Binary to Base-10 Conversion

8-bits example

Sign bit + $(b_6\ b_5\ b_4\ b_3\ b_2\ b_1\ b_0) = b_0 * 2^0 + b_1 * 2^1 + b_2 * 2^2 + b_3 * 2^3 + b_4 * 2^4 + b_5 * 2^5 + b_6 * 2^6$

$1 = 1 * 2^0 = 1$

$11 = 1 * 2^0 + 1 * 2^1 = 3$

$101 = 1 * 2^0 + 0 * 2^1 + 1 * 2^2 = 5$

Binary to Base-10 Conversion

- 1 byte = 8 bits, number ranger -127 ~ 127.
- sign bit (0111 1111 = 127 , 1111 1111 = -127).
- set sign bit to 0 is for positive number, set sign bit to 1 is for negative number.
- $0(111\ 1111) = 1*2^0 + 1*2^1 + 1*2^2 + 1*2^3 + 1*2^4 + 1*2^5 + 1*2^6$
- $0(111\ 1111) = 1 + 2 + 4 + 8 + 16 + 32 + 64 = 127$
- How to present 130(127+3) in 8 bits? Incorrect, will cause bits overflow.
- 0(111 1111) + 0000 0011 = 1(000 0010) = -2(Related to lab 3).