CSCI 301 - Formal Languages & Functional Programming

- About me
- About this course
    - Lisp/Scheme/Racket   (Labs)
    - Discrete math, logic, proof [Weeks 0-5]
    - Theory of Computation (weeks 5-10)
- Syllabus
- Teams!

- Sets 0
- Racket 0

Sets

A set is an (unordered) collection of (unique) items

The items (members) are called elements

Membership is written :

$$a \in S$$

Non-membership :

$$a \notin S$$

Write a set like so :

$$S = \{1, 2, 3, 4\} \leftarrow \text{Roster method}$$

$$1 \in S$$

$$0 \notin S$$

Unordered : $S = \{1, 2, 3, 4\} = \{1, 3, 2, 4\}$

Unique elements : $S = \{1, 2, 3, 4\} = \{1, 1, 2, 3, 4, 4\}$

You can use ... when meaning is clear.

$$A = \{a, b, c, \ldots, z\}$$

Important Sets

$\mathbb{N}$	natural numbers	$\{1, 2, 3, \ldots\}$
$\mathbb{Z}$	integers	$\{\ldots, -2, -1, 0, 1, 2, \ldots\}$
$\mathbb{Q}$	rational numbers	
$\mathbb{R}$	real numbers	
$\mathbb{C}$	complex numbers	
$\emptyset$	empty set	$\{\}$

Racket 0 - Prefix Notation

Math: $a + b$

Most prog. languages: $add(a, b)$

Lisp family: $(+ \quad a \quad b)$

$(add \quad a \quad b)$