AAD - Assignment 1
Hamming Codes

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Parallel version of Decoder

- The number of gates xor : 28 → 22
- The number of propagation time delays: 7 → 4

$$p1 = y1 \oplus y2 \oplus y3 \oplus y7 \oplus y8 \oplus y9 \oplus y11 \oplus y12$$

$$p2 = y1 \oplus y4 \oplus y5 \oplus y7 \oplus y8 \oplus y10 \oplus y11 \oplus y13$$

$$p3 = y2 \oplus y4 \oplus y6 \oplus y7 \oplus y9 \oplus y10 \oplus y11 \oplus y14$$

$$p4 = y3 \oplus y5 \oplus y6 \oplus y8 \oplus y9 \oplus y10 \oplus y11 \oplus y15$$

$$\mathbf{A} = y1 \oplus y7 \oplus y8 \oplus y11$$

$$\mathbf{B} = y6 \oplus y9 \oplus y10 \oplus y11$$

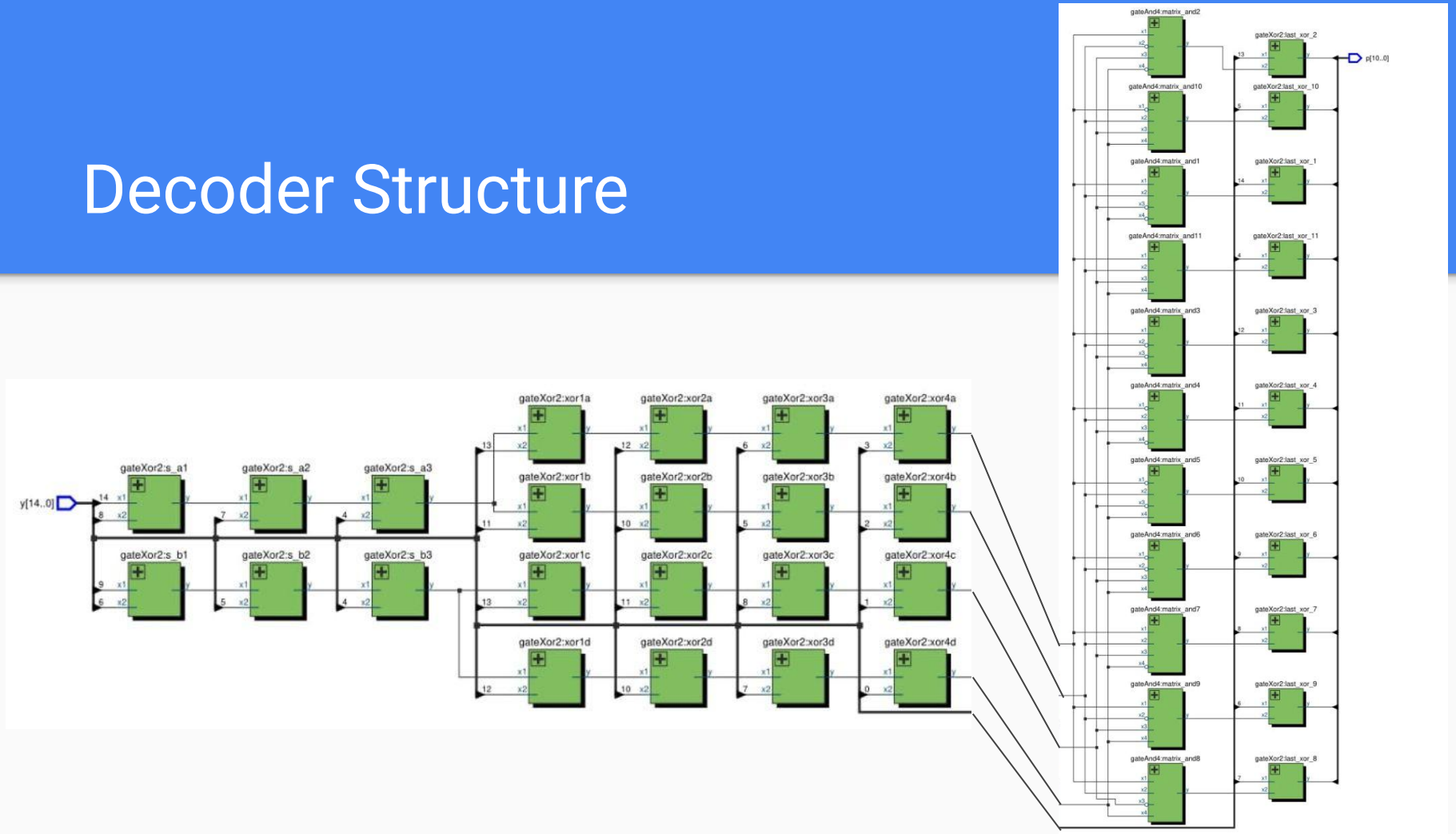
$$p1: \mathbf{A} \oplus y2 \oplus y3 \oplus y9 \oplus y12$$

$$p2: \mathbf{A} \oplus y4 \oplus y5 \oplus y10 \oplus y13$$

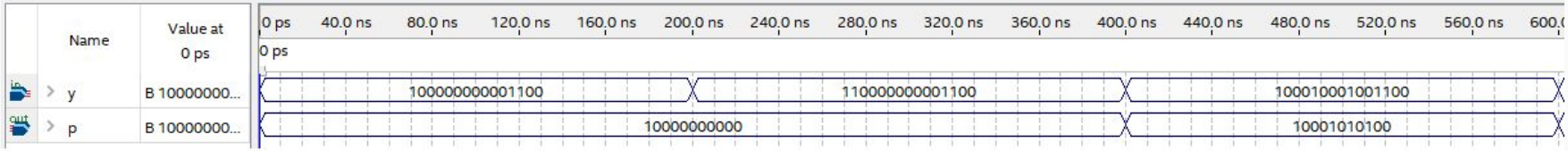
$$p3: \mathbf{B} \oplus y2 \oplus y4 \oplus y7 \oplus y14$$

$$p4: \mathbf{B} \oplus y3 \oplus y5 \oplus y8 \oplus y15$$

Decoder Structure



Decoder simulation (.vwf)



Bit serial version of Encoder

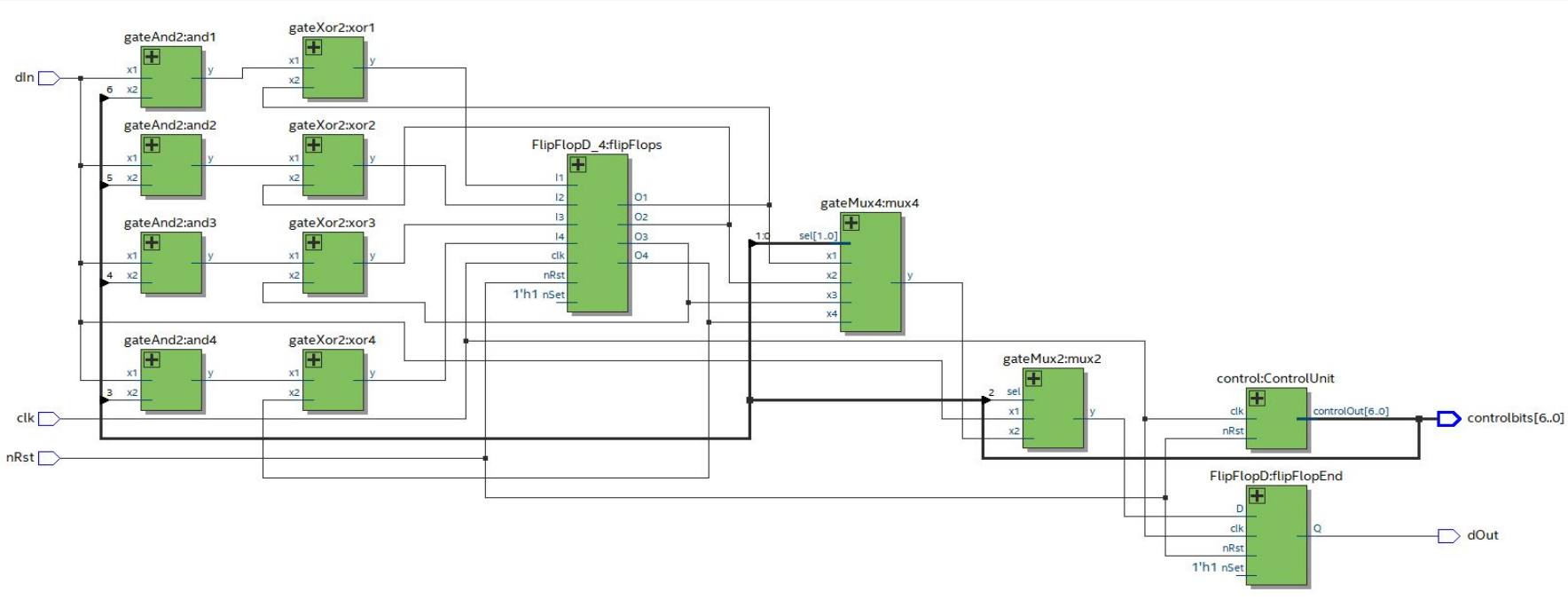
- $\mathbf{x12} = m1 \oplus m2 \oplus m3 \oplus m7 \oplus m8 \oplus m9 \oplus m11$

  $\mathbf{x13} = m1 \oplus m4 \oplus m5 \oplus m7 \oplus m8 \oplus m10 \oplus m11$

  $\mathbf{x14} = m2 \oplus m4 \oplus m6 \oplus m7 \oplus m9 \oplus m10 \oplus m11$

  $\mathbf{x15} = m3 \oplus m5 \oplus m6 \oplus m8 \oplus m9 \oplus m10 \oplus m11$

Encoder Structure



Encoder simulation (.vwf)