

Digital technology

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Jari Hautamäki

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Error checking

- In data transfer, it is important to be able to ensure the correct transmission of information
- At its simplest, verification is done through parity checking
 - a parity bit that is transmitted to the recipient of the information along with the normal data
 - Requires the recipient and sender to agree in advance what kind of parity check will be used. Is it EVEN or ODD parity?
- The parity check is done by counting the number of ones in the binary data and, depending on the type of check (EVEN / ODD), either one or zero is added as the parity bit.
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- Example: EVEN parity and character to send (ASCII) 31h = "1"
 31h = 011 0001 -> in chapter three ones (odd number)->
• add one to the parity bit -> is obtained as the number of ones
 even -> 1 011 0001
- Restrictions
 - Errors occurring in only one bit or an odd number of bits can be detected
 - Cannot correct or indicate the location of the error in the data.
 - If an error is detected, the recipient requests to resend the incorrect data
 - The so-called exception block parity check, in which the parity is checked from the character and the position of the bit contained in the character

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Block parity check

- Example of block parity check with ODD (odd) check.

Luku	Pos 1	Pos 2	Pos 3	Pos 4	Pariteetti
2	0	0	1	0	0
6	0	1	1	0	1
9	1	0	0	1	1
1	0	0	0	1	0
Pariteetti	0	0	1	1	1

- If the bit has become invalid, eg bit 1 -> 0 in position 6 of number 6

Luku	Pos 3	Pos 2	Pos 1	Pos 0	Pariteetti	Tulisi olla
2	0	0	1	0	0	0
6	0	1	0	0	1	0
9	1	0	0	1	1	1
1	0	0	0	1	0	0
Pariteetti	0	0	1	1	0	1
Tulisi olla	0	0	0	1	0	0

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Exercises

9. Encode ODD parity check for ASCII string "Hello" (Use pseudocoding)
10. Encode Even parity block check for ASCII character "Hello"