

thm_2Ebool_2ERES_SELECT_THM (TMbSfJoaCgwNz5jbQuTEAwE9jhdseRcVEje)

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Definition 1 We define `c_2Emin_2E_3D` to be $\lambda A. \lambda x \in A. \lambda y \in A. \text{inj_o } (x = y)$
of type $\iota \Rightarrow \iota$.

Definition 2 We define `c_2Ebool_2E_2T` to be $(\text{ap } (\text{ap } (\text{c_2Emin_2E_3D } (2^2)) (\lambda V0x \in 2. V0x)) (\lambda V1x \in 2. V1x))$

Definition 3 We define `c_2Ebool_2E_21` to be $\lambda A_27a : \iota. (\lambda V0P \in (2^{A_27a}). (\text{ap } (\text{ap } (\text{c_2Emin_2E_3D } (2^{A_27a})) (\lambda V1x \in 2^{A_27a}. V1x)) (\lambda V2x \in 2^{A_27a}. V2x)))$

Definition 4 We define `c_2Ebool_2E_2IN` to be $\lambda A_27a : \iota. (\lambda V0x \in A_27a. (\lambda V1f \in (2^{A_27a}). (\text{ap } V1f V0x)))$

Definition 5 We define `c_2Emin_2E_3D_3D_3E` to be $\lambda P \in 2. \lambda Q \in 2. \text{inj_o } (p \Rightarrow q)$
of type ι .

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

Definition 7 We define `c_2Emin_2E_40` to be $\lambda A. \lambda P \in 2^A. \text{if } (\exists x \in A. p (\text{ap } P x)) \text{ then } (\text{the } (\lambda x. x \in A \wedge p (\text{ap } P x)))$
of type $\iota \Rightarrow \iota$.

Definition 8 We define `c_2Ebool_2ERES_SELECT` to be $\lambda A_27a : \iota. (\lambda V0p \in (2^{A_27a}). (\lambda V1m \in (2^{A_27a}). (\text{ap } (\text{ap } (\text{c_2Ebool_2E_2F_5C } (2^{A_27a})) (\lambda V2x \in 2^{A_27a}. V2x)) (\lambda V3x \in 2^{A_27a}. V3x)) (\lambda V4x \in 2^{A_27a}. V4x))))$

Theorem 1

$$\forall A_27a. \text{nonempty } A_27a \Rightarrow (\forall V0P \in (2^{A_27a}). (\forall V1f \in (2^{A_27a}). ((\text{ap } (\text{ap } (\text{c_2Ebool_2ERES_SELECT } A_27a) V0P) V1f) = (\text{ap } (\text{c_2Emin_2E_40 } A_27a) (\lambda V2x \in A_27a. (\text{ap } (\text{ap } (\text{c_2Ebool_2E_2F_5C } (2^{A_27a})) (\lambda V3x \in 2^{A_27a}. V3x)) (\lambda V4x \in 2^{A_27a}. V4x))))))))$$