

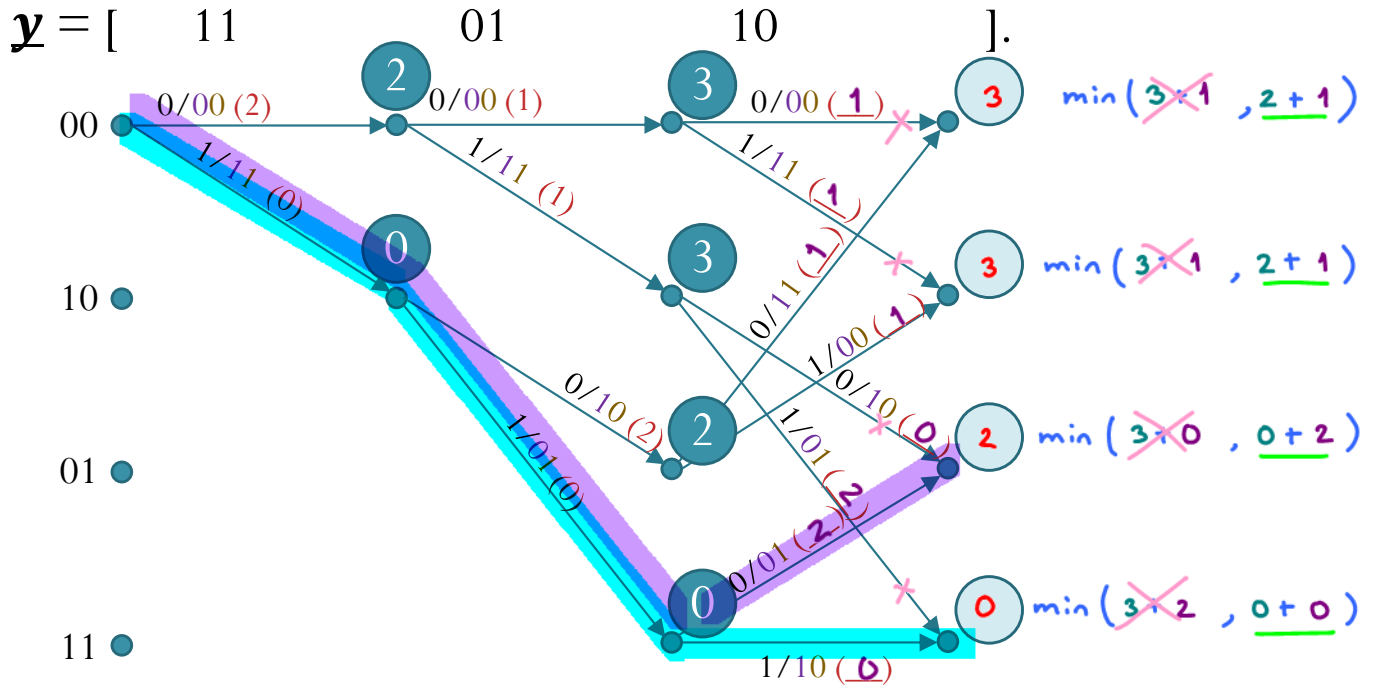
ECS 452: In-Class Exercise #16

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups after the midterm.**
2. **Write down all the steps** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

Date: 24 / 04 / 2018			
Name			ID (last 3 digits)
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Consider a convolutional encoder whose trellis diagram is given below



1. Suppose the data vector is $\mathbf{b} = [110]$. Find the corresponding codeword \mathbf{x} .

Read from the highlighted path: [110101]

2. Suppose that we observe $\mathbf{y} = 110110$ at the input of the minimum distance decoder.

The decoder uses Viterbi's algorithm.

- a. Write down

(1) all the distance values on the branches and

(2) the (chosen) cumulative distance values inside all the circles

in the figure above.

- b. Find the decoded codeword $\hat{\mathbf{x}}$ and the decoded message $\hat{\mathbf{b}}$.

Read from the highlighted path:

$\hat{\mathbf{x}} = \underline{[110110]}$ $\hat{\mathbf{b}} = \underline{[111]}$



No error in the received vector