Cyclic Redundancy Check

Daniel Carvalho – 64003

Ruben Menino - 89185

CRC

- Is one type of error detection used in data transmission.
- Commonly used in digital networks and storage devices to detect accidental changes to raw data.
- It has two applications areas:
  - - The bit-serial transmission
  - - The parallel access

To get re result we wanted, we used the properties of the reminder.

It is based in the following polynomial:

$$\left(\sum_{n=0}^{15} a_n \times x^{n+8}\right) \bmod b(x)$$

where,

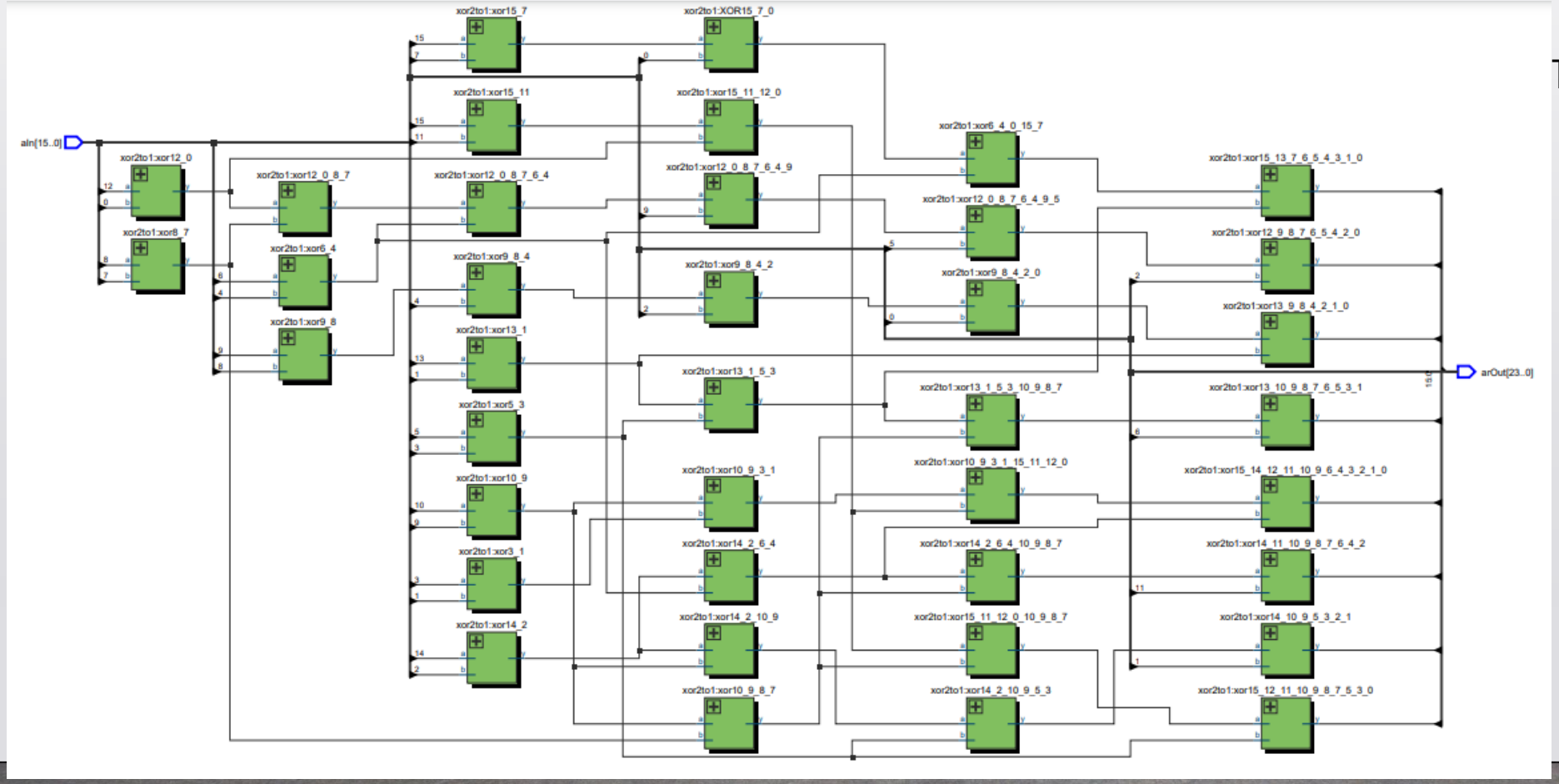
$$b(x) = x^8 + x^5 + x^3 + x^2 + x + 1$$

$$\left(\sum_{n=0}^{15} a_n \times x^{n+8}\right) \bmod (x^8 + x^5 + x^3 + x^2 + x + 1) =$$

$$\begin{aligned}
&= (a_2 \oplus a_4 \oplus a_6 \oplus a_7 \oplus a_8 \oplus a_9 \oplus a_{10} \oplus a_{11} \oplus a_{14}) \times x^7 + \\
&+ (a_1 \oplus a_3 \oplus a_5 \oplus a_6 \oplus a_7 \oplus a_8 \oplus a_9 \oplus a_{10} \oplus a_{13}) \times x^6 + \\
&+ (a_0 \oplus a_2 \oplus a_4 \oplus a_5 \oplus a_6 \oplus a_7 \oplus a_8 \oplus a_9 \oplus a_{12}) \times x^5 + \\
&+ (a_1 \oplus a_2 \oplus a_3 \oplus a_5 \oplus a_9 \oplus a_{10} \oplus a_{14}) \times x^4 + \\
&+ (a_0 \oplus a_1 \oplus a_2 \oplus a_4 \oplus a_8 \oplus a_9 \oplus a_{13}) \times x^3 + \\
&+ (a_0 \oplus a_1 \oplus a_2 \oplus a_3 \oplus a_4 \oplus a_6 \oplus a_9 \oplus a_{10} \oplus a_{11} \oplus a_{12} \oplus a_{14} \oplus a_{15}) \times x^2 + \\
&+ (a_0 \oplus a_1 \oplus a_3 \oplus a_4 \oplus a_5 \oplus a_6 \oplus a_7 \oplus a_{13} \oplus a_{15}) \times x + \\
&+ (a_0 \oplus a_3 \oplus a_5 \oplus a_7 \oplus a_8 \oplus a_9 \oplus a_{10} \oplus a_{11} \oplus a_{12} \oplus a_{15})
\end{aligned}$$

- 64 x-or gates are needed
- 11 x-or propagation time delays in the worst case.

Encoder Architecture



Total number os XORs: 39

Checker Architecture