

thm_2Ebinary_2Eieee_2Efloat_2Ecompare2num_2ONTO
 (TMQoYqRBL4Z95N5oNqmGKVgr2qMPnFtxUxA)

October 26, 2020

Definition 1 We define $c_2Emin_2E_40$ to be $\lambda A. \lambda P \in 2^A. \text{if } (\exists x \in A. p (ap P x)) \text{ then } (\lambda x. x \in A \wedge p(x)) \text{ else } \perp$ 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 $\lambda A. \lambda a : \iota. (\lambda V0P \in (2^{A-27a}). (ap V0P (ap (c_2Emin_2E_40 A) a)))$

Let $c_2Enum_2EZERO_REP : \iota$ be given. Assume the following.

$$c_2Enum_2EZERO_REP \in \omega \quad (1)$$

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

$$\text{nonempty } ty_2Enum_2Enum \quad (2)$$

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

$$c_2Enum_2EABS_num \in (ty_2Enum_2Enum^{\omega}) \quad (3)$$

Definition 4 We define c_2Enum_2E0 to be $(ap c_2Enum_2EABS_num c_2Enum_2EZERO_REP)$.

Definition 5 We define $c_2Earithmetic_2EZERO$ to be c_2Enum_2E0 .

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

$$c_2Enum_2EREP_num \in (\omega^{ty_2Enum_2Enum}) \quad (4)$$

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

$$c_2Enum_2ESUC_REP \in (\omega^{\omega}) \quad (5)$$

Definition 6 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 7 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 8 We define c_2Enum_2ESUC to be $\lambda V0m \in ty_2Enum_2Enum.(ap c_2Enum_2EABS_num ($

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

$$c_2Earithmetic_2E_2B \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (6)$$

Definition 9 We define $c_2Earithmetic_2EBIT1$ to be $\lambda V0n \in ty_2Enum_2Enum.(ap (ap c_2Earithmetic_2E$

Definition 10 We define $c_2Earithmetic_2EBIT2$ to be $\lambda V0n \in ty_2Enum_2Enum.(ap (ap c_2Earithmetic_2E$

Definition 11 We define $c_2Earithmetic_2ENUMERAL$ to be $\lambda V0x \in ty_2Enum_2Enum.V0x.$

Definition 12 We define c_2Ebool_2EF to be $(ap (c_2Ebool_2E_21 2) (\lambda V0t \in 2.V0t)).$

Definition 13 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 14 We define $c_2Ebool_2E_7E$ to be $(\lambda V0t \in 2.(ap (ap c_2Emin_2E_3D_3D_3E V0t) c_2Ebool_2E$

Definition 15 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 16 We define $c_2Eprim_rec_2E_3C$ to be $\lambda V0m \in ty_2Enum_2Enum.\lambda V1n \in ty_2Enum_2Enum.$

Let $ty_2Ebinary_ieee_2Efloat_compare : \iota$ be given. Assume the following.

$$nonempty\ ty_2Ebinary_ieee_2Efloat_compare \quad (7)$$

Let $c_2Ebinary_ieee_2Efloat_compare2num : \iota$ be given. Assume the following.

$$c_2Ebinary_ieee_2Efloat_compare2num \in (ty_2Enum_2Enum^{ty_2Ebinary_ieee_2Efloat_compare}) \quad (8)$$

Let $c_2Ebinary_ieee_2Enum2float_compare : \iota$ be given. Assume the following.

$$c_2Ebinary_ieee_2Enum2float_compare \in (ty_2Ebinary_ieee_2Efloat_compare^{ty_2Enum_2Enum}) \quad (9)$$

Assume the following.

$$\begin{aligned} & ((\forall V0a \in ty_2Ebinary_ieee_2Efloat_compare.((ap c_2Ebinary_ieee_2Enum2float_compare \\ & \quad (ap c_2Ebinary_ieee_2Efloat_compare2num V0a)) = V0a)) \wedge (\forall V1r \in \\ & \quad ty_2Enum_2Enum.((p (ap (\lambda V2n \in ty_2Enum_2Enum.(ap (ap c_2Eprim_rec_2E_3C \\ & \quad V2n) (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT2 \\ & \quad (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO))))))) V1r))) \Leftrightarrow \\ & ((ap c_2Ebinary_ieee_2Efloat_compare2num (ap c_2Ebinary_ieee_2Enum2float_compare \\ & \quad V1r)) = V1r))) \end{aligned} \quad (10)$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(((p V0t1) \Rightarrow (p V1t2)) \Rightarrow (((p \\ & \quad V1t2) \Rightarrow (p V0t1)) \Rightarrow ((p V0t1) \Leftrightarrow (p V1t2))))) \quad (11)$$

Theorem 1

$$(\forall V0r \in ty_2Enum_2Enum.((p (ap (ap c_2Eprim_rec_2E_3C V0r) (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT2 (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO))))))) \Leftrightarrow (\exists V1a \in ty_2Ebinary_ieee_2Efloat_compare. (V0r = (ap c_2Ebinary_ieee_2Efloat_compare2num V1a))))$$