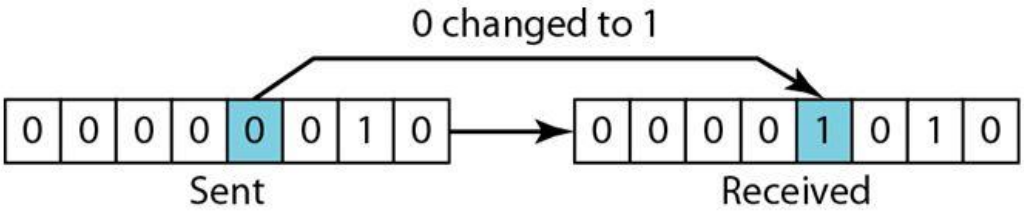
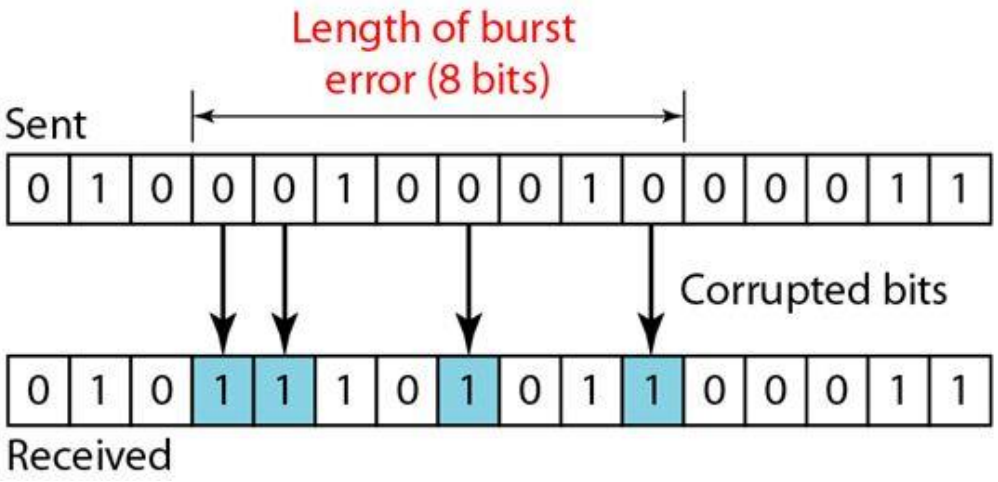
Error Detection

Whenever bits flow from one point to another, they are subject to unpredictable changes because of interference. This interference can change the shape of the signal.

Single-Bit Error: The term single-bit error means that only 1 bit of a given data unit (such as a byte, character, or packet) is changed from 1 to 0 or from 0 to 1.



Burst Error: The term burst error means that 2 or more bits in the data unit have changed from 1 to 0 or from 0 to 1.



Error detection

Error detection involves checking whether any error has occurred or not. The number of error bits and the type of error does not matter. There are three main techniques for detecting errors in frames:

1. Parity Check
2. Checksum
3. Cyclic Redundancy Check (CRC).

Cyclic Redundancy Check (CRC).

Cyclic Redundancy Check (CRC) involves binary division of the data bits being sent by a predetermined divisor agreed upon by the communicating system. The divisor is generated using polynomials.

- Here, the sender performs binary division of the data segment by the divisor. It then appends the remainder called CRC bits to the end of the data segment. This makes the resulting data unit exactly divisible by the divisor.
- The receiver divides the incoming data unit by the divisor. If there is no remainder, the data unit is assumed to be correct and is accepted. Otherwise, it is understood that the data is corrupted and is therefore rejected.