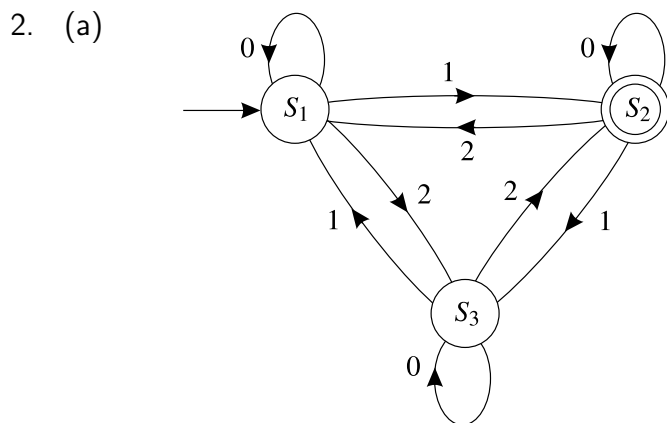


1. (a) $f(S_1, 10100) = S_2, f(S_4, 110010) = S_3$ (b) w_1, w_3 are accepted, w_2 is rejected.

(c)

state table	0	1
S_1	S_3	S_2
S_2	S_2	S_1
S_3	S_2	S_5
S_4	S_5	S_4
S_5	S_2	S_4



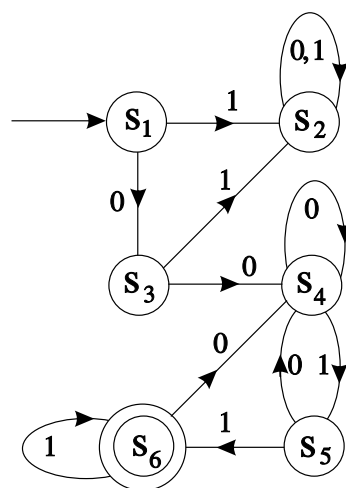
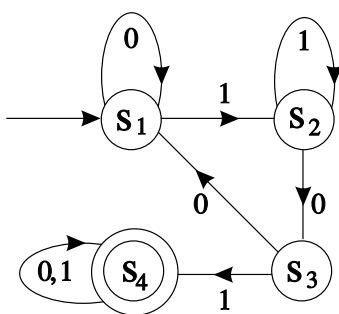
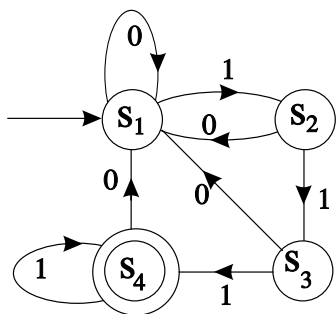
- (b) S_3 (c) S_3 (d) No.

3. (a) 0^*1^* OR $\{0^n 1^m : m, n \in \mathbb{Z}_{\geq 0}\}$.

In English: The set of all binary words consisting of n zeros followed by m ones, where $m, n \in \{0, 1, 2, \dots\}$

- (b) The set of all binary words containing an odd number of digits.
 (c) The set of all non-empty binary words containing an even number of digits.

4. (a) (b) (c)



5. (a) The set of all binary words containing an even number of digits.
 (b) The set of all binary words with an even number of zeros and an even number of ones.
6. (a) $1(000)^+1$, ie, words of the form $1(000)^n 1$ $n \geq 1$.
 (b) $1(000)^+1^+$, ie, words of the form $1(000)^n 1^m$ $n \geq 1$ $m \geq 1$.