Pre-Lab Task

Q1

The constraint length of the code is 3 for the generator is 1×3 dimensions.

Q2

The n=2 and k = 1,therefore,$R = \frac{k}{n} = \frac{1}{2}$

Q3

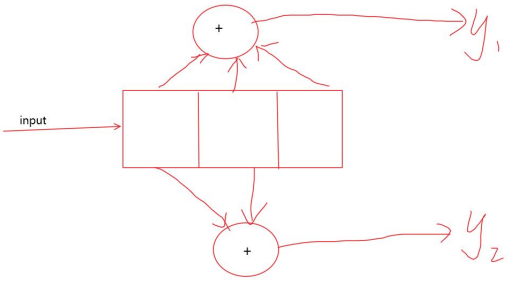

Figure 1: Shift Diagram of the Encoder

Q4

The state diagram are shown below,the initial state is the **00** state.

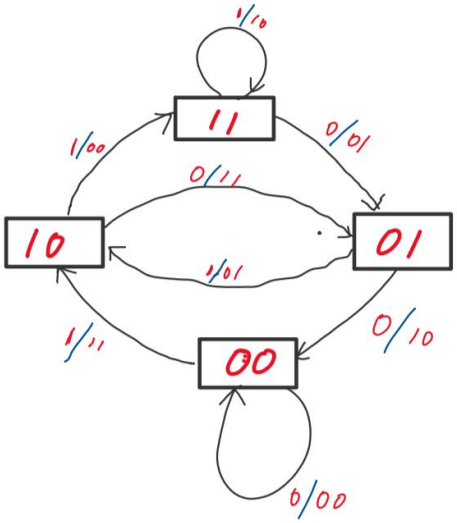

Figure 2: State Diagram of the Encoder

Q5

The trellis diagram are shown below:

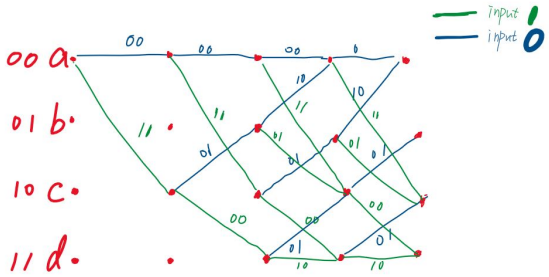

Figure 3: Trellis Diagram of the Encoder

Q6

$$A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} \tag{1}$$

$$B = \begin{bmatrix} 1 & 0 \end{bmatrix} \tag{2}$$

$$P = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \tag{3}$$

$$F = \begin{bmatrix} 1 & 0 \end{bmatrix} \tag{4}$$

Q7

The input of hard decision with a fixed set of possible values(like 0,1),however,the input of the soft decision is a range of real values.Because the input for soft decision has more levels,it has a better error performance.
Hamming metric is a choice for hard decision and Euclidean metric is a choice for soft decision.

Q8