thm_2EEncode_2Edatatype__tree (TMUxpiK7DgaHGgqSB9feVzaCc6ivwWNwtPn)

October 26, 2020

Let $ty\_2EEncode\_2Etree : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty\_2EEncode\_2Etree\ A0) \tag{1}$$

Let $ty\_2Elist\_2Elist : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty\_2Elist\_2Elist\ A0) \tag{2}$$

Let $c\_2EEncode\_2ENode : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow c\_2EEncode\_2ENode\ A\_27a \in (((ty\_2EEncode\_2Etree\ A\_27a)^{(ty\_2Elist\_2Elist\ (ty\_2EEncode\_2Etree\ A\_27a))})^{A\_27a}) \tag{3}$$

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_2Ebool_2ET *to be* $(ap\ (ap\ (\mathsf{c\_2Emin\_2E\_3D}\ (2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V$

Definition 3 *We define* c_2Ebool_2EDATATYPE *to be* $\lambda A\_27a : \iota.(\lambda V0x \in A\_27a.\mathsf{c\_2Ebool\_2ET})$.

Definition 4 *We define* c_2Ebool_2E_21 *to be* $\lambda A\_27a : \iota.(\lambda V0P \in (2^{A\_27a}).(ap\ (ap\ (\mathsf{c\_2Emin\_2E\_3D}\ (2^{A\_27}$

Assume the following.

$$True \tag{4}$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow (\forall V0x \in A\_27a.((p\ (ap\ (\mathsf{c\_2Ebool\_2EDATATYPE}\ A\_27a)\ V0x)) \Leftrightarrow True)) \tag{5}$$

Theorem 1

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow (\forall V0tree \in (2^{(((ty\_2EEncode\_2Etree\ A\_27a)^{(ty\_2Elist\_2Elist\ (ty\_2EEncode\_2Etree\ A\_27a))})} \ldots (p\ (ap\ (\mathsf{c\_2Ebool\_2EDATATYPE}\ 2)\ (ap\ V0tree\ (c\_2EEncode\_2ENode\ A\_27a)))))$$