

thm_2EdefCNF_2EFINAL__DEF
 (TMTCrRoCkqP8sikcNvg4GXuNuqwopVH27rF)

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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_2ET 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 $\lambda A. \lambda a : \iota. (\lambda V0P \in (2^{A_27a}). (ap (ap (c_2Emin_2E_3D (2^{A_27a})) (\lambda V1x \in 2.V1x)) (\lambda V2x \in 2.V2x)))$

Definition 4 We define c_2Ebool_2EF to be $(ap (c_2Ebool_2E_21 2) (\lambda V0t \in 2.V0t))$.

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

$$nonempty\ ty_2Enum_2Enum \quad (1)$$

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

$$c_2Enum_2EREP_num \in (\omega^{ty_2Enum_2Enum}) \quad (2)$$

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

$$c_2Enum_2ESUC_REP \in (\omega^{\omega}) \quad (3)$$

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

$$c_2Enum_2EABS_num \in (ty_2Enum_2Enum^{\omega}) \quad (4)$$

Definition 5 We define c_2Enum_2ESUC to be $\lambda V0m \in ty_2Enum_2Enum. (ap c_2Enum_2EABS_num m)$

Let $ty_2Esum_2Esum : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall A0. nonempty\ A0 \Rightarrow \forall A1. nonempty\ A1 \Rightarrow nonempty\ (ty_2Esum_2Esum \\ A0\ A1) \end{aligned} \quad (5)$$

Let $ty_2Epair_2Eprod : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall A0. nonempty\ A0 \Rightarrow \forall A1. nonempty\ A1 \Rightarrow nonempty\ (ty_2Epair_2Eprod \\ A0\ A1) \end{aligned} \quad (6)$$

Let $c_2EdefCNF_2EUNIQUE : \iota$ be given. Assume the following.

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

$$\forall A. \text{nonempty } A \Rightarrow \text{nonempty} (\text{ty_2Elist_2Elist } A) \quad (8)$$

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

$$\forall A_27a.\text{nonempty } A_27a \Rightarrow c_2Elist_2ECONS\ A_27a \in (((ty_2Elist_2Elist\\ A_27a)^{(ty_2Elist_2Elist\ A_27a)})^A_27a) \quad (9)$$

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

$\forall A \exists a. nonempty\ A \Rightarrow \exists c \in A \exists L \in ENIL\ A \in (ty \exists L \in ELIST\ A)$

Let $c_2EdefCNF_2EDEF : \iota$ be given. Assume the following.

Definition 6 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 7 We define $c_2Ebool_2E_2F_5C$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap(c_2Ebool_2E_21 2))(\lambda V2t \in 2.$

Assume the following.

True (12)

Assume the following.

$$\forall A_27a.\text{nonempty } A_27a \Rightarrow (\forall V0t \in 2.((\forall V1x \in A_27a.(p\ V0t)) \Leftrightarrow (p\ V0t))) \quad (13)$$

Assume the following.

$$(\forall V0t \in 2.(((True \wedge (p \ V0t)) \Leftrightarrow (p \ V0t)) \wedge (((p \ V0t) \wedge True) \Leftrightarrow (p \ V0t)) \wedge (((False \wedge (p \ V0t)) \Leftrightarrow False) \wedge (((p \ V0t) \wedge False) \Leftrightarrow False) \wedge (((p \ V0t) \wedge (p \ V0t)) \Leftrightarrow (p \ V0t))))))) \quad (14)$$

Assume the following.

$$\forall A. \text{nonempty } A \Rightarrow (\forall V0x \in A. ((V0x = V0x) \Leftrightarrow \text{True})) \quad (15)$$

Assume the following.

$$\begin{aligned}
& ((\forall V0v \in (2^{ty_2Enum_2Enum}).(\forall V1n \in ty_2Enum_2Enum. \\
& ((p (ap (ap (ap c_2EdefCNF_2EDEF V0v) V1n) (c_2Elist_2ENIL (ty_2Epair_2Eprod \\
& ((2^2)^2) (ty_2Epair_2Eprod (ty_2Esum_2Esum ty_2Enum_2Enum 2) \\
& (ty_2Esum_2Esum ty_2Enum_2Enum 2))))))) \Leftrightarrow True))) \wedge (\forall V2v \in \\
& (2^{ty_2Enum_2Enum}).(\forall V3n \in ty_2Enum_2Enum.(\forall V4x \in \\
& (ty_2Epair_2Eprod ((2^2)^2) (ty_2Epair_2Eprod (ty_2Esum_2Esum \\
& ty_2Enum_2Enum 2) (ty_2Esum_2Esum ty_2Enum_2Enum 2))).(\forall V5xs \in \\
& (ty_2Elist_2Elist (ty_2Epair_2Eprod ((2^2)^2) (ty_2Epair_2Eprod \\
& (ty_2Esum_2Esum ty_2Enum_2Enum 2) (ty_2Esum_2Esum ty_2Enum_2Enum 2))) \wedge \\
& ((p (ap (ap (ap c_2EdefCNF_2EDEF V2v) V3n) (ap (ap (c_2Elist_2ECONS \\
& (ty_2Epair_2Eprod ((2^2)^2) (ty_2Epair_2Eprod (ty_2Esum_2Esum \\
& ty_2Enum_2Enum 2) (ty_2Esum_2Esum ty_2Enum_2Enum 2)))) V4x) \\
& V5xs))) \Leftrightarrow ((p (ap (ap (ap c_2EdefCNF_2EUNIQUE V2v) V3n) V4x)) \wedge (p \\
& (ap (ap (ap c_2EdefCNF_2EDEF V2v) (ap c_2Enum_2ESUC V3n)) V5xs))))))) \\
& (16)
\end{aligned}$$

Theorem 1

$$\begin{aligned}
& ((\forall V0v \in (2^{ty_2Enum_2Enum}).(\forall V1n \in ty_2Enum_2Enum. \\
& (\forall V2x \in 2.(((p (ap V0v V1n)) \Leftrightarrow (p V2x)) \Leftrightarrow (((p (ap V0v V1n)) \Leftrightarrow \\
& (p V2x)) \wedge (p (ap (ap (ap c_2EdefCNF_2EDEF V0v) (ap c_2Enum_2ESUC \\
& V1n)) (c_2Elist_2ENIL (ty_2Epair_2Eprod ((2^2)^2) (ty_2Epair_2Eprod \\
& (ty_2Esum_2Esum ty_2Enum_2Enum 2) (ty_2Esum_2Esum ty_2Enum_2Enum \\
& 2)))))))))))
\end{aligned}$$