46. Longitudinal Redundancy Check (LRC)

Outcomes of the lecture –

* Understanding LRC.
* Performance of LRC.

Longitudinal Redundancy Check (LRC) – (refer example to understand)

* In LRC the bits are organized in Rows and Columns.
* This type of redundancy check is also known as Two Dimensional Parity.
* The parity bit is calculated for each column and sent along the data.
* The block of parity acts as the redundant bits.

Example

Columns

Row1 1 1 1 0 0 1 1 1

Row2 1 1 0 1 1 1 0 1

Row3 0 0 1 1 1 0 0 1

Row4 1 0 1 0 1 0 0 1

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LRC 1 0 1 0 1 0 1 0

LRC is calculated by comparing the bits from rows and assigning 1 bit if odd numbers of 1 and 0 bit if even numbers of 1.

How LRC works –

* When one or more data packets are present in a frame, they are organized into rows and columns.
* LRC is calculated by using the step above.
* This LRC code is attached as a header or trailer of the frame.
* When the receiver receives the frame, it calculates the LRC of the data packet received and compares it to the LRC provided by the data link layer.
* If the LRC matches, the frame is further used, if LRC is different, the frame is not further used.

10101010 10101001 00111001 11011101 11100111

LRC ---------------------🡪 ---------------- direction of the movement.

Performance of LRC –

* LRC increases the likelihood of detecting burst errors.
* If even numbers of bits are modified in two different rows, the LRC does not give an error. Since the sum is same as before.

Columns

Row1 1 1 1 0 0 1 1 1

Row2 1 0 0 1 1 1 0 1

Row3 0 1 1 1 1 0 0 1

Row4 1 0 1 0 1 0 0 1

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LRC 1 0 1 0 1 0 1 0 (still the LRC remains the same)

* This acts as a major drawback in the LRC

Exercise –

Columns

Row1 0 1 1 1 0 1 1 1

Row2 1 0 1 0 1 0 0 1

Row3 0 1 1 0 1 0 0 1

Row4 1 0 1 0 1 0 1 0

LRC 0 0 0 1 1 1 0 1

Data transmitted is - 00011101 10101010 01101001 10101001 01110111