



Sets

$$\{3, 1, 4\} = \{1, 3, 4\}$$

Unordered
no dups

multiset

$$\{2, 2, 3\} = \{3, 2, 2\}$$

Unordered &
allow dups

Seq

$$(3, 1, 4, 1) \neq (3, 1, 4)$$
$$\neq (3, 1, 1, 4)$$

Ordered
allow dup

Seq

3 4

{1, 2} {1}

String

Seq of Symbols

Symbol is value w/ no properties
identity only



1

0

"3.1415"

("3", ".", "1", "4", "1", "5")

Cartesian Product

$$\{1, 2\} \times \{3, 4\} = \{(1, 3), (2, 3), (1, 4), (2, 4)\}$$

multiplication

$A \times (B \times C)$
 $(A \times B) \times C$

Commutative? no
 Associative? yes
no

$(\{1\} \times \{1\}) \times \{1\}$
 $\{(1, 1)\} \times \{1\}$
 $\{(1, 1), 1\}$

$$\{3, 4\} \times \{1, 2\} = \{(3, 1), (3, 2), (4, 1), (4, 2)\}$$

$(1, 1, 1) \stackrel{\text{flatten}}{=} (1, 1, 1)$
 $((1, 1), 1) \neq (1, (1, 1))$

$\{1\} \times (\{1\} \times \{1\}) = \{(1, (1, 1))\}$

$\{s \mid s \in \Sigma^* \wedge \text{len}(s) < 10\}$ Kleene Star

$$A^* = A^0 \cup A^1 \cup A^2 \cup A^3 \cup \dots$$

$$\{0,1\}^* = \{(), (0), (1), (0,0), (0,1), (1,0), (1,1), (0,0,0) \dots\}$$

Σ = set of all characters

$$|\Sigma| \geq 1 \rightarrow |A^*| = \infty$$

Σ^* = set of all strings

Set: cardinality

$|S|$

Seq: length

String

S

← finite b/c memory is finite

String $\subset \Sigma^*$

↑
NOT a sum

Set of all characters

"the alphabet" — vary by context
all the symbols in use