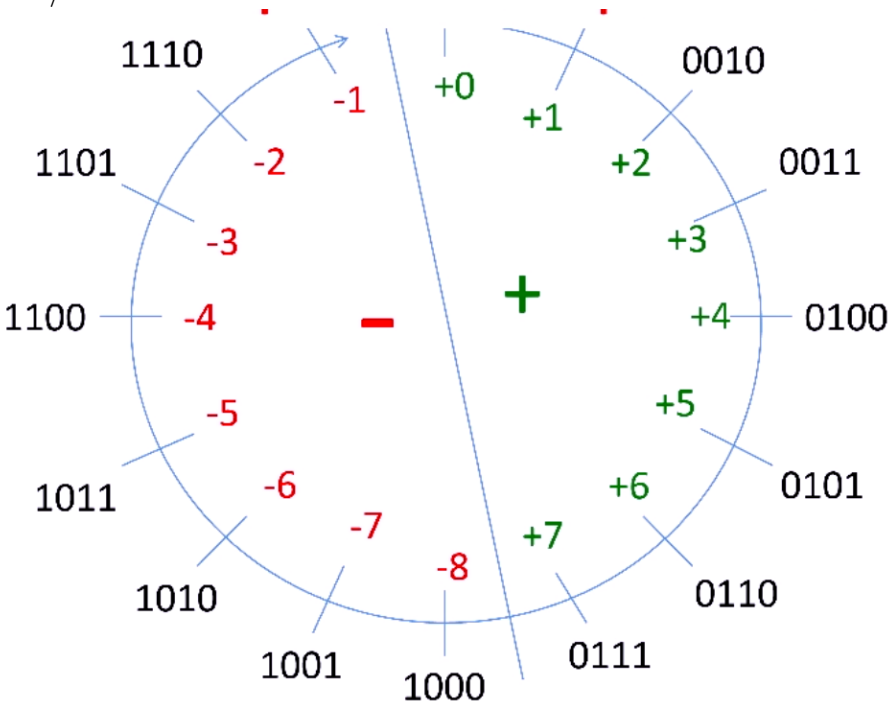
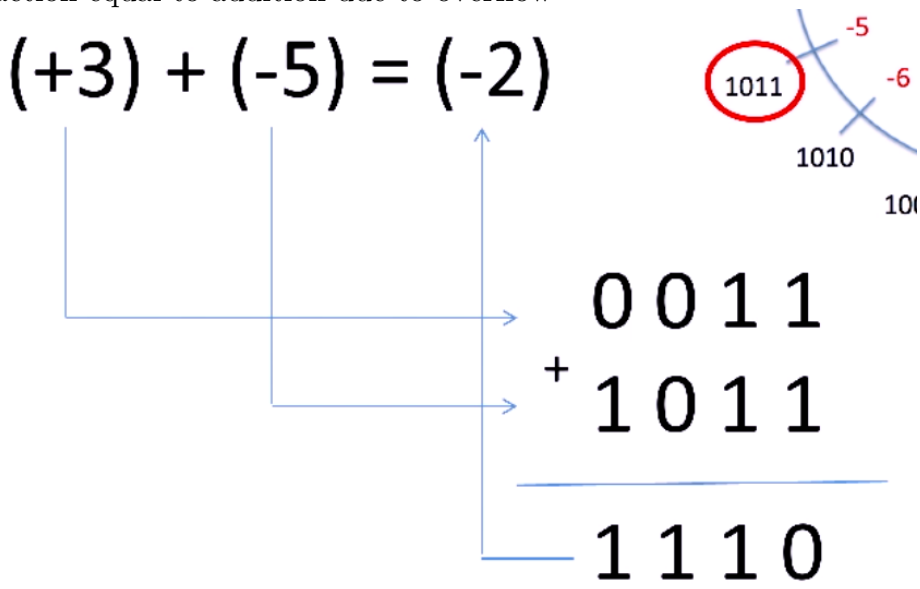
Two's Complement

- most significant bit is 1 if negative
- over/underflow as side effect

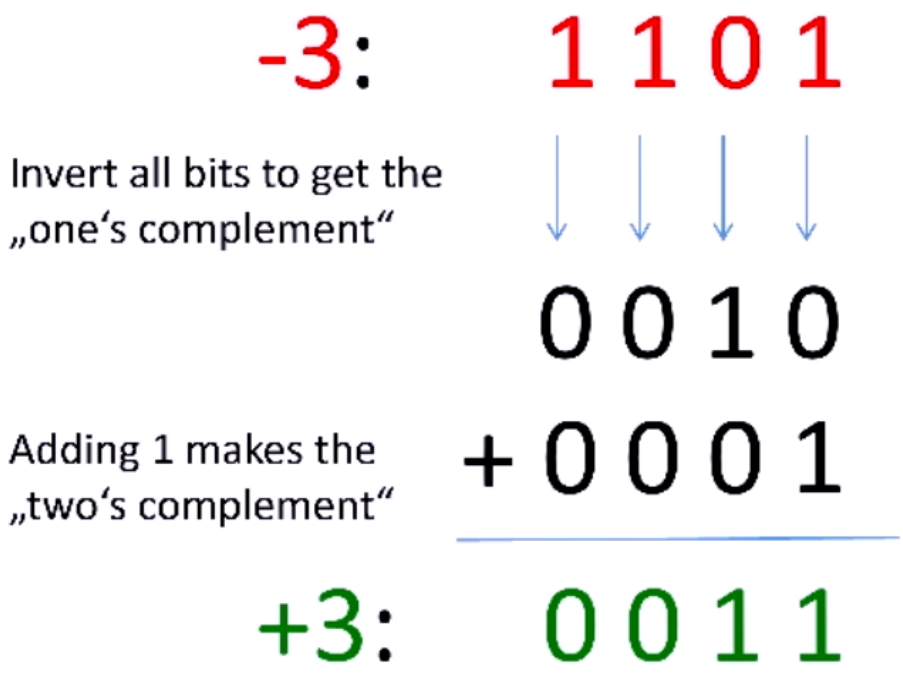


- subtraction equal to addition due to overflow



–

- negation
  - flipping MSB
  - add 1



Sign Extension

- required to add different sized numbers

  Value A (16 bit): 7 (Binary: 00000000 00000111)

  Value B (8 bit): -1 (Binary: 11111111)

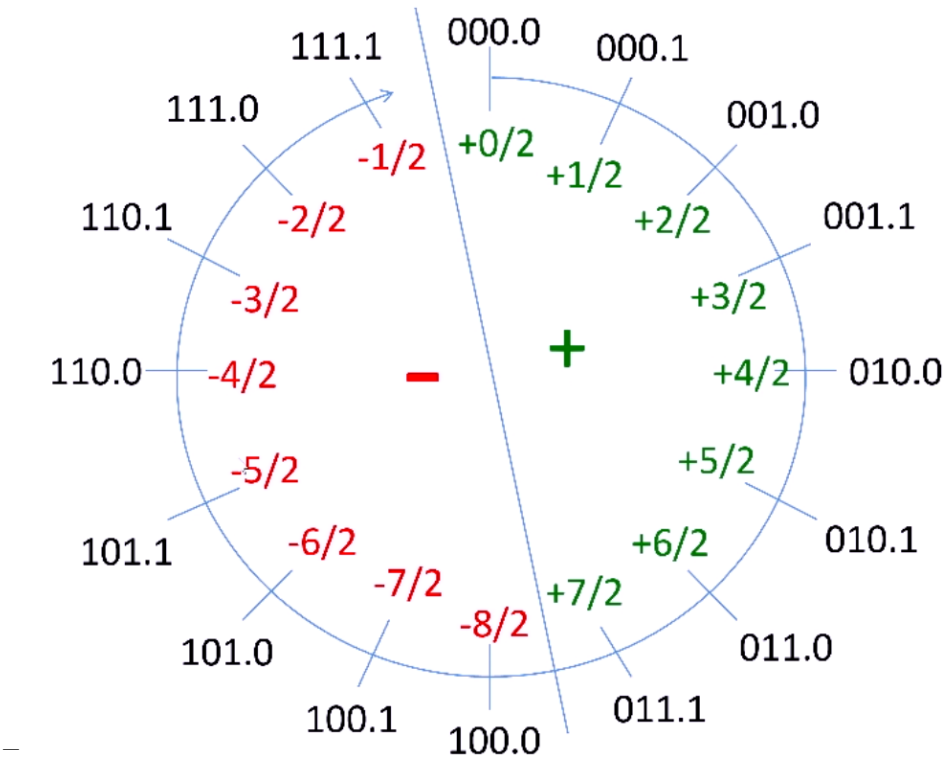
- fill up bits left of MSB with MSB

  Value A (16 bit): 7 (Binary: 00000000 00000111)

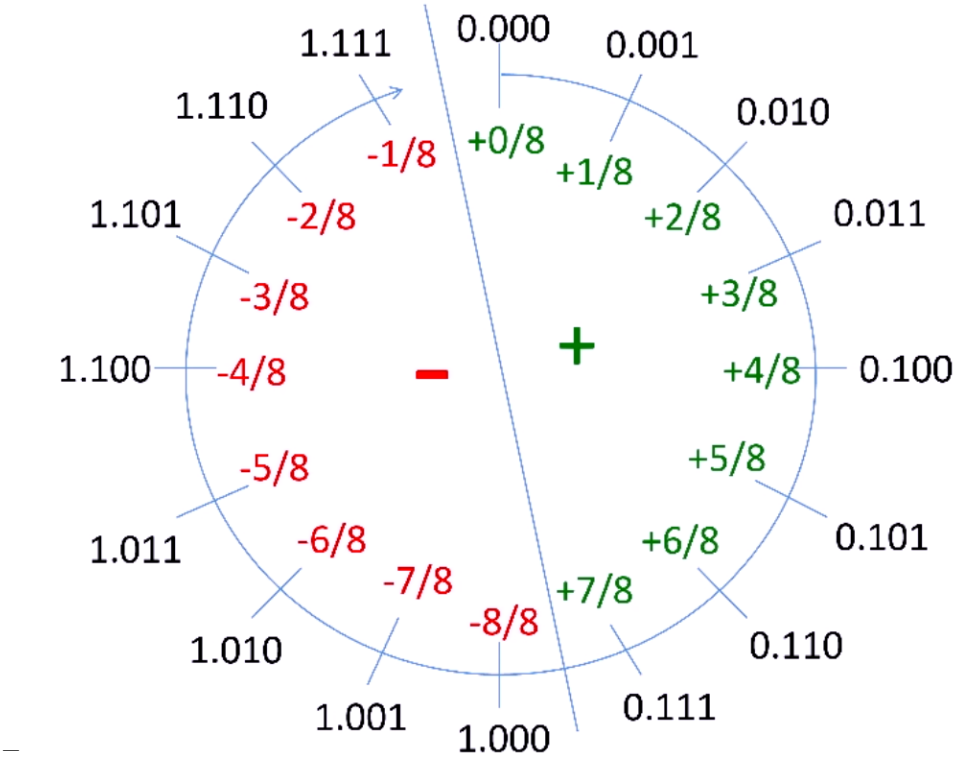
  Value B after sign extension (16 bit): -1 (Binary: 11111111 11111111)

Rational Numbers

- LSB represent fractions of 2



on by 8



Multiplication and Division by the base

- multiplication by left shift
- division

- Arithmetic Shift Right
  - shift right
  - prior MSB as new MSB
- Logic Shift Right
  - shift right
  - 0 as new MSB