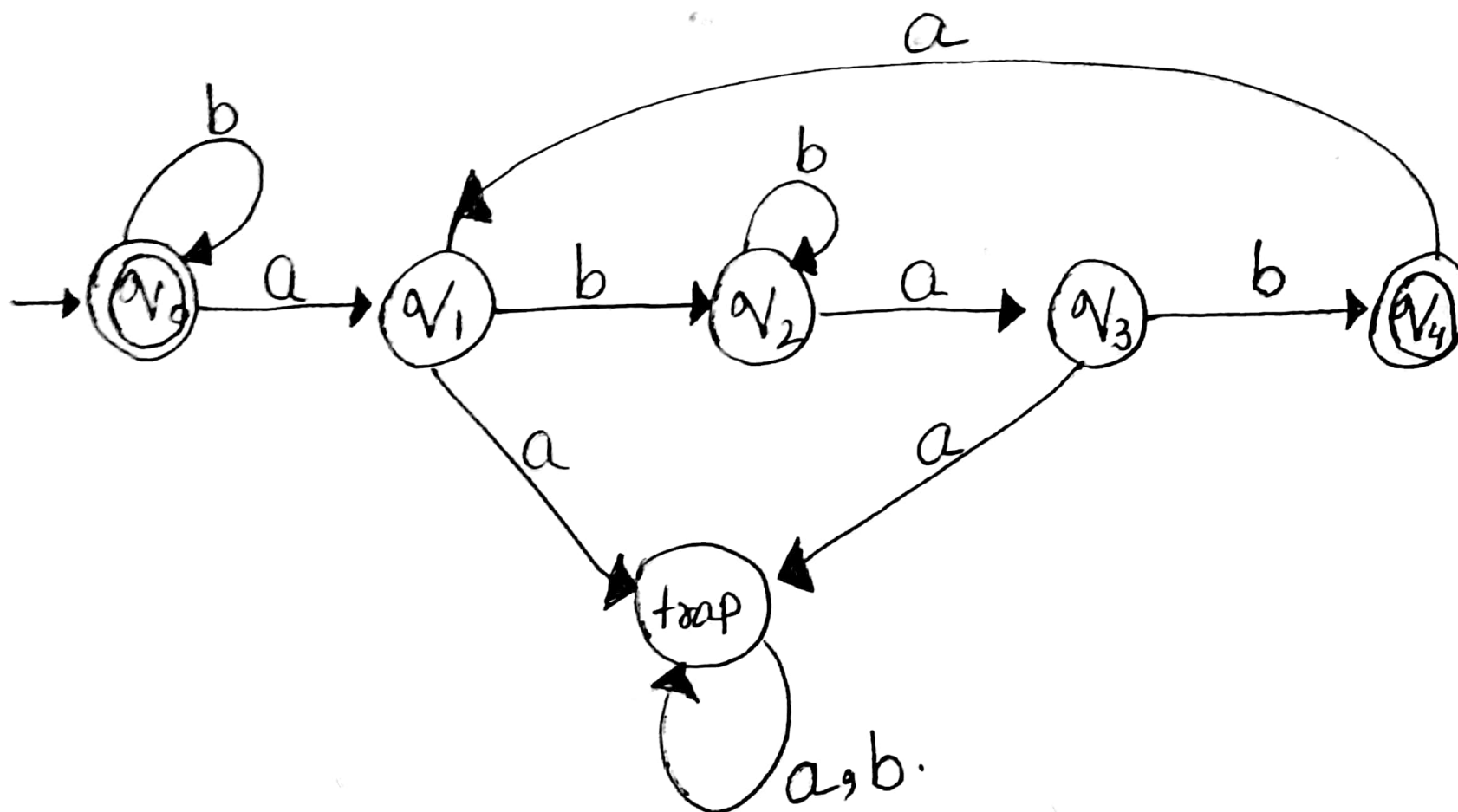# Problem 1 ⇒ L1:

a) $\{\emptyset, b, bb, bbb, abab, abbabb\ldots\ldots\}$
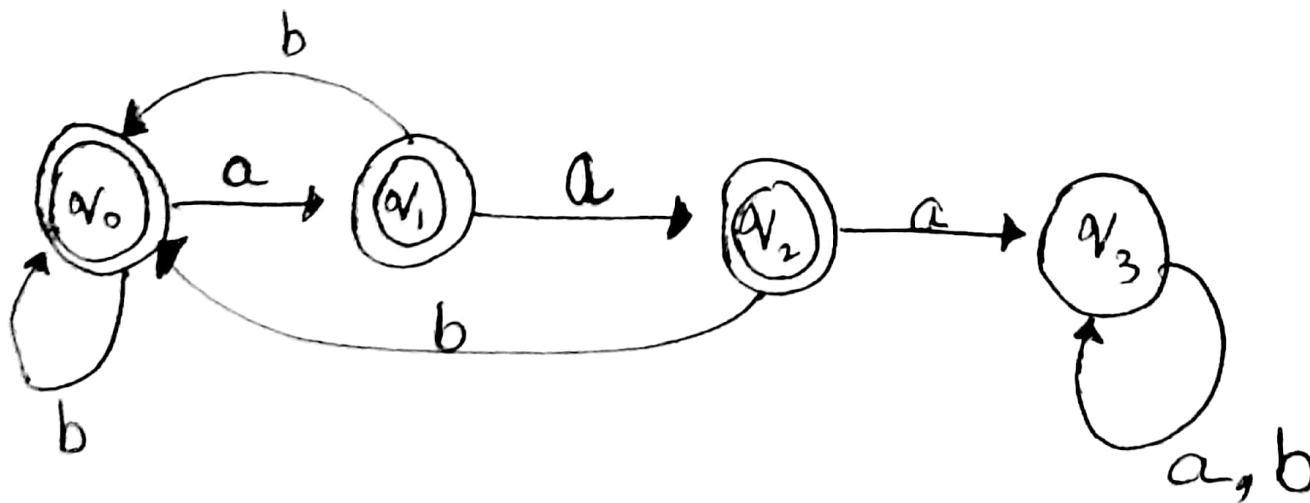
b)

L4:>

a) $\{\emptyset, b, bb, aba, ab, aab, aabb, abaab,$
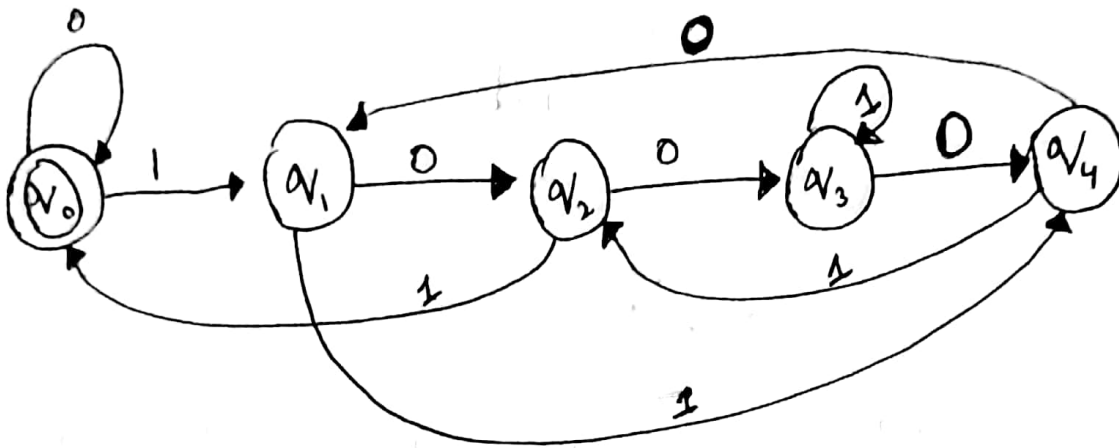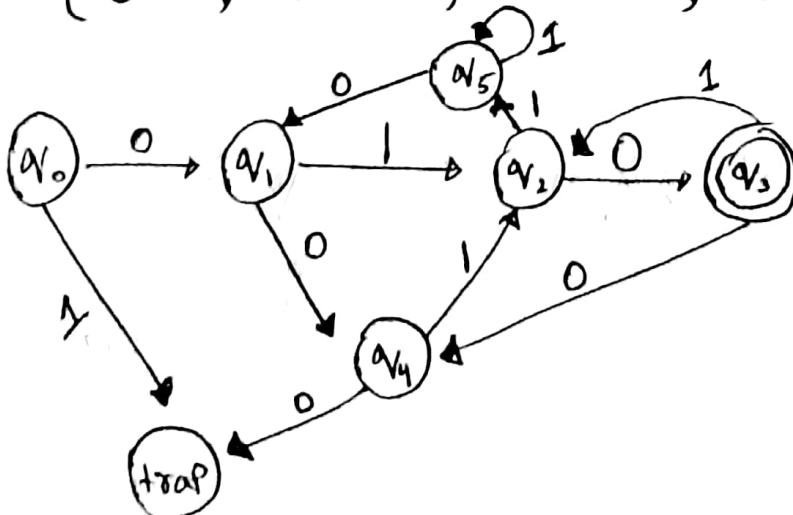$aabab ----\}$

b)

Problem 2 a:

L1:

a) $\{ 0, 101, 1010, 1111, 10100, 11001, ---\}$

b)

L2:

a) $\{010, 0010, 01010, 00010, 010010 ---\}$

Problem 2a

L4:

a) $\{010101, 001101, 000111, 111000,$
   $011001, 100110 \text{ ---- } \}$

b)
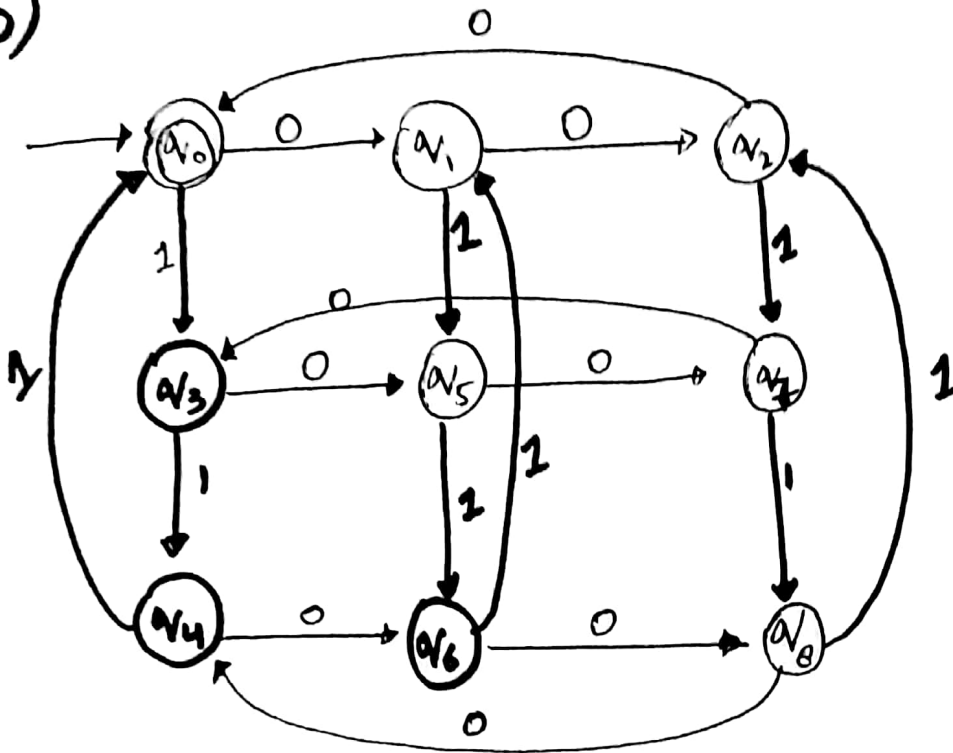
Problem 2b

·) 000111

$$f^*(\mathcal{N}_0, 000111)$$
$$f(f^*(\mathcal{N}_0, 00011), 1)$$
$$f(f(f^*(\mathcal{N}_0, 0001), 1), 1)$$
$$f(f(f(f^*(\mathcal{N}_0, 000), 1), 1), 1)$$
$$f(f(f(f(f^*(\mathcal{N}_0, 00), 0), 10), 1), 1)$$
$$f(f(f(f(f(f^*(\mathcal{N}_0, 0), 0), 0), 1), 1), 1)$$
$$f(f(f(f(f(f^*(\mathcal{N}_0, \emptyset), 0), 0), 0), 1), 1), 1)$$
$$f(f(f(f(f(f(\mathcal{N}_0, 0), 0), 0), 1), 1), 1)$$
$$f(f(f(f(f(\mathcal{N}_0, 0), 0), 1), 1), 1)$$
$$f(f(f(f(\mathcal{N}_0, 0), 1), 1), 1)$$
$$f(f(f(\mathcal{N}_0, 1), 1), 1)$$
$$f(f(\mathcal{N}_1, 1), 1)$$
$$f(\mathcal{N}_4, 1)$$
$$\mathcal{N}_2$$

Hence $\mathcal{N}_2$ is not a final stage hence rejected.

⇒ <u>101000</u> ⇒

$$f^*(N_0, 101000)$$

$$f(f^*(N_0, 10100), 0)$$

$$f(f(f^*(N_0, 1010), 0), 0)$$

$$f(f(f(f^*(N_0, 101), 0), 0), 0)$$

$$f(f(f(f(f^*(N_0, 10)), 1), 0), 0), 0)$$

$$f(f(f(f(f(f^*(N_0, 1), 0), 1), 0), \emptyset), 0)$$

$$f(f(f(f(f(f(N_0, \emptyset)), 1), 0), 1), 0), 0), 0)$$

$$f(f(f(f(f(f(N_0, 1), 0), 1), 0), 0), 0)$$

$$f(f(f(f(f(N_1, 0), 1), 0), 0), 0)$$

$$f(f(f(f(N_2, 1), 0), 0), 0)$$

$$f(f(f(N_0, 0), 0), 0)$$

$$f(f(N_0, 0), 0)$$

$$f(N_0, 0)$$

$$\boxed{N_0}$$

Hence N_0 is a final stage so this

string is accepted.

10110100

$f^*(N_0, 10110100)$

$f(f^*(N_0, 1011010), 0)$

$f(f(f^*(N_0, 101101), 0), 0)$

$f(f(f(f^*(N_0, 10110), 1), 0), 0)$

$f(f(f(f(f^*(N_0, 1011), 0), 1), 0), 0)$

$f(f(f(f(f(f^*(N_0, 101), 1), 0), 1), 0), 0)$

$f(f(f(f(f(f(f^*(N_0, 10), 1), 1), 0), 1), 0), 0)$

$f(f(f(f(f(f(f(f^*(N_0, 1), 0), 1), 1), 0), 1), 0), 0)$

$f(f(f(f(f(f(f(f(f^*(N_0, \phi), 1), 0), 1), 1), 0), 1), 0), 0)$

$f(f(f(f(f(f(f(f(N_0, 1), 0), 1), 1), 0), 1), 0), 0)$

$f(f(f(f(f(f(f(N_1, 0), 1), 1), 0), 1), 0), 0)$

$f(f(f(f(f(f(N_2, 1), 1), 0), 1), 0), 0)$

$f(f(f(f(f(N_0, 1), 0), 1), 0), 0)$

$f(f(f(f(N_1, 0), 1), 0), 0)$

$f(f(f(N_2, 1), 0), 0)$

$f(f(N_0, 0), 0)$

$f(N_0, 0)$

$\boxed{N_0}$ Hence N_0 is a final state hence accepted.

$000010\,0000$

$f^*(v_0, 000010\,0000)$

$f(f^*(v_0, 00001\,0000), 0)$

$f(f(f^*(v_0, 00001\,000), 0), 0$

$f(f(f(f^*(v_0, 00001\,00), 0), 0), 0)$

$f(f(f(f(f^*(v_0, 00001\,0), 0), 0), 0), 0)$

$f(f(f(f(f(f^*(v_0, 00001), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(f^*(v_0, 0000), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(f(f^*(v_0, 000), 0), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(f(f(f^*(v_0, 00), 0), 0), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(f(f(f(f^*(v_0, 0), 0), 0), 0), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(f(f(f(f(f^*(v_0, \phi), 0), 0), 0), 0), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(f(f(f(f(f(v_0, 0), 0), 0), 0), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(f(f(f(f(v_0, 0), \,0), 0), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(f(f(v_0, 0), 0), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(v_0, 0), 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(f(v_0, 1), 0), 0), 0), 0), 0)$

$f(f(f(f(f(v_1, 0), 0), 0), 0), 0)$

$f(f(f(f(v_2, 0), 0), 0), 0)$

$f(f(f(v_3, 0), 0), 0)$

$$f(f(q_4, 0), 0)$$

$$f(q_1, 0)$$

$$\boxed{q_2}$$

Hence q_2 is not a final state hence rejected.