Isaccs & Rawlins (2008)

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1 Syntax

(1) $p \in \mathcal{W}ff$ if $p \in \mathcal{A}t = \{\mathsf{a}, \mathsf{a}_0, \mathsf{a}_1, \ldots, \mathsf{a}_n, \mathsf{b}\}$
(2) $(\neg\phi) \in \mathcal{W}ff$ if $\phi \in \mathcal{W}ff$
(3) $(\phi \wedge \psi) \in \mathcal{W}ff$ if $\phi, \psi \in \mathcal{W}ff$
(4) $(?\phi) \in \mathcal{W}ff$ if $\phi \in \mathcal{W}ff$
(5) $(\triangle\phi) \in \mathcal{W}ff$ if $\phi \in \mathcal{W}ff$
(6) $((\mathsf{if}\ \phi)\ \psi) \in \mathcal{W}ff$ if $\phi, \psi \in \mathcal{W}ff$

- Outer parens are omitted when unnecessary.

2 Worlds & Boolean Propositions

(1) $w \in \Omega \iff w : \mathcal{A}t \mapsto \{0, 1\}$
(2) $[\![p]\!]_{c,w} = 1 \iff w(p) = 1, \quad \text{if } p \in \mathcal{A}t$
(3) $[\![\phi \wedge \psi]\!]_{c,w} = 1 \iff [\![\phi]\!]_{c,w} = [\![\psi]\!]_{c,w} = 1$
(4) $[\![\neg\phi]\!]_{c,w} = 1 \iff [\![\phi]\!]_{c,w} = 0$

3 Contexts, Macro-Contexts, Push & Pop

(1) c is a **context** iff $c \subseteq \Omega \times \Omega$, c is transitive & symmetric (GR99)

(2) a. $\langle\rangle$ is a **macro-context**
b. If c is a context & s is a **macro-context**, then $\langle c, s\rangle$ is a **macro-context**
c. Nothing else is a **macro-context**
d. If s is a **macro-context**, then s_n is the nth context of s (counting from 0 at the top) and $|s|$ is the number of contexts in s (excluding it's final empty element) (I&R:291)

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(3) For any macro-context s & context c:
$\textsc{push}(s, c) = \langle c, s\rangle$ (**Push**, I&R:292)

(4) For any macro-context s & context c:
$\textsc{pop}(\langle c, s'\rangle) = \langle c, s'\rangle$ if $s' = \langle\rangle$, s' otherwise (**Pop**, I&R:292)

4 Context Update

(1) $c \oplus \phi = \{\langle w, w'\rangle \mid [\![\phi]\!]_{c,w} = [\![\phi]\!]_{c,w'} = 1\}$ (**Assertive Update**$_c$, I&R:273)
(2) $c \oslash \phi = \{\langle w, w'\rangle \mid [\![\phi]\!]_{c,w} = [\![\phi]\!]_{c,w'}\}$ (**Inquisitive Update**$_c$, I&R:273)

5 Percolation & Macro-Context Update

(1) $\vdash (c, c', c'') = \{\langle w_1, w_2\rangle \in c \mid \langle w_1, w_2\rangle \in c''$ or $\forall w \in \Omega : \langle w_1, w\rangle \notin c'$ and $\langle w, w_2\rangle \notin c'\}$
(**Percolation**, I&R:293)

(2) $s[\triangle\phi] = s'$ iff (i) $|s'| = |s| = n$ & (ii) $\forall i \leqslant i < n : s'_i = \vdash (s_i, s_0, s_0 \oplus \phi)$
(**Assertive Update**$_m$, I&R:293)

(3) $\langle c, s'\rangle[?\phi] = \langle c \oslash \phi, s'\rangle$ (**Inquisitive Update**$_m$, I&R:293)

(4) $s[(\mathsf{if}\ \phi)] = \textsc{push}(s, s_0 \oplus \phi)$ if $s_0 \oplus \phi \neq \varnothing$; otherwise undefined (**If Update**$_m$, I&R:297)

(5) $s[(\mathsf{if}\ \phi)\ \psi] = (s[(\mathsf{if}\ \phi)])[\psi]$ (**Conditional Update**$_m$, I&R:297)

6 Useful Contexts

	a	b	
w_0	0	0	$00 := w_0$
w_1	0	1	$01 := w_1$
w_2	1	0	$10 := w_2$
w_3	1	1	$11 := w_3$

$\Omega = \{00, 01, 10, 11\}$ $\quad \Omega^2 = \begin{Bmatrix} 00,00 & 00,01 & 00,10 & 00,11 \\ 01,00 & 01,01 & 01,10 & 01,11 \\ 10,00 & 10,01 & 10,10 & 10,11 \\ 11,00 & 11,01 & 11,10 & 11,11 \end{Bmatrix}$

$c_{\mathsf{a}} := \Omega^2 \oplus \mathsf{a} = \begin{Bmatrix} 10,10 & 10,11 \\ 11,10 & 11,11 \end{Bmatrix}$ $\quad c_{\mathsf{b}} := \Omega^2 \oplus \mathsf{b} = \begin{Bmatrix} 01,01 & 01,11 \\ 11,01 & 11,11 \end{Bmatrix}$ $\quad s^0 := \langle \Omega^2, \langle\rangle\rangle$

$c_1 := \begin{Bmatrix} 00,00 & 00,01 \\ 01,00 & 01,01 \\ 11,11 & \end{Bmatrix}$ $\quad s^2 := \langle\{(11,11)\}, \langle c_1, \langle\rangle\rangle\rangle$ $\quad s^3 := \langle\{(10,10),(11,11)\}, s^0\rangle$