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$\Rightarrow 8C' = 24C' - 3C' + 4$

$\Rightarrow -8 = 24C' - 4 = 24C' - 77C'$

$\Rightarrow C' = -3C' = -4$

$C' = \frac{-4}{3}$

∴ Our general solution is

$U_n = a_n = b\left(\frac{1}{2}\right)^n + d\,3^n - \left(\frac{4}{3}\right)2^n$ #

(7) Write short notes on:

(a) FSM properties

⇒ FSM (Finite State Machine) is an abstract model of a machine with a primitive memory. It is defined mathematically by 5 tuple.

A FSM consists of

(a) Finite set 'I' of input symbols.

(b) Finite set 'O' of output symbols.

(c) Finite set 'S' of states.

(d) A next state function 'f' from $S * I$ into S

(e) An output function 'g' from $S * I$ into O

(f) An initial state $\sigma \in S$

∴ $m = (I, O, S, f, g, \sigma)$ is

Eg:

Let $I = \{a, b\}$, $O = \{0, 1\}$ and $S\{\sigma_0, \sigma_1\}$

Define the pair of functions $f: S * I \to S$ and $g: S * I \to O$ by the rules given table:

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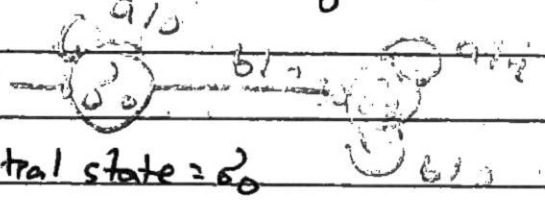
		f		g	
s	I	a	b	a	b
q_0		q_0	q_1	0	1
q_1		q_1	q_1	1	0

For f function,
$f(q_0, a) = q_0$
$f(q_0, b) = q_1$
$f(q_1, a) = q_1$
$f(q_1, b) = q_1$

For g function
$g(q_0, a) = 0$
$g(q_0, b) = 1$
$g(q_1, a) = 1$
$g(q_1, b) = 0$

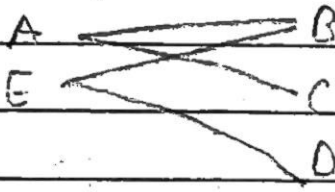
Transition diagram:



Initial state = q_0

(b) Bipartite graph

=> A graph is said to be bi-partite graph if its vertices are divided into two parts such that the vertices of first part are connected to the vertices of second part but the vertices of same part are never connected.



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If all the vertices of first part are connected to all the vertices of second part then it is called complete bi-partite graph. Let, m be the vertices of first part and n be the vertices of second part. Then, complete bi-partite graph is represented by $K_{m,n}$. Eg. $K_{3,3}$ is a complete bi-partite graph consisting of 3 vertices in the first part and 3 vertices in the second part.

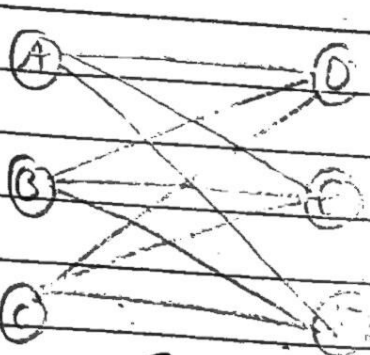

Fig: Complete bi-partite graph.