

thm_2Estring_2EIMPL0DE__EQ__THM
(TMVWHKYm5nziyhigoZ3Y9FZsixrHPN1ECUX)

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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_2Ebool_2E_2T` to be $(ap (ap (c_2Emin_2E_3D (2^2))) (\lambda V0x \in 2.V0x)) (\lambda V1x \in 2.V1x)$

Definition 3 We define `c_2Ebool_2E_21` to be $\lambda A_27a : \iota.(\lambda V0P \in (2^{A_27a}).(ap (ap (c_2Emin_2E_3D (2^{A_27a}))$

Definition 4 We define `c_2Ebool_2E_2F` to be $(ap (c_2Ebool_2E_21 2) (\lambda V0t \in 2.V0t))$.

Definition 5 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 6 We define `c_2Emin_2E_40` to be $\lambda A.\lambda P \in 2^A.if (\exists x \in A.p (ap P x)) \mathbf{then} (the (\lambda x.x \in A \wedge p$ of type $\iota \Rightarrow \iota$.

Definition 7 We define `c_2Ebool_2E_3F` to be $\lambda A_27a : \iota.(\lambda V0P \in (2^{A_27a}).(ap V0P (ap (c_2Emin_2E_40 A_27a$

Definition 8 We define `c_2Ebool_2E_5C_2E_2F` to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21 2) (\lambda V2t \in 2.V2t))$

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

Let `ty_2Elist_2Elist` : $\iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty A0 \Rightarrow nonempty (ty_2Elist_2Elist A0) \quad (1)$$

Let `c_2Elist_2ECONS` : $\iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Elist_2ECONS A_27a \in (((ty_2Elist_2Elist A_27a)^{(ty_2Elist_2Elist A_27a)})^{A_27a}) \quad (2)$$

Let `c_2Elist_2ENIL` : $\iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Elist_2ENIL A_27a \in (ty_2Elist_2Elist A_27a) \quad (3)$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(\forall V2t3 \in 2.(((p V0t1) \Rightarrow (p V1t2) \Rightarrow (p V2t3))) \Leftrightarrow (((p V0t1) \wedge (p V1t2)) \Rightarrow (p V2t3)))))) \quad (15)$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(((p V0t1) \Leftrightarrow (p V1t2)) \Leftrightarrow (((p V0t1) \Rightarrow (p V1t2)) \wedge ((p V1t2) \Rightarrow (p V0t1)))))) \quad (16)$$

Assume the following.

$$(\forall V0x \in 2.(\forall V1x_{.27} \in 2.(\forall V2y \in 2.(\forall V3y_{.27} \in 2.(((p V0x) \Leftrightarrow (p V1x_{.27})) \wedge ((p V1x_{.27}) \Rightarrow ((p V2y) \Leftrightarrow (p V3y_{.27})))))) \Rightarrow ((p V0x) \Rightarrow (p V2y)) \Leftrightarrow ((p V1x_{.27}) \Rightarrow (p V3y_{.27})))))) \quad (17)$$

Assume the following.

$$\forall A_{.27a}.nonempty A_{.27a} \Rightarrow (\forall V0l \in (ty_2Elist_2Elist A_{.27a}).((V0l = (c_2Elist_2ENIL A_{.27a})) \vee (\exists V1h \in A_{.27a}.(\exists V2t \in (ty_2Elist_2Elist A_{.27a}).(V0l = (ap (ap (c_2Elist_2ECONS A_{.27a}) V1h) V2t))))))) \quad (18)$$

Assume the following.

$$\forall A_{.27a}.nonempty A_{.27a} \Rightarrow (\forall V0a0 \in A_{.27a}.(\forall V1a1 \in (ty_2Elist_2Elist A_{.27a}).(\forall V2a0_{.27} \in A_{.27a}.(\forall V3a1_{.27} \in (ty_2Elist_2Elist A_{.27a}).(((ap (ap (c_2Elist_2ECONS A_{.27a}) V0a0) V1a1) = (ap (ap (c_2Elist_2ECONS A_{.27a}) V2a0_{.27}) V3a1_{.27})) \Leftrightarrow ((V0a0 = V2a0_{.27}) \wedge (V1a1 = V3a1_{.27}))))))) \quad (19)$$

Assume the following.

$$\forall A_{.27a}.nonempty A_{.27a} \Rightarrow (\forall V0a1 \in (ty_2Elist_2Elist A_{.27a}).(\forall V1a0 \in A_{.27a}.(\neg((c_2Elist_2ENIL A_{.27a}) = (ap (ap (c_2Elist_2ECONS A_{.27a}) V1a0) V0a1)))))) \quad (20)$$

Assume the following.

$$(((ap c_2Estring_2EIMPLode (c_2Elist_2ENIL ty_2Estring_2Echar)) = (c_2Elist_2ENIL ty_2Estring_2Echar)) \wedge (\forall V0c \in ty_2Estring_2Echar. (\forall V1cs \in (ty_2Elist_2Elist ty_2Estring_2Echar).((ap c_2Estring_2EIMPLode (ap (ap (c_2Elist_2ECONS ty_2Estring_2Echar) V0c) V1cs)) = (ap (ap (c_2Elist_2ECONS ty_2Estring_2Echar) V0c) (ap c_2Estring_2EIMPLode V1cs))))))) \quad (21)$$

Assume the following.

$$(\forall V0s \in (ty_2Elist_2Elist ty_2Estring_2Echar).((ap c_2Estring_2EIMPLode (ap c_2Estring_2EEXPLODE V0s)) = V0s)) \quad (22)$$

Assume the following.

$$(\forall V0cs \in (ty_2Elist_2Elist\ ty_2Estring_2Echar).((ap\ c_2Estring_2EEXPLODE\ (ap\ c_2Estring_2EIMPLODE\ V0cs)) = V0cs)) \quad (23)$$

Theorem 1

$$\begin{aligned} & (\forall V0c \in ty_2Estring_2Echar. (\forall V1s \in (ty_2Elist_2Elist \\ & \quad ty_2Estring_2Echar). (\forall V2l \in (ty_2Elist_2Elist\ ty_2Estring_2Echar). \\ & \quad (((ap\ (ap\ (c_2Elist_2ECONS\ ty_2Estring_2Echar)\ V0c)\ V1s) = (ap \\ & \quad c_2Estring_2EIMPLODE\ V2l)) \Leftrightarrow (V2l = (ap\ (ap\ (c_2Elist_2ECONS\ ty_2Estring_2Echar) \\ & \quad V0c)\ (ap\ c_2Estring_2EEXPLODE\ V1s)))) \wedge (((ap\ c_2Estring_2EIMPLODE \\ & \quad V2l) = (ap\ (ap\ (c_2Elist_2ECONS\ ty_2Estring_2Echar)\ V0c)\ V1s)) \Leftrightarrow \\ & \quad (V2l = (ap\ (ap\ (c_2Elist_2ECONS\ ty_2Estring_2Echar)\ V0c)\ (ap\ c_2Estring_2EEXPLODE \\ & \quad V1s)))))))) \end{aligned}$$