

# Data Communication & Networking CE253

- **Prepared by:**

Michele Mistry,  
Assistant Professor,  
Department of Computer Engineering,  
DEPSTAR, CHARUSAT

# Even/Odd parity

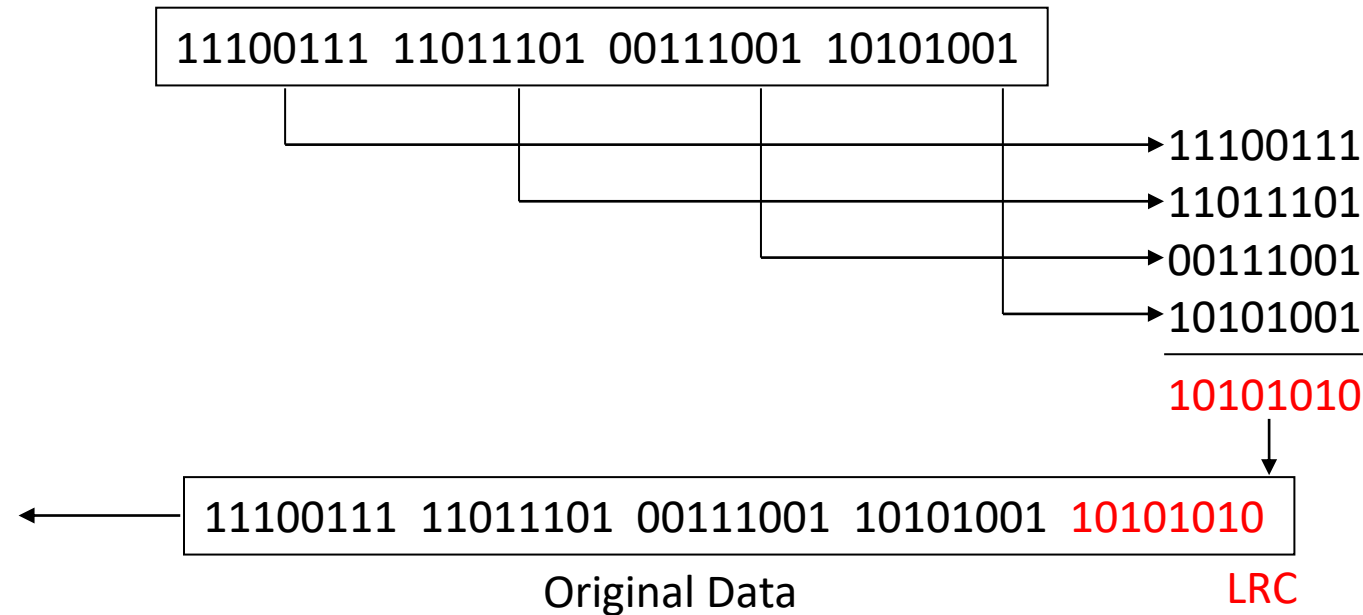
- Even parity:
  - To make the total number of 1s even.
  - Even number of 1s- 0
  - Odd number of 1s- 1
- Odd parity:
  - To make the total number of 1s odd.
  - Even number of 1s- 1
  - Odd number of 1s- 0

# Vertical Redundancy Check

- Also known as parity check.
- The redundant bit called parity bit is appended to every data unit so that the total number of 1s in the unit becomes even.

# Longitudinal Redundancy Check (LRC)

- Organize data into a table and create a parity for each column



# CRC

- Sender:
- The binary data is first augmented by adding  $k-1$  zeros in the end of the data
- Use *modulo-2 binary division* to divide binary data by the key and store remainder of division.
- Append the remainder at the end of the data to form the encoded data and send the same

# CRC

- Receiver:
- Perform modulo-2 division again and if remainder is 0, then there are no errors.

# Checksum

- In checksum error detection scheme, the data is divided into  $k$  segments each of  $m$  bits.
- In the sender's end the segments are added using 1's complement arithmetic to get the sum. The sum is complemented to get the checksum.
- The checksum segment is sent along with the data segments.
- At the receiver's end, all received segments are added using 1's complement arithmetic to get the sum. The sum is complemented.
- If the result is zero, the received data is accepted; otherwise discarded.