

thm_2EPast__Temporal__Logic_2ENO__FUTURE__EVENT (TMZ7NUevvaAbVzUhYVnqxytniF9je9Z2vEh)

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Let $ty_2Enum_2Enum : \iota$ be given. Assume the following.

$$nonempty\ ty_2Enum_2Enum \tag{1}$$

Let $c_2Earithmetic_2E_2B : \iota$ be given. Assume the following.

$$c_2Earithmetic_2E_2B \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \tag{2}$$

Definition 1 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 2 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 3 We define $c_2Ebool_2E_3F$ to be $\lambda A.\lambda a : \iota.(\lambda V0P \in (2^{A-27a}).(ap\ V0P (ap (c_2Emin_2E_40\ A$

Definition 4 We define $c_2Ebool_2E_2T$ to be $(ap (ap (c_2Emin_2E_3D (2^2)) (\lambda V0x \in 2.V0x)) (\lambda V1x \in 2.V$

Definition 5 We define $c_2Ebool_2E_21$ to be $\lambda A.\lambda a : \iota.(\lambda V0P \in (2^{A-27a}).(ap (ap (c_2Emin_2E_3D (2^{A-27$

Definition 6 We define $c_2ETemporal_Logic_2EEVENTUAL$ to be $\lambda V0P \in (2^{ty_2Enum_2Enum}).\lambda V1t0 \in ty$

Definition 7 We define $c_2Ebool_2E_2F$ to be $(ap (c_2Ebool_2E_21\ 2) (\lambda V0t \in 2.V0t))$.

Definition 8 We define $c_2Emin_2E_3D_3D_3E$ to be $\lambda P \in 2.\lambda Q \in 2.inj_o (p \Rightarrow Q)$ of type ι .

Definition 9 We define $c_2Ebool_2E_7E$ to be $(\lambda V0t \in 2.(ap (ap\ c_2Emin_2E_3D_3D_3E\ V0t)\ c_2Ebool_2E_2F$

Definition 10 We define $c_2Ebool_2E_2F_5C$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21\ 2) (\lambda V2t \in$

Definition 11 We define $c_2Ebool_2E_5C_2F$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21\ 2) (\lambda V2t \in$

Let $c_2Enum_2EREP_num : \iota$ be given. Assume the following.

$$c_2Enum_2EREP_num \in (\omega^{ty_2Enum_2Enum}) \quad (3)$$

Let $c_2Enum_2ESUC_REP : \iota$ be given. Assume the following.

$$c_2Enum_2ESUC_REP \in (\omega^{\omega}) \quad (4)$$

Let $c_2Enum_2EABS_num : \iota$ be given. Assume the following.

$$c_2Enum_2EABS_num \in (ty_2Enum_2Enum^{\omega}) \quad (5)$$

Definition 12 We define c_2Enum_2ESUC to be $\lambda V0m \in ty_2Enum_2Enum. (ap\ c_2Enum_2EABS_num$

Definition 13 We define $c_2ETemporal_Logic_2EWATCH$ to be $\lambda V0q \in (2^{ty_2Enum_2Enum}). \lambda V1b \in (2^{ty_2Enum_2Enum}).$

Definition 14 We define $c_2ETemporal_Logic_2ESBEFORE$ to be $\lambda V0a \in (2^{ty_2Enum_2Enum}). \lambda V1b \in (2^{ty_2Enum_2Enum}).$

Definition 15 We define $c_2ETemporal_Logic_2ESUNTIL$ to be $\lambda V0a \in (2^{ty_2Enum_2Enum}). \lambda V1b \in (2^{ty_2Enum_2Enum}).$

Definition 16 We define $c_2ETemporal_Logic_2ESWHEN$ to be $\lambda V0a \in (2^{ty_2Enum_2Enum}). \lambda V1b \in (2^{ty_2Enum_2Enum}).$

Definition 17 We define $c_2ETemporal_Logic_2EBEFORE$ to be $\lambda V0a \in (2^{ty_2Enum_2Enum}). \lambda V1b \in (2^{ty_2Enum_2Enum}).$

Definition 18 We define $c_2ETemporal_Logic_2EUNTIL$ to be $\lambda V0a \in (2^{ty_2Enum_2Enum}). \lambda V1b \in (2^{ty_2Enum_2Enum}).$

Definition 19 We define $c_2ETemporal_Logic_2EWHEN$ to be $\lambda V0a \in (2^{ty_2Enum_2Enum}). \lambda V1b \in (2^{ty_2Enum_2Enum}).$

Definition 20 We define $c_2ETemporal_Logic_2EALWAYS$ to be $\lambda V0P \in (2^{ty_2Enum_2Enum}). \lambda V1t0 \in ty_2Enum_2Enum.$

Assume the following.

$$\begin{aligned} & (\forall V0b \in (2^{ty_2Enum_2Enum}). (\forall V1t0 \in ty_2Enum_2Enum. \\ & ((p\ (ap\ (ap\ c_2ETemporal_Logic_2EALWAYS\ (\lambda V2t \in ty_2Enum_2Enum. \\ & (ap\ c_2Ebool_2E_7E\ (ap\ V0b\ V2t))))\ V1t0)) \Rightarrow ((\forall V3a \in (2^{ty_2Enum_2Enum}). \\ & ((p\ (ap\ (ap\ (ap\ c_2ETemporal_Logic_2EWHEN\ V3a)\ V0b)\ V1t0)) \Leftrightarrow True)) \wedge \\ & ((\forall V4a \in (2^{ty_2Enum_2Enum}). ((p\ (ap\ (ap\ (ap\ c_2ETemporal_Logic_2EUNTIL \\ & V4a)\ V0b)\ V1t0)) \Leftrightarrow (p\ (ap\ (ap\ c_2ETemporal_Logic_2EALWAYS\ V4a) \\ & V1t0)))) \wedge ((\forall V5a \in (2^{ty_2Enum_2Enum}). ((p\ (ap\ (ap\ (ap\ c_2ETemporal_Logic_2EBEFORE \\ & V5a)\ V0b)\ V1t0)) \Leftrightarrow True)) \wedge ((\forall V6a \in (2^{ty_2Enum_2Enum}). (\\ & (p\ (ap\ (ap\ (ap\ c_2ETemporal_Logic_2ESWHEN\ V6a)\ V0b)\ V1t0)) \Leftrightarrow False)) \wedge \\ & ((\forall V7a \in (2^{ty_2Enum_2Enum}). ((p\ (ap\ (ap\ (ap\ c_2ETemporal_Logic_2ESUNTIL \\ & V7a)\ V0b)\ V1t0)) \Leftrightarrow False)) \wedge (\forall V8a \in (2^{ty_2Enum_2Enum}). (\\ & (p\ (ap\ (ap\ (ap\ c_2ETemporal_Logic_2ESBEFORE\ V8a)\ V0b)\ V1t0)) \Leftrightarrow \\ & (p\ (ap\ (ap\ c_2ETemporal_Logic_2EEVENTUAL\ V8a)\ V1t0))))))))))))) \\ & (6) \end{aligned}$$

Theorem 1

$$\begin{aligned} & (\forall V0b \in (2^{ty_2Enum_2Enum}).(\forall V1t0 \in ty_2Enum_2Enum. \\ & ((p (ap (ap c_2ETemporal_Logic_2EALWAYS (\lambda V2t \in ty_2Enum_2Enum. \\ & (ap c_2Ebool_2E_7E (ap V0b V2t)))) V1t0)) \Rightarrow ((\forall V3a \in (2^{ty_2Enum_2Enum}). \\ & ((p (ap (ap (ap c_2ETemporal_Logic_2EWHEN V3a) V0b) V1t0)) \Leftrightarrow True)) \wedge \\ & ((\forall V4a \in (2^{ty_2Enum_2Enum}).((p (ap (ap (ap c_2ETemporal_Logic_2EUNTIL \\ & V4a) V0b) V1t0)) \Leftrightarrow (p (ap (ap c_2ETemporal_Logic_2EALWAYS V4a) \\ & V1t0)))) \wedge ((\forall V5a \in (2^{ty_2Enum_2Enum}).((p (ap (ap (ap c_2ETemporal_Logic_2EBEFORE \\ & V5a) V0b) V1t0)) \Leftrightarrow True)) \wedge ((\forall V6a \in (2^{ty_2Enum_2Enum}).(\\ & (p (ap (ap (ap c_2ETemporal_Logic_2ESWHEN V6a) V0b) V1t0)) \Leftrightarrow False)) \wedge \\ & ((\forall V7a \in (2^{ty_2Enum_2Enum}).((p (ap (ap (ap c_2ETemporal_Logic_2ESUNTIL \\ & V7a) V0b) V1t0)) \Leftrightarrow False)) \wedge ((\forall V8a \in (2^{ty_2Enum_2Enum}).(\\ & (p (ap (ap (ap c_2ETemporal_Logic_2ESBEFORE V8a) V0b) V1t0)) \Leftrightarrow \\ & (p (ap (ap c_2ETemporal_Logic_2EEVENTUAL V8a) V1t0)))))))))))))) \end{aligned}$$