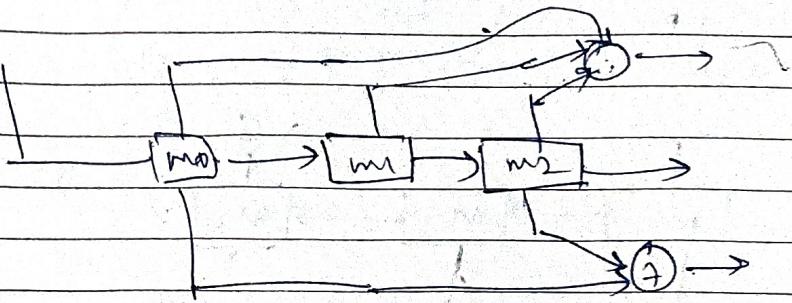




## TTE TUT 7.

Q1) For the convolutional encoder show below:



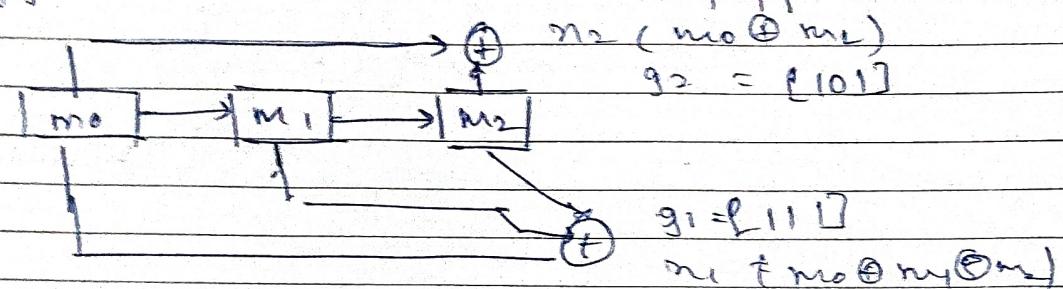
- Draw the state diagram
- Write the output sequence if message bits are [1011]

Q2) Use the Chinese Remainder Theorem to find  $n$  such that

$$\begin{aligned}a) \quad n &\equiv 2 \pmod{3} \\n &\equiv 1 \pmod{5} \\n &\equiv 6 \pmod{7}\end{aligned}$$

input = 1011

No. of zeroes to be appended to  
1/p seq so as to clear the  
ff's  $\Rightarrow M-1 \neq M = \text{No. of ff}$



State Diagram.

$$M-1 = 2 \quad \dots \quad (3-1=2)$$

No. of outputs bits =  $(Kem-1)v$

$K=4$  (digits in input)

$$m=2$$

$$v=2$$

$$\text{No. of outputs bits} = (4+2)2 \\ = 12$$

b)	1/p	$s_1$	$s_2$	$s_3$	$v_1$	$v_2$	$S_{2m}$
	0	0	0	0	0	0	demod
1	1	0	0	0	1	1	
0	0	1	0	0	1	0	
1	0	0	1	0	0	0	
0	1	1	0	0	0	1	
0	0	0	1	1	0	1	
0	0	0	0	1	1	1	



{ 11, 10, 00, 01, 01, 11 } = output seq.

$$M_1 = m_1 \cdot m_2 \cdot m_3$$

$$M_1 = M/m_1$$

$$M_2 = M/m_2$$

$$M_3 = M/m_3$$

$$M_2 = m_1 \cdot m_2 \cdot m_3$$

$$= 105/3$$

$$= 105$$

$$x \equiv a_1 \pmod{m_1}$$

$$x' \equiv a_2 \pmod{m_2}$$

$$x \equiv a_3 \pmod{m_3}$$

$$M_1 = 105/3$$

$$\approx 35$$

$$M_2 = 105/5$$

$$= 21$$

$$M_3 = 105/7$$

$$= 15$$

$$M = M_1 m_1 a_1 + M_2 m_2 a_2 + M_3 m_3 a_3$$

$m_1$  = inverse of  $M_1$

$$m_1, m_1 \equiv 1 \pmod{7}, \\ (3 \times \text{mod } 3) m_1 \equiv 1 \pmod{3}$$

$$3m_1 \equiv 1 \pmod{3}$$

$$m_2, m_2 \equiv 1 \pmod{5}$$

$$m_2 + 21 \pmod{5} \equiv 1 \pmod{5}$$

$$m_2 \equiv 1 \pmod{5}$$

$$m_2 = 6$$

$$m_3, m_3 \equiv 1 \pmod{7}$$

$$m_3 (1 \times \text{mod } 2) \equiv 1 \pmod{7}$$

$$m_3 1 \equiv 1 \pmod{7}$$

$$m_3 = 8$$

~~m = 35. 2. 2 + 21. 6. 1 + 18. 8. 6~~

$$m = 35 \cdot 2 \cdot 2 + 21 \cdot 6 \cdot 1 + 18 \cdot 8 \cdot 6 \\ = 988$$

$$m_1, m_2, m_3 = 105$$

HCF (988, 108) by difference method

HCF

Q1) Find

Grade: \_\_\_\_\_ Assignment / tutorial No. \_\_\_\_\_  
Signature of the Faculty with date \_\_\_\_\_



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Batch:	_____	Roll No.:	_____
Name :	_____		
Course :	_____		
Experiment / assignment / tutorial No. _____		_____	
Grade:	_____	Signature of the Faculty with date _____	

$$(986, 105)$$

$$(881, 105)$$

$$(776, 105)$$

$$(671, 105)$$

$$(566, 105)$$

$$(461, 105)$$

$$(356, 105)$$

$$(251, 105)$$

$$(146, 105)$$

$$(41, 105)$$

$$986 - 105$$

$$881 - 105$$

$$776 - 105$$

$$671 - 105$$

$$566 - 105$$

$$461 - 105$$

$$356 - 105$$

$$251 - 105$$

$$146 - 105$$

881

776

671

566

461

356

251

146

41

$$\text{HCF} = 41$$

$$\text{Ans.} = 41$$