

→ An error has occurred. The original data had an odd number of 1s, making it odd parity. With even parity, the total number of 1s should be even. The received data has size 15, making it even parity, which means an error must have occurred.

2) CRC (Cyclic Redundancy Check)

$$x^3 + x + 1 \Rightarrow \text{divisor} \Rightarrow \text{dividend} \text{ mod}$$

$$11010011101100 \rightarrow \text{dividend} \Rightarrow \text{dataword} \Rightarrow 14 \text{ bits} = k$$

$$1011 \overline{) 110100111011000000}$$

$$n - k = 4$$

$$n = 17$$

i.e. no. of redundant bits $r = n - k = 17 - 14 = 3$

$$\begin{array}{r} 1011 \overline{) 110100111011000000} \\ \underline{1011000000000000} \\ 01100 \\ \underline{0110} \\ 1110 \\ \underline{1011} \\ 1011 \\ \underline{1011} \\ 001101 \\ \underline{0101} \\ 1100 \\ \underline{1011} \\ 1110 \\ \underline{1011} \\ 1011 \\ \underline{1011} \\ 00100 \end{array}$$

The message sent

$$= 11010011101100100$$

If the received CRC value matches the calculated CRC value, it signifies data is correct.

→

An error has likely occurred.

The checksum is calculated by summing the byte values and taking on the last byte of sum. In this case, the sum of data bytes is 287. To get checksum we take 287 modulo 256.