thm_2Eenumeral_2Edatatype__bl (TMV-ZLT5dFZU8y4ekrN4UNYv8gVH4HkYKAwm)

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Let $ty\_2Eenumeral\_2Ebl : \iota\Rightarrow\iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0\Rightarrow nonempty\ (ty\_2Eenumeral\_2Ebl\ A0) \qquad (1)$$

Let $ty\_2Eenumeral\_2Ebt : \iota\Rightarrow\iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0\Rightarrow nonempty\ (ty\_2Eenumeral\_2Ebt\ A0) \qquad (2)$$

Let $c\_2Eenumeral\_2Eonebl : \iota\Rightarrow\iota$ be given. Assume the following.

$$\forall A\_27a.nonempty\ A\_27a\Rightarrow c\_2Eenumeral\_2Eonebl\ A\_27a \in ((\\
((ty\_2Eenumeral\_2Ebl\ A\_27a)^{(ty\_2Eenumeral\_2Ebl\ A\_27a)})^{(ty\_2Eenumeral\_2Ebt\ A\_27a)})^{A\_27a})$$
$$(3)$$

Let $c\_2Eenumeral\_2Ezerbl : \iota\Rightarrow\iota$ be given. Assume the following.

$$\forall A\_27a.nonempty\ A\_27a\Rightarrow c\_2Eenumeral\_2Ezerbl\ A\_27a \in ((\\
ty\_2Eenumeral\_2Ebl\ A\_27a)^{(ty\_2Eenumeral\_2Ebl\ A\_27a)}) \qquad (4)$$

Let $c\_2Eenumeral\_2Enbl : \iota\Rightarrow\iota$ be given. Assume the following.

$$\forall A\_27a.nonempty\ A\_27a\Rightarrow c\_2Eenumeral\_2Enbl\ A\_27a \in (ty\_2Eenumeral\_2Ebl\\
A\_27a)$$
$$(5)$$

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$\ (2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V1$

Definition 3 *We define* c_2Ebool_2EDATATYPE *to be* $\lambda A\_27a : \iota.(\lambda V0x \in A\_27a.c_2Ebool_2ET)$.

Definition 4 *We define* c_2Ebool_2E_21 *to be* $\lambda A\_27a : \iota.(\lambda V0P \in (2^{A\_27a}).(ap\ (ap\ ($c_2Emin_2E_3D$\ (2^{A\_27}$

Assume the following.

$$True \qquad (6)$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a\Rightarrow(\forall V0x \in A\_27a.((p\ (ap\ ($c_2Ebool_2EDATATYPE\\
A\_27a)\ V0x))\Leftrightarrow True))$$
$$(7)$$

Theorem 1

$\forall A\_27a.nonempty\ A\_27a \Rightarrow (\forall V0bl \in (((2^{((((ty\_2Eenumeral\_2Ebl\ A\_27a)^{(ty\_2Eenumeral\_2Ebl\ A\_27a)})^{(ty\_2Eenumeral\_2l}}$

$(p\ (ap\ (\mathsf{c\_2Ebool\_2EDATATYPE}\ 2)\ (ap\ (ap\ (a$

$A\_27a))\ (c\_2Eenumeral\_2Ezerbl\ A\_27a)$

$A\_27a)))))$