thm_2EPast__Temporal__Logic_2ESIMPLIFY (TMLnGou3LinbcMHbsiQi9pAondm9zB5BFdX)

October 26, 2020

Let $c\_2Enum\_2EZERO\_\_REP : \iota$ be given. Assume the following.

$$c\_2Enum\_2EZERO\_\_REP \in omega \quad (1)$$

Let $ty\_2Enum\_2Enum : \iota$ be given. Assume the following.

$$nonempty\ ty\_2Enum\_2Enum \quad (2)$$

Let $c\_2Enum\_2EABS\_\_num : \iota$ be given. Assume the following.

$$c\_2Enum\_2EABS\_\_num \in (ty\_2Enum\_2Enum^{omega}) \quad (3)$$

Definition 1 *We define* c_2Emin_2E_3D *to be* $\lambda A.\lambda x \in A.\lambda y \in A.inj\_\_o\ (x = y)$ *of type* $\iota \Rightarrow \iota$.

Definition 2 *We define* c_2Enum_2E0 *to be* $(ap\ c\_2Enum\_2EABS\_\_num\ c\_2Enum\_2EZERO\_\_REP)$.

Definition 3 *We define* c_2EPast__Temporal__Logic_2EInitPoint *to be* $(\lambda V0t \in ty\_2Enum\_2Enum.(ap\ (ap\ ($

Let $c\_2Enum\_2EREP\_\_num : \iota$ be given. Assume the following.

$$c\_2Enum\_2EREP\_\_num \in (omega^{ty\_2Enum\_2Enum}) \quad (4)$$

Let $c\_2Enum\_2ESUC\_\_REP : \iota$ be given. Assume the following.

$$c\_2Enum\_2ESUC\_\_REP \in (omega^{omega}) \quad (5)$$

Definition 4 *We define* c_2Ebool_2ET *to be* $(ap\ (ap\ (\mathsf{c\_2Emin\_2E\_3D}\ (2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V$

Definition 5 *We define* c_2Ebool_2E_21 *to be* $\lambda A\_27a : \iota.(\lambda V0P \in (2^{A\_27a}).(ap\ (ap\ (\mathsf{c\_2Emin\_2E\_3D}\ (2^{A\_27}$

Definition 6 *We define* c_2Enum_2ESUC *to be* $\lambda V0m \in ty\_2Enum\_2Enum.(ap\ c\_2Enum\_2EABS\_\_num\ ($

Definition 7 *We define* c_2Emin_2E_40 *to be* $\lambda A.\lambda P \in 2^A.$**if** $(\exists x \in A.p\ (ap\ P\ x))$ **then** $(the\ (\lambda x.x \in A \wedge p$ *of type* $\iota \Rightarrow \iota$.

Definition 8 *We define* c_2Ebool_2EF *to be* $(ap\ (\mathsf{c\_2Ebool\_2E\_21}\ 2)\ (\lambda V0t \in 2.V0t))$.

Definition 9 *We define* c_2Emin_2E_3D_3D_3E *to be* $\lambda P \in 2.\lambda Q \in 2.inj\_\_o\ (p\ P \Rightarrow p\ Q)$ *of type* ι.

Definition 10 *We define* c_2Ebool_2E_2F_5C *to be* $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap\ (\mathsf{c\_2Ebool\_2E\_21}\ 2)\ (\lambda V2t \in$

Definition 11 *We define* c_2Ebool_2ECOND *to be* $\lambda A\_27a : \iota.(\lambda V0t \in 2.(\lambda V1t1 \in A\_27a.(\lambda V2t2 \in A\_27a.($

Definition 12 *We define* c_2Eprim__rec_2EPRE *to be* $\lambda V0m \in ty\_2Enum\_2Enum.(ap\ (ap\ (ap\ (\mathsf{c\_2Ebool\_2E}$

Definition 13 *We define* c_2Ebool_2E_7E *to be* $(\lambda V0t \in 2.(ap\ (ap\ \mathsf{c\_2Emin\_2E\_3D\_3D\_3E}\ V0t)\ \mathsf{c\_2Ebool\_2E}$

Definition 14 *We define* c_2Ebool_2E_3F *to be* $\lambda A\_27a : \iota.(\lambda V0P \in (2^{A\_27a}).(ap\ V0P\ (ap\ (\mathsf{c\_2Emin\_2E\_40}$

Definition 15 *We define* c_2Eprim__rec_2E_3C *to be* $\lambda V0m \in ty\_2Enum\_2Enum.\lambda V1n \in ty\_2Enum\_2Enu$

Definition 16 *We define* c_2EPast__Temporal__Logic_2EPSNEXT *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1t0 \in$

Definition 17 *We define* c_2Ebool_2E_5C_2F *to be* $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap\ (\mathsf{c\_2Ebool\_2E\_21}\ 2)\ (\lambda V2t \in$

Definition 18 *We define* c_2EPast__Temporal__Logic_2EPNEXT *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1t0 \in$

Definition 19 *We define* c_2Earithmetic_2E_3C_3D *to be* $\lambda V0m \in ty\_2Enum\_2Enum.\lambda V1n \in ty\_2Enum\_2$

Definition 20 *We define* c_2EPast__Temporal__Logic_2EPALWAYS *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1t0$

Definition 21 *We define* c_2EPast__Temporal__Logic_2EPEVENTUAL *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V$

Definition 22 *We define* c_2EPast__Temporal__Logic_2EPSWHEN *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in$

Definition 23 *We define* c_2EPast__Temporal__Logic_2EPSUNTIL *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in$

Definition 24 *We define* c_2EPast__Temporal__Logic_2EPSBEFORE *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b$

Definition 25 *We define* c_2EPast__Temporal__Logic_2EPWHEN *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in ($

Definition 26 *We define* c_2EPast__Temporal__Logic_2EPUNTIL *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in ($

Definition 27 *We define* c_2EPast__Temporal__Logic_2EPBEFORE *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in$

Let $c\_2Earithmetic\_2E\_2B : \iota$ be given. Assume the following.

$$c\_2Earithmetic\_2E\_2B \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \quad (6)$$

Definition 28 *We define* c_2ETemporal__Logic_2EALWAYS *to be* $\lambda V0P \in (2^{ty\_2Enum\_2Enum}).\lambda V1t0 \in ty\_2$

Definition 29 *We define* c_2ETemporal__Logic_2EEVENTUAL *to be* $\lambda V0P \in (2^{ty\_2Enum\_2Enum}).\lambda V1t0 \in t$

Definition 30 *We define* c_2ETemporal__Logic_2EWATCH *to be* $\lambda V0q \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in (2^{ty\_2E}$

Definition 31 *We define* c_2ETemporal__Logic_2EWHEN *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in (2^{ty\_2En$

Definition 32 *We define* c_2ETemporal__Logic_2EUNTIL *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in (2^{ty\_2En$

Definition 33 *We define* c_2ETemporal__Logic_2EBEFORE *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in (2^{ty\_2I$

Definition 34 *We define* c_2ETemporal__Logic_2ESWHEN *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in (2^{ty\_2E$

Definition 35 *We define* c_2ETemporal__Logic_2ESUNTIL *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in (2^{ty\_2E$

Definition 36 *We define* c_2ETemporal__Logic_2ENEXT *to be* $\lambda V0P \in (2^{ty\_2Enum\_2Enum}).(\lambda V1t \in ty\_2En$

Definition 37 *We define* c_2ETemporal__Logic_2ESBEFORE *to be* $\lambda V0a \in (2^{ty\_2Enum\_2Enum}).\lambda V1b \in (2^{ty\_$

Let $c\_2Earithmetic\_2EEVEN : \iota$ be given. Assume the following.

$$c\_2Earithmetic\_2EEVEN \in (2^{ty\_2Enum\_2Enum}) \tag{7}$$

Let $c\_2Earithmetic\_2EODD : \iota$ be given. Assume the following.

$$c\_2Earithmetic\_2EODD \in (2^{ty\_2Enum\_2Enum}) \tag{8}$$

Definition 38 *We define* c_2Earithmetic_2E_3E *to be* $\lambda V0m \in ty\_2Enum\_2Enum.\lambda V1n \in ty\_2Enum\_2En$

Definition 39 *We define* c_2Earithmetic_2E_3E_3D *to be* $\lambda V0m \in ty\_2Enum\_2Enum.\lambda V1n \in ty\_2Enum\_2$

Let $c\_2Earithmetic\_2EEXP : \iota$ be given. Assume the following.

$$c\_2Earithmetic\_2EEXP \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \tag{9}$$

Let $c\_2Earithmetic\_2E\_2D : \iota$ be given. Assume the following.

$$c\_2Earithmetic\_2E\_2D \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \tag{10}$$

Let $c\_2Earithmetic\_2E\_2A : \iota$ be given. Assume the following.

$$c\_2Earithmetic\_2E\_2A \in ((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum}) \tag{11}$$

Definition 40 *We define* c_2Earithmetic_2ENUMERAL *to be* $\lambda V0x \in ty\_2Enum\_2Enum.V0x.$

Definition 41 *We define* c_2Enumeral_2EiiSUC *to be* $\lambda V0n \in ty\_2Enum\_2Enum.(ap$ c_2Enum_2ESUC $(ap$

Definition 42 *We define* c_2Enumeral_2EiZ *to be* $\lambda V0x \in ty\_2Enum\_2Enum.V0x.$

Definition 43 *We define* c_2Earithmetic_2EBIT2 *to be* $\lambda V0n \in ty\_2Enum\_2Enum.(ap\ (ap\ c\_2Earithmetic$

Definition 44 *We define* c_2Earithmetic_2EBIT1 *to be* $\lambda V0n \in ty\_2Enum\_2Enum.(ap\ (ap\ c\_2Earithmetic$

Definition 45 *We define* c_2Earithmetic_2EZERO *to be* c_2Enum_2E0*.*

Assume the following.

$$(\forall V0b \in (2^{ty\_2Enum\_2Enum}).(\forall V1a \in (2^{ty\_2Enum\_2Enum}). (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ (\lambda V2t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF}))\ V0b) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS}\ (\lambda V3t \in ty\_2Enum\_2Enum.(ap\ \mathsf{c\_2Ebool\_2E\_7E}\ (ap\ V0b\ V3t)))))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ (\lambda V4t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\ V0b) = (\lambda V5t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ V1a)\ (\lambda V6t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF})) = (\lambda V7t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ V1a)\ (\lambda V8t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET})) = (\lambda V9t \in ty\_2Enum\_2Enum.(ap\ V1a\ V9t)))\wedge((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ V1a)\ V1a) = (\lambda V10t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))))))) \tag{12}$$

Assume the following.

$$(\forall V0b \in (2^{ty\_2Enum\_2Enum}).(\forall V1a \in (2^{ty\_2Enum\_2Enum}). (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ (\lambda V2t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF}))\ V0b) = (\lambda V3t \in ty\_2Enum\_2Enum.(ap\ V0b\ V3t)))\wedge (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ (\lambda V4t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET}))\ V0b) = (\lambda V5t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\wedge (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ V1a)\ (\lambda V6t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF})) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS}\ V1a))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ V1a)\ (\lambda V7t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET})) = (\lambda V8t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\wedge((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ V1a)\ V1a) = (\lambda V9t \in ty\_2Enum\_2Enum. (ap\ V1a\ V9t)))))))) \tag{13}$$

Assume the following.

$$(\forall V0b \in (2^{ty\_2Enum\_2Enum}).(\forall V1a \in (2^{ty\_2Enum\_2Enum}). (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBEFORE}\ (\lambda V2t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF}))\ V0b) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS}\ (\lambda V3t \in ty\_2Enum\_2Enum.(ap\ \mathsf{c\_2Ebool\_2E\_7E}\ (ap\ V0b\ V3t)))))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBEFORE}\ (\lambda V4t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\ V0b) = (\lambda V5t \in ty\_2Enum\_2Enum.(ap\ \mathsf{c\_2Ebool\_2E\_7E}\ (ap\ V0b\ V5t))))\wedge (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBEFORE}\ V1a)\ (\lambda V6t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF})) = (\lambda V7t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBEFORE}\ V1a)\ (\lambda V8t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET})) = (\lambda V9t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\wedge((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBEFORE}\ V1a)\ V1a) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS}\ (\lambda V10t \in ty\_2Enum\_2Enum.(ap\ \mathsf{c\_2Ebool\_2E\_7E}\ (ap\ V1a\ V10t)))))))))) \tag{14}$$

Assume the following.

$$(\forall V0b \in (2^{ty\_2Enum\_2Enum}).(\forall V1a \in (2^{ty\_2Enum\_2Enum}). (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ (\lambda V2t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF}))\ V0b) = (\lambda V3t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\land (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ (\lambda V4t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET}))\ V0b) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ V0b))\land (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ V1a)\ (\lambda V5t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF})) = (\lambda V6t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\land(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ V1a)\ (\lambda V7t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET})) = (\lambda V8t \in ty\_2Enum\_2Enum.(ap\ V1a\ V8t)))\land((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ V1a)\ V1a) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ V1a))))))) \tag{15}$$

Assume the following.

$$(\forall V0b \in (2^{ty\_2Enum\_2Enum}).(\forall V1a \in (2^{ty\_2Enum\_2Enum}). (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ (\lambda V2t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF}))\ V0b) = (\lambda V3t \in ty\_2Enum\_2Enum.(ap\ V0b\ V3t)))\land (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ (\lambda V4t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET}))\ V0b) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ V0b))\land (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ V1a)\ (\lambda V5t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF})) = (\lambda V6t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\land(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ V1a)\ (\lambda V7t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET})) = (\lambda V8t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\land((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ V1a)\ V1a) = (\lambda V9t \in ty\_2Enum\_2Enum. (ap\ V1a\ V9t))))))))) \tag{16}$$

Assume the following.

$$(\forall V0b \in (2^{ty\_2Enum\_2Enum}).(\forall V1a \in (2^{ty\_2Enum\_2Enum}). (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ (\lambda V2t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF}))\ V0b) = (\lambda V3t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\land (((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ (\lambda V4t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2ET}))\ V0b) = (\lambda V5t \in ty\_2Enum\_2Enum.(ap\ \mathsf{c\_2Ebool\_2E\_7E}\ (ap\ V0b\ V5t))))\land(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ V1a)\ (\lambda V6t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF})) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ V1a))\land(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ V1a)\ (\lambda V7t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET})) = (\lambda V8t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\land ((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ V1a)\ V1a) = (\lambda V9t \in ty\_2Enum\_2Enum. \mathsf{c\_2Ebool\_2EF}))))))) \tag{17}$$

Assume the following.

$$(\forall V0P \in (2^{ty\_2Enum\_2Enum}).(\forall V1t0 \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS}\ V0P)\ V1t0))\Leftrightarrow((p\ (ap\ V0P\ V1t0))\wedge(p\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS}\ V0P))\ V1t0)))))) \tag{18}$$

Assume the following.

$$(\forall V0P \in (2^{ty\_2Enum\_2Enum}).(\forall V1t0 \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ V0P)\ V1t0))\Leftrightarrow((p\ (ap\ V0P\ V1t0))\vee(p\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ V0P))\ V1t0)))))) \tag{19}$$

Assume the following.

$$(\forall V0a \in (2^{ty\_2Enum\_2Enum}).(\forall V1b \in (2^{ty\_2Enum\_2Enum}).(\forall V2t0 \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ V0a)\ V1b)\ V2t0))\Leftrightarrow(p\ (ap\ (ap\ (ap\ (\mathsf{c\_2Ebool\_2ECOND}\ 2)\ (ap\ V1b\ V2t0))\ (ap\ V0a\ V2t0))\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ V0a)\ V1b))\ V2t0))))))) \tag{20}$$

Assume the following.

$$(\forall V0a \in (2^{ty\_2Enum\_2Enum}).(\forall V1b \in (2^{ty\_2Enum\_2Enum}).(\forall V2t0 \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ V0a)\ V1b)\ V2t0))\Leftrightarrow((\neg(p\ (ap\ V1b\ V2t0)))\Rightarrow((p\ (ap\ V0a\ V2t0))\wedge(p\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ V0a)\ V1b))\ V2t0)))))))) \tag{21}$$

Assume the following.

$$(\forall V0a \in (2^{ty\_2Enum\_2Enum}).(\forall V1b \in (2^{ty\_2Enum\_2Enum}).(\forall V2t0 \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBEFORE}\ V0a)\ V1b)\ V2t0))\Leftrightarrow((\neg(p\ (ap\ V1b\ V2t0)))\wedge((p\ (ap\ V0a\ V2t0))\vee(p\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBEFORE}\ V0a)\ V1b))\ V2t0)))))))) \tag{22}$$

Assume the following.

$$(\forall V0a \in (2^{ty\_2Enum\_2Enum}).(\forall V1b \in (2^{ty\_2Enum\_2Enum}).(\forall V2t0 \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ V0a)\ V1b)\ V2t0))\Leftrightarrow(p\ (ap\ (ap\ (ap\ (\mathsf{c\_2Ebool\_2ECOND}\ 2)\ (ap\ V1b\ V2t0))\ (ap\ V0a\ V2t0))\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ V0a)\ V1b))\ V2t0))))))) \tag{23}$$

Assume the following.

$$(\forall V0a \in (2^{ty\_2Enum\_2Enum}).(\forall V1b \in (2^{ty\_2Enum\_2Enum}).(\forall V2t0 \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ V0a)\ V1b)\ V2t0))\Leftrightarrow((\neg(p\ (ap\ V1b\ V2t0)))\Rightarrow((p\ (ap\ V0a\ V2t0))\wedge(p\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ V0a)\ V1b))\ V2t0))))))))) \tag{24}$$

Assume the following.

$$(\forall V0a \in (2^{ty\_2Enum\_2Enum}).(\forall V1b \in (2^{ty\_2Enum\_2Enum}).(\forall V2t0 \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ V0a)\ V1b)\ V2t0))\Leftrightarrow((\neg(p\ (ap\ V1b\ V2t0)))\wedge((p\ (ap\ V0a\ V2t0))\vee(p\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ V0a)\ V1b))\ V2t0))))))))) \tag{25}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.(((ap\ (ap\ c\_2Earithmetic\_2E\_2B\ \mathsf{c\_2Enum\_2E0})\ V0m) = V0m)\wedge(((ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ \mathsf{c\_2Enum\_2E0}) = V0m)\wedge(((ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V0m))\ V1n) = (ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ V1n)))\wedge((ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V1n)) = (ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ V1n)))))))) \tag{26}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.((ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ V1n) = (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V1n)\ V0m)))) \tag{27}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.(\forall V2p \in ty\_2Enum\_2Enum.((ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V1n)\ V2p)) = (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ V1n))\ V2p))))) \tag{28}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C}\ V0m)\ V1n))\Leftrightarrow(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V0m))\ V1n))))) \tag{29}$$

Assume the following.

$$(\forall V0n \in ty\_2Enum\_2Enum.(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ \mathsf{c\_2Enum\_2E0})\ V0n))) \tag{30}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.((\neg(p\ (ap\ (ap\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C}\ V0m)\ V1n)))\Leftrightarrow(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V1n)\ V0m))))) \tag{31}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.(((ap\ (ap\ c\_2Earithmetic\_2E\_2A\ \mathsf{c\_2Enum\_2E0})\ V0m) = \mathsf{c\_2Enum\_2E0})\wedge (((ap\ (ap\ c\_2Earithmetic\_2E\_2A\ V0m)\ \mathsf{c\_2Enum\_2E0}) = \mathsf{c\_2Enum\_2E0})\wedge (((ap\ (ap\ c\_2Earithmetic\_2E\_2A\ (ap\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ \mathsf{c\_2Earithmetic\_2EZERO})))\ V0m) = V0m)\wedge (((ap\ (ap\ c\_2Earithmetic\_2E\_2A\ V0m)\ (ap\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ \mathsf{c\_2Earithmetic\_2EZERO}))) = V0m)\wedge(((ap\ (ap\ c\_2Earithmetic\_2E\_2A\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V0m))\ V1n) = (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ (ap\ c\_2Earithmetic\_2E\_2A\ V0m)\ V1n))\ V1n))\wedge((ap\ (ap\ c\_2Earithmetic\_2E\_2A\ V0m)\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V1n)) = (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ (ap\ (ap\ c\_2Earithmetic\_2E\_2A\ V0m)\ V1n)))))))))) \tag{32}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.(\forall V2p \in ty\_2Enum\_2Enum.(((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V0m)\ V1n))\wedge(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V1n)\ V2p)))\Rightarrow(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V0m)\ V2p)))))) \tag{33}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V0m)\ V0m))) \tag{34}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.((V0m = V1n)\Leftrightarrow((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V0m)\ V1n))\wedge(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V1n)\ V0m)))))) \tag{35}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.(\forall V2p \in ty\_2Enum\_2Enum.((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ V1n))\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0m)\ V2p)))\Leftrightarrow(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V1n)\ V2p)))))) \tag{36}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.((\neg(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V0m)\ V1n)))\Leftrightarrow(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V1n))\ V0m))))) \tag{37}$$

Assume the following.

$$(\forall V0m \in ty\_2Enum\_2Enum.(\forall V1n \in ty\_2Enum\_2Enum.((\neg(V0m = V1n))\Leftrightarrow((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V0m))\ V1n))\vee(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V1n))\ V0m)))))) \tag{38}$$

Assume the following.

$$(\forall V0n \in ty\_2Enum\_2Enum.((ap\ \mathsf{c\_2Enum\_2ESUC}\ V0n) = (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ \mathsf{c\_2Earithmetic\_2EZERO})))\ V0n))) \tag{39}$$

Assume the following.

$$True \tag{40}$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(((p\ V0t1)\Rightarrow(p\ V1t2))\Rightarrow(((p\ V1t2)\Rightarrow(p\ V0t1))\Rightarrow((p\ V0t1)\Leftrightarrow(p\ V1t2)))))) \tag{41}$$

Assume the following.

$$(\forall V0t \in 2.(False\Rightarrow(p\ V0t))) \tag{42}$$

Assume the following.

$$(\forall V0t \in 2.((p\ V0t)\vee(\neg(p\ V0t)))) \tag{43}$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a\Rightarrow\forall A\_27b.nonempty\ A\_27b\Rightarrow(\forall V0t1 \in A\_27a.(\forall V1t2 \in A\_27b.((ap\ (\lambda V2x \in A\_27b.V0t1)\ V1t2) = V0t1))) \tag{44}$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a\Rightarrow(\forall V0t \in 2.((\forall V1x \in A\_27a.(p\ V0t))\Leftrightarrow(p\ V0t))) \tag{45}$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a\Rightarrow(\forall V0t \in 2.((\exists V1x \in A\_27a.(p\ V0t))\Leftrightarrow(p\ V0t))) \tag{46}$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(\forall V2t3 \in 2.(((p\ V0t1)\wedge ((p\ V1t2)\wedge(p\ V2t3)))\Leftrightarrow(((p\ V0t1)\wedge(p\ V1t2))\wedge(p\ V2t3)))))) \tag{47}$$

Assume the following.

$$(\forall V0t \in 2.(((True\wedge(p\ V0t))\Leftrightarrow(p\ V0t))\wedge((((p\ V0t)\wedge True)\Leftrightarrow (p\ V0t))\wedge(((False\wedge(p\ V0t))\Leftrightarrow False)\wedge((((p\ V0t)\wedge False)\Leftrightarrow False)\wedge (((p\ V0t)\wedge(p\ V0t))\Leftrightarrow(p\ V0t))))))) \tag{48}$$

Assume the following.

$$(\forall V0t \in 2.(((True\vee(p\ V0t))\Leftrightarrow True)\wedge((((p\ V0t)\vee True)\Leftrightarrow True)\wedge (((False\vee(p\ V0t))\Leftrightarrow(p\ V0t))\wedge((((p\ V0t)\vee False)\Leftrightarrow(p\ V0t))\wedge(((p\ V0t)\vee (p\ V0t))\Leftrightarrow(p\ V0t))))))) \tag{49}$$

Assume the following.

$$(\forall V0t \in 2.(((True\Rightarrow(p\ V0t))\Leftrightarrow(p\ V0t))\wedge((((p\ V0t)\Rightarrow True)\Leftrightarrow True)\wedge(((False\Rightarrow(p\ V0t))\Leftrightarrow True)\wedge((((p\ V0t)\Rightarrow(p\ V0t))\Leftrightarrow True)\wedge(((p\ V0t)\Rightarrow False)\Leftrightarrow(\neg(p\ V0t)))))))) \tag{50}$$

Assume the following.

$$((\forall V0t \in 2.((\neg(\neg(p\ V0t)))\Leftrightarrow(p\ V0t)))\wedge(((\neg True)\Leftrightarrow False)\wedge ((\neg False)\Leftrightarrow True))) \tag{51}$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a\Rightarrow(\forall V0x \in A\_27a.((V0x = V0x)\Leftrightarrow True)) \tag{52}$$

Assume the following.

$$(\forall V0t \in 2.(((True\Leftrightarrow(p\ V0t))\Leftrightarrow(p\ V0t))\wedge((((p\ V0t)\Leftrightarrow True)\Leftrightarrow (p\ V0t))\wedge(((False\Leftrightarrow(p\ V0t))\Leftrightarrow(\neg(p\ V0t)))\wedge(((p\ V0t)\Leftrightarrow False)\Leftrightarrow(\neg(p\ V0t))))))) \tag{53}$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(\forall V2C \in 2.(((p\ V0A)\vee((p\ V1B)\vee(p\ V2C)))\Leftrightarrow(((p\ V0A)\vee(p\ V1B))\vee(p\ V2C)))))) \tag{54}$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(((\neg((p\ V0A)\wedge(p\ V1B)))\Leftrightarrow((\neg(p\ V0A))\vee(\neg(p\ V1B))))\wedge((\neg((p\ V0A)\vee(p\ V1B)))\Leftrightarrow((\neg(p\ V0A))\wedge(\neg(p\ V1B))))))) \tag{55}$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(((p\ V0A) \Rightarrow (p\ V1B)) \Leftrightarrow ((\neg(p\ V0A)) \vee (p\ V1B))))) \tag{56}$$

Assume the following.

$$(\forall V0t \in 2.(((p\ V0t) \Rightarrow False) \Leftrightarrow ((p\ V0t) \Leftrightarrow False))) \tag{57}$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(\forall V2t3 \in 2.(((p\ V0t1) \Rightarrow ((p\ V1t2) \Rightarrow (p\ V2t3))) \Leftrightarrow (((p\ V0t1) \wedge (p\ V1t2)) \Rightarrow (p\ V2t3)))))) \tag{58}$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(((p\ V0t1) \Leftrightarrow (p\ V1t2)) \Leftrightarrow (((p\ V0t1) \wedge (p\ V1t2)) \vee ((\neg(p\ V0t1)) \wedge (\neg(p\ V1t2))))))) \tag{59}$$

Assume the following.

$$(\forall V0P \in (2^{ty\_2Enum\_2Enum}).(((p\ (ap\ V0P\ \mathsf{c\_2Enum\_2E0})) \wedge (\forall V1n \in ty\_2Enum\_2Enum.((p\ (ap\ V0P\ V1n)) \Rightarrow (p\ (ap\ V0P\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V1n)))))) \Rightarrow (\forall V2n \in ty\_2Enum\_2Enum.(p\ (ap\ V0P\ V2n))))) \tag{60}$$

Assume the following.

$$
\begin{array}{c}
((\forall V0n \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2B} \\
\mathsf{c\_2Enum\_2E0})\ V0n) = V0n))\wedge((\forall V1n \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap} \\
(\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2B}\ V1n)\ \mathsf{c\_2Enum\_2E0}) = V1n))\wedge((\forall V2n \in \\
\mathit{ty\_2Enum\_2Enum}.(\forall V3m \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2B} \\
(\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V2n))\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V3m)) = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (\mathit{ap}\ \mathsf{c\_2Enumeral\_2EiZ}\ (\mathit{ap} \\
(\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2B}\ V2n)\ V3m))))))\wedge((\forall V4n \in \mathit{ty\_2Enum\_2Enum}. \\
((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2A}\ \mathsf{c\_2Enum\_2E0})\ V4n) = \mathsf{c\_2Enum\_2E0}))\wedge \\
((\forall V5n \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2A} \\
V5n)\ \mathsf{c\_2Enum\_2E0}) = \mathsf{c\_2Enum\_2E0}))\wedge((\forall V6n \in \mathit{ty\_2Enum\_2Enum}. \\
(\forall V7m \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2A}\ (\\
\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V6n))\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V7m)) = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2A} \\
V6n)\ V7m)))))\wedge((\forall V8n \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2D} \\
\mathsf{c\_2Enum\_2E0})\ V8n) = \mathsf{c\_2Enum\_2E0}))\wedge((\forall V9n \in \mathit{ty\_2Enum\_2Enum}. \\
((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2D}\ V9n)\ \mathsf{c\_2Enum\_2E0}) = V9n))\wedge((\forall V10n \in \\
\mathit{ty\_2Enum\_2Enum}.(\forall V11m \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2D} \\
(\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V10n))\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V11m)) = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2E\_2D} \\
V10n)\ V11m)))))\wedge((\forall V12n \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2EEXP} \\
\mathsf{c\_2Enum\_2E0})\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
V12n))) = \mathsf{c\_2Enum\_2E0}))\wedge((\forall V13n \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap} \\
(\mathit{ap}\ \mathit{c\_2Earithmetic\_2EEXP}\ \mathsf{c\_2Enum\_2E0})\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
(\mathit{ap}\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V13n))) = \mathsf{c\_2Enum\_2E0}))\wedge((\forall V14n \in \\
\mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2EEXP}\ V14n)\ \mathsf{c\_2Enum\_2E0}) = \\
(\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2EBIT1}\ \mathsf{c\_2Earithmetic\_2EZERO}))))\wedge \\
((\forall V15n \in \mathit{ty\_2Enum\_2Enum}.(\forall V16m \in \mathit{ty\_2Enum\_2Enum}. \\
((\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2EEXP}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V15n)) \\
(\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V16m)) = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
(\mathit{ap}\ (\mathit{ap}\ \mathit{c\_2Earithmetic\_2EEXP}\ V15n)\ V16m)))))\wedge(((\mathit{ap}\ \mathsf{c\_2Enum\_2ESUC} \\
\mathsf{c\_2Enum\_2E0}) = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
\mathsf{c\_2Earithmetic\_2EZERO})))\wedge((\forall V17n \in \mathit{ty\_2Enum\_2Enum}.(\\
(\mathit{ap}\ \mathsf{c\_2Enum\_2ESUC}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V17n)) = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
(\mathit{ap}\ \mathsf{c\_2Enum\_2ESUC}\ V17n))))\wedge(((\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2EPRE}\ \mathsf{c\_2Enum\_2E0}) = \\
\mathsf{c\_2Enum\_2E0})\wedge((\forall V18n \in \mathit{ty\_2Enum\_2Enum}.((\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2EPRE} \\
(\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V18n)) = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
(\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2EPRE}\ V18n))))\wedge((\forall V19n \in \mathit{ty\_2Enum\_2Enum}. \\
(((\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V19n) = \mathsf{c\_2Enum\_2E0})\Leftrightarrow(V19n = \mathsf{c\_2Earithmetic\_2EZERO})))\wedge \\
((\forall V20n \in \mathit{ty\_2Enum\_2Enum}.((\mathsf{c\_2Enum\_2E0} = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V20n))\Leftrightarrow(V20n = \mathsf{c\_2Earithmetic\_2EZERO})))\wedge((\forall V21n \in \mathit{ty\_2Enum\_2Enum}. \\
(\forall V22m \in \mathit{ty\_2Enum\_2Enum}.(((\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V21n) = (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V22m))\Leftrightarrow(V21n = V22m))))\wedge \\
((\forall V23n \in \mathit{ty\_2Enum\_2Enum}.((p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C} \\
V23n)\ \mathsf{c\_2Enum\_2E0}))\Leftrightarrow \mathit{False}))\wedge((\forall V24n \in \mathit{ty\_2Enum\_2Enum}. \\
((p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C}\ \mathsf{c\_2Enum\_2E0})\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V24n)))\Leftrightarrow(p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C}\ \mathsf{c\_2Earithmetic\_2EZERO}) \\
V24n))))\wedge((\forall V25n \in \mathit{ty\_2Enum\_2Enum}.(\forall V26m \in \mathit{ty\_2Enum\_2Enum}. \\
((p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V25n))\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V26m)))\Leftrightarrow(p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C} \\
V25n)\ V26m)))))\wedge((\forall V27n \in \mathit{ty\_2Enum\_2Enum}.((p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2E\_3E} \\
\mathsf{c\_2Enum\_2E0})\ V27n))\Leftrightarrow \mathit{False}))\wedge((\forall V28n \in \mathit{ty\_2Enum\_2Enum}. \\
((p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2E\_3E}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V28n))\ \mathsf{c\_2Enum\_2E0}))\Leftrightarrow(p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C}\ \mathsf{c\_2Earithmetic\_2EZERO}) \\
V28n))))\wedge((\forall V29n \in \mathit{ty\_2Enum\_2Enum}.(\forall V30m \in \mathit{ty\_2Enum\_2Enum}. \\
((p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2E\_3E}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL} \\
V29n))\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}\ V30m)))\Leftrightarrow(p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C} \\
V30m)\ V29n)))))\wedge((\forall V31n \in \mathit{ty\_2Enum\_2Enum}.((p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D} \\
\mathsf{c\_2Enum\_2E0})\ V31n))\Leftrightarrow \mathit{True}))\wedge((\forall V32n \in \mathit{ty\_2Enum\_2Enum}. \\
((p\ (\mathit{ap}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (\mathit{ap}\ \mathsf{c\_2Earithmetic\_2ENUMERAL}
\end{array}
$$

Assume the following.

$$
\begin{gathered}
(\forall V0n \in ty\_2Enum\_2Enum.(\forall V1m \in ty\_2Enum\_2Enum.(\\
((ap\ \mathsf{c\_2Enumeral\_2EiZ}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ \mathsf{c\_2Earithmetic\_2EZERO}) \\
V0n)) = V0n) \wedge (((ap\ \mathsf{c\_2Enumeral\_2EiZ}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
V0n)\ \mathsf{c\_2Earithmetic\_2EZERO})) = V0n) \wedge (((ap\ \mathsf{c\_2Enumeral\_2EiZ}\ (\\
ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V0n))\ (\\
ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ (\\
ap\ \mathsf{c\_2Enumeral\_2EiZ}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ V1m)))) \wedge \\
(((ap\ \mathsf{c\_2Enumeral\_2EiZ}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
(ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ V1m)))) \wedge (\\
((ap\ \mathsf{c\_2Enumeral\_2EiZ}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2} \\
V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
(ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ V1m)))) \wedge (\\
((ap\ \mathsf{c\_2Enumeral\_2EiZ}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2} \\
V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT2} \\
(ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ V1m)))) \wedge (\\
((ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ \mathsf{c\_2Earithmetic\_2EZERO}) \\
V0n)) = (ap\ \mathsf{c\_2Enum\_2ESUC}\ V0n)) \wedge (((ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
V0n)\ \mathsf{c\_2Earithmetic\_2EZERO})) = (ap\ \mathsf{c\_2Enum\_2ESUC}\ V0n)) \wedge (((ap \\
\mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
(ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ V1m)))) \wedge (\\
((ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT2} \\
(ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ V1m)))) \wedge (\\
((ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2} \\
V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT2} \\
(ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ V1m)))) \wedge (\\
((ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2} \\
V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
(ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ V1m)))) \wedge \\
(((ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B\ \mathsf{c\_2Earithmetic\_2EZERO}) \\
V0n)) = (ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ V0n)) \wedge (((ap\ \mathsf{c\_2Enumeral\_2EiiSUC} \\
(ap\ (ap\ c\_2Earithmetic\_2E\_2B\ V0n)\ \mathsf{c\_2Earithmetic\_2EZERO})) = (\\
ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ V0n)) \wedge (((ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (\\
ap\ c\_2Earithmetic\_2E\_2B\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1} \\
V1m))) = (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
V0n)\ V1m)))) \wedge (((ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
(ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V1m))) = \\
(ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ (ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
V0n)\ V1m)))) \wedge (((ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
(ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V1m))) = \\
(ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ (ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
V0n)\ V1m)))) \wedge ((ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
(ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V1m))) = \\
(ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ (ap\ \mathsf{c\_2Enumeral\_2EiiSUC}\ (ap\ (ap\ c\_2Earithmetic\_2E\_2B \\
V0n)\ V1m)))))))))))))))))))))))
\end{gathered}
\tag{62}
$$

Assume the following.

$$(\forall V0n \in ty\_2Enum\_2Enum.(\forall V1m \in ty\_2Enum\_2Enum.(((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ \mathsf{c\_2Earithmetic\_2EZERO})\ V0n))\Leftrightarrow True)\wedge(((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V0n))\ \mathsf{c\_2Earithmetic\_2EZERO}))\Leftrightarrow False)\wedge(((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V0n))\ \mathsf{c\_2Earithmetic\_2EZERO}))\Leftrightarrow False)\wedge (((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V1m)))\Leftrightarrow(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V0n)\ V1m)))\wedge(((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V1m)))\Leftrightarrow(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V0n)\ V1m)))\wedge(((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT1}\ V1m)))\Leftrightarrow(\neg(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V1m)\ V0n))))\wedge((p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V0n))\ (ap\ \mathsf{c\_2Earithmetic\_2EBIT2}\ V1m)))\Leftrightarrow(p\ (ap\ (ap\ \mathsf{c\_2Earithmetic\_2E\_3C\_3D}\ V0n)\ V1m)))))))))) \tag{63}$$

Assume the following.

$$(((ap\ \mathsf{c\_2Eprim\_\_rec\_2EPRE}\ \mathsf{c\_2Enum\_2E0}) = \mathsf{c\_2Enum\_2E0})\wedge(\forall V0m \in ty\_2Enum\_2Enum.((ap\ \mathsf{c\_2Eprim\_\_rec\_2EPRE}\ (ap\ \mathsf{c\_2Enum\_2ESUC}\ V0m)) = V0m))) \tag{64}$$

Assume the following.

$$(\forall V0n \in ty\_2Enum\_2Enum.(\neg(p\ (ap\ (ap\ \mathsf{c\_2Eprim\_\_rec\_2E\_3C}\ V0n)\ V0n)))) \tag{65}$$

Assume the following.

$$(\forall V0t \in 2.((\neg(\neg(p\ V0t)))\Leftrightarrow(p\ V0t))) \tag{66}$$

Assume the following.

$$(\forall V0A \in 2.((p\ V0A)\Rightarrow((\neg(p\ V0A))\Rightarrow False))) \tag{67}$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(((\neg((p\ V0A)\vee(p\ V1B)))\Rightarrow False)\Leftrightarrow (((p\ V0A)\Rightarrow False)\Rightarrow((\neg(p\ V1B))\Rightarrow False))))) \tag{68}$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(((\neg((\neg(p\ V0A))\vee(p\ V1B)))\Rightarrow False)\Leftrightarrow ((p\ V0A)\Rightarrow((\neg(p\ V1B))\Rightarrow False))))) \tag{69}$$

Assume the following.

$$(\forall V0A \in 2.(((\neg(p\ V0A))\Rightarrow False)\Rightarrow(((p\ V0A)\Rightarrow False)\Rightarrow False))) \tag{70}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(\forall V2r \in 2.(((p\ V0p) \Leftrightarrow ((p\ V1q) \Leftrightarrow (p\ V2r))) \Leftrightarrow (((p\ V0p) \vee ((p\ V1q) \vee (p\ V2r))) \wedge (((p\ V0p) \vee ((\neg (p\ V2r)) \vee (\neg (p\ V1q)))) \wedge (((p\ V1q) \vee ((\neg (p\ V2r)) \vee (\neg (p\ V0p)))) \wedge ((p\ V2r) \vee ((\neg (p\ V1q)) \vee (\neg (p\ V0p))))))))))) \tag{71}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(\forall V2r \in 2.(((p\ V0p) \Leftrightarrow ((p\ V1q) \wedge (p\ V2r))) \Leftrightarrow (((p\ V0p) \vee ((\neg (p\ V1q)) \vee (\neg (p\ V2r)))) \wedge (((p\ V1q) \vee (\neg (p\ V0p))) \wedge ((p\ V2r) \vee (\neg (p\ V0p))))))))) \tag{72}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(\forall V2r \in 2.(((p\ V0p) \Leftrightarrow ((p\ V1q) \vee (p\ V2r))) \Leftrightarrow (((p\ V0p) \vee (\neg (p\ V1q))) \wedge (((p\ V0p) \vee (\neg (p\ V2r))) \wedge ((p\ V1q) \vee ((p\ V2r) \vee (\neg (p\ V0p)))))))))) \tag{73}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(((p\ V0p) \Leftrightarrow (\neg (p\ V1q))) \Leftrightarrow (((p\ V0p) \vee (p\ V1q)) \wedge ((\neg (p\ V1q)) \vee (\neg (p\ V0p))))))) \tag{74}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.((\neg ((p\ V0p) \Rightarrow (p\ V1q))) \Rightarrow (p\ V0p)))) \tag{75}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.((\neg ((p\ V0p) \Rightarrow (p\ V1q))) \Rightarrow (\neg (p\ V1q))))) \tag{76}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.((\neg ((p\ V0p) \vee (p\ V1q))) \Rightarrow (\neg (p\ V0p))))) \tag{77}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.((\neg ((p\ V0p) \vee (p\ V1q))) \Rightarrow (\neg (p\ V1q))))) \tag{78}$$

Assume the following.

$$(\forall V0p \in 2.((\neg (\neg (p\ V0p))) \Rightarrow (p\ V0p))) \tag{79}$$

Theorem 1

$$
\begin{gathered}
(\forall V0b \in (2^{ty\_2Enum\_2Enum}).(\forall V1a \in (2^{ty\_2Enum\_2Enum}). \\
(((ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (\lambda V2t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2EF})) = (\lambda V3t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\wedge(\\
((ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ENEXT}\ (\lambda V4t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET})) = \\
(\lambda V5t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS} \\
(\lambda V6t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET})) = (\lambda V7t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS}\ (\lambda V8t \in \\
ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF})) = (\lambda V9t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\wedge \\
(((ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ (\lambda V10t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET})) = (\lambda V11t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\wedge \\
(((ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ (\lambda V12t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2EF})) = (\lambda V13t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\wedge \\
(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ (\lambda V14t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2EF}))\ V0b) = V0b)\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL} \\
(\lambda V15t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\ V0b) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENT} \\
V0b))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ V1a)\ (\lambda V16t \in \\
ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF})) = (\lambda V17t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2EF}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ V1a) \\
(\lambda V18t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET})) = (\lambda V19t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESUNTIL}\ V1a) \\
V1a) = V1a)\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ (\lambda V20t \in \\
ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\ V0b) = V0b)\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNT} \\
(\lambda V21t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\ V0b) = (\lambda V22t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ V1a)\ (\\
\lambda V23t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF})) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS} \\
V1a))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ V1a)\ (\lambda V24t \in \\
ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET})) = (\lambda V25t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EUNTIL}\ V1a)\ V1a) = \\
V1a)\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ (\lambda V26t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2EF}))\ V0b) = (\lambda V27t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\wedge \\
(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ (\lambda V28t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET}))\ V0b) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ V0b))\wedge \\
(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ V1a)\ (\lambda V29t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2EF})) = (\lambda V30t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\wedge \\
(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN}\ V1a)\ (\lambda V31t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET})) = V1a)\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESWHEN} \\
V1a)\ V1a) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUAL}\ V1a))\wedge(((ap\ (ap \\
\mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ (\lambda V32t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF})) \\
V0b) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWAYS}\ (\lambda V33t \in ty\_2Enum\_2Enum. \\
(ap\ \mathsf{c\_2Ebool\_2E\_7E}\ (ap\ V0b\ V33t)))))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN} \\
(\lambda V34t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\ V0b) = (\lambda V35t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ V1a)\ (\lambda V36t \in \\
ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF})) = (\lambda V37t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN}\ V1a)\ (\lambda V38t \in \\
ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET})) = V1a)\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EWHEN} \\
V1a)\ V1a) = (\lambda V39t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET}))\wedge(((ap\ (\\
ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ (\lambda V40t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2EF}))\ V0b) = (\lambda V41t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\wedge \\
(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ (\lambda V42t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2ET}))\ V0b) = (\lambda V43t \in ty\_2Enum\_2Enum.(ap\ \mathsf{c\_2Ebool\_2E\_7E} \\
(ap\ V0b\ V43t))))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ V1a) \\
(\lambda V44t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF})) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EEVENTUA} \\
V1a))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ V1a)\ (\lambda V45t \in \\
ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2ET})) = (\lambda V46t \in ty\_2Enum\_2Enum. \\
\mathsf{c\_2Ebool\_2EF}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2ESBEFORE}\ V1a) \\
V1a) = (\lambda V47t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\wedge(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBE} \\
(\lambda V48t \in ty\_2Enum\_2Enum.\mathsf{c\_2Ebool\_2EF}))\ V0b) = (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EALWA} \\
(\lambda V49t \in ty\_2Enum\_2Enum.(ap\ \mathsf{c\_2Ebool\_2E\_7E}\ (ap\ V0b\ V49t)))))\wedge \\
(((ap\ (ap\ \mathsf{c\_2ETemporal\_\_Logic\_2EBEFORE}\ (\lambda V50t \in ty\_2Enum\_2Enum.
\end{gathered}
$$