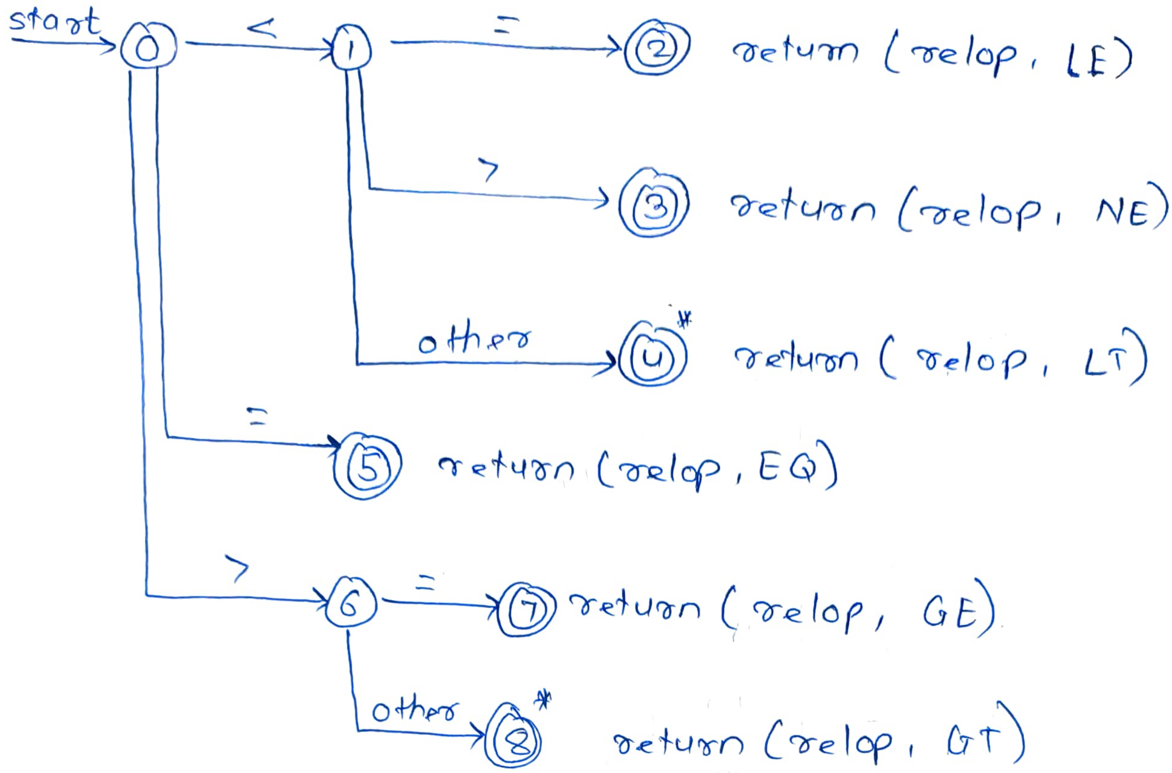
4] all strings with 011 as substring.

→ L = { 011, 0011, 01101, 011011, 1101100, 110111, 000111, ... }



Q. Draw a transition diagram to represent relational operators.

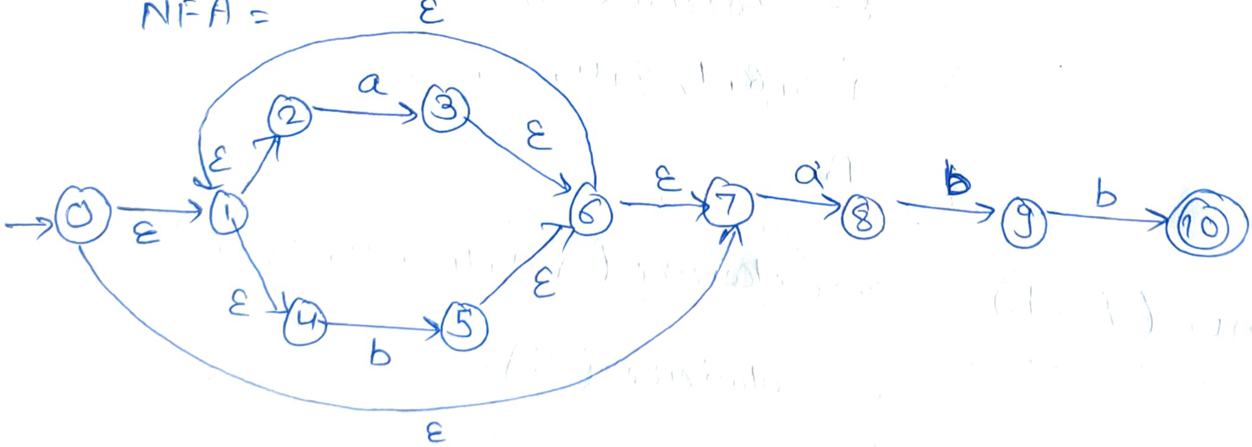
→



Q. Construct NFA from a regular exp $(a|b)^*abb$.
Convert into DFA using subset constr^n method.

→

NFA =



Transition table for NFA is :-

	a	b	ε
0	–	–	1,7
1	–	–	2,4
2	3	–	–
3	–	–	6
4	–	5	–
5	–	–	6
6	–	–	7,1
7	8	–	–
8	–	9	–
9	–	10	–
10	–	–	–

① ε-closure(0) $= \{0,1,2,4,7\} = A$

② move(A, a) $= \varepsilon$-closure($\{0,1,2,4,7\}$, a)

$= \varepsilon$-closure(3, 8)

$= \{3,6,1,2,4,8,7\}$

$= B$

③ move(A, b) $= \varepsilon$-closure($\{0,1,2,4,7\}$, b)

$= \varepsilon$-closure(5)

$= \{5,6,1,7,2,4\}$

$= C$

④ move(B, a) $= \varepsilon$-closure($\{1,2,3,4,6,7,8\}$, a)

$= \varepsilon$-closure(3, 8)

$= B$

(5) $move(B, b) = \varepsilon\text{-}closure(\{1,2,3,4,6,7,8\}, b)$

$= \varepsilon\text{-}closure(5, 9)$

$= \{5, 6, 1, 7, 2, 4, 9\}$

$= D$

(6) $move(C, a) = \varepsilon\text{-}closure(\{1,2,4,5,6,7\}, a)$

$= \varepsilon\text{-}closure(3, 8)$

$= B$

(7) $move(C, b) = \varepsilon\text{-}closure(\{1,2,4,5,6,7\}, b)$

$= \varepsilon\text{-}closure(5)$

$= C$

(8) $move(D, a) = \varepsilon\text{-}closure(\{1,2,4,5,6,7,9\}, a)$

$= \varepsilon\text{-}closure(3, 8)$

$= B$

(9) $move(D, b) = \varepsilon\text{-}closure(\{1,2,4,5,6,7,9\}, b)$

$= \varepsilon\text{-}closure(5, 10)$

$= \{5, 6, 7, 1, 2, 4, 10\}$

$= E$

(10) $move(E, a) = \varepsilon\text{-}closure(\{1,2,4,5,6,7,10\}, a)$

$= \varepsilon\text{-}closure(3, 8)$

$= B$

(11) $move(E, b) = \varepsilon\text{-}closure(\{1,2,4,5,6,7,10\}, b)$

$= \varepsilon\text{-}closure(5)$

$= C$

$A = \{0, 1, 2, 4, 7\}$ → starting state

$B = \{1, 2, 3, 4, 6, 7, 8\}$

$C = \{1, 2, 4, 5, 6, 7\}$

$D = \{1, 2, 4, 5, 6, 7, 9\}$

$E = \{1, 2, 4, 5, 6, 7, 10\}$ → accepting state.

Transition diagram for DFA is:

state	a	b
→ A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

DFA =