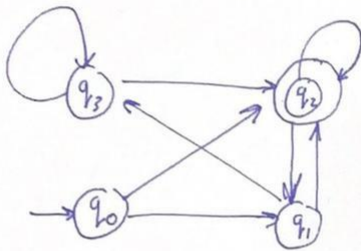


Q 11-(i)

Transition table (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

State transition sketch



Q 11-(ii)

DFA can be applied to verify the password of an email.

DFA can use to match the email then the password can match using the dfa with the password stored for email

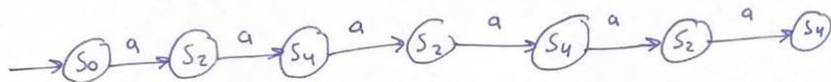
Beside this DFA can help to determine whether a password is invalid or not like there should be one integer atleast and one alphabet, there cannot be any special character as it would lead to dead state.

Q2 (i)

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 ₄

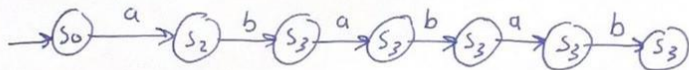
Q2 (ii)

W = a a a a a



S₄ is not a final state so DFA will not accept this

W = a b a b a b



S₃ is a final state so it will be accepted by DFA

Q 3: (i) a)

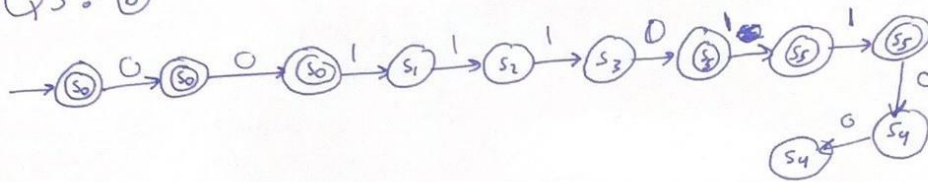
$$S = \{s_0, s_1, s_2, s_3, s_4, s_5\}$$

$$I = \{0, 1\}$$

$$q_0 = s_0$$

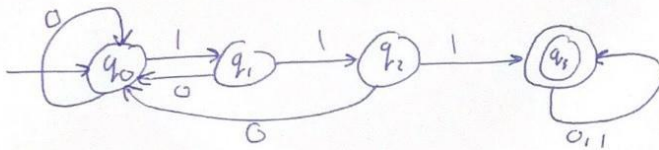
$$F = \{s_0, s_1, s_3\}$$

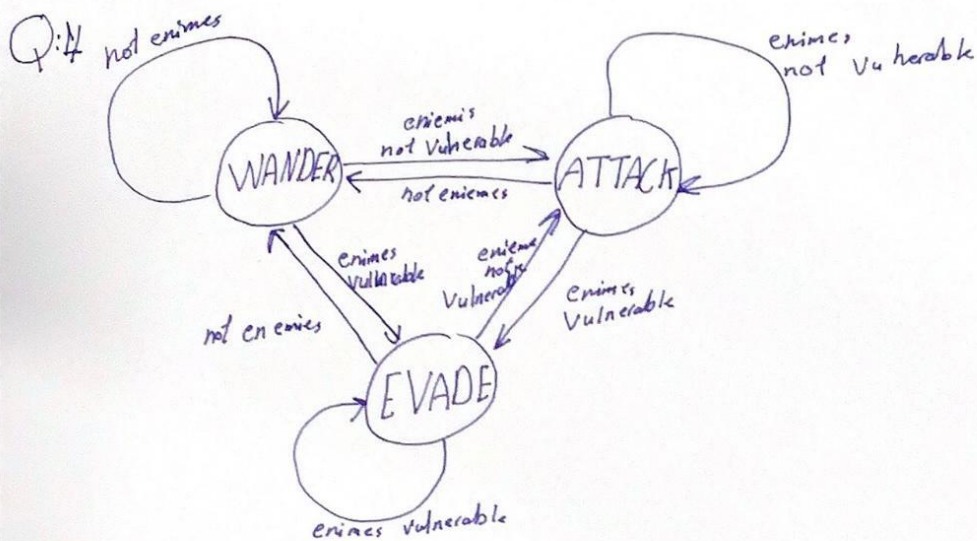
Q 3: (i) b)



0011101100 not accepted by DFA as $s_4 \notin F$

Q 3: (ii)





States

- ① ATTACK - the hero keeps attacking in this state
- ② EVADE - In this state hero tries to save himself from the enemies
- ③ WANDER - In this state hero keeps wandering the battle field

Actions:

- shoot: if the hero encounters enemies, then he immediately shoots them
- Not shoot: if the hero is invulnerable condition, then he shoots only to save himself, otherwise he remains calm.

Q4 States, $S : \{ \text{wander, Evade, Attack} \}$
 output, $O : \{ \text{shoot, not shoot} \}$
 Input, $I : \{ \text{not enemies, enemies and vulnerable, enemies and not vulnerable} \}$

S	F _S			F _O
	not enemies	enemies & not vulnerable	enemies & vulnerable	
wander	wander	Attack	Evade	
evade	wander	Attack	Evade	
Attack	wander	Attack	Evade	

not enemies	enemies & not vulnerable	enemies & vulnerable
not shoot	shoot	shoot
not shoot	shoot	shoot
not shoot	shoot	shoot

state diagram: Let:

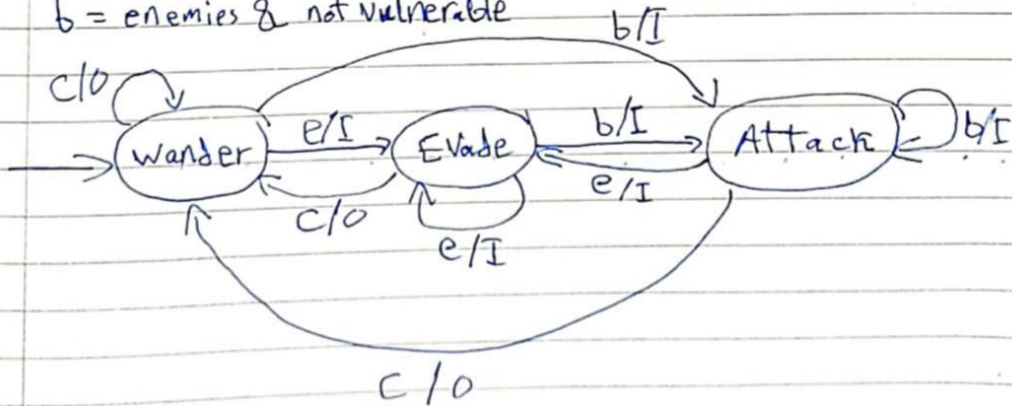
o = not shoot

I = shoot

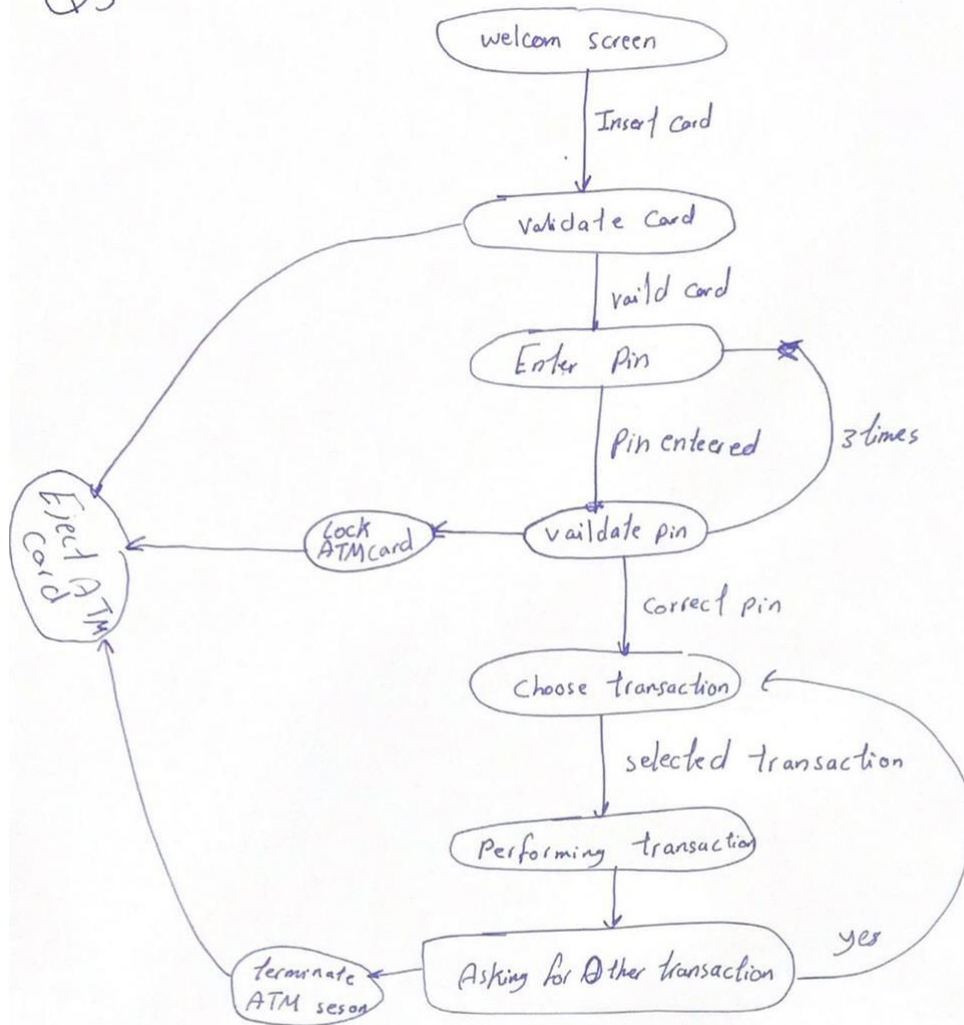
c = not enemies

e = enemies & vulnerable

b = enemies & not vulnerable



Q5



MEMBERS NAME

- **YOUSSEF HESHAM KHAIRAT**
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- **MOHANAD ALAA ABOUZIED**
A20EC4042
- **OMAR MOHAMED ABDELFAHATTAH IBRAHIM**
A20EC4047