

LECTURE 3

ERROR DETECTION AND CORRECTION

➤ **Types of Errors**

➤ **Detection**

➤ **Correction**

Device A



Data

Device B



*Data can be corrupted during transmission.
For reliable communication, errors must be
detected and corrected.*

Device A



Device B



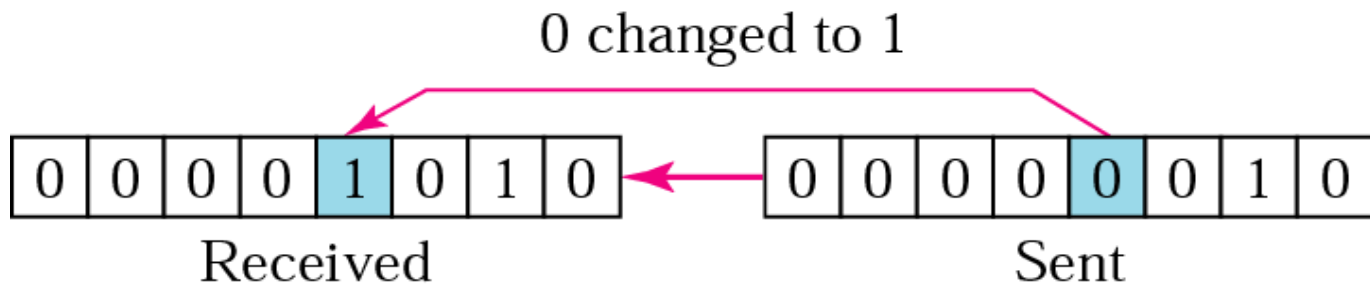
Types of Error

- Single-Bit Error
- Burst Error

Single-Bit Error

Note:

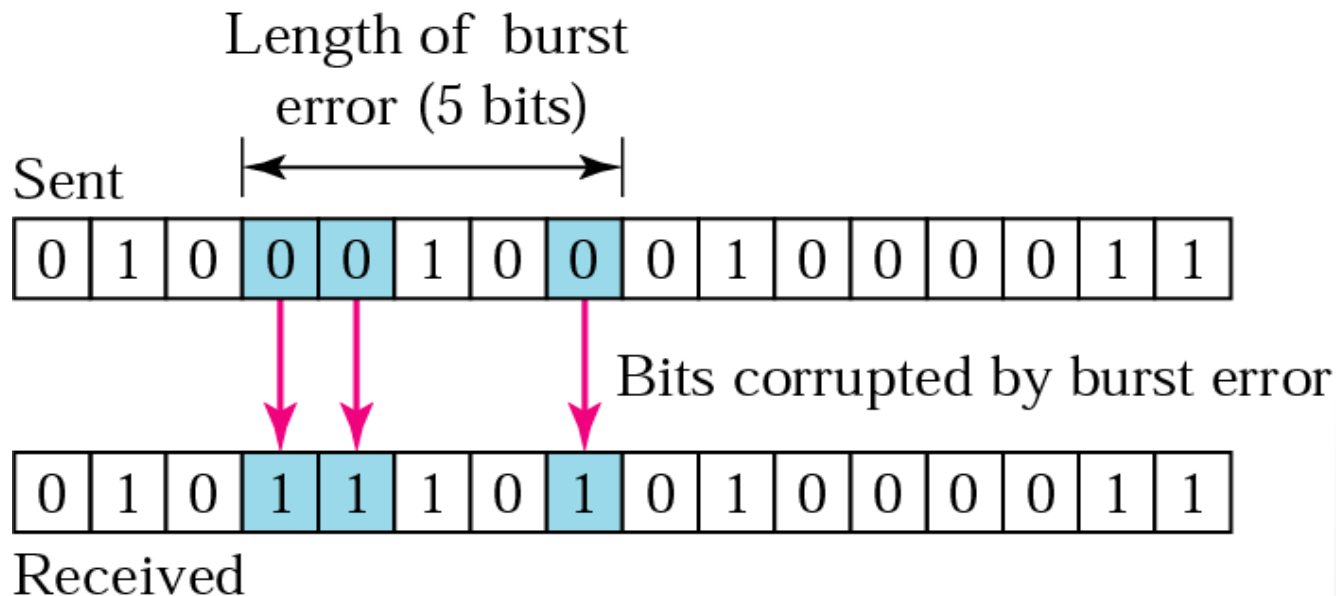
In a single-bit error, only one bit in the data unit has changed.



Burst Error

Note:

A burst error means that 2 or more bits in the data unit have changed.



Error Detection

Redundancy

Parity Check

Longitudinal Redundancy Check

Cyclic Redundancy Check (CRC)

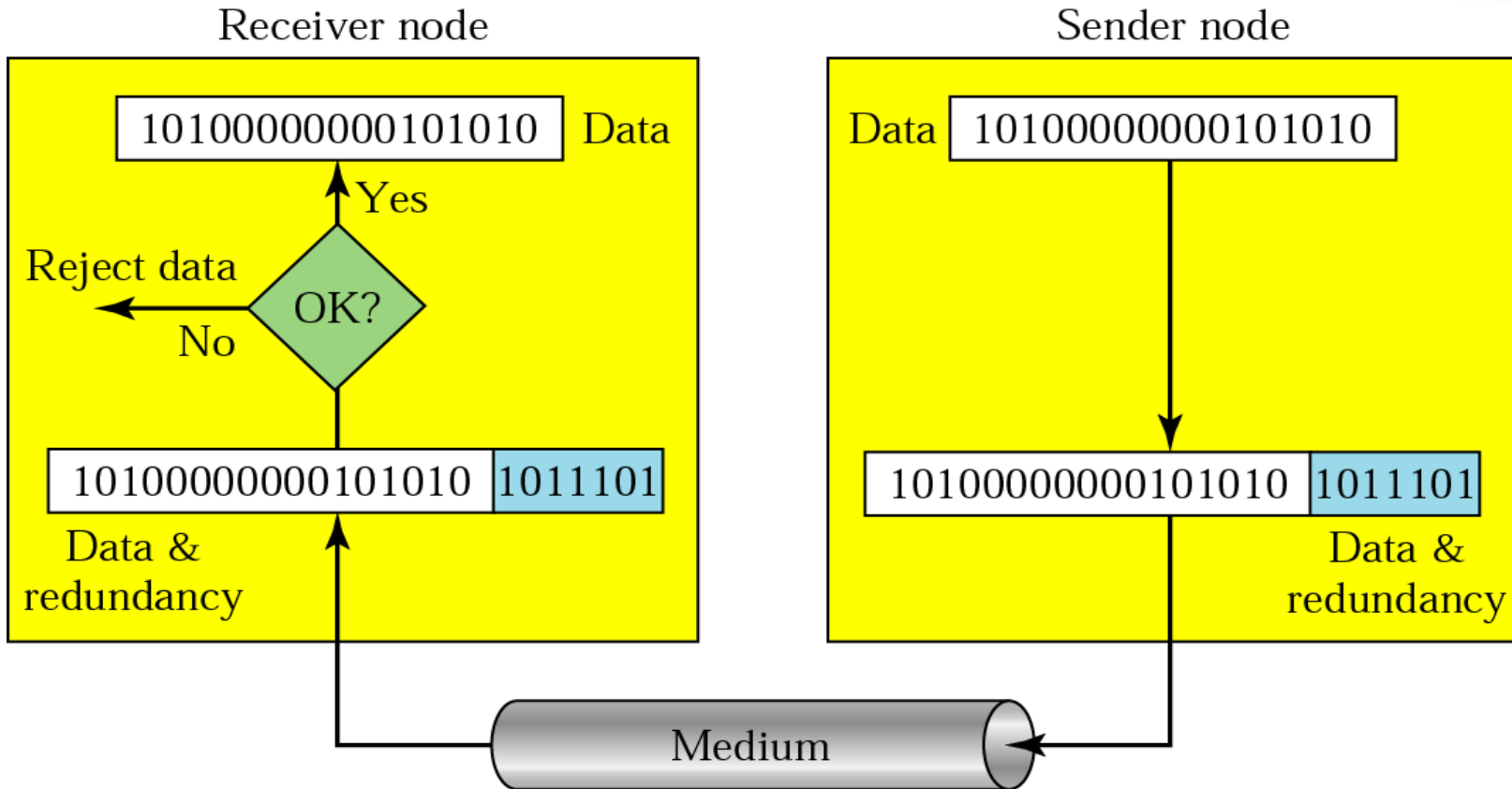
Checksum



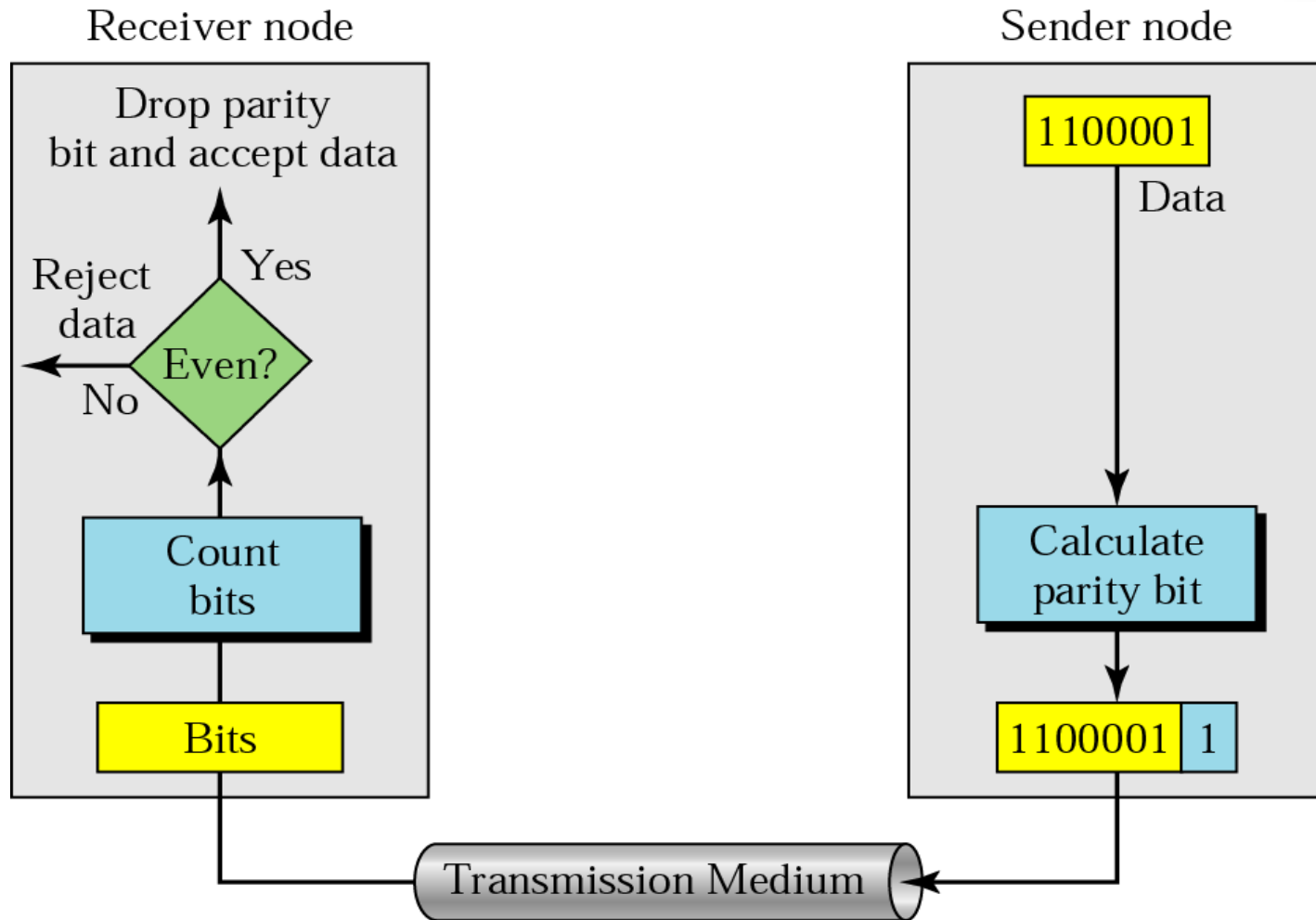
Note:

Error detection uses the concept of redundancy, which means adding extra bits for detecting errors at the destination.

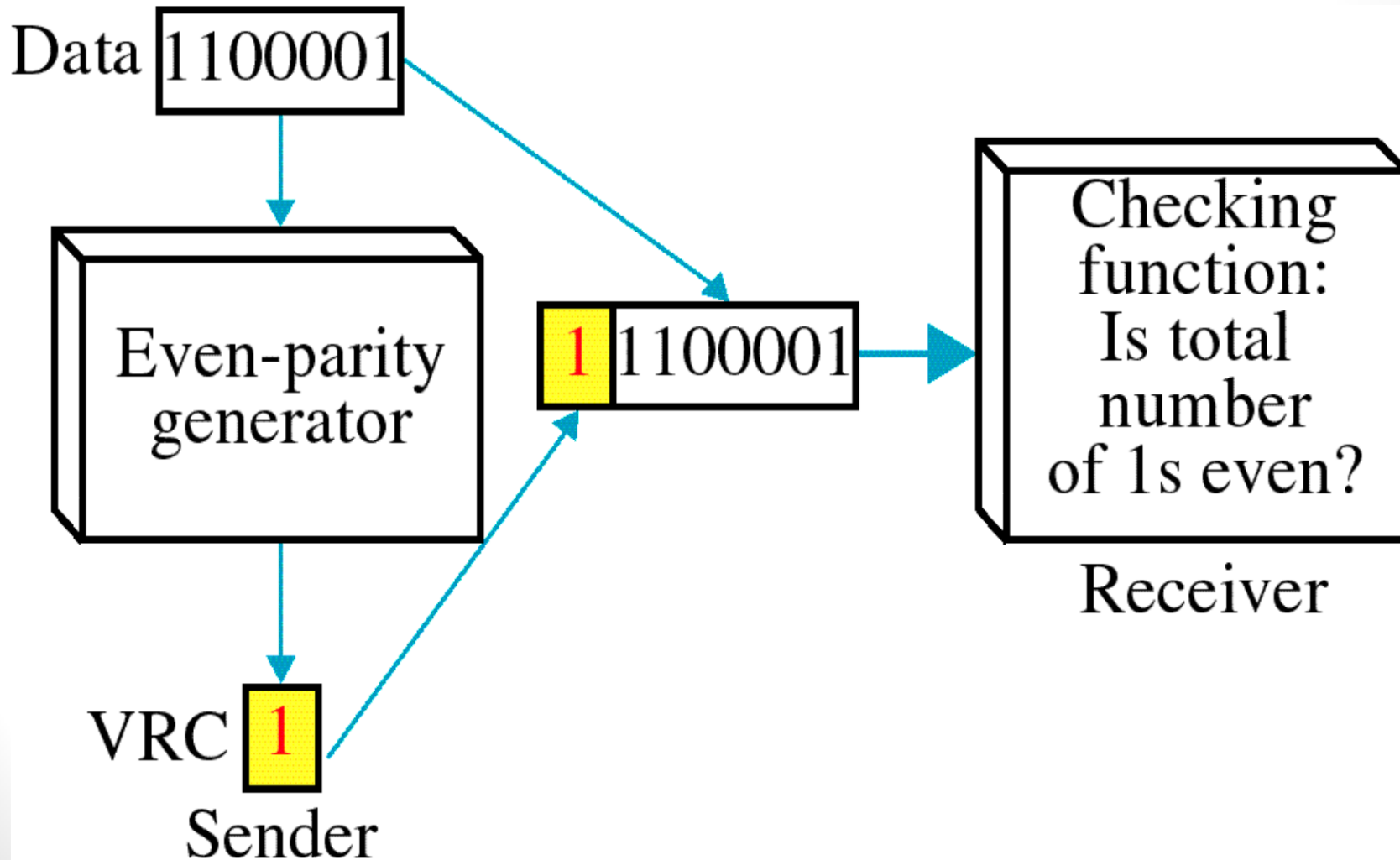
Redundancy



Even-parity concept



VERTICAL REDUNDANCY CHECK (VRC)





Note:

In parity check, a parity bit is added to every data unit so that the total number of 1s is even (or odd for odd-parity).