Basic Symbolic Reasoning in a Nutshell

Symbolism	Notes	Natural Language Examples
Simple Propositions		
$\mathbf{a}^{1}$	A set as a singular entity but comprising multiple elements. Same concept used in conventional set theory.	$\mathbf{a}^{1}$ is the noun phrase "The apes."
$\mathbf{a}$	A set as a plural entity. This is a modification of conventional set theory.	$\mathbf{a}$ is the noun "Apes".
$^{V}\mathbf{Sa}^{1}$	All relationships whose subject is $\mathbf{a}^{1}$. This is a simplified way of expressing the more complete $^{V}\mathbf{S}{*}\mathbf{a}^{1}$ (see below).	
$^{V}\mathbf{Qb}^{1}$	All relationships whose object is $\mathbf{b}^{1}$.	$\mathbf{b}^{1}$ is the noun phrase "The bananas"
. (dot)	Logical "and". Same as $\bigwedge$ in conventional logic. Also, same as $\bigcap$ in conventional set theory.	
$^{V}\mathbf{Sa}^{1}.^{V}\mathbf{Qb}^{1}$	The relationship between a subject $\mathbf{a}^{1}$ and an object $\mathbf{b}^{1}$. This is the same as an ordered pair in conventional set theory.	
$^{V}\mathbf{Sa}.^{V}\mathbf{Qb}$	The plural collection of relationships between any $\mathbf{a}$ and any $\mathbf{b}$.	
$^{V}\mathbf{Sa}^{1}.\mathbf{c}.^{V}\mathbf{Qb}^{1}$	The relationship between a subject $\mathbf{a}^{1}$ and an object $\mathbf{b}^{1}$ modified by conjunction with the collection, $\mathbf{c}$, which is a collection of relationships of a particular type. There may be many such relationships at different times.	$\mathbf{c}$ is the verb "consume" $^{V}\mathbf{Sa}^{1}.\mathbf{c}.^{V}\mathbf{Qb}^{1}$ is a relationship in which "the apes consume the bananas".
$^{V}\mathbf{Sa}.\mathbf{c}.^{V}\mathbf{Qb}$	The plural collection of relationships between any $\mathbf{a}$ and any $\mathbf{b}$ modified by conjunction with the collection, $\mathbf{c}$.	$^{V}\mathbf{Sa}^{1}.\mathbf{c}.^{V}\mathbf{Qb}^{1}$ is the plural collection of relationships in which "any ape consumes any banana".
$\varnothing$	The null set.	"Nothing" or "In no circumstances"
$^{V}\mathbf{Sa}^{1}.\mathbf{c}.^{V}\mathbf{Qb}^{1} \neq \varnothing$	The above collection of relationships converted into a proposition by equating it to the null set, i.e., relationships of type $\mathbf{c}$ exist between $\mathbf{a}^{1}$ and $\mathbf{b}^{1}$.	$^{V}\mathbf{Sa}^{1}.\mathbf{c}.^{V}\mathbf{Qb}^{1} \neq \varnothing$ is the proposition "The apes consume the bananas".
$\subseteq$	The binary operator "is a subset of or equal to". This is the same as $\subseteq$ in conventional set theory. It is also the same as in $\rightarrow$ conventional logic.	$\subseteq$ means "is" or "are" between two nouns, or "if… then…" between two propositions.
$\mathbf{c}{*}\mathbf{b}^{1}$	The collection of relationships $\mathbf{c}$ operating on the object $\mathbf{b}^{1}$ to define a collection of subjects.	"Things that consume the bananas."
$\mathbf{a}^{1} \subseteq \mathbf{c}{*}\mathbf{b}^{1}$	The proposition $^{V}\mathbf{Sa}^{1}.\mathbf{c}.^{V}\mathbf{Qb}^{1} \neq \varnothing$ in relationship form transformed into standard form.	$\mathbf{a}^{1} \subseteq \mathbf{c}{*}\mathbf{b}^{1}$ is also the proposition "The apes consume the bananas" or more fully "The apes are something that consumes the bananas".
$\mathbf{a} \subseteq \mathbf{c}{*}\mathbf{b}$		$\mathbf{a} \subseteq \mathbf{c}{*}\mathbf{b}$ is the proposition "(All) apes consume (some) bananas". N.B. words in brackets are normally omitted in plain English.
$\not\subseteq$	The binary operator "is not a subset of and not equal to". This is same as $\not\subseteq$ in conventional set theory.	
$\mathbf{a} \not\subseteq \mathbf{c}{*}\mathbf{b}$		$\mathbf{a} \not\subseteq \mathbf{c}{*}\mathbf{b}$ is the proposition "Not all apes consume (some) bananas".
$\mathbf{c}\underline{*}\mathbf{b}$	N.B. $*$ is underscored. The complement of (or everything but) the collection of relationships $\mathbf{c}$ operating on the objects $\mathbf{b}$ to define a collection of subjects.	"Things that consume (some) bananas"

$\mathbf{a} \not\subseteq \mathbf{c}\underline{*}\mathbf{b}$		$\mathbf{a} \not\subseteq \mathbf{c}\underline{*}\mathbf{b}$ is the proposition “Some apes consume (some) bananas”.
$\mathbf{a} \subseteq \mathbf{c}\underline{*}\mathbf{b}$	N.B. $*$ is underscored.	$\mathbf{a} \not\subseteq \mathbf{c}*\mathbf{b}$ is the proposition “No apes consume (some or any) bananas”.
Truth and Probability		
$\mathbf{E}$	The universal set.	“Everything” or “Every circumstance”
$(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) = \mathbf{E}$	A probabilistic proposition. N.B. $\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}$ is the same as $(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) = \mathbf{E}$ by default.	“It is true (or certain) that all apes consume bananas.”
$(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) \neq \mathbf{E}$	A probabilistic proposition.	“It is uncertain that all apes consume bananas.”
$(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) \neq \varnothing$	A probabilistic proposition.	“It is possible that all apes consume bananas.”
$(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) = \varnothing$	A probabilistic proposition.	“It is false (or impossible) that all apes consume bananas.”
Adjectives and Adverbs		
$\mathcal{g}^1$	A characteristic as opposed to a physical entity.	$\mathcal{g}^1$ is the characteristic “grey”.
$\{\subseteq\}*{}^{\vee}\mathcal{A}*\mathcal{g}^1$ or $\mathbf{g}$	The collection of physical things with that characteristic. Rather curiously, a characteristic and the conventional set of physical things with that characteristic are reciprocals in space-time. ${}^{\vee}\mathcal{A}*$ maps the former onto the latter. $\{\subseteq\}*$ specifies the elements of that conventional set of physical things and in Symbolic Reasoning they comprise a plural collection. The whole expression can also be simplified to $\mathbf{g}$.	$\{\subseteq\}*{}^{\vee}\mathcal{A}*\mathcal{g}^1$ or $\mathbf{g}$ is the collection of “grey things”.
$\mathbf{a}.\{\subseteq\}*{}^{\vee}\mathcal{A}*\mathcal{g}^1\subseteq \mathbf{c}*\mathbf{b}$ or $\mathbf{a.g} \subseteq \mathbf{c}*\mathbf{b}$	A subject modified by an adjective.	“All grey apes consume bananas”
$\mathbf{a}\subseteq (\mathbf{c}.\{\subseteq\}*{}^{\vee}\mathcal{A}*\mathcal{h}^1)*\mathbf{b}$ or $\mathbf{a} \subseteq (\mathbf{c.h})*\mathbf{b}$	A verb modified by an adverb.	“All apes hungrily consume bananas”.
Compound Propositions		
$(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}).(\mathbf{d}\subseteq \mathbf{e}*\mathbf{f})$	Conjoined propositions.	“(All) apes consume (some) bananas and (all) dragons exhale (some) fire”.
$+$	Logical “or”. Same as $\bigvee$ in conventional logic and $\bigcup$ in conventional set theory. N.B. Natural English is inconsistent and sometimes is referred to as “and”. For example, apples and bananas are fruits or $\mathbf{a} + \mathbf{b} \subseteq \mathbf{f}$.	
$(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) + (\mathbf{d}\subseteq \mathbf{e}*\mathbf{f})$	Disjoined propositions.	“Apes consume bananas or dragons exhale fire”.
$(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) \not\subseteq (\mathbf{d}\subseteq \mathbf{e}*\mathbf{f})$	A second order proposition.	“If apes consume bananas, then this does not imply that dragons exhale fire”.
$((\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) = \mathbf{E}) \subseteq ((\mathbf{d}\subseteq \mathbf{e}*\mathbf{f}) \neq \varnothing)$	A second order probabilistic proposition.	“If it is certain that apes eat bananas, then it is possible that dragons exhale fire”
$(\mathbf{a}\subseteq \mathbf{c}*\mathbf{b}) + (\mathbf{d}\subseteq \mathbf{e}*\mathbf{f}) \subseteq (\mathbf{i}^1 \subseteq \mathbf{j}*\mathbf{k}^1)$		“If apes consume bananas or dragons exhale fire, then I join the conscripts”.
$\mathbf{f}.{}^{\vee}\mathbf{Qe} \subseteq \{\subseteq\}*{}^{\vee}\mathcal{A}*\mathcal{d}^1$ or $\mathbf{f}.{}^{\vee}\mathbf{Qe} \subseteq \mathbf{d}$		“Finding examples is difficult”.
Tense		
$\{<\}_{\mathcal{T}}*\mathbf{e}$	Circumstances before any event $\mathbf{e}$.	
$\{>\}_{\mathcal{T}}*\mathbf{e}$	Circumstances after any event $\mathbf{e}$.	

$\mathbf{{}^{V}Sa^{1}.c.{}^{V}Qb^{1}} \neq \emptyset$	Tenseless Proposition.	Andrew climbs Mont Blanc.
$\mathbf{\{\supset\}_{\mathcal{T}}({}^{V}Sa^{1}.c.{}^{V}Qb^{1})} \neq \emptyset$	Continuous Tense Proposition.	Andrew is climbing Mont Blanc.
$\mathbf{\{>\}_{\mathcal{T}}({}^{V}Sa^{1}.c.{}^{V}Qb^{1})} \neq \emptyset$	Imperfect Tense Proposition.	Andrew climbed Mont Blanc.
$\mathbf{\{>\}_{\mathcal{T}}\{\supset\}_{\mathcal{T}}({}^{V}Sa^{1}.c.{}^{V}Qb^{1})} \neq \emptyset$	Imperfect Continuous Tense Proposition.	Andrew was climbing Mont Blanc.
$\mathbf{\{>\}_{\mathcal{T}}\mathcal{C}_{\mathcal{T}}({}^{V}Sa^{1}.c.{}^{V}Qb^{1})} \neq \emptyset$	Perfect Tense Proposition.	Andrew has climbed Mont Blanc.
$\mathbf{\{>\}_{\mathcal{T}}\mathcal{C}_{\mathcal{T}}\{\supset\}_{\mathcal{T}}({}^{V}Sa^{1}.c.{}^{V}Qb^{1})} \neq \emptyset$	Perfect Continuous Tense Proposition	Andrew has been climbing Mont Blanc.
$\mathbf{\{<\}_{\mathcal{T}}({}^{V}Sa^{1}.c.{}^{V}Qb^{1})} \neq \emptyset$	Future Tense Proposition.	Andrew will climb Mont Blanc.
$\mathbf{\{<\}_{\mathcal{T}}\{\supset\}_{\mathcal{T}}({}^{V}Sa^{1}.c.{}^{V}Qb^{1})} \neq \emptyset$	Future Continuous Tense Proposition.	Andrew will be climbing Mont Blanc.
	Causality	
	A collection of events is the same as a collection of relationships and simplified symbolism can be used. Thus, for example the collection $\mathbf{{}^{V}Sa^{1}.c.{}^{V}Qb^{1}}$ can be simplified to **a**. This is because both are entities which occupy a region of space-time.	
$\mathbf{(@a)b}$	The regions of space-time occupied by both an event **a** and an event **b**.	
$\mathbf{E^{1}}$	The universe, i.e., all of space-time, as a singular entity.	
$\mathbf{(@a)E^{1}}$	The regions of space-time occupied by an event **a**.	
$\mathbf{B{\ast}c}$	The collection of beginnings in time of **c**s.	
$\mathbf{\{\supseteq\}{\ast}c}$	The collection of regions of space-time that include the region of space-time occupied by an event **c**, and which may be more extensive than the latter.	
$\mathbf{(@a)E^{1}} \subseteq \mathbf{\{\supseteq\}{\ast}B{\ast}c}$	A causal proposition.	An event **a** is sufficient to cause an event **c** (to begin).
$\mathbf{(@a)(@b)E^{1}} \subseteq \mathbf{\{\supseteq\}{\ast}B{\ast}c}$	A causal proposition.	An event **a** and an event **b** are together sufficient to cause an event **c** (to begin).
$\mathbf{\{\subseteq\}{\ast}a}$	The collection of regions of space time that are contained by a region of space-time occupied by an event **a**, and which may be less extensive than the latter.	
$\mathbf{B{\ast}c} \subseteq \mathbf{\{\subseteq\}(@a)E^{1}}$	A causal proposition.	An event **a** is necessary to cause an event **c** (to begin).