Homework 1

1. The state of a Linear Feedback Shift Register from a 1-error-correcting (7,4) cyclic decoder, after the whole received word $\boldsymbol{r}$, is:

$$\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$$

The generator polynomial is $g(x) = 1 \oplus x^2 \oplus x^3$.

Is there an error present? If yes, find the location of the error (its position in $\boldsymbol{r}$).

2. In a multiplication circuit with 4 modulo-2 adders places outside the binary cells, we know the following:

- during the first 4 moments, the input is 1 0 0 1 and the output is 1 1 0 1
- during the first 5 moments, the last binary cells has the values 0 0 0 0 1

Find the generator polynomial of the circuit.

Hint: draw the functioning table, fill the known values, then reason what are be the values of g_i