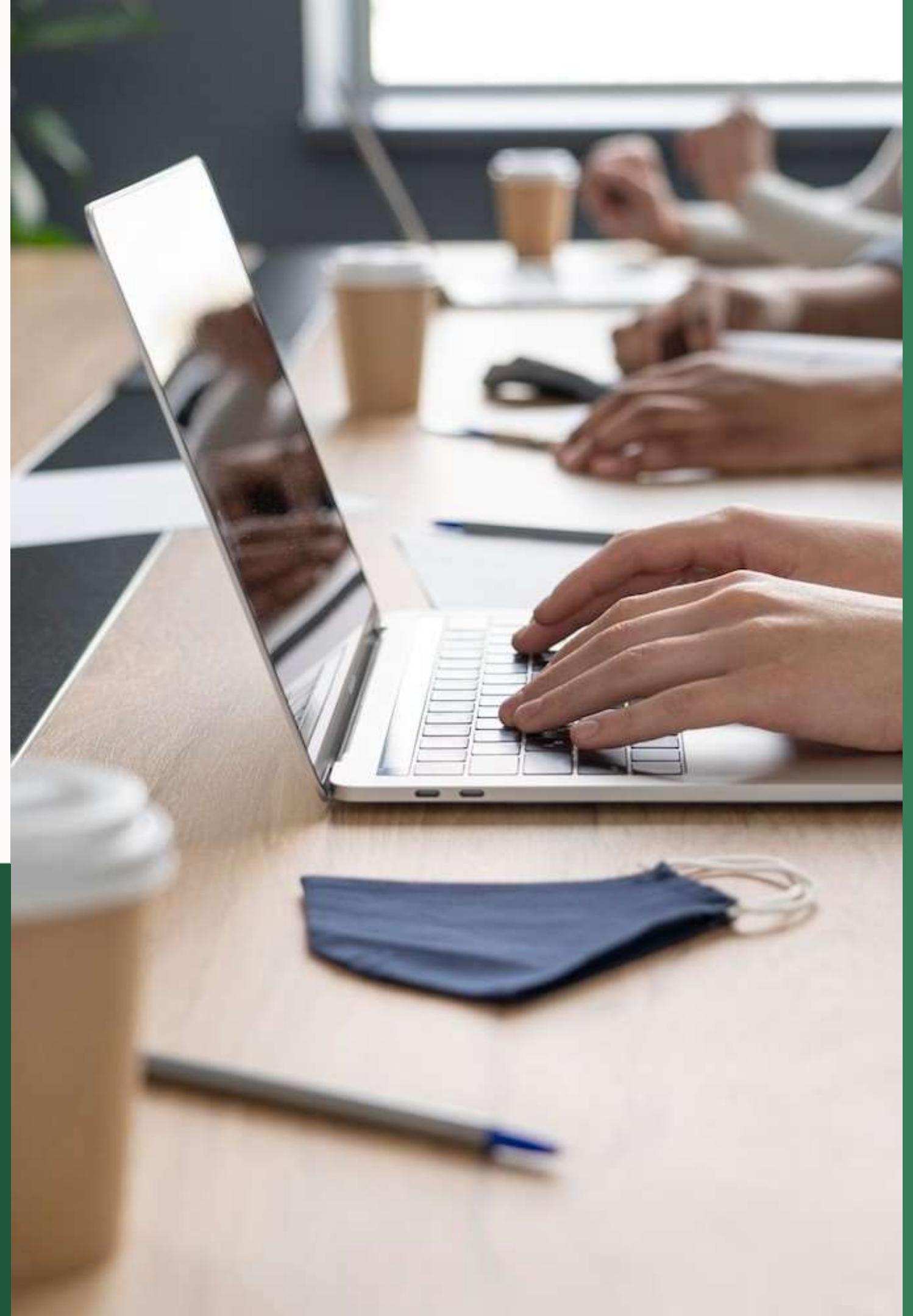


Welcome to Our Presentation



Error Detection



Content

01

Error detection

02

Types of Errors

03

Detection Methods

Content



This presentation is presented to

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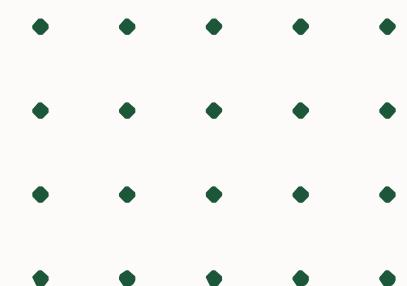
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Error detection

Error detection is the process of identifying errors that may occur during data transmission.

Sales



Types of Errors

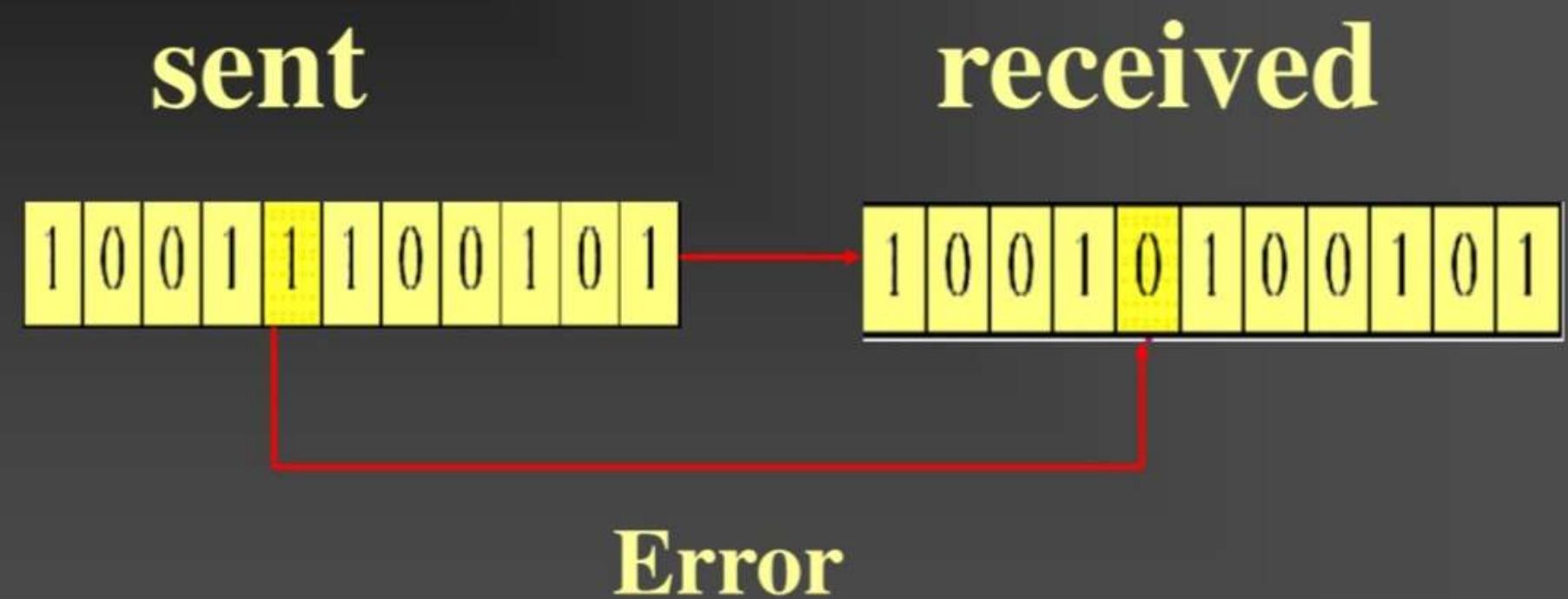
Errors

Single-bit

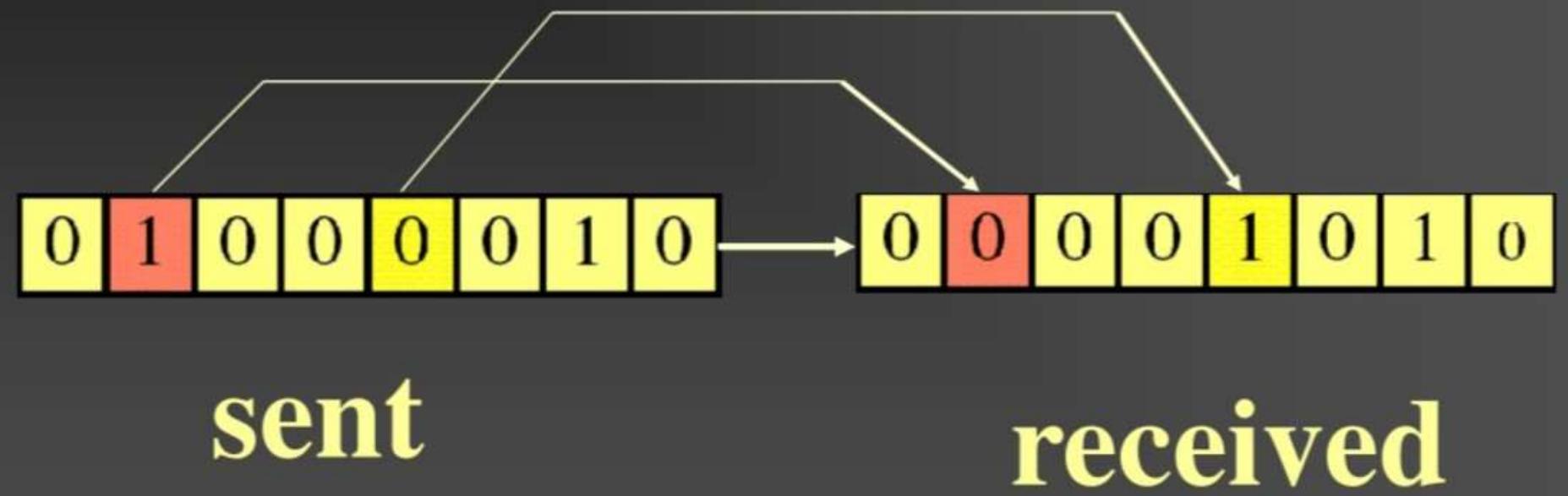
Multiple-bit

Burst

Single-bit error



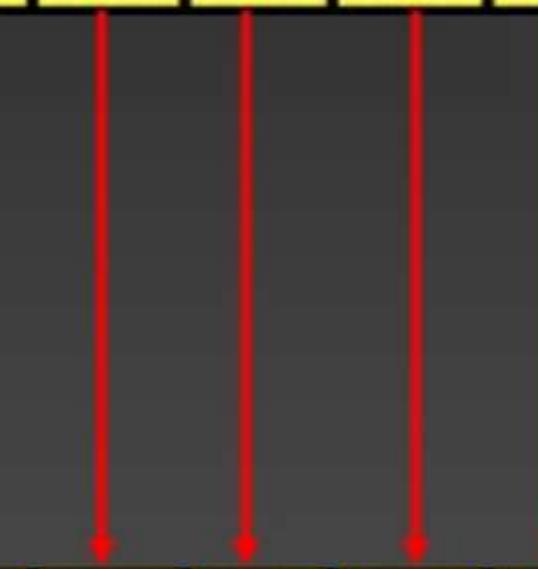
Multiple-bit error



Burst error

sent

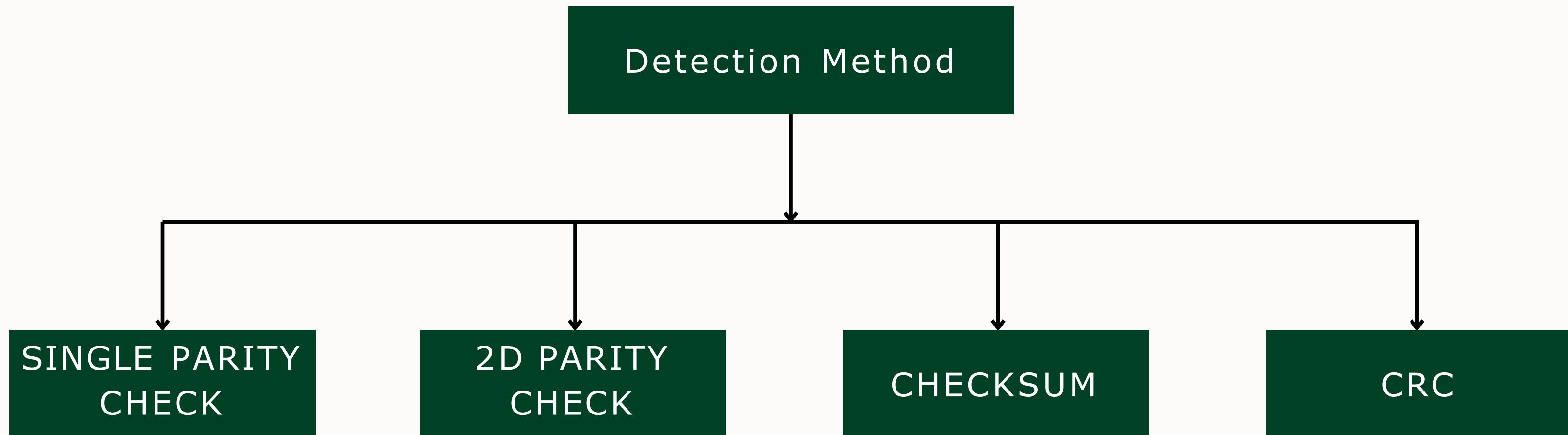
0	1	0	0	0	1	0	0	0	1	0	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



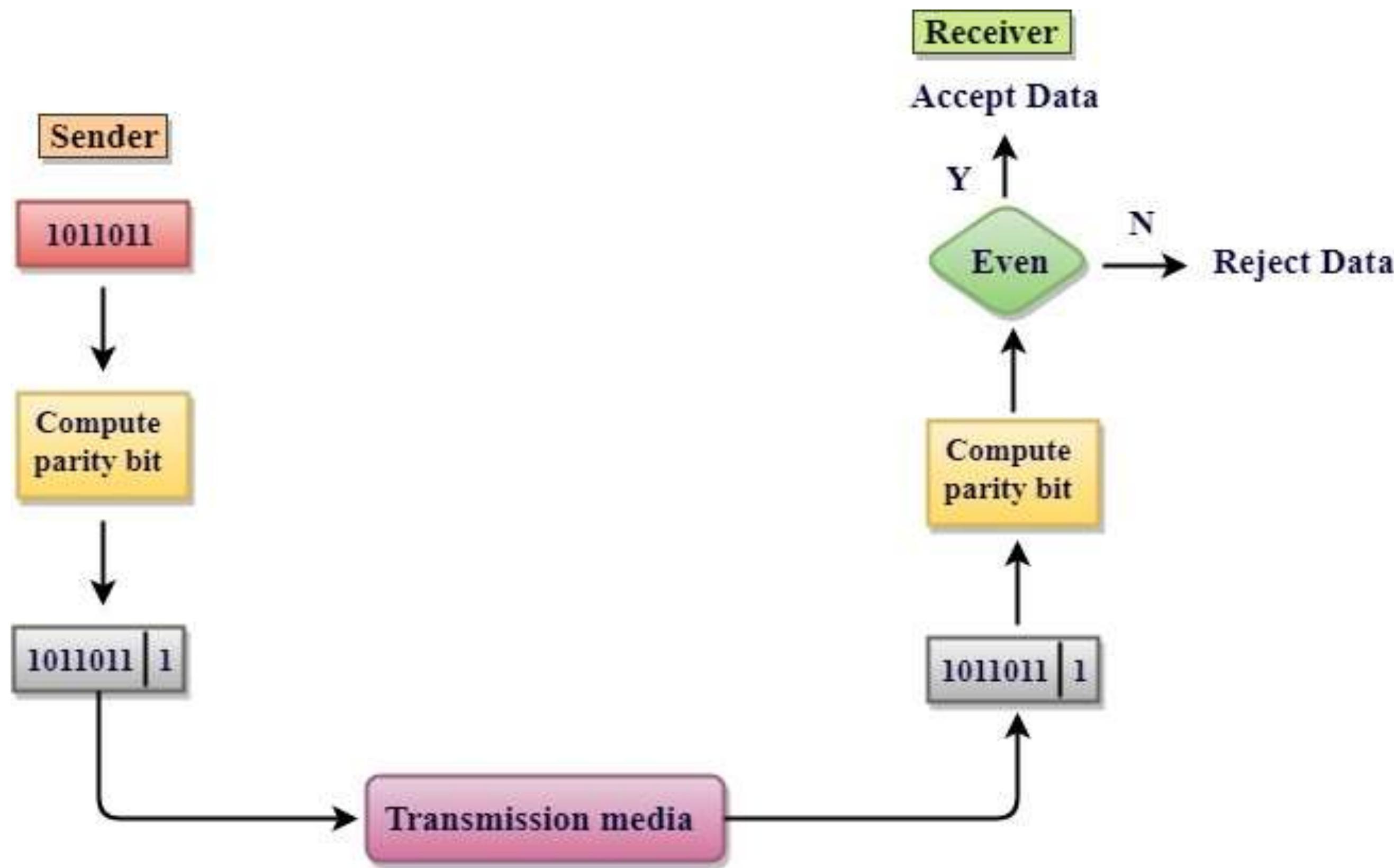
0	1	0	1	1	0	1	1	0	1	0	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

received

Detection Methods



PARITY CHECK



2D PARITY CHECK

Original Data

10011001	11100010	00100100	10000100
----------	----------	----------	----------

Row parities

10011001	0
11100010	0
00100100	0
10000100	0
11011011	0

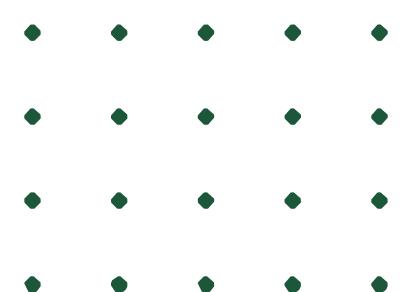
Even number of 1 -> 0

odd number of 1 -> 1

Column
parities

100110010	111000100	001001000	100001000	110110110
-----------	-----------	-----------	-----------	-----------

Data to be sent



CHECKSUM

Orginal Data: 11010011

Sender Side

$$\begin{array}{r} 1101 \text{ ----B1} \\ + 0011 \text{ ----B2} \\ \hline \end{array}$$

$$\begin{array}{r} 10000 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 0001 \\ \hline \end{array}$$

1110 → 1's Complement
(CheckSum)

Data Should be transmitted

1110

11010011

Receiver Side

$$\begin{array}{r} 1101 \text{ ----B1} \\ 0011 \text{ ----B2} \\ + 1110 \\ \hline \end{array}$$

$$\begin{array}{r} 11110 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 1111 \\ \hline \end{array}$$

Series of 1: (Accepted)

CRC

original message

1 0 1 0 0 0 0

@ means X-OR

Sender

$$\begin{array}{r} 1001 \mid 101000000 \\ @1001 \\ \hline 001100000 \end{array}$$

$$\begin{array}{r} @1001 \\ \hline 01010000 \end{array}$$

$$\begin{array}{r} @1001 \\ \hline 0011000 \end{array}$$

$$\begin{array}{r} @1001 \\ \hline 01010 \end{array}$$

$$\begin{array}{r} @1001 \\ \hline 0011 \end{array}$$

Message to be transmitted

$$\begin{array}{r} 101000000 \\ + 011 \\ \hline 101000011 \end{array}$$

Generator polynomial

$$x^3+1$$

$$\hookrightarrow 1.x^3 + 0.x^2 + 0.x^1 + 1.x^0$$

CRC generator

1001 4-bit

If CRC generator is of n

bit then append $(n-1)$

zeros in the end of
original message

$$\begin{array}{r} 1001 \mid 1010000011 \\ @1001 \\ \hline 0011000011 \end{array}$$

$$\begin{array}{r} @1001 \\ \hline 01010011 \end{array}$$

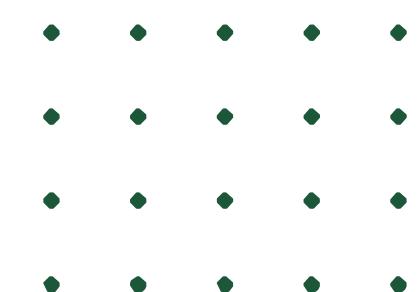
$$\begin{array}{r} @1001 \\ \hline 0011011 \end{array}$$

$$\begin{array}{r} @1001 \\ \hline 01001 \end{array}$$

$$\begin{array}{r} @1001 \\ \hline 0000 \end{array}$$

Receiver

Zero means data is
accepted



THANK YOU