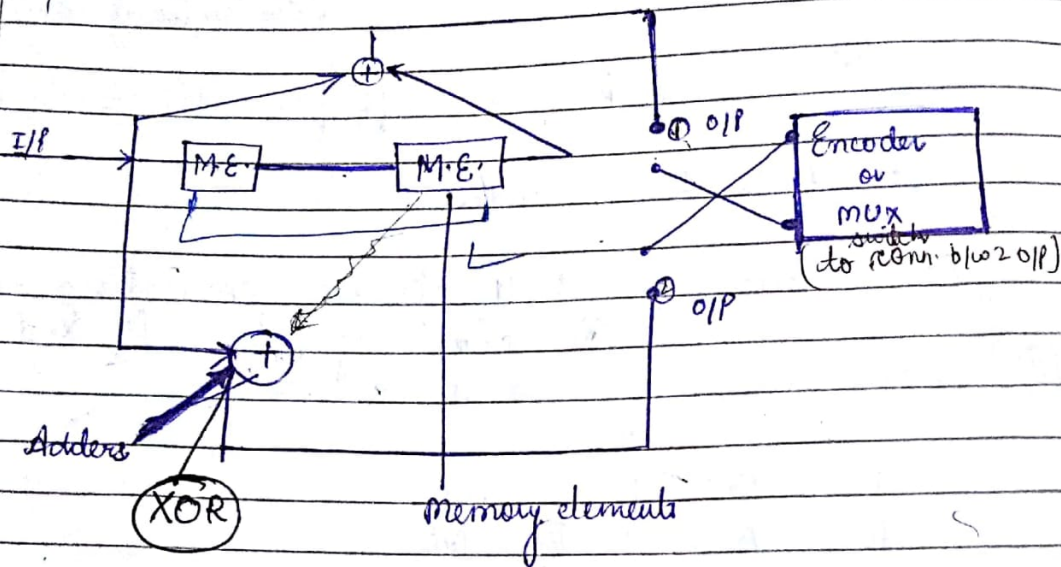


Block codes \rightarrow O/P depends on present I/P.

In conv. codes, O/P depends upon present I/P & previous O/P.



I/P	Present state		Next state		O/P
	P_1	P_2			
0	0	0	0	0	0 0
1	0	0	1	0	1 1
0	1	0	0	1	1 0
1	1	0	1	1	0 1
0	0	1	0	0	1 1
1	0	1	1	0	0 0
0	1	1	0	1	0 1
1	1	1	1	1	1 0

$$O/P_I = I/P \oplus P_1 \oplus P_2$$

$$O/P_{II} = I/P \oplus P_2$$

$$0 \oplus 0 \oplus 0 = 00$$

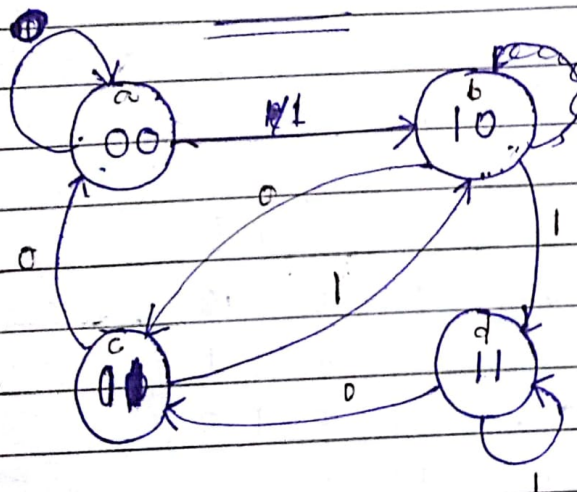
$$1 \oplus 0 \oplus 0 = 11$$

$$1 \oplus 0 = 1$$

Huffman Coding :

(AN APP. OF BINARY TREE & PRIORITY QUEUE)

I/P	P.S	N.S	Output
[0 → 0 0.]	0 0.]	00 → a	0 0
[1 → 0 0.]	0 0.]	10 → b	1 1
0	1 0.]	01 → c	1 0
1	1 0.]	11 → d	0 1
0	0 1.]	00 → a	1 1
1	0 1.]	10 → b	0 0
0	1 1.]	01 → c	0 1
1	1 1.]	11 → d	1 0

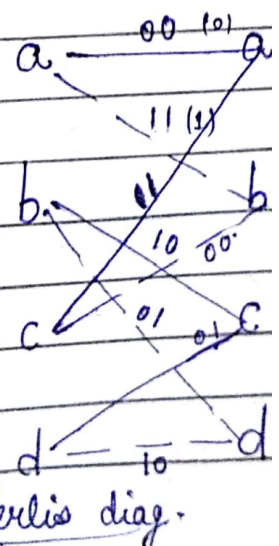


State Diagram

$$0 + 1 + 0 = 10$$

$$1 + 1 + 0 = 0$$

$$1 + 0 = 1$$



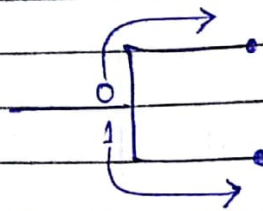
Graphical representation :-

Tree, Trilis, Diag

I/P bit 0 →
1 →

TREE CODE :- We must know three things

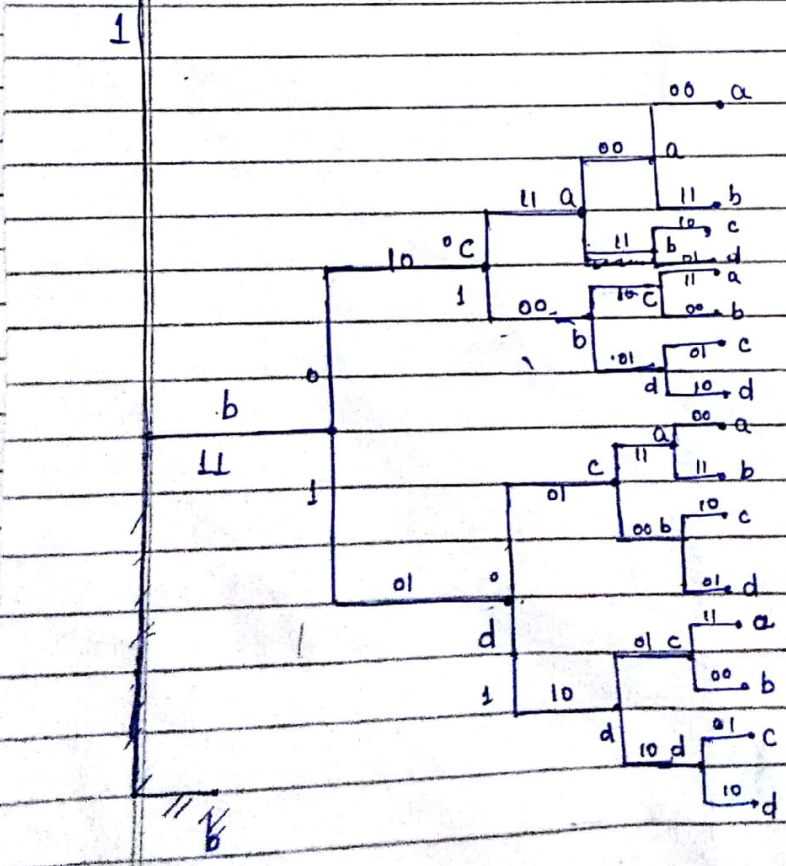
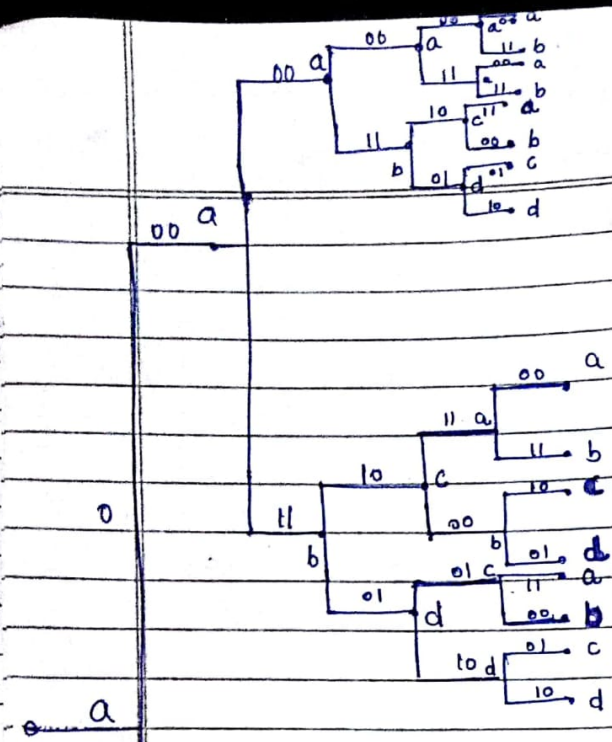
- ① Every branch represents an I/P bit (0 and 1)
- ② Upper branch of bifercation i.e division of branch denotes a bit zero.
When it moves upward, I/P bit is 0.
downward, 1.

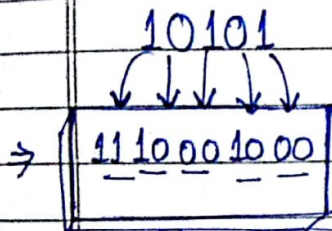
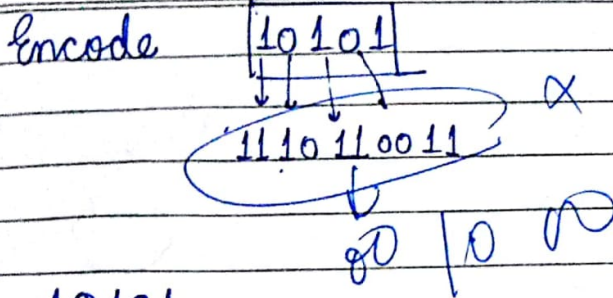


- ③ Lower branch of bifercation denotes bit zero
When it moves upward, I/P bit is 0
downward, 1
- ④ Encoder sequence path has to be traced from left to right.

I/P	P.S.	N.S	O/P
0	0 0 } ^a	00 - a	0 0
1	0 0 } ^a	10 - b	1 1
0	1 0 } ^b	01 - c	1 0
1	1 0 } ^b	11 - d	0 1
0	0 1 } ^c	00 - a	1 1
1	0 1 } ^c	10 - b	0 0
0	1 1 } ^d	01 - c	0 1
1	1 1 } ^d	11 - d	1 0

00 → a
10 → b
01 → c
11 → d



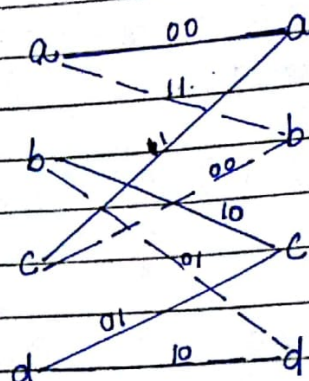


Viterbi Algo :-

I/P	P.S.	N.S	O/P
0	0 0] a	0 0 → a	0 0
1	0 0] a	1 0 → b	0 1
0	1 0] b	0 1 → c	1 0
1	1 0] b	1 1 → d	0 1
0	0 1] c	0 0 → a	0 1
1	0 1] c	1 0 → b	0 0
0	1 1] d	0 1 → c	0 1
1	1 1] d	1 1 → d	1 0

- ① It is one type of conv. decoding
 - ② It is used to correct errors.
 - ③ Used to find out best path
- It has two paths:
- ① ^{METRIC} Active path (use Hamming dist. concept)
 - ② Survivor path / Active path.

Trellis diag.



Received
Predicted
Correct

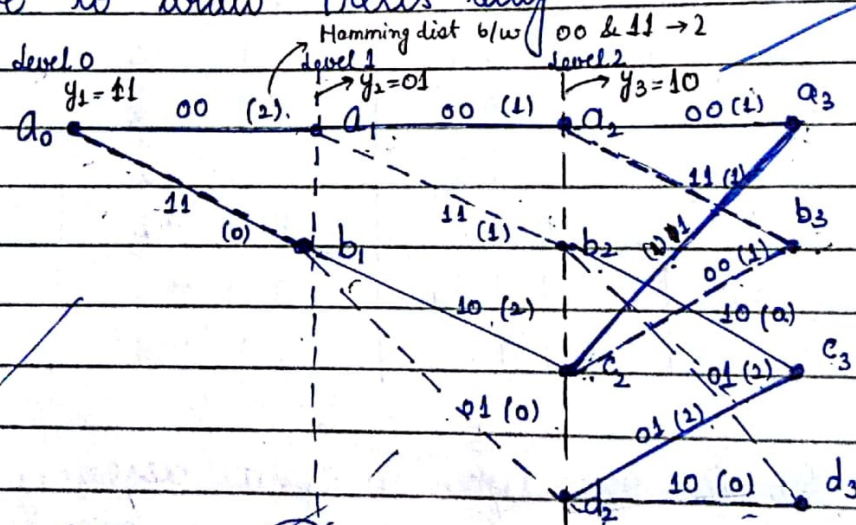
Ques:- i) For given sequence decode through Viterbi Algo

Hammy distance

Decode this $y = \boxed{11010}$
 $y_1 \ y_2 \ y_3$

$$\begin{bmatrix} 110 \\ 101 \end{bmatrix} = 2 \quad \begin{bmatrix} 110 \\ 100 \end{bmatrix} = 1$$

sol:- We have to draw Trellis diag



Bifurcation

(1)11

22/10/2019 13:27

Page No. :
Date : | |

Also called

	Path	Distance (Sum of H-D)
1.)	$a_0 a_1 a_2 a_3$	4
2.)	$a_0 a_1 a_2 b_3$	$2+1+1=4$
3.)	$a_0 a_1 b_2 c_3$	$2+1+0=3$
4.)	$a_0 a_1 b_2 d_3$	$2+1+2=5$
5.)	$a_0 b_1 c_2 a_3$	$0+2+1=3$
6.)	$a_0 b_1 c_2 b_3$	$0+2+1=3$
7.)	$a_0 b_1 d_2 c_3$	$0+0+2=2$
8.)	$a_0 b_1 d_2 d_3$	$0+0+0=0$

BEST PATH having distance 0

⇒ Signal is free of error

"SURVIVAL PATH"

Received code has no error if distance is ZERO.

Encoding signal has best path.

Survival path → 110110 is 111 is ENCODING SIGNAL

b_1 to d_2
 a_0 to b_1 d_2 to d_3