




# COMP1521 Week 7



Two's complement and floating point  
numbers

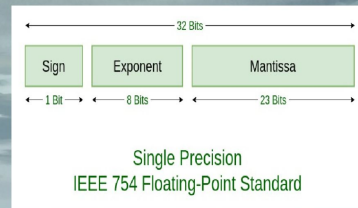


# The three parts of a floating-point number

Formula:  $\text{sign} * (1 + \text{fraction}) * 2^{(\text{exponent} - 127)}$

Useful converter:

<https://www.h-schmidt.net/FloatConverter/IEEE754.html>



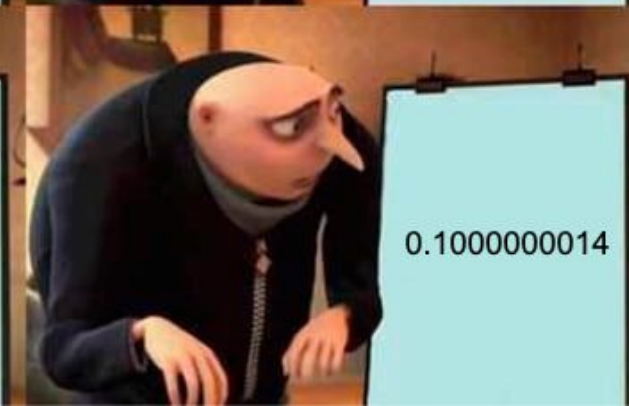
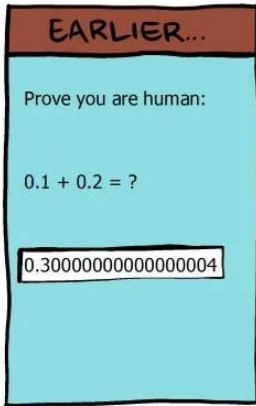
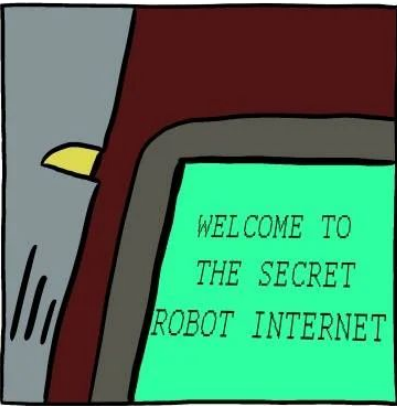
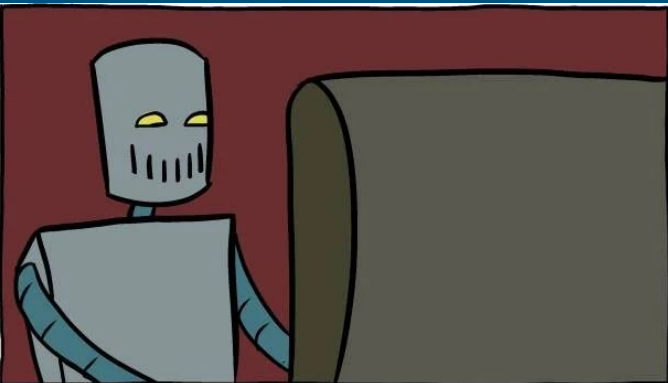
Look what they need to  
mimic a fraction

# Special numbers:

---

- NaN
  - “Not a number”
  - Exponent is all 1s, and fraction is non-zero.
- Inf
  - Exponent is all 1s, fraction is 0, and sign is 0 (positive).
- -Inf
  - Exponent is all 1s, fraction is 0, and sign is 1 (negative).
- Zero/-Zero
  - Exponent is 0, and fraction is 0.

# Any problems with floating point numbers?



# Two's Complement

---

- Method of representing signed integers
- To convert positive to its negative two's complement equivalent (and back again):
  - Flip all the bits
  - Add 1
- This means “higher” negative numbers (e.g. -1), have a “higher” unsigned value than “lower” negative numbers (e.g. -3000)