Constraints

Announcements

Constraint Networks

Solving for Variables in an Equation

```
                                        ⎡ Boltzmann's constant ⎤
        a + b = c
        a = c − b                 p ∗ v = n ∗ k ∗ t
        b = c − a              9 ∗ c = 5 ∗ (f − 32)
```

Algebraic equations are *declarative:* They describe a relation among different quantities

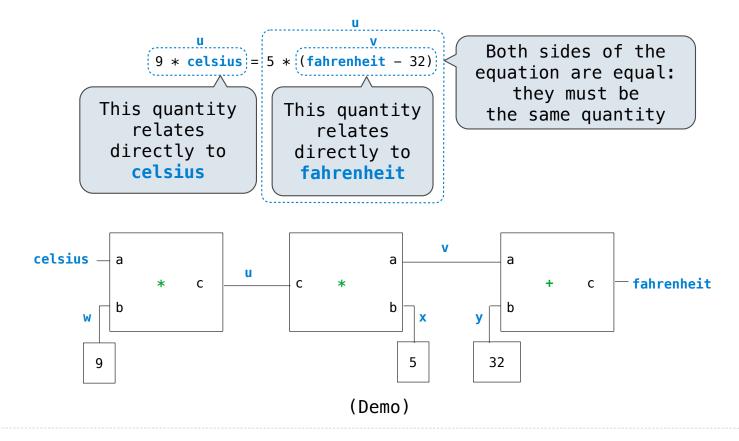`ONE WAY` Python functions are *procedural:* They describe how to compute a result from a set of input arguments

Constraint programming:
- We define the relationship between quantities
- We provide values for the "known" quantities
- The system computes values for the "unknown" quantities

Challenge: We want a general means of combination.

A Constraint Network for Temperature Conversion

Combination idea: All intermediate quantities have values too.

$$9 * celsius = 5 * (fahrenheit - 32)$$

This quantity relates directly to **celsius**

This quantity relates directly to **fahrenheit**

Both sides of the equation are equal: they must be the same quantity

(Demo)