

thm_2Eblast_2EBCARRY__def__compute (TM- GaamygVsyP9nfEA8QVGLWxsk6NBEMTHn8)

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

$$c_2Enum_2EZERO_REP \in \omega \tag{1}$$

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

$$\text{nonempty } ty_2Enum_2Enum \tag{2}$$

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

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

Definition 1 We define c_2Emin_2E3D 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_2Enum_2E0 to be $(ap\ c_2Enum_2EABS_num\ c_2Enum_2EZERO_REP)$.

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

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

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

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

Definition 3 We define c_2Ebool_2E2 to be $(ap\ (ap\ (c_2Emin_2E3D\ (2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V1x))$

Definition 4 We define c_2Ebool_2E21 to be $\lambda A. 27a : \iota. (\lambda V0P \in (2^{A-27a}). (ap\ (ap\ (c_2Emin_2E3D\ (2^{A-27a}))\ (\lambda V1x \in 2.V1x))\ (\lambda V0x \in 2.V0x))$

Definition 5 We define c_2Enum_2ESUC to be $\lambda V0m \in ty_2Enum_2Enum. (ap\ c_2Enum_2EABS_num\ (c_2Enum_2E0\ m))$

Let $c_2Earithmetic_2E2B : \iota$ be given. Assume the following.

$$c_2Earithmetic_2E2B \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \tag{6}$$

Definition 6 We define $c_2Earithmetic_2EBIT2$ to be $\lambda V0n \in ty_2Enum_2Enum.(ap (ap c_2Earithmetic_2EBIT2 V0n) V2n)$.

Definition 7 We define $c_2Earithmetic_2EZERO$ to be c_2Enum_2E0 .

Let $c_2Earithmetic_2E_2D : \iota$ be given. Assume the following.

$$c_2Earithmetic_2E_2D \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum})^{ty_2Enum_2Enum} \quad (7)$$

Definition 8 We define $c_2Earithmetic_2EBIT1$ to be $\lambda V0n \in ty_2Enum_2Enum.(ap (ap c_2Earithmetic_2EBIT1 V0n) V2n)$.

Definition 9 We define $c_2Earithmetic_2ENUMERAL$ to be $\lambda V0x \in ty_2Enum_2Enum.V0x$.

Definition 10 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 11 We define $c_2Ebool_2E_5C_2F$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21 2) (\lambda V2t \in 2.V2t))))$.

Definition 12 We define $c_2Ebool_2E_2F_5C$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21 2) (\lambda V2t \in 2.V2t))))$.

Definition 13 We define $c_2Eblast_2Ebcarry$ to be $\lambda V0x \in 2.\lambda V1y \in 2.\lambda V2c \in 2.(ap (ap c_2Ebool_2E_5C_2F V0x V1y) V2c))$.

Let $c_2Eblast_2EBCARRY : \iota$ be given. Assume the following.

$$c_2Eblast_2EBCARRY \in (((2^2)^{(2^{ty_2Enum_2Enum})})^{(2^{ty_2Enum_2Enum})})^{ty_2Enum_2Enum}) \quad (8)$$

Assume the following.

$$\begin{aligned} & \forall A_27a.nonempty A_27a \Rightarrow (\forall V0f \in ((A_27a^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}). \\ & \quad (\forall V1g \in (A_27a^{ty_2Enum_2Enum}).((\forall V2n \in ty_2Enum_2Enum. \\ & \quad ((ap V1g (ap c_2Enum_2ESUC V2n)) = (ap (ap V0f V2n) (ap c_2Enum_2ESUC V2n)))) \Leftrightarrow ((\forall V3n \in ty_2Enum_2Enum.((ap V1g (ap c_2Earithmetic_2ENUMERAL \\ & \quad (ap c_2Earithmetic_2EBIT1 V3n))) = (ap (ap V0f (ap (ap c_2Earithmetic_2E_2D \\ & \quad (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 V3n))) \\ & \quad (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)))) \\ & \quad (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 V3n)))))) \wedge \\ & \quad (\forall V4n \in ty_2Enum_2Enum.((ap V1g (ap c_2Earithmetic_2ENUMERAL \\ & \quad (ap c_2Earithmetic_2EBIT2 V4n))) = (ap (ap V0f (ap c_2Earithmetic_2ENUMERAL \\ & \quad (ap c_2Earithmetic_2EBIT1 V4n))) (ap c_2Earithmetic_2ENUMERAL \\ & \quad (ap c_2Earithmetic_2EBIT2 V4n)))))))))) \end{aligned} \quad (9)$$

Assume the following.

$$\begin{aligned} & ((\forall V0x \in (2^{ty_2Enum_2Enum}).(\forall V1y \in (2^{ty_2Enum_2Enum}). \\ & \quad (\forall V2c \in 2.((p (ap (ap (ap (ap c_2Eblast_2EBCARRY c_2Enum_2E0) \\ & \quad V0x) V1y) V2c)) \Leftrightarrow (p V2c)))))) \wedge (\forall V3i \in ty_2Enum_2Enum.(\forall V4x \in \\ & \quad (2^{ty_2Enum_2Enum}).(\forall V5y \in (2^{ty_2Enum_2Enum}).(\forall V6c \in \\ & \quad 2.((p (ap (ap (ap (ap c_2Eblast_2EBCARRY (ap c_2Enum_2ESUC V3i)) \\ & \quad V4x) V5y) V6c)) \Leftrightarrow (p (ap (ap (ap c_2Eblast_2Ebcarry (ap V4x V3i)) (\\ & \quad ap V5y V3i)) (ap (ap (ap (ap c_2Eblast_2EBCARRY V3i) V4x) V5y) V6c)))))))))) \end{aligned} \quad (10)$$

Assume the following.

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

Theorem 1

$$\begin{aligned} & ((\forall V0x \in (2^{ty_2Enum_2Enum}).(\forall V1y \in (2^{ty_2Enum_2Enum}). \\ & (\forall V2c \in 2.((p (ap (ap (ap (ap c_2Eblast_2EBCARRY c_2Enum_2E0) \\ & V0x) V1y) V2c)) \Leftrightarrow (p V2c)))))) \wedge ((\forall V3i \in ty_2Enum_2Enum.(\forall V4x \in \\ & (2^{ty_2Enum_2Enum}).(\forall V5y \in (2^{ty_2Enum_2Enum}).(\forall V6c \in \\ & 2.((p (ap (ap (ap (ap c_2Eblast_2EBCARRY (ap c_2Earithmetic_2ENUMERAL \\ & (ap c_2Earithmetic_2EBIT1 V3i))) V4x) V5y) V6c)) \Leftrightarrow (p (ap (ap (ap \\ & c_2Eblast_2Ebcarry (ap V4x (ap (ap c_2Earithmetic_2E_2D (ap c_2Earithmetic_2ENUMERAL \\ & (ap c_2Earithmetic_2EBIT1 V3i))) (ap c_2Earithmetic_2ENUMERAL \\ & (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)))))) (ap V5y \\ & (ap (ap c_2Earithmetic_2E_2D (ap c_2Earithmetic_2ENUMERAL (ap \\ & c_2Earithmetic_2EBIT1 V3i))) (ap c_2Earithmetic_2ENUMERAL (\\ & ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)))))) (ap (ap \\ & (ap (ap c_2Eblast_2EBCARRY (ap (ap c_2Earithmetic_2E_2D (ap c_2Earithmetic_2ENUMERAL \\ & (ap c_2Earithmetic_2EBIT1 V3i))) (ap c_2Earithmetic_2ENUMERAL \\ & (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)))))) V4x) V5y) \\ & V6c)))))) \wedge ((\forall V7i \in ty_2Enum_2Enum.(\forall V8x \in (2^{ty_2Enum_2Enum}). \\ & (\forall V9y \in (2^{ty_2Enum_2Enum}).(\forall V10c \in 2.((p (ap (ap \\ & (ap (ap c_2Eblast_2EBCARRY (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT2 \\ & V7i))) V8x) V9y) V10c)) \Leftrightarrow (p (ap (ap (ap c_2Eblast_2Ebcarry (ap V8x \\ & (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 V7i))) \\ & (ap V9y (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\ & V7i)))))) (ap (ap (ap (ap c_2Eblast_2EBCARRY (ap c_2Earithmetic_2ENUMERAL \\ & (ap c_2Earithmetic_2EBIT1 V7i))) V8x) V9y) V10c)))))))))) \end{aligned}$$