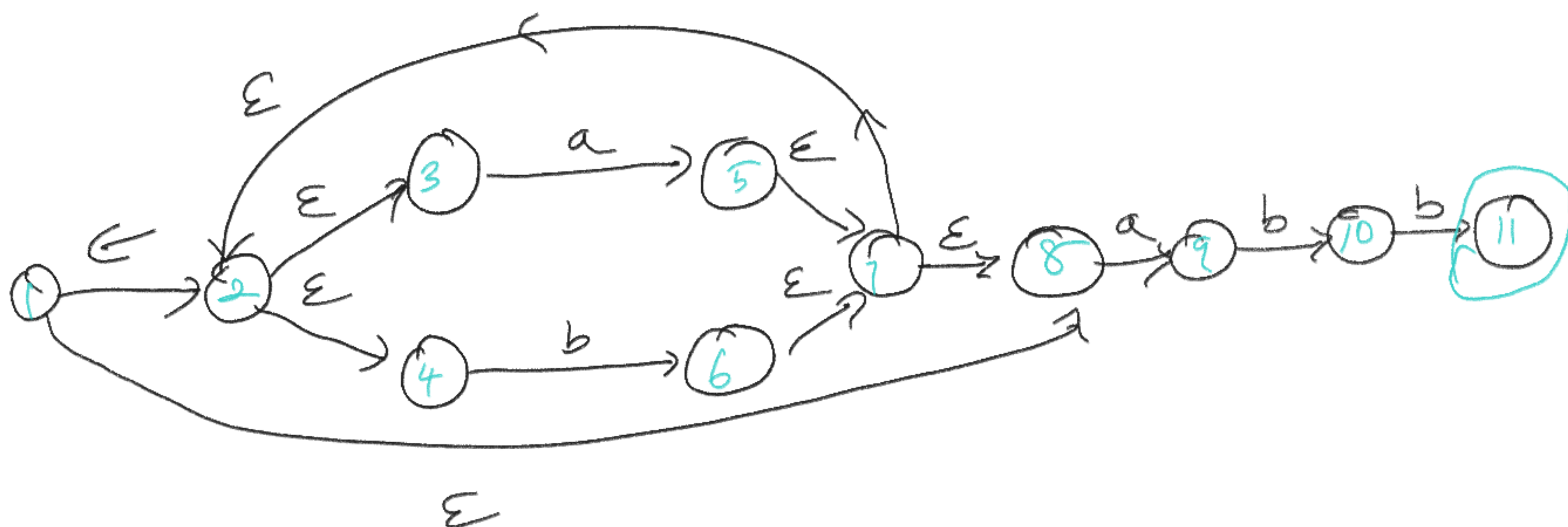


# Compiler Design:

$$1. RE = (a/b)^* ab$$

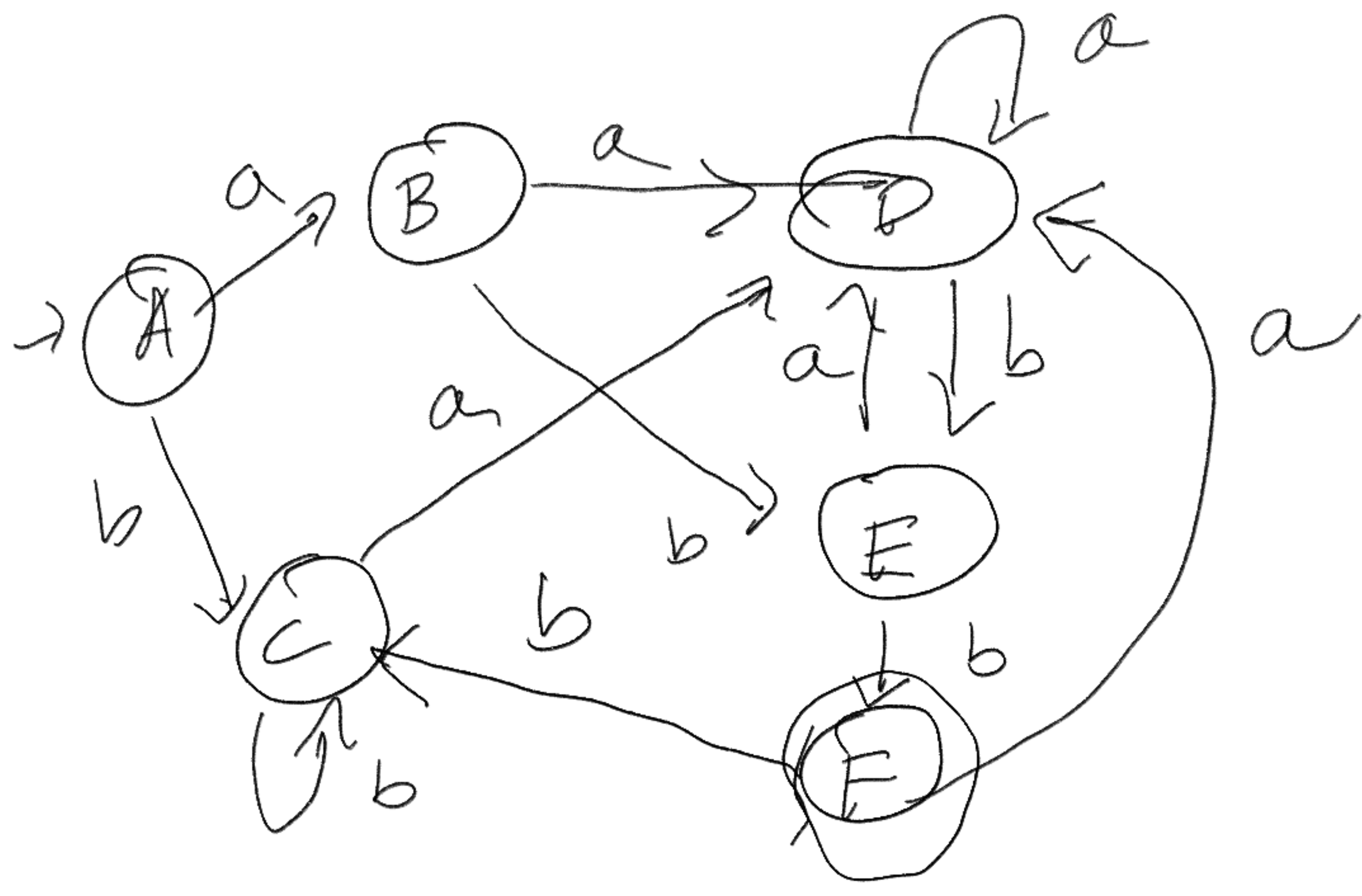


states	a	b
1, 2, 3, 4, 8 (A)	5, 7, 8, 2, 3, 4, 9 (B)	6, 7, 8, 2, 3, 4 (C)
5, 7, 8, 2, 3, 4, 9 (B)	9, 5, 7, 8, 2, 3, 4 (D)	6, 7, 8, 2, 3, 4, 10 (E)
6, 7, 8, 2, 3, 4 (C)	9, 5, 7, 8, 2, 3, 4 (D)	6, 7, 8, 2, 3, 4 (C)
9, 5, 7, 8, 2, 3, 4 (D)	9, 5, 7, 8, 2, 3, 4 (D)	10, 6, 7, 8, 2, 3, 4 (E)
6, 7, 8, 2, 3, 4, 10 (E)	9, 5, 7, 8, 2, 3, 4 (D)	6, 7, 8, 2, 3, 4, 11 (F)

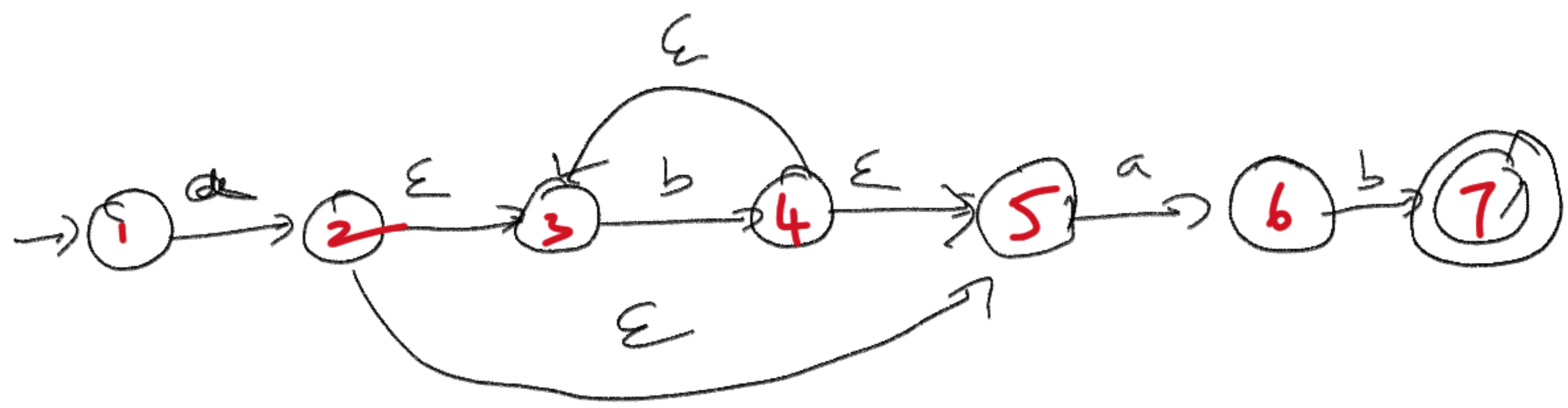
6, 7, 8, 2, 3, 4,  
 11  
 (2)

9, 5, 7, 8, 2, 3, 4  
 (D)

6, 7, 8, 2, 3, 4  
 (C)



2 Construct NFA for RE  $(ab^*ab)$



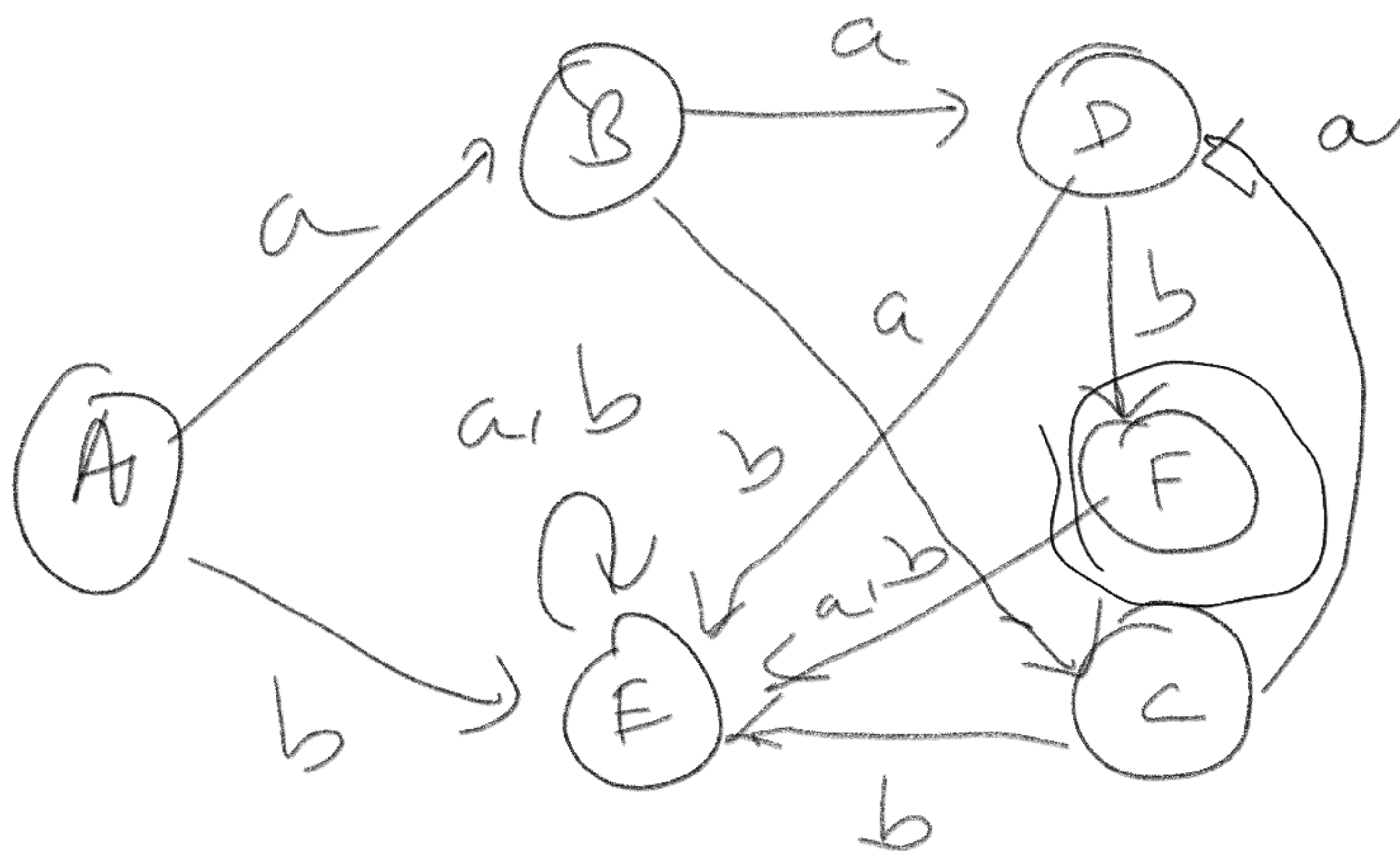
states	a	b
1, (A)	2, 3, 5 (B)	∅ (E)
2, 3, 5 (B)	b (D)	3, 4, 5, (C)
3, 4, 5 (C)	b (F)	∅



b (D)  
 1 (F)

$\phi$  (E)  
 $\phi$  (E)

1 (F)  
 $\phi$  (E)

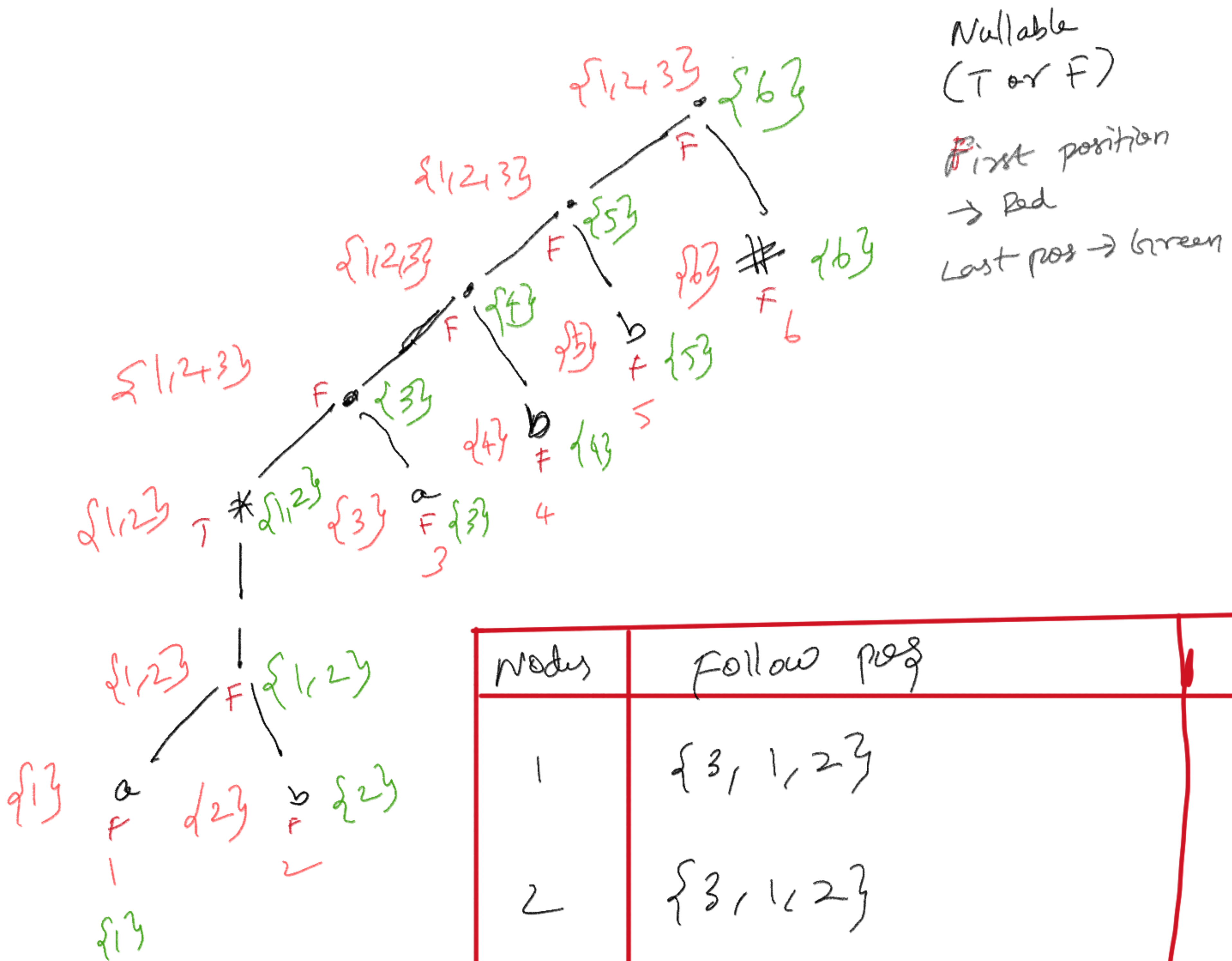


## Optimised DFA from RE

1. form syntax tree
2. Give node number
3. Nullable finding
4. First pos
5. Last pos
6. Follow pos
7. Forming DFA from root node and follow pos to form table

with help of that table, we can find the optimized DFA.

$$Q) RE = (a|b)^*abb$$



Nodes	Follow pos
1	$\{3, 1, 2\}$
2	$\{3, 1, 2\}$
3	$\{4\}$
4	$\{5\}$
5	$\{6\}$
6	$\phi$



Nodes	a	b
$\{1, 2, 3\}$ (A)	$(1, 3) =$ $\{1, 2, 3, 4\}$ (B)	$(2) = \{1, 2, 3\}$ (A)
(B) $\{1, 2, 3, 4\}$	$(1, 3) = \{1, 2, 3, 4\}$ (B)	$(2, 4) = \{1, 2, 3, 5\}$ (C)
(C) $\{1, 2, 3, 5\}$	$(4, 3) = \{1, 2, 3, 4\}$ (B)	$(2, 5) = \{1, 2, 3, 6\}$ (D)
(D) $\{1, 2, 3, 6\}$	$(1, 3) = \{1, 2, 3, 4\}$ (B)	$(2) = \{1, 2, 3\}$ (A)

