6.2 Data Integrity

Thursday, 18 February 2021 7:02 PM

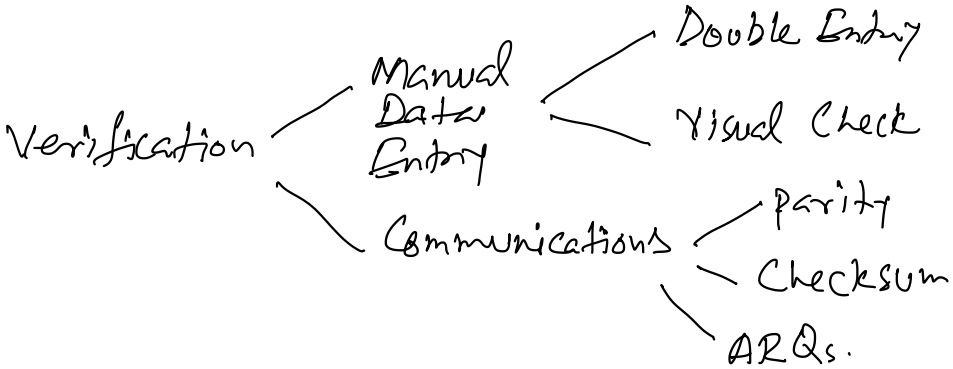
Keyterms:

- Data Integrity
- Validation
- Verification
- Check Digit
- Modulo-11
- Checksum
- Parity Check
- parity bit
- Even/odd parity.
- parity byte
- ARQs
- Acknowledgement
- Timeout.

Validations:

- Type
- Range
- Limit
- format
- length
- Presence
- existence
- Consistency
- Uniqueness.

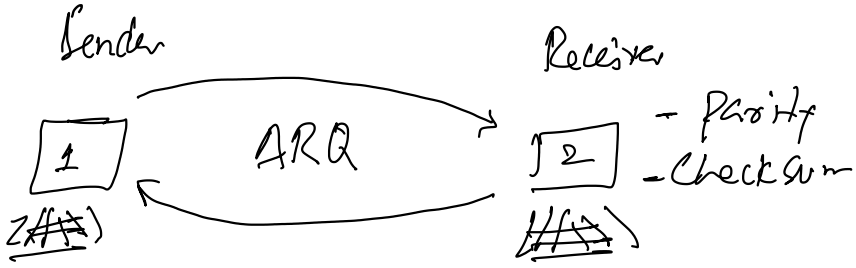
Verification:



Parity

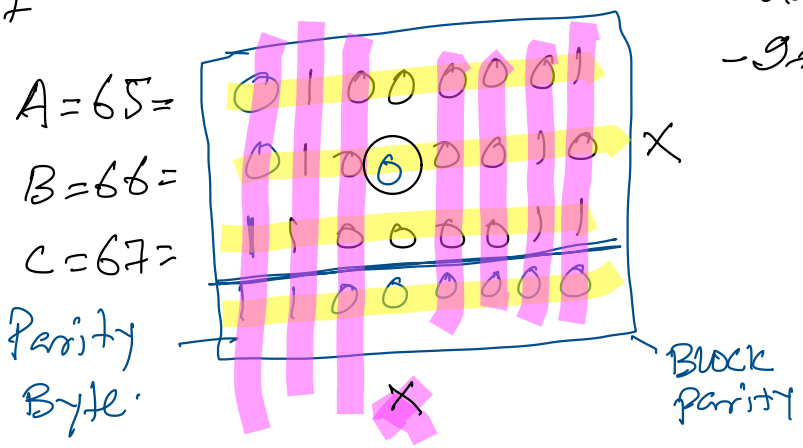
Text uses ASCII.

0-127



$2^7 = 128$ → 0
↘ 127

- Time set for reply.
- Timeout occurs when second computer does not acknowledge during set time.
- If timeout occurs then first machine resends the data.
- If acknowledgement arrives:
  1) data received and it correct; send more
  2) data is received and it is corrupted; send again



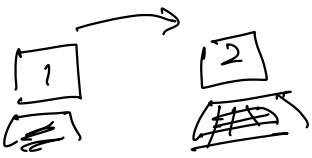
0 → 1 gain.
1 → 0 drop.

Single byte parity has weaknesses:
1. If two bits are swapped.
2. If two bits are gained.
3. If two bits are dropped.

Checksum:

A = 65
B = 66
C = 67
198

01000001
01000010
01000011
11000110



Sum
$<= 255 = 2^8$

Z = 90
Y = 89
X = 88

267

$x = \frac{267}{256} = 1.043$

$y = 1$

$y \times 256 = 256$

IF sum is within 2^8 range then it is the checksum.

$2 = 1 * 256$

diff(X-2) = 267 - 256
= 11

IF sum is >255 or $2^8 = 256$ (0 to 255)

Then:

1. We divide sum by 256, X.
2. Round down the ans to the nearest whole num.
3. Then we multiply by 256
4. Subtract that from X
5. Result is checksum.