

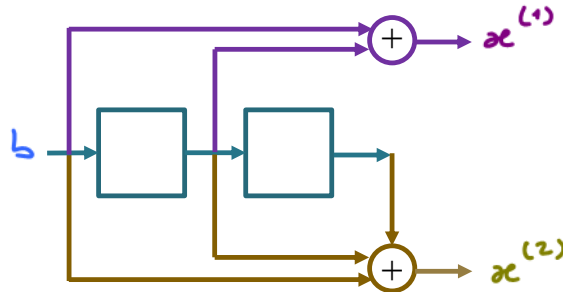
ECS 452: In-Class Exercise #13

Instructions

1. Separate into groups of no more than three persons.
2. The group cannot be the same as your former group.
3. Only one submission is needed for each group.
4. **Do not panic.**

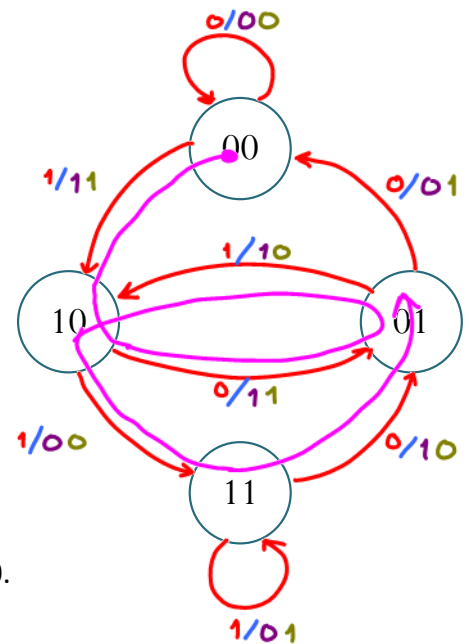
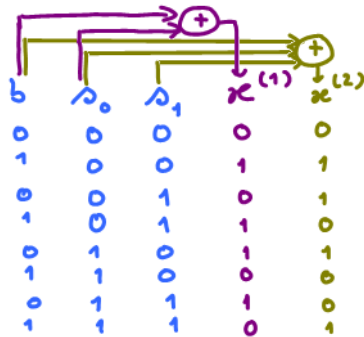
Date: 20/04/2017			
Name			ID (last 3 digits)
Prapun			555

1. Consider a convolution encoder represented by the following diagram



a. Draw the corresponding state (transition) diagram

First, observe that this encoder uses a shift register with two FFs which is the same as the one discussed in lecture. Therefore, the arrows will be the same as what we had in the lecture. Note, however, that the connections that produce the outputs are different from the encoder in lecture. Therefore, we simply need to find the outputs.



b. Suppose the information input bits (the message bits) are 10110.

Find the corresponding codeword \underline{x}

i. by using the direct method (filling out the table below)

and

ii. by "tracing" the corresponding path on the state diagram above

(Also draw your trace on the state diagram.)

See the trace in the diagram above

b	s ₀	s ₁	x ⁽¹⁾	x ⁽²⁾
1	0	0	1	1
0	1	0	1	1
1	0	1	1	0
1	1	0	0	0
0	1	1	1	0

Note that the final output is one row vector resulting from interleaving the upper and lower outputs.

$$\underline{x} = [1111100010]$$