### Why

We want to talk about making a sequence of decisions.

### Definition

Let $S$ and $A$ be finite sets. Let $T : S \times A \to (S \to [0,1])$ so that for each $s \in S$ and $a \in A$, $T_{sa} : S \to [0,1]$ is a probability distribution over $S$. We call the ordered triple $(S, A, T)$ a *finite state-action process.*

A *trajectory* in the *state set* $S$ and *action set* $A$ is a sequence in $S \times A$.

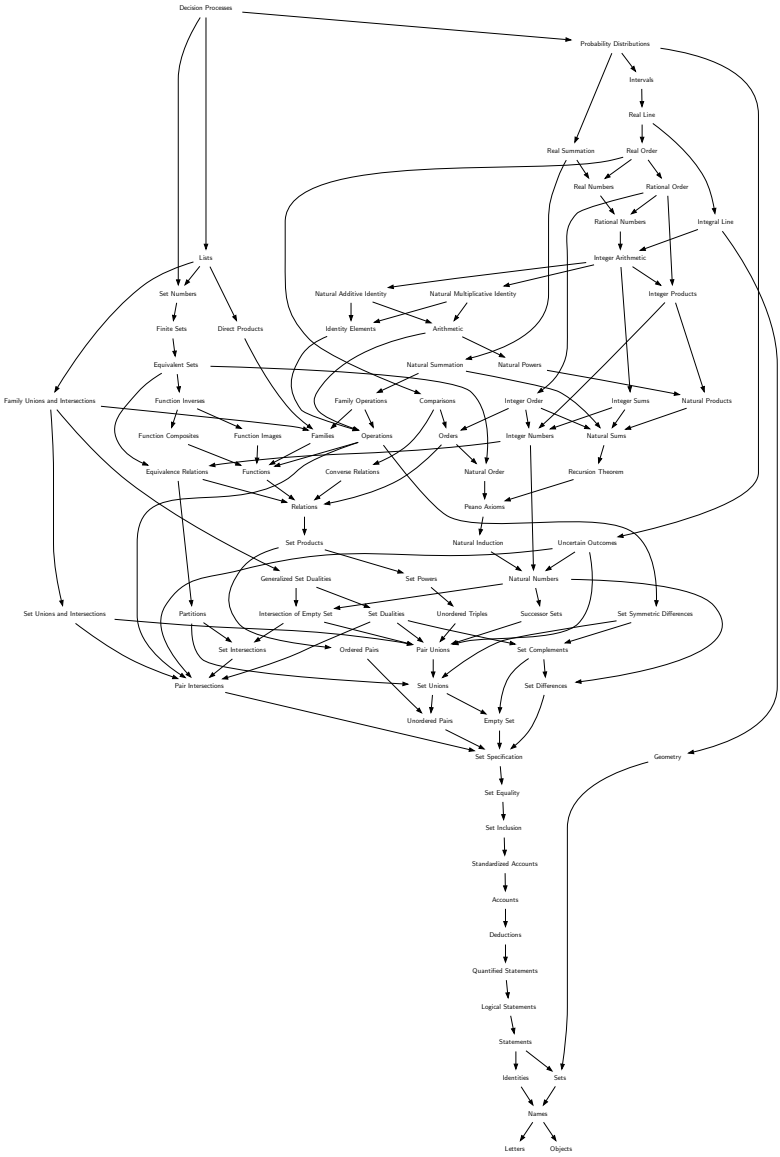
Let $r : S \times A \times S \to \mathbf{R}$, $N \in \mathbf{N}$.

A *decision process* is a sequence $(S, A, T, r, \gamma,$, consists of two sets, a function set, an action

### Other terminology

Decision processes are commonly called *markov decision processes.*[1]

[1] As usual, we avoid this terminology in connection with the projects guidelines against using particular names.


Decision Processes
Probability Distributions
Intervals
Real Line
Real Summation
Real Order
Real Numbers
Rational Order
Rational Numbers
Integral Line
Integer Arithmetic
Lists
Set Numbers
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Finite Sets
Direct Products
Identity Elements
Arithmetic
Equivalent Sets
Natural Summation
Natural Powers
Family Unions and Intersections
Function Inverses
Family Operations
Comparisons
Integer Order
Integer Sums
Natural Products
Function Composites
Function Images
Families
Operations
Orders
Integer Numbers
Natural Sums
Equivalence Relations
Functions
Convene Relations
Natural Order
Recursion Theorem
Relations
Peano Axioms
Set Products
Natural Induction
Uncertain Outcomes
Generalized Set Dualities
Set Powers
Natural Numbers
Set Unions and Intersections
Partitions
Intersection of Empty Set
Set Dualities
Unordered Triples
Successor Sets
Set Symmetric Differences
Set Intersections
Ordered Pairs
Pair Unions
Set Complements
Pair Intersections
Set Unions
Set Differences
Unordered Pairs
Empty Set
Set Specification
Geometry
Set Equality
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects