

Explain the Cyclic Redundancy Checks (CRCs)

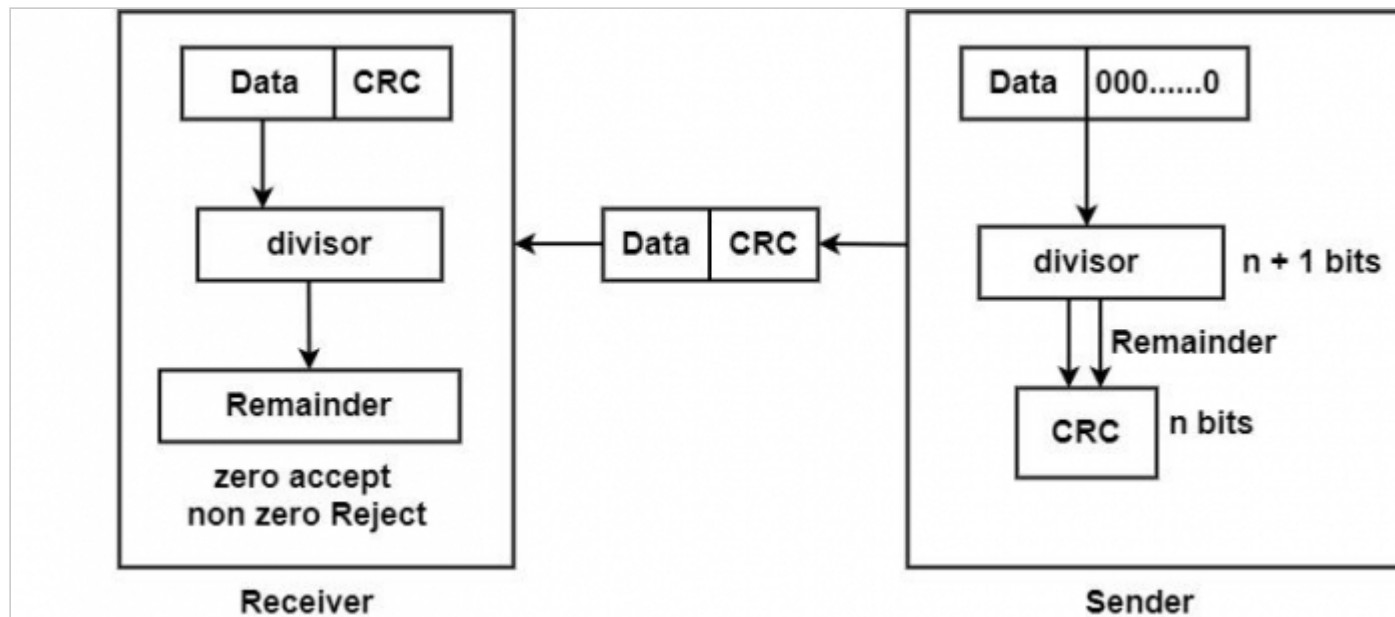
The Cyclic Redundancy Checks (CRC) is the most powerful method for Error-Detection and Correction. It is given as a kbit message and the transmitter creates an $(n - k)$ bit sequence called frame check sequence. The out coming frame, including n bits, is precisely divisible by some fixed number. Modulo 2 Arithmetic is used in this binary addition with no carries, just like the XOR operation.

Redundancy means **duplicacy**. The redundancy bits used by CRC are changed by splitting the data unit by a fixed divisor. The remainder is CRC.

Qualities of CRC

- It should have accurately one less bit than the divisor.
- Joining it to the end of the data unit should create the resulting bit sequence precisely divisible by the divisor.

CRC generator and checker



Process

- A string of n 0s is added to the data unit. The number n is one smaller than the number of bits in the fixed divisor.
- The new data unit is divided by a divisor utilizing a procedure known as binary division; the remainder appearing from the division is CRC.
- The CRC of n bits interpreted in phase 2 restores the added 0s at the end of the data unit.

Example

Message D = 1010001101 (10 bits)

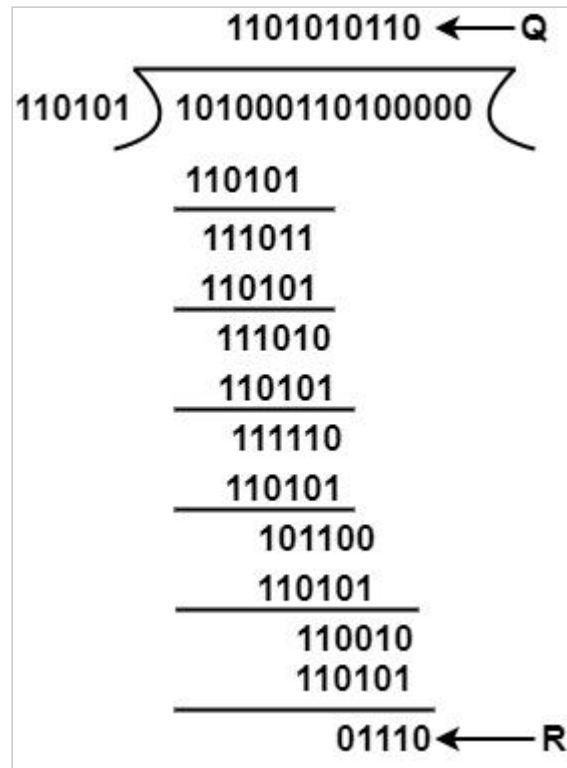
Predetermined P = 110101 (6 bits)

FCS R = to be calculated 5 bits

Hence, $n = 15$ $K = 10$ and $(n - k) = 5$

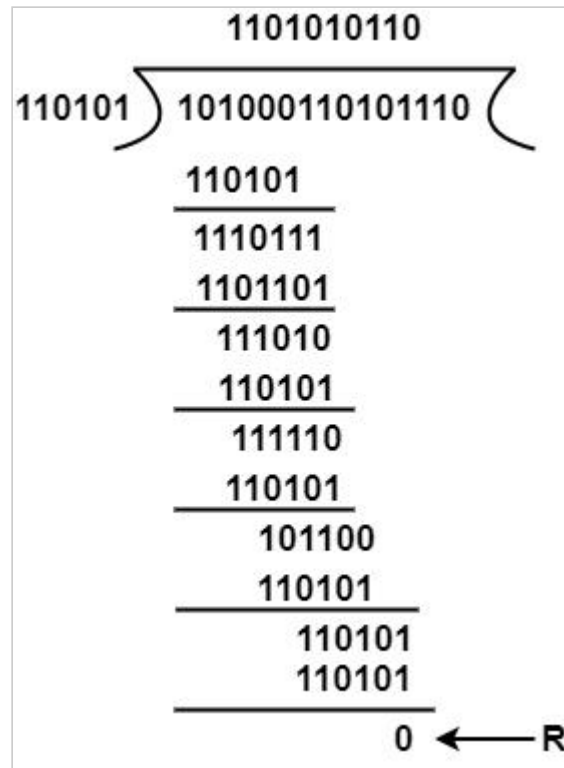
The message is generated through 2^5 :accommodating 1010001101000

The product is divided by P.



The remainder is inserted to 2^5D to provide $T = 101000110101110$ that is sent.

Suppose that there are no errors, and the receiver gets T perfect. The received frame is divided by P .



Because of no remainder, there are no errors.