## Number representation

## Signed Magnitude

## Two representations for zero!

another problem: adding positive and negative numbers

## One's complement:

flip all bits for negative

Still has 2 representations for zero

Adding positive and negative still has a problem:

Pattern: leading 1 and off by 1

The most significant bit is negative while the rest are positive

mere examples:

$$-7 = -8 + 1 \rightarrow 1000 + 0001 = 1001$$
  
 $-4 = -8 + 4 \rightarrow 1100$ 

negative to positive conversion:

- 1. flip all bits
- 2. add 1

$$ex: -5 = -8 + 3 = 1011$$

positive to negative conversion:

- 1. subtract 1
- 2. flip all bits

Addition is now correct

Packed decimal (Binary Coded Decimal):
each digit is replaced with 4 bit equivalent

ex; 5372 => 0101 0011 0111 0010

Parity:

Check the number of 1s

-even parity: total numbers of 1 is even

-odd parity: odd

ex: 0110 0001 has odd parity ex: 0001 1000 has even parity

Horner's method