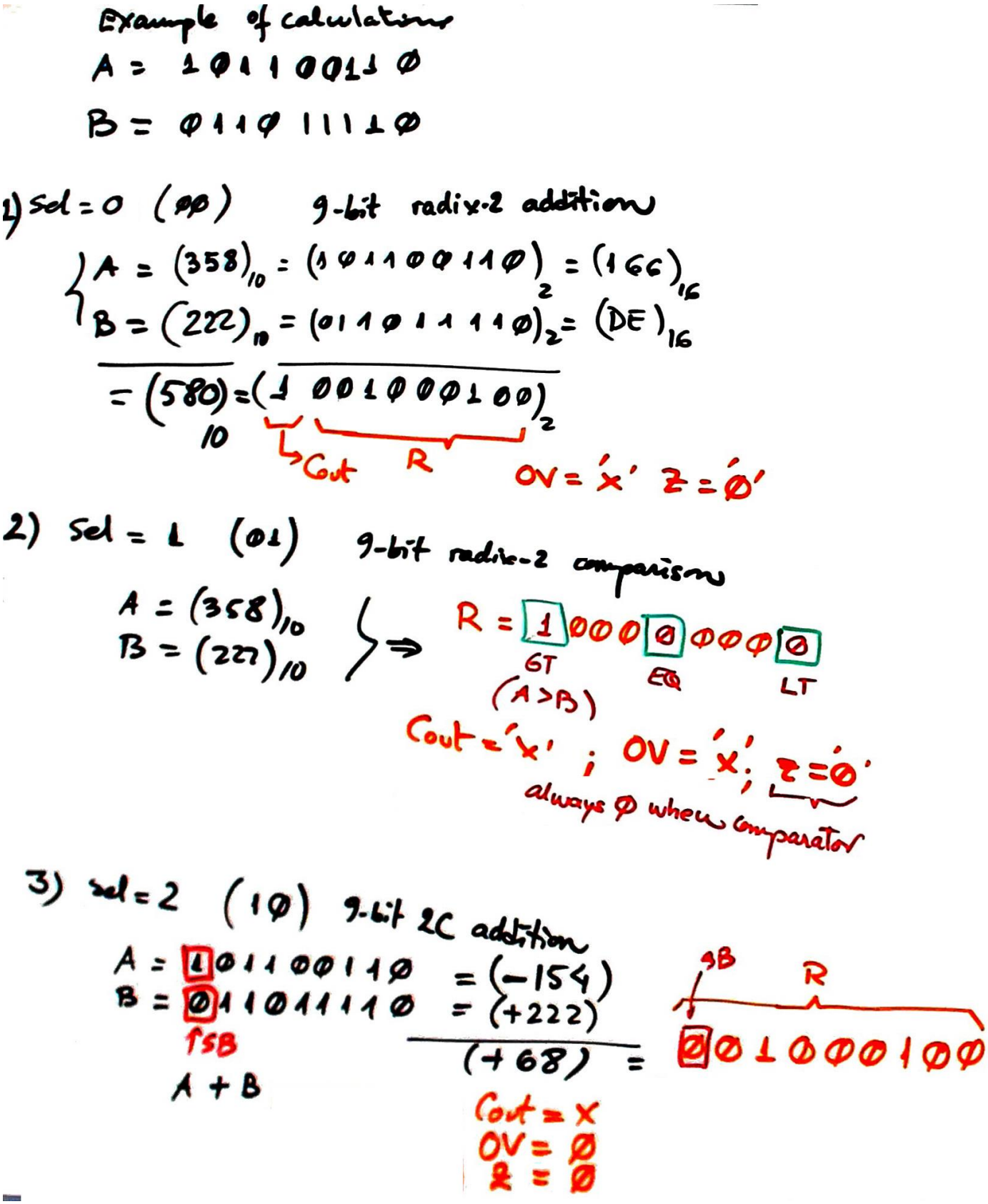
CSD laboratory P_Ch1: 9-bit arithmetic and logic unit

Operations. Let us apply an example input vector, and determine the *ALU_9bit* outputs as if we were applying circuit's truth table. This kind of outputs have to be checked using a VHDL testbench.



Example of calculations

A = 10110011Ø

B = Ø11Ø1111Ø

4) Sel = 3 (11) 9-bit 2C subtraction

A = [1] Ø 1 1 ØØ 11 Ø = (-154)

B = [Ø] 1 1 Ø 1 1 1 Ø = (+222)

MSB

A - B

(-376)

Operation range $-2^8 \leq A, B, R \leq 2^8 - 1$

-256 ; $2^8 - 1 = 257$

↳ OUT of RANGE → OV = 1

Z = X

Cout = X

overflow

[1] Ø 1 1 ØØ 11 Ø

+ [1] ØØ1 Ø ØØ1 Ø

1 [Ø] 1 ØØ Ø1 ØØ Ø

MSB → error

R → 9-bit 2C wrong result

The calculator generates (+136) that is wrong