

1.  $w(wy|yw)^+w^*y$   
a)  $w \cdot (w \cdot y | y \cdot w)^+ \cdot w^* \cdot y \cdot \#$   
1 2 3 4 5 6 7 8

Follow post (1) = 2,4

Follow post (2) = 3

Follow post (3) = 2,6,4,7 = 2,4,6,7

Follow post (4) = 5

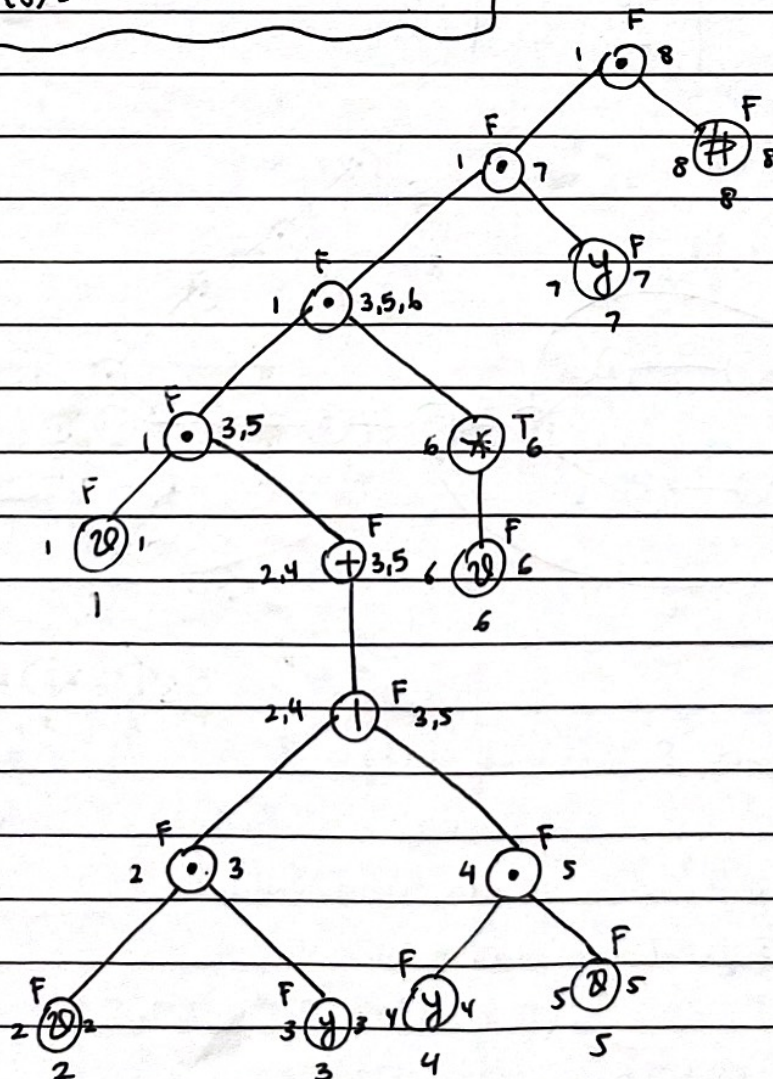
Follow post (5) = 2,4,6,7

Follow post (6) = 6,7

Follow post (7) = 8

Follow post (8) = -

b)

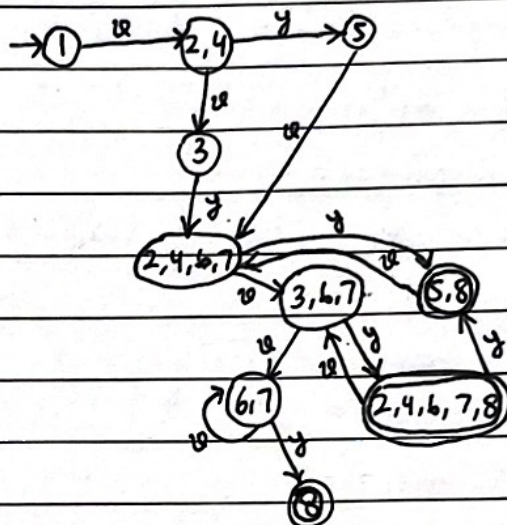




c.) First post root = 1

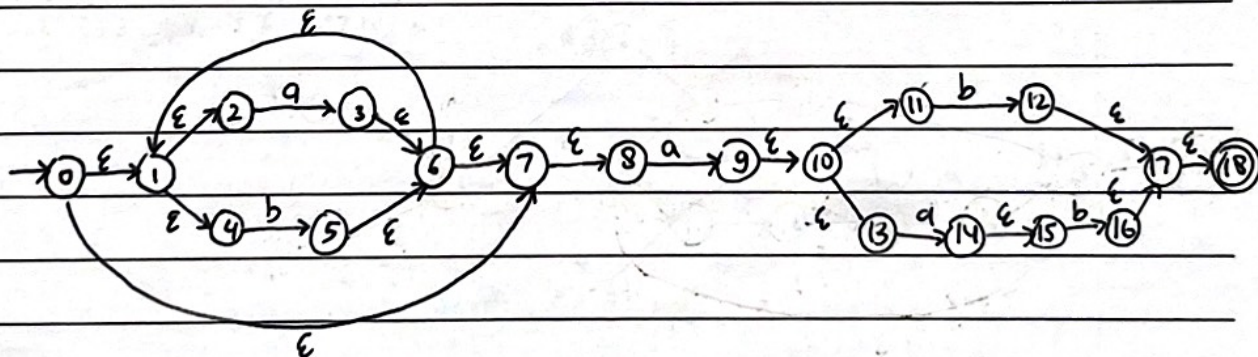
| state       | 0       | 1         |
|-------------|---------|-----------|
| → 1         | 2,4     | —         |
| 2,4         | 3       | 5         |
| 3           | —       | 2,4,6,7   |
| 5           | 2,4,6,7 | —         |
| 2,4,6,7     | 3,6,7   | 5,8       |
| 3,6,7       | 6,7     | 2,4,6,7,8 |
| 5,8 *       | 2,4,6,7 | —         |
| 6,7         | 6,7     | 8         |
| 2,4,6,7,8 * | 3,6,7   | 5,8       |
| 8 *         | —       | —         |

### DFA Diagram



2.  $(a|b)^* a (b|ab)^+$

a)



b)  $\text{eclose}(0) = 0, 1, 2, 4, 7, 8$

$$\text{eclose}(8) = 8$$
$$\text{etale}(17) = 17, 18$$

$\text{eclose}(1) = 1, 2, 4$

$$\text{closure}(9) = 9, 10, 11, 13$$
$$\text{eclose}(18) = 18$$
$$\text{edge}(2) = 2$$
$$\text{eclose}(10) = 10, 11, 13$$
$$\text{exlowe}(3) = 1, 2, 3, 4, 6, 7, 8$$
$$ec(wr(11)) = 11$$
$$\text{eclose}(4) = 4$$
$$\text{eclose}(12) = 10, 11, 12, 13, 17, 18$$
$$\text{enclose}(s) = 1, 2, 4, 5, 6, 7, 8$$
$$\text{eclose}(13) = 13$$

$\text{Eclose}(6) = 1, 2, 4, 6, 7, 8$

$\text{close}(14) = 14, 15$

$$\text{eclose}(7) = 7,8$$
$$\rho_{\text{close}}(17) = 15$$
$$\text{PClose}(16) = 10, 11, 13, 16, 17, 18$$



start  $\rightarrow 0 = \{0, 1, 2, 4, 7, 8\} = S_0$

$(\delta S_0, a) = \{1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13\} = S_1$

$(\delta S_0, b) = \{1, 2, 4, 5, 6, 7, 8\} = S_2$

$(\delta S_1, a) = \{1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15\} = S_3$

$(\delta S_1, b) = \{1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 17, 18\} = S_4$

$(\delta S_2, a) = \{1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13\} = S_1$

$(\delta S_2, b) = \{1, 2, 4, 5, 6, 7, 8\} = S_2$

$(\delta S_3, a) = \{1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15\} = S_3$

$(\delta S_3, b) = \{1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 16, 17, 18\} = S_5$

$(\delta S_4, a) = \{1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15\} = S_3$

$(\delta S_4, b) = \{1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 17, 18\} = S_4$

$(\delta S_5, a) = \{1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15\} = S_3$

$(\delta S_5, b) = \{1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 16, 17, 18\} = S_5$

