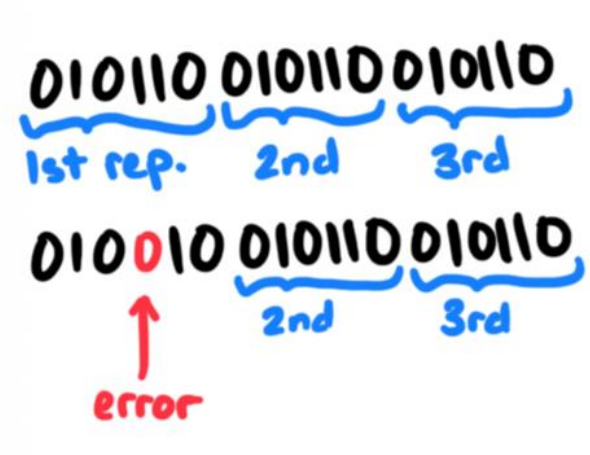
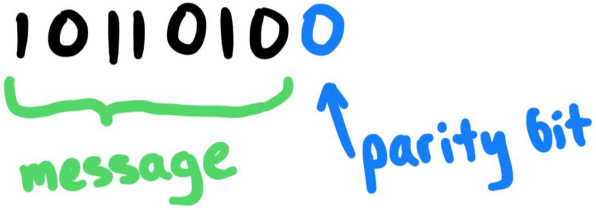
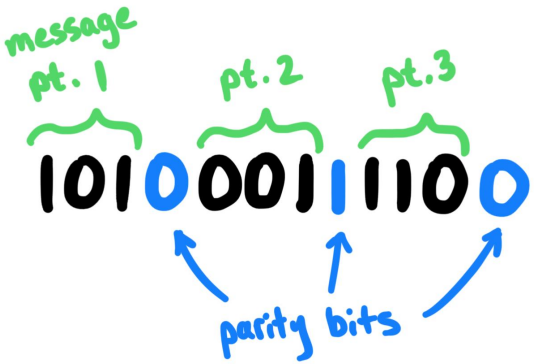
Repetition code



What's wrong with this code?

Parity checks





Parity checks

Which of these have errors? (and why?)

011000101

100010111 0

011 0 0000 1111 1

0101 0110 1100

Luhn algorithm

1) double every other digit

1234 5678 9012 3456
4 8 12 16 0 4 8 12

2) add the digits of these numbers together

1234 5678 9012 3456
4 8 12 16 0 4 8 12
4 8 3 7 0 4 8 3

3) add every 1st, 3rd, 5th, etc. digit of the card number to these

$1+4+3+8+5+3+\cdots = 71$

4) if the result is divisible by 10, the card number might be valid.

This method detects whether there are single-digit errors, or digits next to each other are swapped.

(However, it can't correct any of these errors automatically or locate them in the card number.)

^ Hans Peter Luhn

(image credit: https://spectrum.ieee.org/hans-peter-luhn-and-the-birth-of-the-hashing-algorithm)