- When the polynomial code method is employed, the sender and receiver must agree upon a **generator polynomial**, $G(x)$, in advance.

- Both the high- and low order bits of the generator must be 1.

- To compute the CRC for some frame with *m* bits corresponding to the polynomial $M(x)$, the frame must be longer than the generator polynomial.

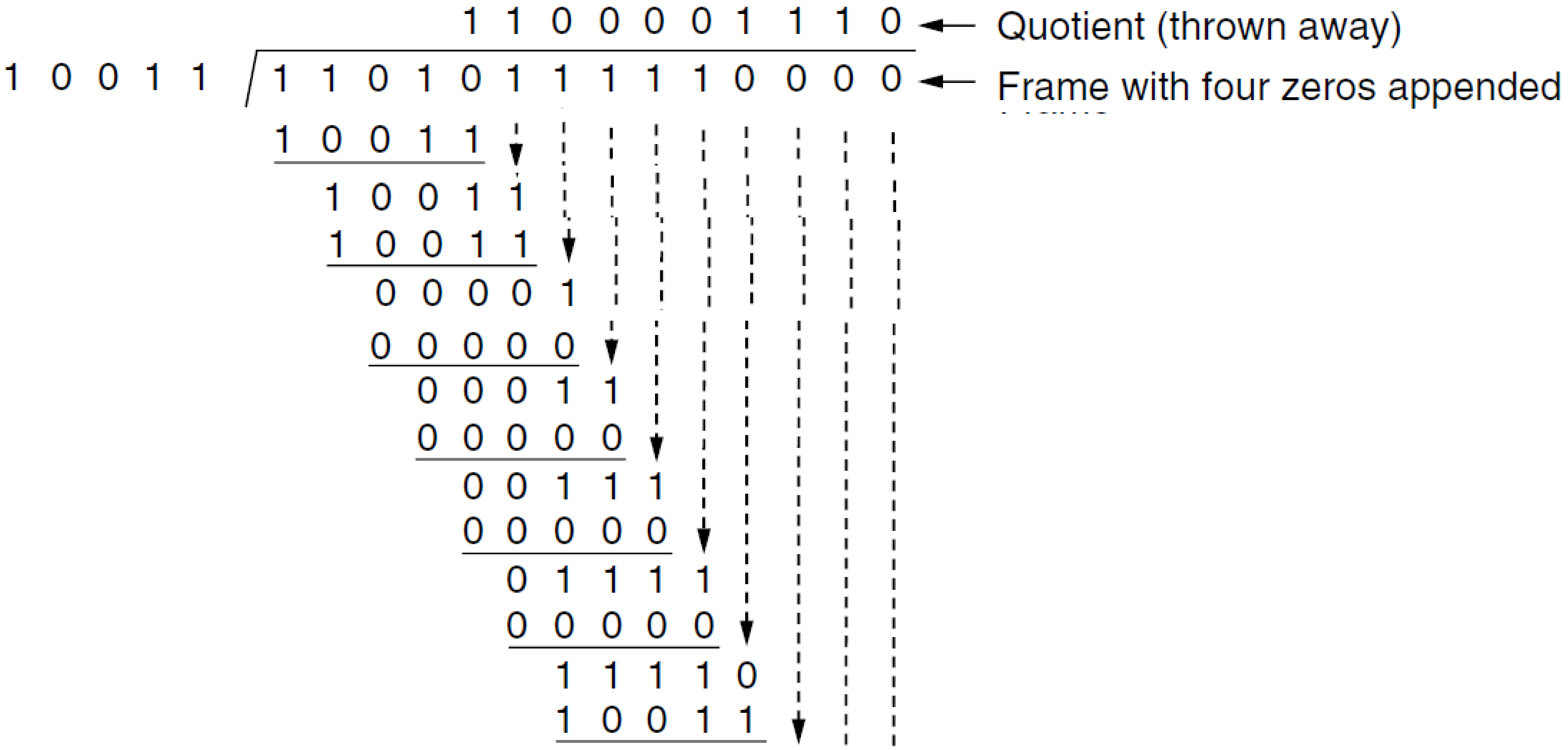
- The idea is to append a CRC to the end of the frame in such a way that the polynomial represented by the checksummed frame is divisible by $G(x)$.
- When the receiver gets the checksummed frame, it tries dividing it by $G(x)$. If there is a remainder, there has been a transmission error.

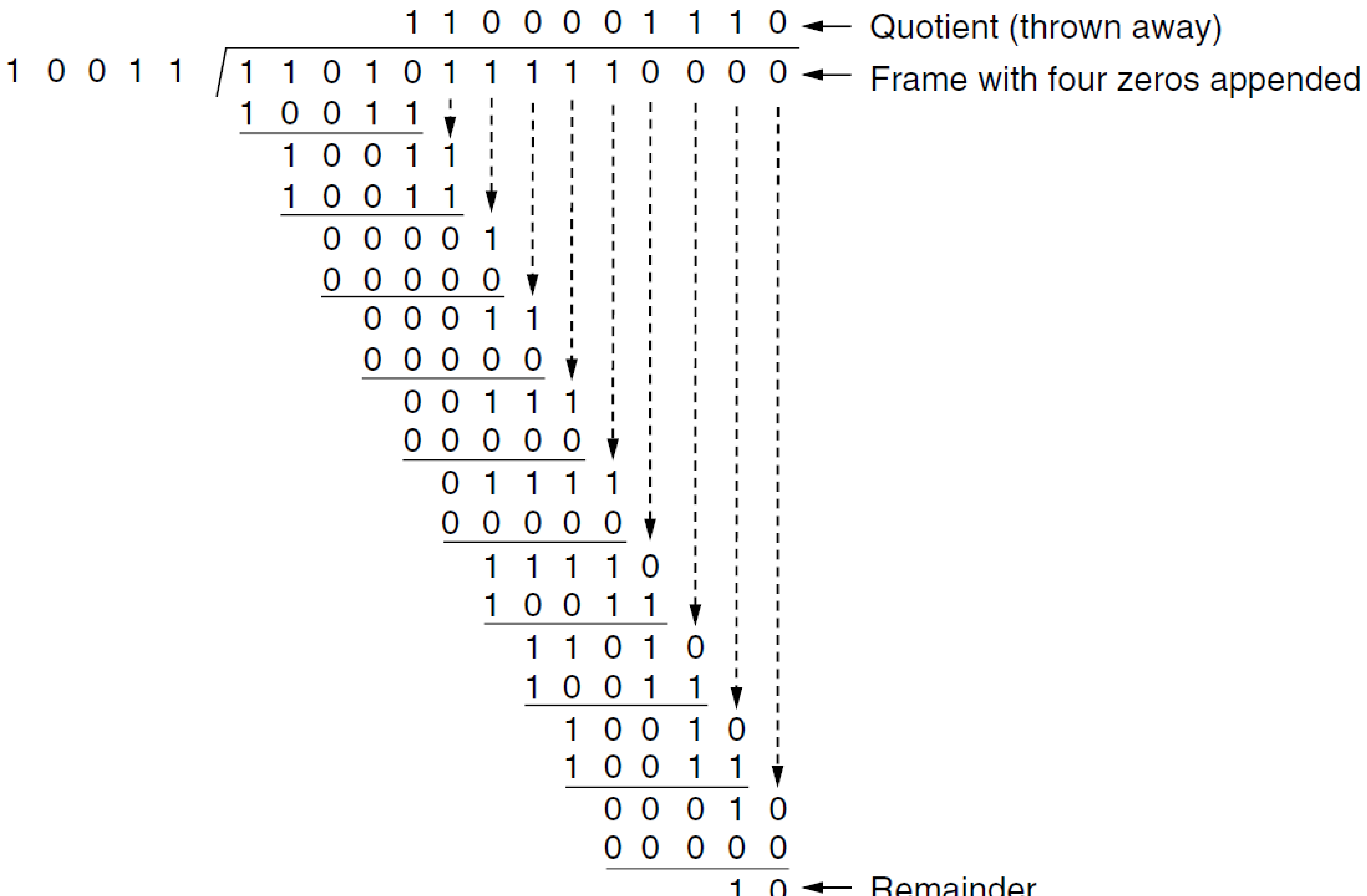
- 1. Let r be the degree of $G(x)$. Append r zero bits to the low-order end of the frame so it now contains $m + r$ bits and corresponds to the polynomial $x^r M(x)$.

- 2. Divide the bit string corresponding to $G(x)$ into the bit string corresponding to $x^rM(x)$, using modulo 2 division.

- 3. Subtract the remainder (which is always r or fewer bits) from the bit string corresponding to $x^rM(x)$ using modulo 2 subtraction. The result is the checksummed frame to be transmitted. Call its polynomial $T(x)$.

- calculation for a frame 1101011111 using the generator $G(x) = x^4 + x + 1$.




1 1 0 0 0 0 1 1 1 0
Quotient (thrown away)
1 0 0 1 1
1 1 0 1 0 1 1 1 1 1 0 0 0 0
Frame with four zeros appended
1 0 0 1 1
1 0 0 1 1
1 0 0 1 1
0 0 0 0 1
0 0 0 0 0
0 0 0 1 1
0 0 0 0 0
0 0 1 1 1
0 0 0 0 0
0 1 1 1 1
0 0 0 0 0
1 1 1 1 0
1 0 0 1 1
1 1 0 1 0
1 0 0 1 1
1 0 0 1 0
1 0 0 1 1
0 0 0 1 0
0 0 0 0 0
1 0
Remainder

Transmitted frame: 1 1 0 1 0 1 1 1 1 1 0 0 1 0 $\leftarrow$ Frame with four zeros appended minus remainder