

Question 1.

$$M = \{S, I, q_0, f_s, F\}$$

$$S = \{q_0, q_1, q_2, q_3\}$$

$$I = \{a, b\}$$

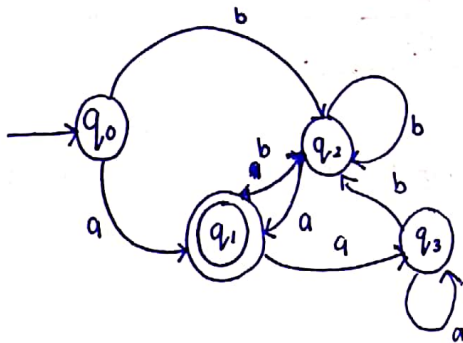
$$F = \{q_1\}$$

$$q_0 \notin F$$

q_0 : initial state.

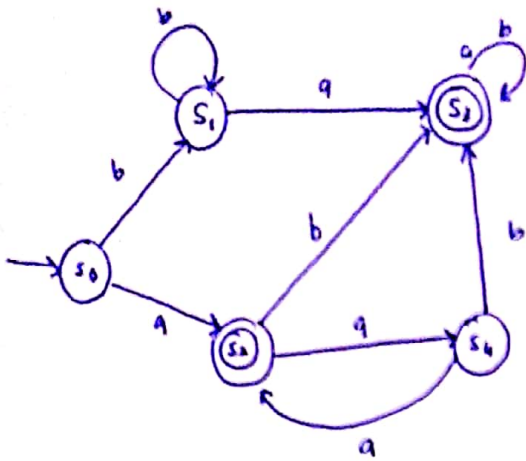
f_s	a	b
q_0	q_1	q_2
q_1	q_3	q_2
q_2	q_1	q_2
q_3	q_3	q_2

(i)



(iii) • DFA is suitable for verification because DFA can accept the string. DFAs recognize exactly the set of regular language which are, among other things, useful for doing lexical analysers and pattern matching.

• DFA can validate the input string for alphabet such as $\Sigma = \{a, b, c\}$



f_s	a	b
s_0	s_2	s_1
s_1	s_3	s_1
s_2	s_4	s_3
s_3	s_3	s_3
s_4	s_2	s_3

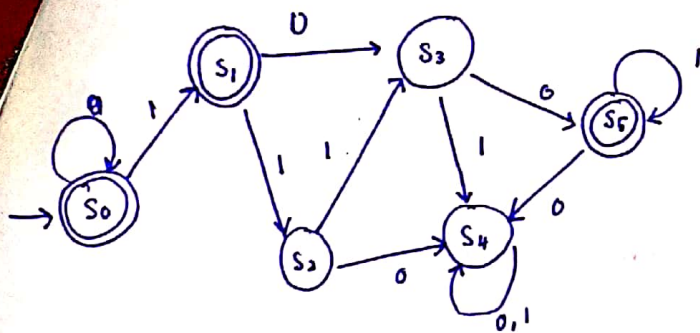
(ii) Construct Identify whether the following input can be accepted by DFA.

(a) $w: a a a a a a$.

~~$\rightarrow s_0$~~ $\rightarrow s_0 \xrightarrow{a} s_2 \xrightarrow{a} s_4 \xrightarrow{a} s_2 \xrightarrow{a} s_4 \xrightarrow{a} s_2 \xrightarrow{a} s_4$
 $\therefore$ not accepted by DFA because ~~$s_4 \in F$~~
 $s_4 \notin F$

(b) $w = a b a b a b$

$\rightarrow s_0 \xrightarrow{a} s_2 \xrightarrow{b} s_3 \xrightarrow{a} s_3 \xrightarrow{b} s_3 \xrightarrow{a} s_3 \xrightarrow{b} s_3 \xrightarrow{a} s_3$
 $\therefore$ accepted by DFA because $s_3 \in F$



(a) $S = \{S_0, S_1, S_2, S_3, S_4, S_5\}$.

$I = \{0, 1\}$

$q_0 = S_0$ (initial state)

$F = \{S_0, S_1, S_5\}$

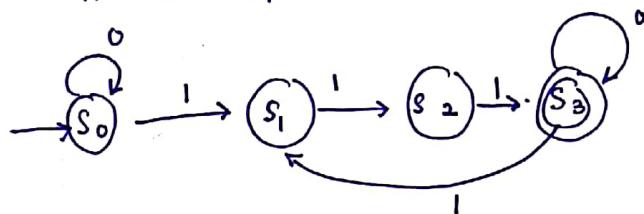
f_s	0	1
S_0	S_0	S_1
S_1	S_3	S_2
S_2	S_4	S_3
S_3	S_5	S_4
S_4	S_4	S_4
S_5	S_4	S_5

(b) 0011101100 is accepted or not

$$S_0 \xrightarrow{0} S_0 \xrightarrow{0} S_0 \xrightarrow{1} S_1 \xrightarrow{1} S_3 \xrightarrow{1} S_4 \xrightarrow{0} S_4 \xrightarrow{1} S_4 \xrightarrow{1} S_4 \xrightarrow{0} S_4 \xrightarrow{0} S_4$$

$\therefore$ Not accepted because $S_4 \notin F$ (S_4 not belong to F)

(ii) construct a DFA that accepts the set of all bit strings that contain 3 consecutive 1's



string will generate: 111, 1110, 0111, 01110, ...

Question 4

NOT enemies - A

Chemies & not vulnerable - B

enemies & vulnerable - C

shoot - 0

not shoot - 1

WANDER	A	1	Remain
	B	0	ATTACK
	C	0	EVADÉ
ATTACK	A	1	GO to WANDER
	B	0	REMAIN
	C	0	EVADÉ
EVADÉ	A	1	GO to WANDER.
	B	0	ATTACK
	C	0	REMAIN

