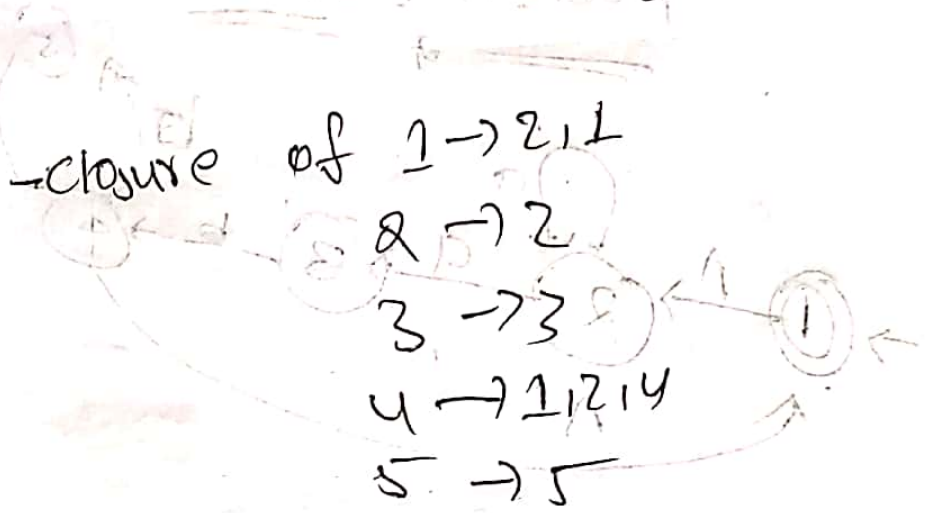
1061191132

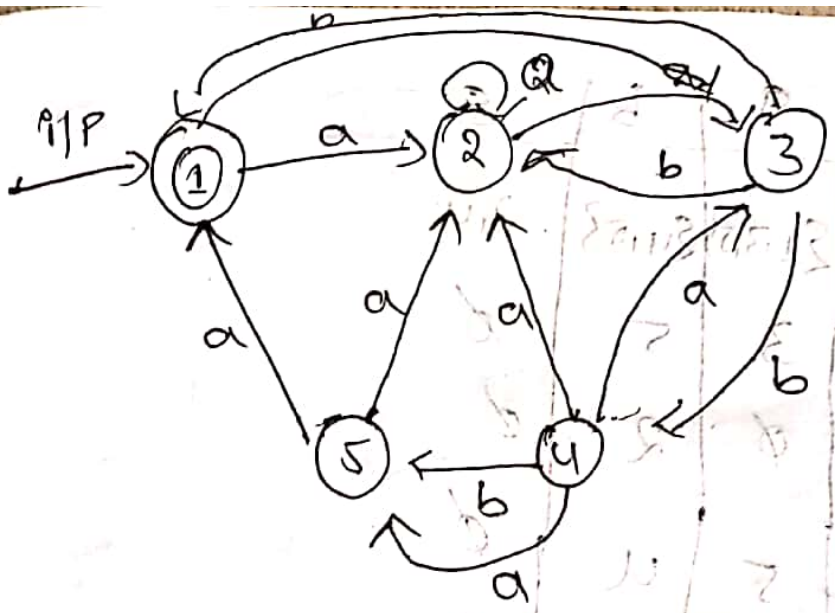
① ε-closure of 1 → 2,1
2 → 2
3 → 3
4 → 1,2,4
5 → 5



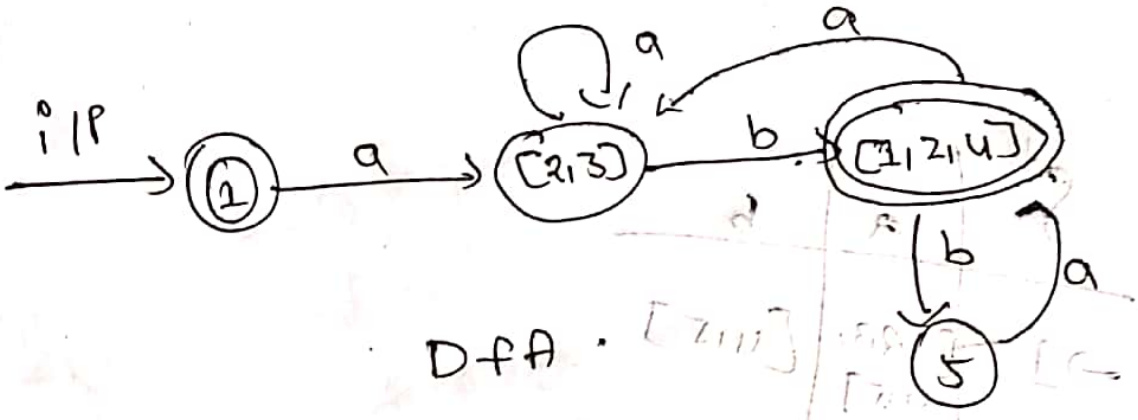
δ	a	b	ε
→ ①	{2,3}	ϕ	2
2	{2,3}	ϕ	ϕ
3	ϕ	4	ϕ
4	{2,3}	5	1,2
5	4	ϕ	ϕ

δ'	a	b
→ ①	{2,3}	ϕ
2	{2,3}	ϕ
3	ϕ	{1,2,4}
4	{2,3}	5
5	{1,4,2}	ϕ

δ''	a	b
→ [1]	[2,3]	ϕ
[2,3]	[2,3]	[1,2,4]
[1,2,3]	[2,3]	[5]
(5)	[1,2,4]	ϕ



NFA without ε



DFA

2. ε-closure of 1 → 1,2,4

2 → 2

3 → 3

4 → 4

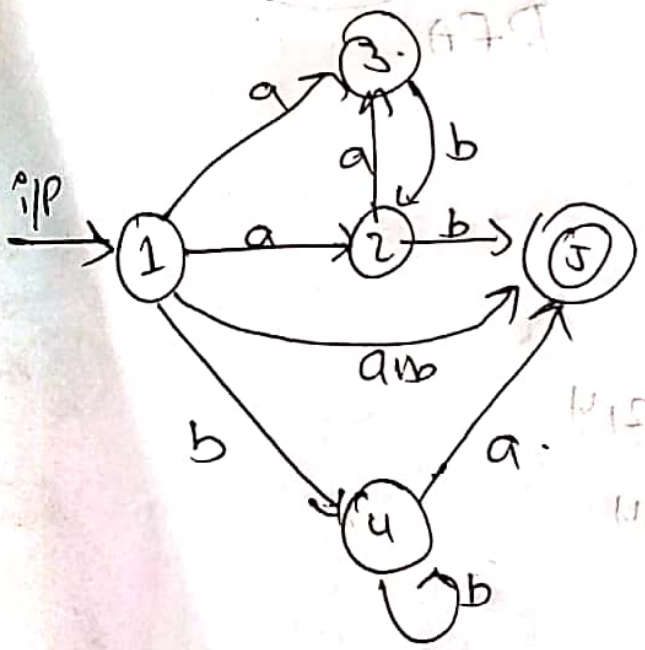
5 → 5

δ	a	b	ε
→ 1	{1,3,5}	{4,5}	2,4
2	3	5	∅
3	∅	2	∅
4	5	4	∅
(5)	∅	∅	∅

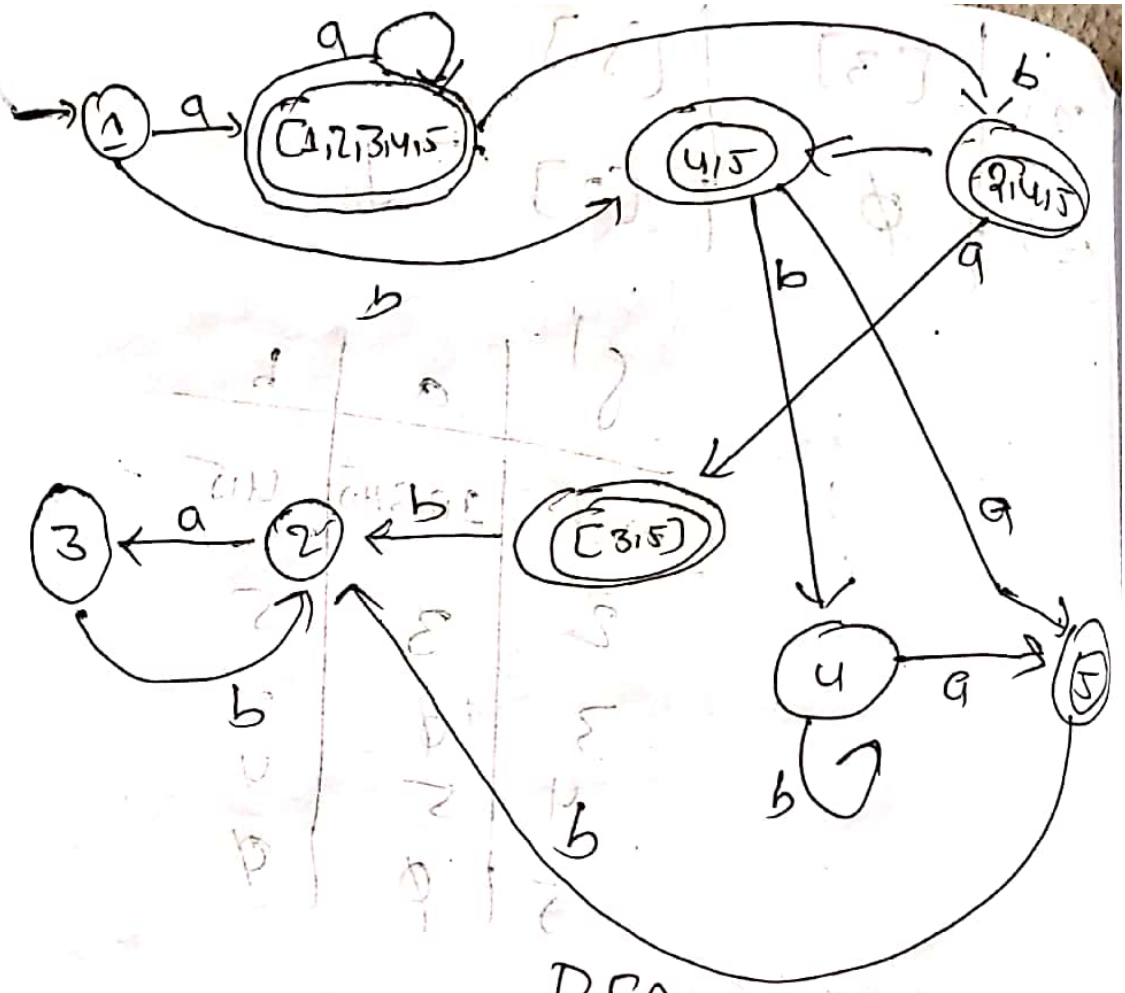
δ^{11}	a	b
→ 1	[1,2,3,4,5]	[4,5]
[1,2,3,4,5]	[1,2,3,4,5]	[2,4,5]
[4,5]	5	4
[2,4,5]	[3,5]	[4,5]
[5]	∅	∅
[4]	[5]	[4]
[3,5]	∅	[2]

[2]	[3]	[5]
[3]	ϕ	[2]

δ'	a	b
→ 1	1 2 3 4 5	4 5
2	3	5
3	ϕ	2
4	5	4
5	ϕ	ϕ



NFA without ε



(3) ε- closure of

1 → 1,2,4

2 → 2,4

3 → 3

4 → 4

5 → 5

6 → 6

7 → 7

8 → 8.

δ	a	b	ε
→ ①	{3,5}	{2,8}	{2,4}
2	{3,5}	{2,8}	4
3	2	ϕ	ϕ
4	5	8	ϕ
5	ϕ	6	ϕ
6	4	ϕ	ϕ
7	ϕ	1	ϕ
8	7	ϕ	ϕ

δ'	a	b
→ ①	{3,5}	{2,4,8}
2	{3,5}	{2,4,8}
3	{2,4}	ϕ
4	5	8
5	ϕ	6
6	4	ϕ
7	ϕ	{1,2,4}
8	7	ϕ

δ''	a	b
→ (1)	[3,5]	[2,4,8]
[3,5]	[2,4]	[6]
[2,4,8)	(3,5,7]	(2,4,8]
2,4	3,5	2,4,8
6	4	ϕ
3,5,7	2,4	1,2,4,6
4	5	8
1,2,4,6	3,4,5	2,4,8
5	ϕ	6
8	7	ϕ
3,4,5	2,4,5	6,8
7	ϕ	(1,2,4)
[2,4,5]	[3,5]	[2,4,8,6]
[6,8)	(4,7)	ϕ

4,7	(5)	1,2,4,6,8
3,4,5,7	2,4,5	1,2,4,6,8
(1,2,4,6)	(3,5,7)	(2,4,8)
[1,2,4,6,8]	(3,5,4,7)	(2,4,8)

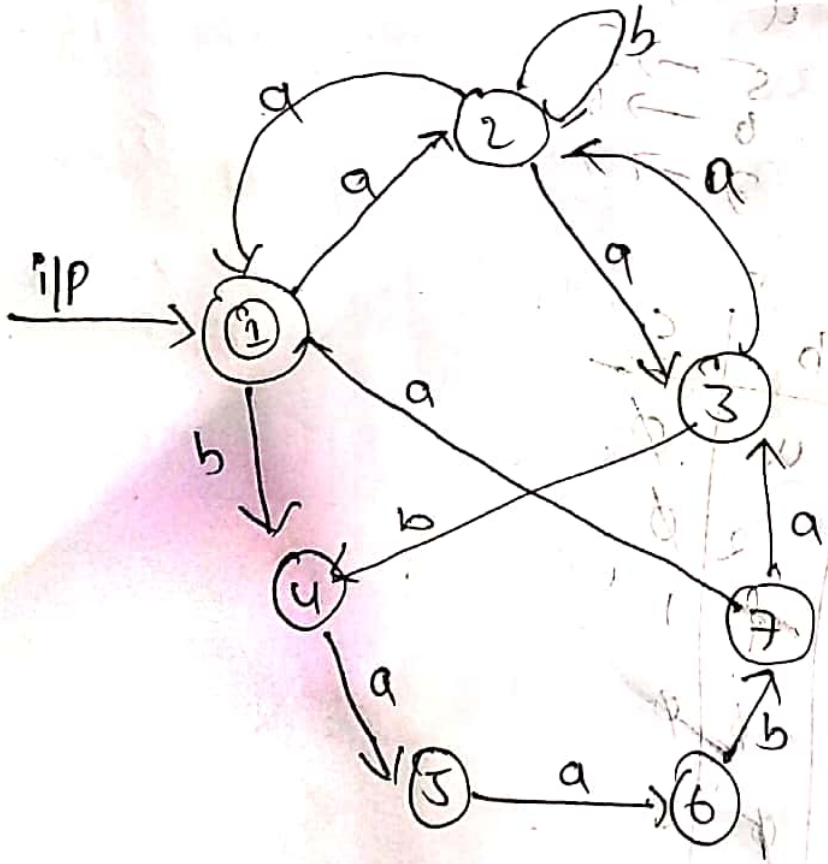
(5) ε-closure of

1 → 1
2 → 2
3 → 1,3
4 → 4
5 → 5
6 → 6
7 → 7

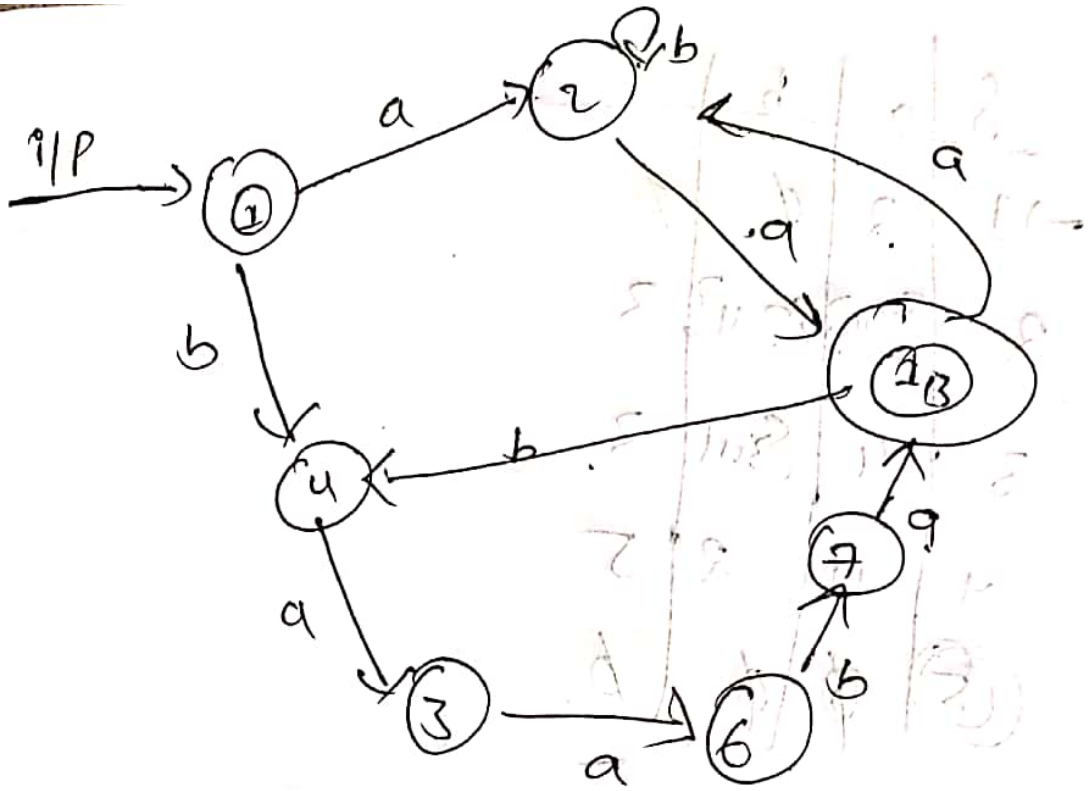
δ	a	b	ε
→ ①	2	4	ϕ
2	3	2	ϕ
3	2	4	1
4	5	ϕ	ϕ
5	6	ϕ	ϕ
6	ϕ	7	ϕ
7	3	ϕ	ϕ

δ'	a	b
→ ①	2	4
2	{1,3}	2
3	2	4
4	5	ϕ
5	6	ϕ
6	ϕ	7
7	{1,3}	4

δ''	a	b
→ ①	2	4
2	1,3	2
4	5	ϕ
1,3	2	4
5	6	ϕ
6	ϕ	7
7	1,3	ϕ



NFA without ε



DFA

④ ε-closure of $\overline{1} \rightarrow 1$

$2 \rightarrow 23$

$3 \rightarrow 3$

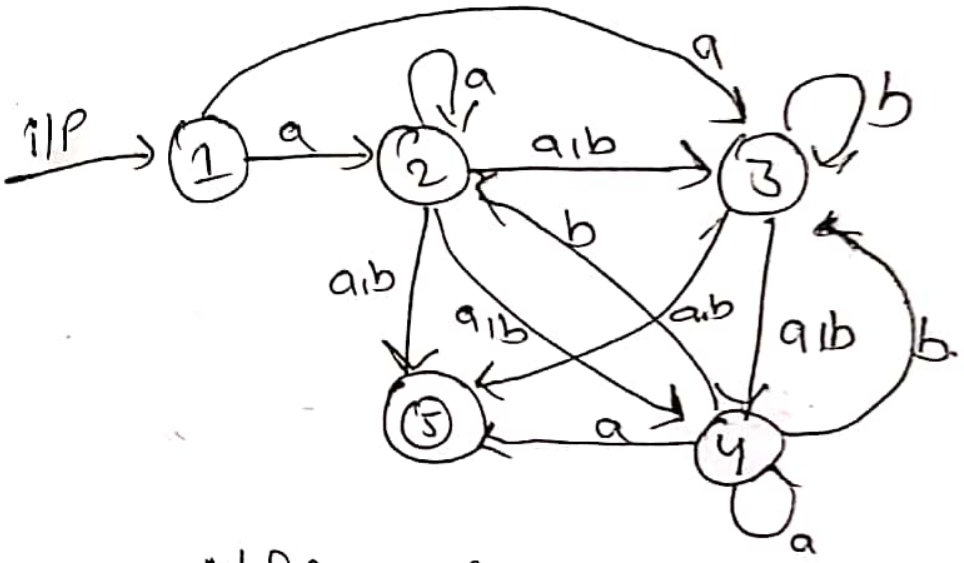
$4 \rightarrow 45$

$5 \rightarrow 5$

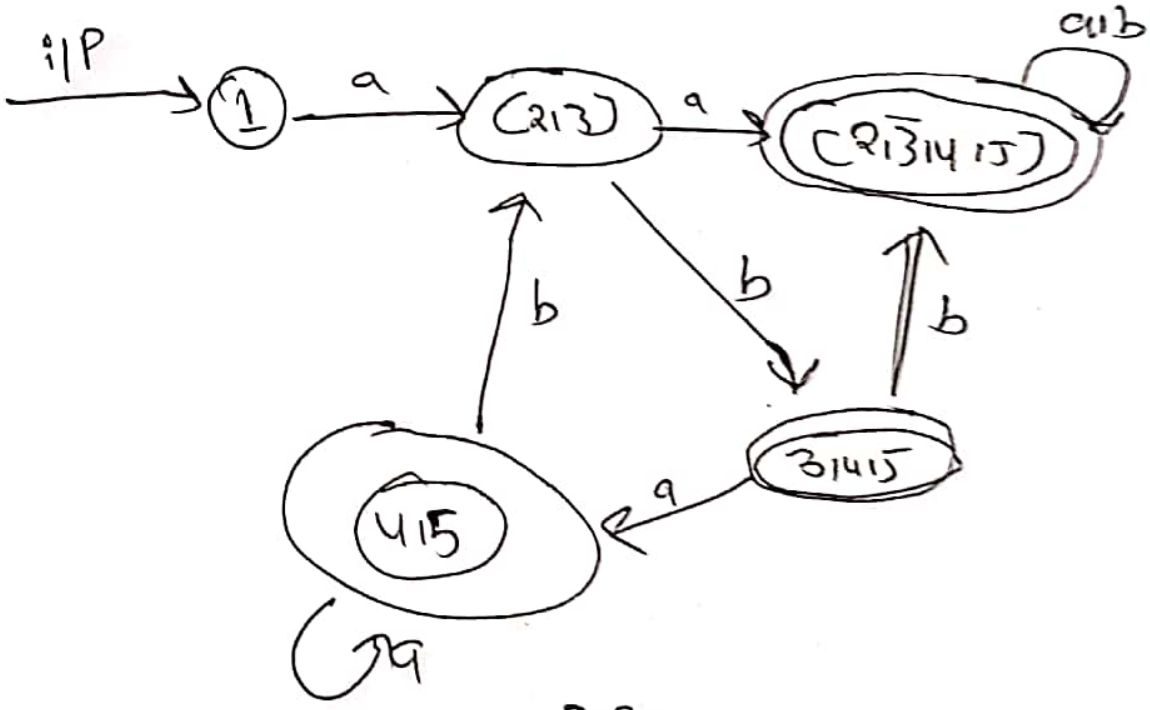
δ	a	b	ε
→1	2	ϕ	ϕ
2	{2,4}	{3,4}	3
3	4	{3,4}	3
4	4	2	5
(5)	ϕ	ϕ	ϕ

δ''	a	b
→1	(2,3)	ϕ
(2,3)	2,3,4,5	3,4,5
2,3,4,5	2,3,4,5	2,3,4,5
3,4,5	4,5	2,3,4,5
4,5	4,5	2,3

δ'	a	b
→1	2,3	ϕ
2	2,3,4,5	3,4,5
3	4,5	3,4,5
4	4,5	2,3
5	ϕ	ϕ



Nfa without ε



Dfa.