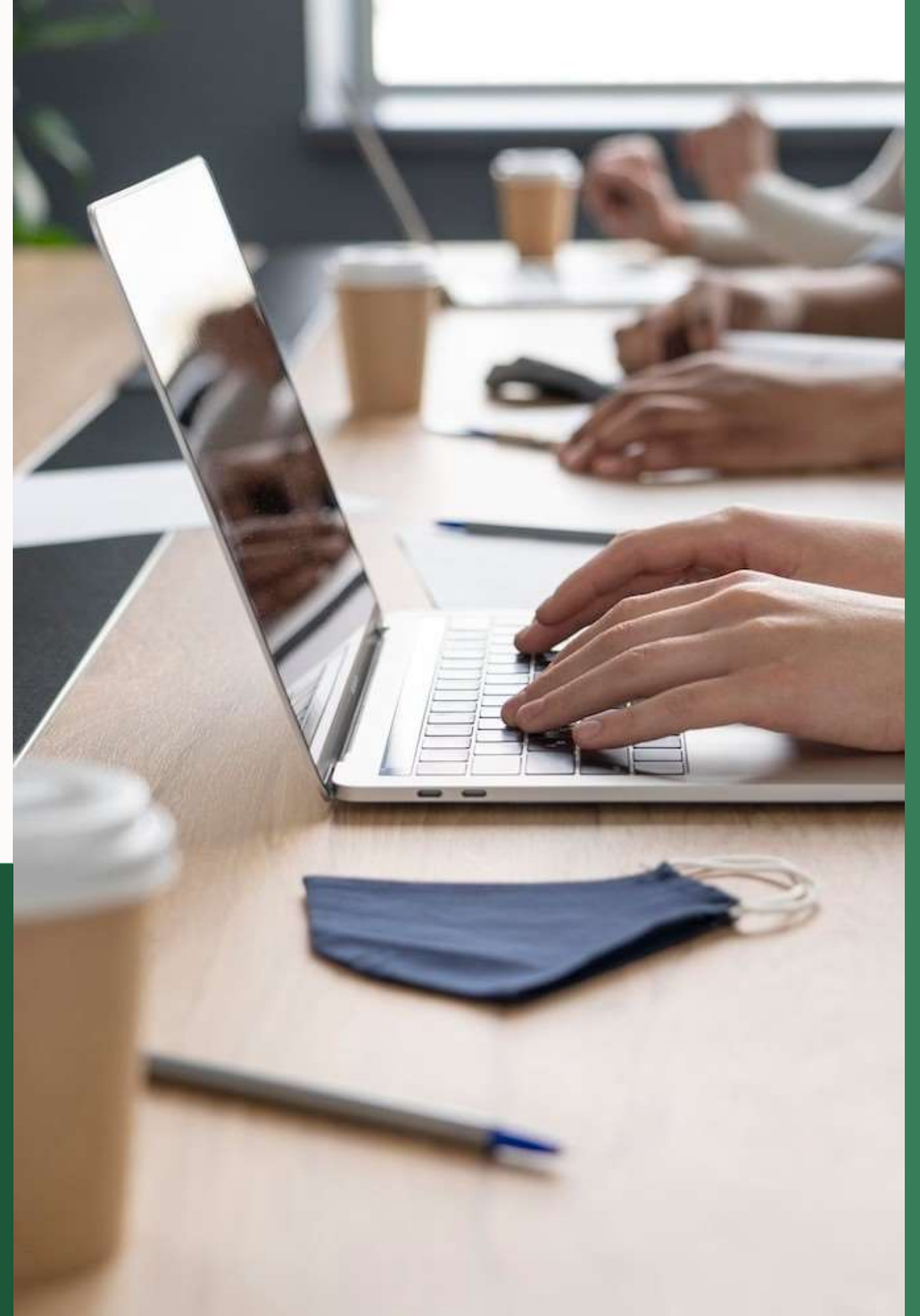


Welcome to Our Presentation



Error Detection



Content

01

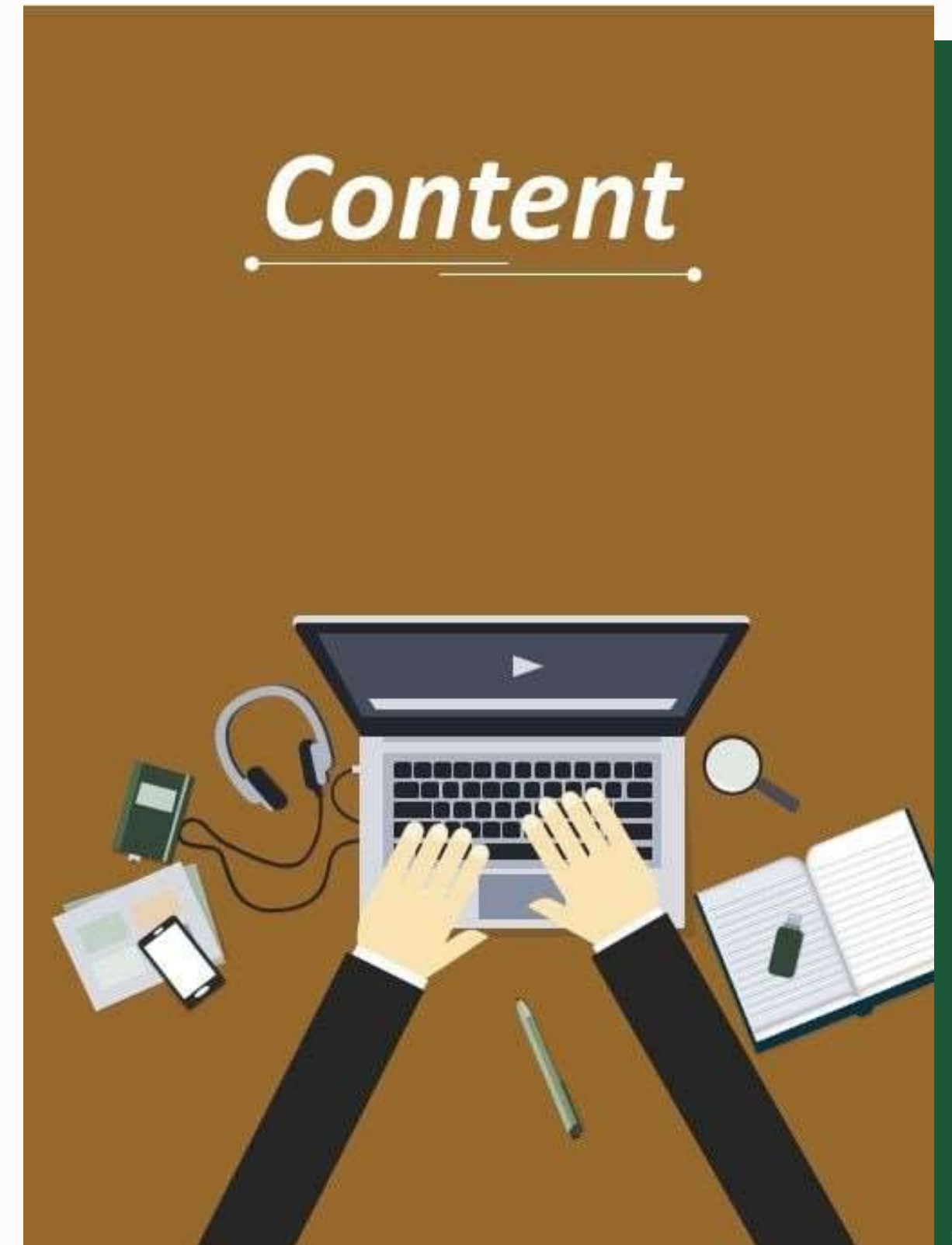
Error detection

02

Types of Errors

03

Detection Methods



This presentation is presented to

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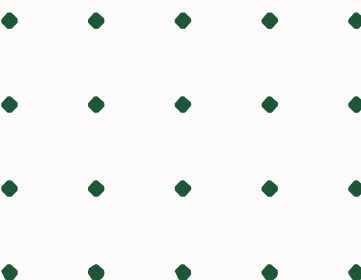
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Error detection

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

Sales



Types of Errors



Single-bit error

sent

1 0 0 1 1 1 0 0 1 0 1

received

1 0 0 1 0 1 0 0 1 0 1

Error

Multiple-bit error

sent

0 1 0 0 0 0 1 0

received

0 0 0 0 1 0 1 0

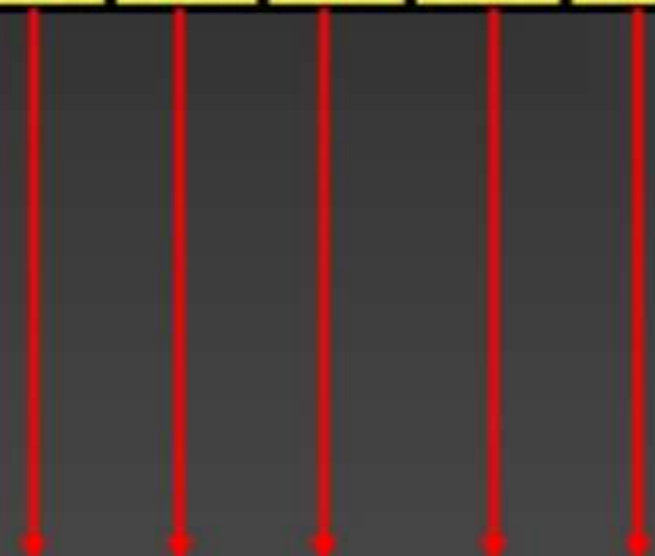
Burst error

sent

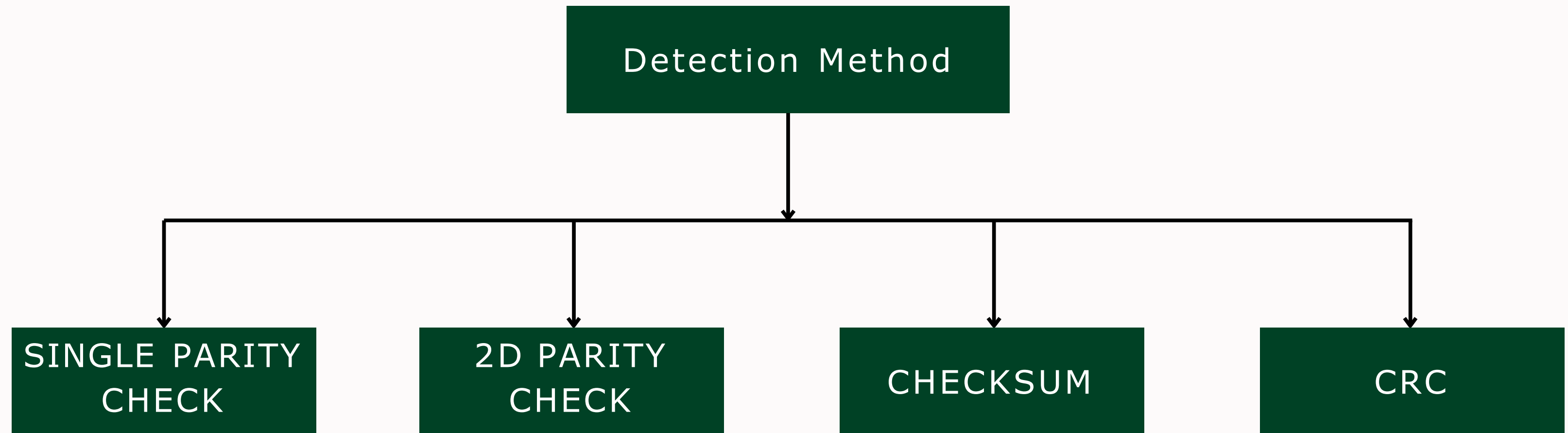
0	1	0	0	0	1	0	0	0	1	0	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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

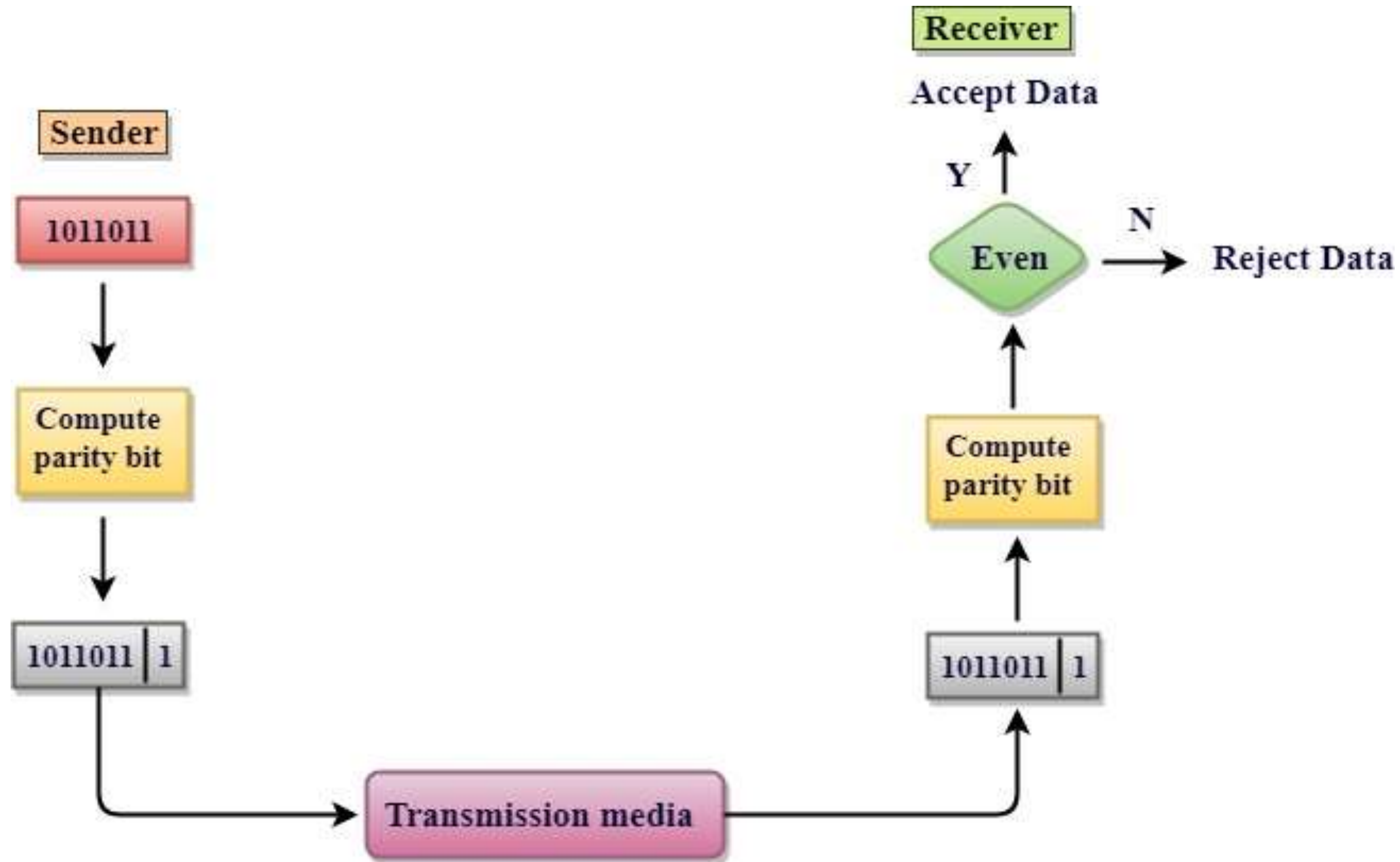
received



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

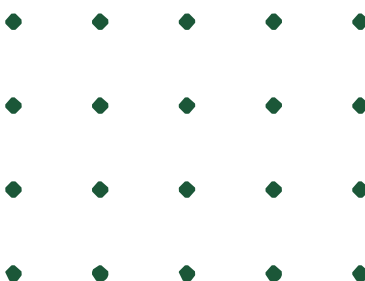
odd number of 1 -> 1

Column
parities



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

Data to be sent



CHECKSUM

Original Data: 11010011

Sender Side

$$\begin{array}{r} 1101 \text{ ----B1} \\ + 0011 \text{ ----B2} \\ \hline 10000 \\ + 1 \\ \hline 0001 \\ 1110 \longrightarrow \text{1's Complement} \\ \text{(Checksum)} \end{array}$$

Data Should be transmitted

1110 11010011

Receiver Side

$$\begin{array}{r} 1101 \text{ ----B1} \\ 0011 \text{ ----B2} \\ + 1110 \\ \hline 11110 \\ + 1 \\ \hline 1111 \\ \text{Series of 1: (Accepted)} \end{array}$$

CRC

original message

1 0 1 0 0 0 0

@ means X-OR

Sender

```

1001 | 1010000000
@ 1001
-----
0011000000
@ 1001
-----
01010000
@ 1001
-----
0011000
@ 1001
-----
01010
@ 1001
-----
0011
  
```

Message to be transmitted

```

1010000000
+ 011
-----
1010000011
  
```

Generator polynomial

x^3+1

$1 \cdot x^3 + 0 \cdot x^2 + 0 \cdot x^1 + 1 \cdot x^0$

CRC generator

1 0 0 1 4-bit

If CRC generator is of n

bit then append $(n-1)$

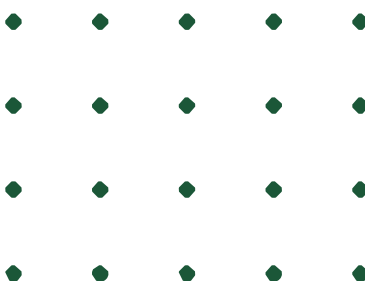
zeros in the end of
original message

```

1001 | 10100000011
@ 1001
-----
0011000011
@ 1001
-----
01010011
@ 1001
-----
0011011
@ 1001
-----
01001
@ 1001
-----
0000
  
```

Receiver

Zero means data is
accepted



A blurred background image of an office interior, showing several desks with computers and office chairs. The image is overlaid with a semi-transparent dark green filter. On the left and right sides, there are decorative geometric patterns consisting of parallel lines in a lighter shade of green.

THANK YOU