

EC8395-Communication Engineering

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Objective

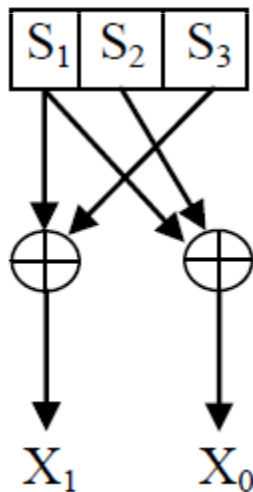
1. To Discuss about Convolutional Encoder/Decoder by Trellis diagram/Viterbi decoding algorithm



Problems

1. Convolutional encoder is shown in the figure below. Find the output of the encoder when the input is 0 1 0 1 1 0. Also discuss the operation of the convolutional encoder with the help of a state diagram, Trellis diagram and the code tree.

Use Viterbi algorithm to decode the sequence 00 11 01 01



State table:

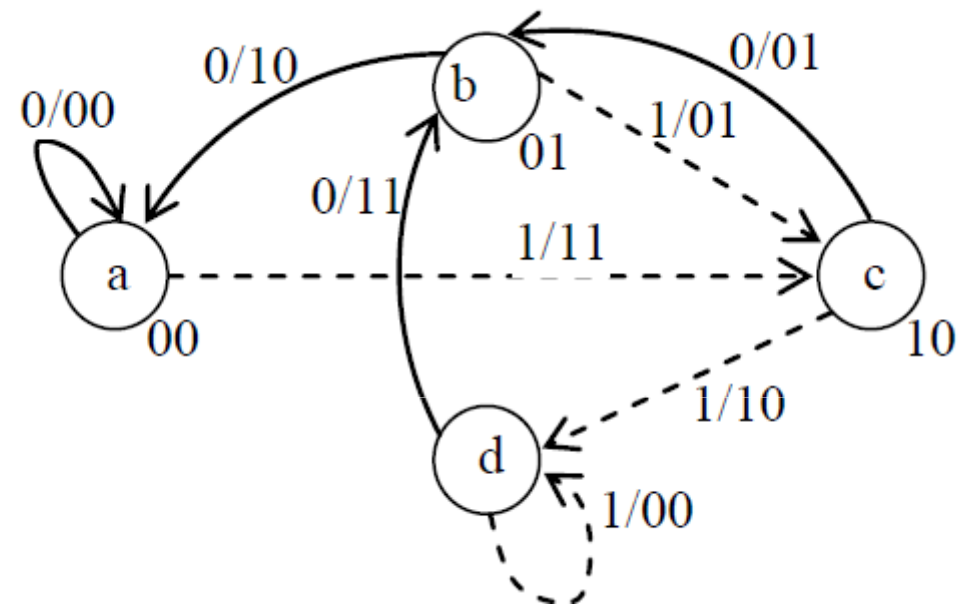
Input s_1	Current state $s_2 s_3$	Next state $s_2 s_3$	Output $X_1 X_0$
Initial condition	0 0	- -	- -
0	0 0	0 0	0 0
1	0 0	1 0	1 1
0	0 1	0 0	1 0
1	0 1	1 0	0 1
0	1 0	0 1	0 1
1	1 0	1 1	1 0
0	1 1	0 1	1 1
1	1 1	1 1	0 0

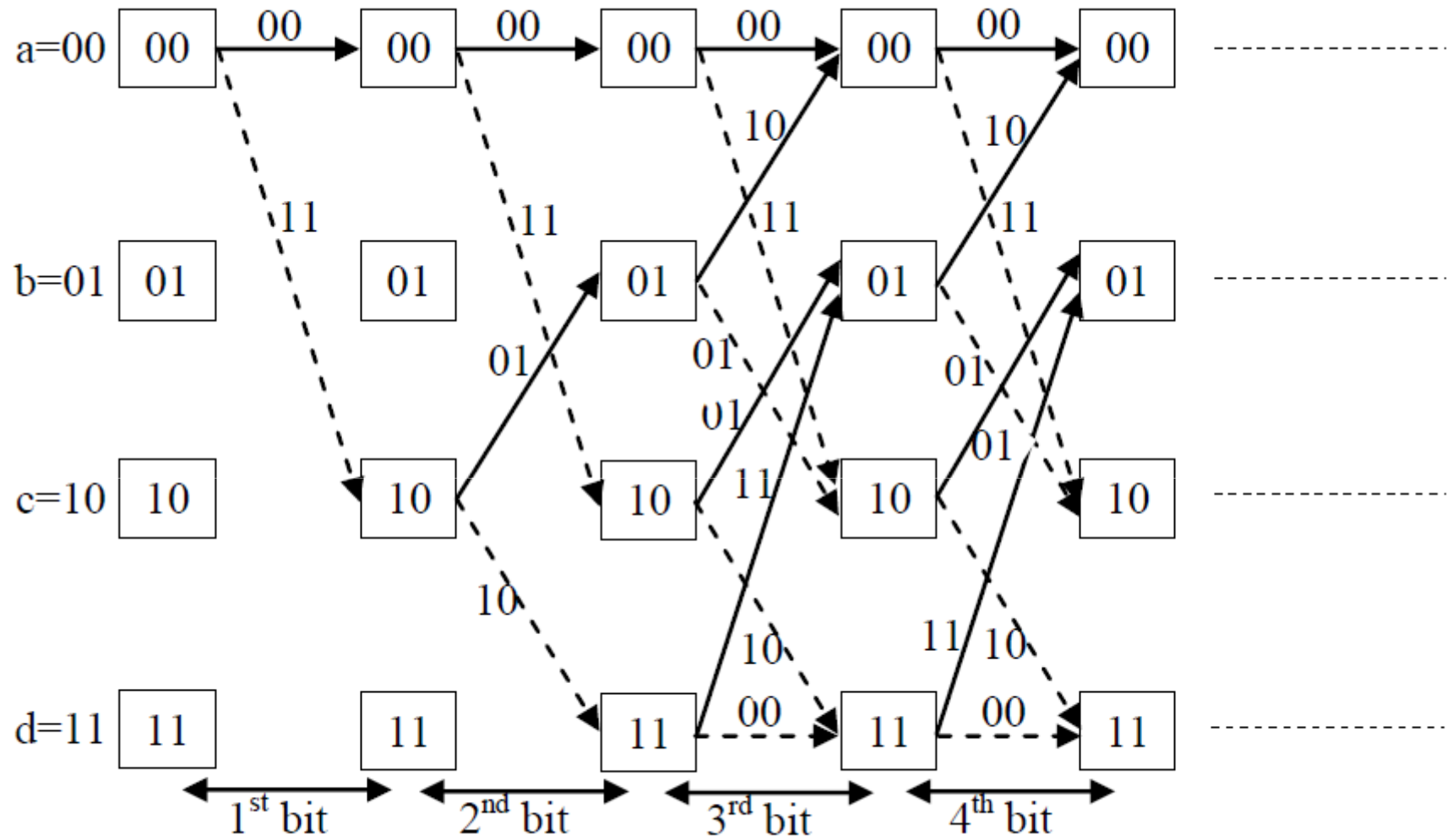
The present state and the next state table:

Current state	Next state	
	When input=0	When input=1
$a = 00$	00	10
$b = 01$	00	10
$c = 10$	01	11
$d = 11$	01	11



State diagram:





(ii) Encoder output when the inputs is 0 1 0 1 1 0.

Based on the knowledge of constructing state diagram, we can draw the State diagram for the given input sequence.

Input s_1	Current state $s_2 s_3$	Next state $s_2 s_3$	Output $X_1 X_0$
Initial condition	0 0	- -	- -
0	0 0	0 0	0 0
1	0 0	1 0	1 1
0	1 0	0 1	0 1
1	0 1	1 0	0 1

Viterbi Decoding Algorithm

