Topic: Example of Errors Detection Methods

Here are examples for each error detection method, check digit usage, and automatic repeat query (ARQ) mentioned in the previous lecture:

Parity Check:

(a) Odd Parity:

Data: 1101

Parity bit: 1 (to make the total number of 1s odd)

Transmitted data: 11011

(b) Even Parity:

Data: 1101

Parity bit: 0 (to make the total number of 1s even)

Transmitted data: 11010

Checksum:

A simple example of checksum calculation is the summation of all byte values in the data.

Data: 01100001 (97 in decimal), 01100010 (98 in decimal)

Calculated checksum: 97 + 98 = 195

Transmitted data: 01100001 01100010 11000011

Echo Check:

Suppose a sender transmits the following data to a receiver:

Data: 10101010

The receiver, after receiving the data, sends it back to the sender as an echo:

Echo: 10101010

The sender compares the echoed data with the original data and finds no discrepancies, confirming successful data transmission.

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Check Digits:

(a) ISBN-10:

An example ISBN-10 number: 0-306-40615-2

The last digit (2) is the check digit. It is calculated using a weighted sum algorithm on the other digits.

(b) Barcodes:

A UPC-A barcode number: 6 39382 00034 2

The last digit (2) is the check digit. It is calculated using a specific algorithm based on the other digits in the barcode.

Automatic Repeat Query (ARQ):

Suppose a sender transmits the following data to a receiver:

Data: 11011010

The receiver detects an error in the received data and sends a negative acknowledgement (NAK) to the sender. The sender, upon receiving the NAK, retransmits the data until it is received without errors, at which point the receiver sends a positive acknowledgement (ACK).