

thm_2Ealignment_2Ealigned_add_sub_123
 (TMb9tCDJrHNoGFUfczg6Mn1FNdM74cH4Rw3)

October 26, 2020

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.

$$nonempty\ ty_2Enum_2Enum \quad (2)$$

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

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

Definition 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_2Enum_2E0 to be ($ap\ c_2Enum_2EABS_num\ c_2Enum_2EZERO_REP$).

Definition 3 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 4 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 5 We define $c_2Ebool_2E_21$ to be $\lambda A. 27a : \iota. (\lambda V0P \in (2^{A-27a}).(ap\ (ap\ (c_2Emin_2E_3D\ (2^{A-27a}))\ (\lambda V1x \in 2.V1x)))$.

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

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 7 We define $c_2Earithmetic_2EBIT1$ to be $\lambda V0n \in ty_2Enum_2Enum.(ap (ap c_2Earithmetic_2EBIT1 A) n)$

Definition 8 We define $c_2Earithmetic_2ENUMERAL$ to be $\lambda V0x \in ty_2Enum_2Enum.V0x$.

Let $ty_2Ebool_2Eitself : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty A0 \Rightarrow nonempty (ty_2Ebool_2Eitself A0) \quad (7)$$

Let $c_2Ebool_2Ethethe_value : \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall A_27a.nonempty A_27a \Rightarrow c_2Ebool_2Ethethe_value A_27a \in & (\\ & ty_2Ebool_2Eitself A_27a) \end{aligned} \quad (8)$$

Let $c_2Efcp_2Edimindex : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty A_27a \Rightarrow c_2Efcp_2Edimindex A_27a \in (ty_2Enum_2Enum^{(ty_2Ebool_2Eitself A_27a)}) \quad (9)$$

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

$$c_2Earithmetic_2E_2D \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (10)$$

Let $ty_2Efcp_2Efinit_image : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty A0 \Rightarrow nonempty (ty_2Efcp_2Efinit_image A0) \quad (11)$$

Definition 9 We define c_2Ebool_2EF to be $(ap (c_2Ebool_2E_21 2) (\lambda V0t \in 2.V0t))$.

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 $c_2Ebool_2E_7E$ to be $(\lambda V0t \in 2.(ap (ap c_2Emin_2E_3D_3D_3E V0t) c_2Ebool_2E_7E))$

Definition 12 We define $c_2Ebool_2E_2F_5C$ to be $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap (c_2Ebool_2E_21 2) (\lambda V2t \in 2.(\lambda V3t3 \in 2.(ap (c_2Ebool_2E_7E V3t3) c_2Ebool_2E_2F_5C))))))$

Definition 13 We define $c_2Emin_2E_40$ to be $\lambda A.\lambda P \in 2^A.\text{if } (\exists x \in A.p (ap P x)) \text{ then } (\text{the } (\lambda x.x \in A \wedge p x) \text{ of type } \iota \Rightarrow \iota)$.

Definition 14 We define $c_2Ebool_2E_3F$ to be $\lambda A_27a : \iota.(\lambda V0P \in (2^{A_27a}).(ap V0P (ap (c_2Emin_2E_40 A_27a) P)))$

Definition 15 We define $c_2Eprim_rec_2E_3C$ to be $\lambda V0m \in ty_2Enum_2Enum.\lambda V1n \in ty_2Enum_2Enum.(ap (c_2Eprim_rec_2E_3C V0m) V1n)$

Definition 16 We define $c_2Ebool_2E_3F_21$ to be $\lambda A_27a : \iota.(\lambda V0P \in (2^{A_27a}).(ap (ap c_2Ebool_2E_3F A_27a) P))$

Definition 17 We define $c_2Efcp_2Efinit_index$ to be $\lambda A_27a : \iota.(ap (c_2Emin_2E_40 (A_27a^{ty_2Enum_2Enum})) A_27a)$

Let $ty_2Efcp_2Ecart : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall A0.nonempty A0 \Rightarrow \forall A1.nonempty A1 \Rightarrow nonempty & (ty_2Efcp_2Ecart \\ & A0 A1) \end{aligned} \quad (12)$$

Let $c_2Efcp_2Edest_cart : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\begin{aligned} \forall A_27a.nonempty A_27a \Rightarrow \forall A_27b.nonempty A_27b \Rightarrow c_2Efcp_2Edest_cart & \\ & A_27a A_27b \in ((A_27a^{(ty_2Efcp_2Efinit_image A_27b)})(ty_2Efcp_2Ecart A_27a A_27b)) \end{aligned} \quad (13)$$

Definition 18 We define $c_2Efcp_2Efcp_index$ to be $\lambda A_27a : \iota. \lambda A_27b : \iota. \lambda V0x \in (ty_2Efcp_2Ecart\ A_27a)$

Definition 19 We define c_2Ebool_2ECOND to be $\lambda A_27a : \iota. (\lambda V0t \in 2. (\lambda V1t1 \in A_27a. (\lambda V2t2 \in A_27a. ($

Definition 20 We define $c_2Earithmetic_2EMIN$ to be $\lambda V0m \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. ($

Definition 21 We define $c_2Ebool_2E_5C_2F$ to be $(\lambda V0t1 \in 2. (\lambda V1t2 \in 2. (ap\ (c_2Ebool_2E_21\ 2)\ (\lambda V2t \in 2. ($

Definition 22 We define $c_2Earithmetic_2E_3C_3D$ to be $\lambda V0m \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. ($

Definition 23 We define c_2Efcp_2EFCP to be $\lambda A_27a : \iota. \lambda A_27b : \iota. (\lambda V0g \in (A_27a^{ty_2Enum_2Enum}). (ap\ (c_2Efcp_2Efcp_index\ A_27a)\ V0g)$

Definition 24 We define $c_2Ewords_2Eword_slice$ to be $\lambda A_27a : \iota. \lambda V0h \in ty_2Enum_2Enum. \lambda V1l \in ty_2Enum_2Enum. ($

Definition 25 We define $c_2Ealignment_2Ealign$ to be $\lambda A_27a : \iota. \lambda V0p \in ty_2Enum_2Enum. \lambda V1w \in (ty_2Enum_2Enum. ($

Definition 26 We define $c_2Ealignment_2Ealigned$ to be $\lambda A_27a : \iota. \lambda V0p \in ty_2Enum_2Enum. \lambda V1w \in (ty_2Enum_2Enum. ($

Definition 27 We define $c_2Earithmetic_2E_3E$ to be $\lambda V0m \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. ($

Definition 28 We define $c_2Earithmetic_2E_3E_3D$ to be $\lambda V0m \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. ($

Definition 29 We define $c_2Enumeral_2EiiSUC$ to be $\lambda V0n \in ty_2Enum_2Enum. (ap\ c_2Enum_2ESUC\ (ap\ (c_2Ebool_2ECOND\ V0n))$

Let $c_2Earithmetic_2EEVEN : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EEVEN \in (2^{ty_2Enum_2Enum}) \quad (14)$$

Let $c_2Enumeral_2Eonecount : \iota$ be given. Assume the following.

$$c_2Enumeral_2Eonecount \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (15)$$

Let $c_2Enumeral_2Eexactlog : \iota$ be given. Assume the following.

$$c_2Enumeral_2Eexactlog \in (ty_2Enum_2Enum^{ty_2Enum_2Enum}) \quad (16)$$

Definition 30 We define $c_2Eprim_rec_2EPRE$ to be $\lambda V0m \in ty_2Enum_2Enum. (ap\ (ap\ (ap\ (c_2Ebool_2ECOND\ V0m))\ (c_2Eprim_rec_2EPRE\ V0m)))$

Definition 31 We define $c_2Earithmetic_2EBIT2$ to be $\lambda V0n \in ty_2Enum_2Enum. (ap\ (ap\ c_2Earithmetic_2E_3E\ V0n))$

Let $c_2Earithmetic_2EDIV : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EDIV \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (17)$$

Definition 32 We define $c_2Earithmetic_2EDIV2$ to be $\lambda V0n \in ty_2Enum_2Enum. (ap\ (ap\ c_2Earithmetic_2EDIV\ V0n))$

Let $c_2Enumeral_2Etexp_help : \iota$ be given. Assume the following.

$$c_2Enumeral_2Etexp_help \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (18)$$

Let $c_2Earithmetic_2EODD : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EODD \in (2^{ty_2Enum_2Enum}) \quad (19)$$

Definition 33 We define c_2Ebool_2ELET to be $\lambda A_27a : \iota. \lambda A_27b : \iota. (\lambda V0f \in (A_27b^{A_27a}).(\lambda V1x \in A_27a))$

Definition 34 We define $c_2Enumeral_2EiDUB$ to be $\lambda V0x \in ty_2Enum_2Enum.(ap (ap (c_2Earithmetic_2E2A)))$

Definition 35 We define $c_2Enumeral_2EiZ$ to be $\lambda V0x \in ty_2Enum_2Enum.V0x$.

Let $c_2Earithmetic_2E_2A : \iota$ be given. Assume the following.

$$c_2Earithmetic_2E_2A \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (20)$$

Definition 36 We define $c_2Enumeral_2Einternal_mult$ to be $c_2Earithmetic_2E_2A$.

Let $c_2Earithmetic_2EEEXP : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EEEXP \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (21)$$

Definition 37 We define c_2Ebit_2ESBIT to be $\lambda V0b \in 2. \lambda V1n \in ty_2Enum_2Enum.(ap (ap (ap (c_2Ebool_2ELET)))$

Let $c_2Esum_num_2ESUM : \iota$ be given. Assume the following.

$$c_2Esum_num_2ESUM \in ((ty_2Enum_2Enum^{(ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}})^{ty_2Enum_2Enum}) \quad (22)$$

Definition 38 We define $c_2Ewords_2Ew2n$ to be $\lambda A_27a : \iota. \lambda V0w \in (ty_2Efcp_2Ecart 2 A_27a).(ap (ap (c_2Ebool_2ELET)))$

Let $c_2Ewords_2Edimword : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a. nonempty A_27a \Rightarrow c_2Ewords_2Edimword A_27a \in (ty_2Enum_2Enum^{(ty_2Ebool_2Eitself A_27a)}) \quad (23)$$

Definition 39 We define $c_2Ebit_2EDIV_2EXP$ to be $\lambda V0x \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. \lambda V2m \in ty_2Enum_2Enum. ap (ap (c_2Ebool_2ELET)))$

Let $c_2Earithmetic_2EMOD : \iota$ be given. Assume the following.

$$c_2Earithmetic_2EMOD \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \quad (24)$$

Definition 40 We define $c_2Ebit_2EMOD_2EXP$ to be $\lambda V0x \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. \lambda V2m \in ty_2Enum_2Enum. ap (ap (c_2Ebool_2ELET)))$

Definition 41 We define c_2Ebit_2EBITS to be $\lambda V0h \in ty_2Enum_2Enum. \lambda V1l \in ty_2Enum_2Enum. \lambda V2m \in ty_2Enum_2Enum. ap (ap (c_2Ebool_2ELET)))$

Definition 42 We define c_2Ebit_2EBIT to be $\lambda V0b \in ty_2Enum_2Enum. \lambda V1n \in ty_2Enum_2Enum. \lambda V2m \in ty_2Enum_2Enum. ap (ap (c_2Ebool_2ELET)))$

Definition 43 We define $c_2Ewords_2En2w$ to be $\lambda A_27a : \iota. \lambda V0n \in ty_2Enum_2Enum.(ap (c_2Efcp_2EFC)))$

Definition 44 We define $c_2Ewords_2Eword_2comp$ to be $\lambda A_27a : \iota. \lambda V0w \in (ty_2Efcp_2Ecart 2 A_27a). ap (c_2Efcp_2EFC))$

Definition 45 We define $c_2Ewords_2Eword_add$ to be $\lambda A_27a : \iota. \lambda V0v \in (ty_2Efcp_2Ecart 2 A_27a). ap (c_2Efcp_2EFC))$

Definition 46 We define $c_2Ewords_2Eword_sub$ to be $\lambda A_27a : \iota. \lambda V0v \in (ty_2Efcp_2Ecart 2 A_27a). ap (c_2Efcp_2EFC))$

Definition 47 We define $c_2Ewords_2Eword_mul$ to be $\lambda A_27a : \iota. \lambda V0v \in (ty_2Efcp_2Ecart\ 2\ A_27a). \lambda V$

Definition 48 We define $c_2Ewords_2Eword_lsl$ to be $\lambda A_27a : \iota. \lambda V0w \in (ty_2Efcp_2Ecart\ 2\ A_27a). \lambda V1$

Assume the following.

$$\begin{aligned} & \forall A_27a. nonempty\ A_27a \Rightarrow \forall A_27b. nonempty\ A_27b \Rightarrow (\\ & (\forall V0p \in ty_2Enum_2Enum. (p (ap (ap (c_2Ealignment_2Ealigned \\ & A_27a) V0p) (ap (c_2Ewords_2En2w\ A_27a) c_2Enum_2E0)))) \wedge (\forall V1w \in \\ & (ty_2Efcp_2Ecart\ 2\ A_27b). (p (ap (ap (c_2Ealignment_2Ealigned \\ & A_27b) c_2Enum_2E0) V1w)))))) \end{aligned} \quad (25)$$

Assume the following.

$$\begin{aligned} & \forall A_27a. nonempty\ A_27a \Rightarrow (\forall V0p \in ty_2Enum_2Enum. (\\ & \forall V1w \in (ty_2Efcp_2Ecart\ 2\ A_27a). (\forall V2x \in (ty_2Efcp_2Ecart \\ & 2\ A_27a). (((p (ap (ap (c_2Ealignment_2Ealigned\ A_27a) V0p) (ap \\ & (ap (c_2Ewords_2Eword_add\ A_27a) V1w) (ap (ap (c_2Ewords_2Eword_mul \\ & A_27a) (ap (ap (c_2Ewords_2Eword_lsl\ A_27a) (ap (c_2Ewords_2En2w \\ & A_27a) (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\ & c_2Earithmetic_2EZZERO)))) V0p)) V2x)))) \Leftrightarrow (p (ap (ap (c_2Ealignment_2Ealigned \\ & A_27a) V0p) V1w))) \wedge ((p (ap (ap (c_2Ealignment_2Ealigned\ A_27a) \\ & V0p) (ap (ap (c_2Ewords_2Eword_sub\ A_27a) V1w) (ap (ap (c_2Ewords_2Eword_mul \\ & A_27a) (ap (ap (c_2Ewords_2Eword_lsl\ A_27a) (ap (c_2Ewords_2En2w \\ & A_27a) (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\ & c_2Earithmetic_2EZZERO)))) V0p)) V2x)))) \Leftrightarrow (p (ap (ap (c_2Ealignment_2Ealigned \\ & A_27a) V0p) V1w)))))) \end{aligned} \quad (26)$$

Assume the following.

$$\begin{aligned} & (\forall V0n \in ty_2Enum_2Enum. (((ap (ap c_2Earithmetic_2EEEXP \\ & (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZZERO)))) \\ & V0n) = (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\ & c_2Earithmetic_2EZZERO)))) \wedge ((ap (ap c_2Earithmetic_2EEEXP V0n) \\ & (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZZERO)))) = \\ & V0n))) \end{aligned} \quad (27)$$

Assume the following.

$$(\forall V0t1 \in 2. (\forall V1t2 \in 2. (((p V0t1) \Rightarrow (p V1t2)) \Rightarrow (((p \\ & V1t2) \Rightarrow (p V0t1)) \Rightarrow ((p V0t1) \Leftrightarrow (p V1t2)))))) \quad (28)$$

Assume the following.

$$(\forall V0t \in 2. (False \Rightarrow (p V0t))) \quad (29)$$

Assume the following.

$$\forall A_27a. nonempty\ A_27a \Rightarrow (\forall V0x \in A_27a. ((V0x = V0x) \Leftrightarrow \\ True)) \quad (30)$$

Assume the following.

$$\begin{aligned} \forall A.27a.\text{nonempty } A.27a \Rightarrow (\forall V0x \in A.27a.(\forall V1y \in \\ A.27a.((V0x = V1y) \Leftrightarrow (V1y = V0x)))) \end{aligned} \quad (31)$$

Assume the following.

$$\begin{aligned} (\forall V0t \in 2.(((True \Leftrightarrow (p V0t)) \Leftrightarrow (p V0t)) \wedge (((p V0t) \Leftrightarrow True) \Leftrightarrow \\ (p V0t)) \wedge (((False \Leftrightarrow (p V0t)) \Leftrightarrow (\neg(p V0t))) \wedge (((p V0t) \Leftrightarrow False) \Leftrightarrow (\neg(p \\ V0t))))))) \end{aligned} \quad (32)$$

Assume the following.

$$\begin{aligned} \forall A.27a.\text{nonempty } A.27a \Rightarrow (\forall V0t1 \in A.27a.(\forall V1t2 \in \\ A.27a.(((ap (ap (ap (c_2Ebool_2ECOND A.27a) c_2Ebool_2ET) V0t1) \\ V1t2) = V0t1) \wedge ((ap (ap (ap (c_2Ebool_2ECOND A.27a) c_2Ebool_2EF) \\ V0t1) V1t2) = V1t2)))))) \end{aligned} \quad (33)$$

Assume the following.

$$\begin{aligned} (((ap c_2Enum_2ESUC c_2Earithmetic_2EZERO) = (ap c_2Earithmetic_2EBIT1 \\ c_2Earithmetic_2EZERO)) \wedge ((\forall V0n \in ty_2Enum_2Enum.((ap \\ c_2Enum_2ESUC (ap c_2Earithmetic_2EBIT1 V0n)) = (ap c_2Earithmetic_2EBIT2 \\ V0n))) \wedge (\forall V1n \in ty_2Enum_2Enum.((ap c_2Enum_2ESUC (ap c_2Earithmetic_2EBIT2 \\ V1n)) = (ap c_2Earithmetic_2EBIT1 (ap c_2Enum_2ESUC V1n))))))) \end{aligned} \quad (34)$$

Assume the following.

$$\begin{aligned}
& ((\forall V0n \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2B \\
& c_2Enum_2E0) V0n) = V0n)) \wedge ((\forall V1n \in ty_2Enum_2Enum.((ap \\
& (ap c_2Earithmetic_2E_2B V1n) c_2Enum_2E0) = V1n)) \wedge ((\forall V2n \in \\
& ty_2Enum_2Enum.(\forall V3m \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2B \\
& (ap c_2Earithmetic_2ENUMERAL V2n)) (ap c_2Earithmetic_2ENUMERAL \\
& V3m)) = (ap c_2Earithmetic_2ENUMERAL (ap c_2Enumeral_2EiZ (ap \\
& (ap c_2Earithmetic_2E_2B V2n) V3m))))))) \wedge ((\forall V4n \in ty_2Enum_2Enum. \\
& ((ap (ap c_2Earithmetic_2E_2A c_2Enum_2E0) V4n) = c_2Enum_2E0)) \wedge \\
& ((\forall V5n \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2A \\
& V5n) c_2Enum_2E0) = c_2Enum_2E0)) \wedge ((\forall V6n \in ty_2Enum_2Enum. \\
& (\forall V7m \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2A \\
& ap c_2Earithmetic_2ENUMERAL V6n)) (ap c_2Earithmetic_2ENUMERAL \\
& V7m)) = (ap c_2Earithmetic_2ENUMERAL (ap (ap c_2Earithmetic_2E_2A \\
& V6n) V7m)))))) \wedge ((\forall V8n \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2D \\
& c_2Enum_2E0) V8n) = c_2Enum_2E0)) \wedge ((\forall V9n \in ty_2Enum_2Enum. \\
& ((ap (ap c_2Earithmetic_2E_2D V9n) c_2Enum_2E0) = V9n)) \wedge ((\forall V10n \in \\
& ty_2Enum_2Enum.(\forall V11m \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2E_2D \\
& (ap c_2Earithmetic_2ENUMERAL V10n)) (ap c_2Earithmetic_2ENUMERAL \\
& V11m)) = (ap c_2Earithmetic_2ENUMERAL (ap (ap c_2Earithmetic_2E_2D \\
& V10n) V11m)))))) \wedge ((\forall V12n \in ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2EEXP \\
& c_2Enum_2E0) (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\
& V12n)) = c_2Enum_2E0)) \wedge ((\forall V13n \in ty_2Enum_2Enum.((ap \\
& (ap c_2Earithmetic_2EEXP c_2Enum_2E0) (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Earithmetic_2EBIT2 V13n)) = c_2Enum_2E0)) \wedge ((\forall V14n \in \\
& ty_2Enum_2Enum.((ap (ap c_2Earithmetic_2EEXP V14n) c_2Enum_2E0) = \\
& (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)))))) \wedge \\
& ((\forall V15n \in ty_2Enum_2Enum.(\forall V16m \in ty_2Enum_2Enum. \\
& ((ap (ap c_2Earithmetic_2EEXP (ap c_2Earithmetic_2ENUMERAL V15n)) \\
& (ap c_2Earithmetic_2ENUMERAL V16m)) = (ap c_2Earithmetic_2ENUMERAL \\
& (ap (ap c_2Earithmetic_2EEXP V15n) V16m)))))) \wedge (((ap c_2Enum_2ESUC \\
& c_2Enum_2E0) = (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\
& c_2Earithmetic_2EZERO)))) \wedge ((\forall V17n \in ty_2Enum_2Enum. \\
& (ap c_2Enum_2ESUC (ap c_2Earithmetic_2ENUMERAL V17n)) = (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Enum_2ESUC V17n)))) \wedge (((ap c_2Eprim_rec_2EPRE c_2Enum_2E0) = \\
& c_2Enum_2E0) \wedge ((\forall V18n \in ty_2Enum_2Enum.((ap c_2Eprim_rec_2EPRE \\
& (ap c_2Earithmetic_2ENUMERAL V18n)) = (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Eprim_rec_2EPRE V18n)))))) \wedge ((\forall V19n \in ty_2Enum_2Enum. \\
& (((ap c_2Earithmetic_2ENUMERAL V19n) = c_2Enum_2E0) \Leftrightarrow (V19n = c_2Earithmetic_2EZERO))) \wedge \\
& ((\forall V20n \in ty_2Enum_2Enum.((c_2Enum_2E0 = (ap c_2Earithmetic_2ENUMERAL \\
& V20n)) \Leftrightarrow (V20n = c_2Earithmetic_2EZERO))) \wedge ((\forall V21n \in ty_2Enum_2Enum. \\
& (\forall V22m \in ty_2Enum_2Enum.(((ap c_2Earithmetic_2ENUMERAL \\
& V21n) = (ap c_2Earithmetic_2ENUMERAL V22m)) \Leftrightarrow (V21n = V22m)))) \wedge \\
& ((\forall V23n \in ty_2Enum_2Enum.((p (ap (ap c_2Eprim_rec_2E_3C \\
& V23n) c_2Enum_2E0)) \Leftrightarrow False)) \wedge ((\forall V24n \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Eprim_rec_2E_3C c_2Enum_2E0) (ap c_2Earithmetic_2ENUMERAL \\
& V24n))) \Leftrightarrow (p (ap (ap c_2Eprim_rec_2E_3C c_2Earithmetic_2EZERO) \\
& V24n)))))) \wedge ((\forall V25n \in ty_2Enum_2Enum.(\forall V26m \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Eprim_rec_2E_3C (ap c_2Earithmetic_2ENUMERAL \\
& V25n)) (ap c_2Earithmetic_2ENUMERAL V26m))) \Leftrightarrow (p (ap (ap c_2Eprim_rec_2E_3C \\
& V25n) V26m)))))) \wedge ((\forall V27n \in ty_2Enum_2Enum.((p (ap (ap c_2Earithmetic_2E_3E \\
& c_2Enum_2E0) V27n)) \Leftrightarrow False)) \wedge ((\forall V28n \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Earithmetic_2E_3E (ap c_2Earithmetic_2ENUMERAL \\
& V28n)) c_2Enum_2E0)) \Leftrightarrow (p (ap (ap c_2Eprim_rec_2E_3C c_2Earithmetic_2EZERO) \\
& V28n)))))) \wedge ((\forall V29n \in ty_2Enum_2Enum.(\forall V30m \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Earithmetic_2E_3E (ap c_2Earithmetic_2ENUMERAL \\
& V29n)) (ap c_2Earithmetic_2ENUMERAL V30m))) \Leftrightarrow (p (ap (ap c_2Eprim_rec_2E_3C \\
& V30m) V29n)))))) \wedge ((\forall V31n \in ty_2Enum_2Enum.((p (ap (ap c_2Earithmetic_2E_3C_3D \\
& c_2Enum_2E0) V31n)) \Leftrightarrow True)) \wedge ((\forall V32n \in ty_2Enum_2Enum. \\
& ((p (ap (ap c_2Earithmetic_2E_3C_3D (ap c_2Earithmetic_2ENUMERAL \\
& V32n)) (ap c_2Earithmetic_2ENUMERAL V32n)))))))
\end{aligned}$$

Assume the following.

Assume the following.

$$\begin{aligned}
 & (\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. \\
 & ((c_2Earithmetic_2EZERO = (ap c_2Earithmetic_2EBIT1 V0n)) \Leftrightarrow False) \wedge \\
 & (((ap c_2Earithmetic_2EBIT1 V0n) = c_2Earithmetic_2EZERO) \Leftrightarrow \\
 & False) \wedge (((c_2Earithmetic_2EZERO = (ap c_2Earithmetic_2EBIT2 \\
 & V0n)) \Leftrightarrow False) \wedge (((ap c_2Earithmetic_2EBIT2 V0n) = c_2Earithmetic_2EZERO) \Leftrightarrow \\
 & False) \wedge (((ap c_2Earithmetic_2EBIT1 V0n) = (ap c_2Earithmetic_2EBIT2 \\
 & V1m)) \Leftrightarrow False) \wedge (((ap c_2Earithmetic_2EBIT2 V0n) = (ap c_2Earithmetic_2EBIT1 \\
 & V1m)) \Leftrightarrow False) \wedge (((ap c_2Earithmetic_2EBIT1 V0n) = (ap c_2Earithmetic_2EBIT1 \\
 & V1m)) \Leftrightarrow (V0n = V1m)) \wedge (((ap c_2Earithmetic_2EBIT2 V0n) = (ap c_2Earithmetic_2EBIT2 \\
 & V1m)) \Leftrightarrow (V0n = V1m)))))))))) \\
 \end{aligned} \tag{37}$$

Assume the following.

$$\begin{aligned}
 & (((ap c_2Eprim_rec_2EPRE c_2Earithmetic_2EZERO) = c_2Earithmetic_2EZERO) \wedge \\
 & (((ap c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT1 c_2Earithmetic_2EZERO)) = \\
 & c_2Earithmetic_2EZERO) \wedge ((\forall V0n \in ty_2Enum_2Enum. ((ap \\
 & c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT1 (ap c_2Earithmetic_2EBIT1 \\
 & V0n))) = (ap c_2Earithmetic_2EBIT2 (ap c_2Eprim_rec_2EPRE (ap \\
 & c_2Earithmetic_2EBIT1 V0n))))))) \wedge ((\forall V1n \in ty_2Enum_2Enum. \\
 & ((ap c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT1 (ap c_2Earithmetic_2EBIT2 \\
 & V1n))) = (ap c_2Earithmetic_2EBIT2 (ap c_2Earithmetic_2EBIT1 \\
 & V1n)))) \wedge (\forall V2n \in ty_2Enum_2Enum. ((ap c_2Eprim_rec_2EPRE \\
 & (ap c_2Earithmetic_2EBIT2 V2n)) = (ap c_2Earithmetic_2EBIT1 V2n))))))) \\
 \end{aligned} \tag{38}$$

Assume the following.

$$\begin{aligned}
 & (\forall V0n \in ty_2Enum_2Enum. (((ap c_2Enumeral_2EiDUB (ap c_2Earithmetic_2EBIT1 \\
 & V0n)) = (ap c_2Earithmetic_2EBIT2 (ap c_2Enumeral_2EiDUB V0n))) \wedge \\
 & (((ap c_2Enumeral_2EiDUB (ap c_2Earithmetic_2EBIT2 V0n)) = (ap \\
 & c_2Earithmetic_2EBIT2 (ap c_2Earithmetic_2EBIT1 V0n))) \wedge ((ap \\
 & c_2Enumeral_2EiDUB c_2Earithmetic_2EZERO) = c_2Earithmetic_2EZERO)))) \\
 \end{aligned} \tag{39}$$

Assume the following.

$$\begin{aligned}
 & (\forall V0n \in ty_2Enum_2Enum. ((p (ap c_2Earithmetic_2EEVEN c_2Earithmetic_2EZERO)) \wedge \\
 & ((p (ap c_2Earithmetic_2EEVEN (ap c_2Earithmetic_2EBIT2 V0n))) \wedge \\
 & ((\neg(p (ap c_2Earithmetic_2EEVEN (ap c_2Earithmetic_2EBIT1 V0n)))) \wedge \\
 & ((\neg(p (ap c_2Earithmetic_2EODD c_2Earithmetic_2EZERO))) \wedge ((\\
 & \neg(p (ap c_2Earithmetic_2EODD (ap c_2Earithmetic_2EBIT2 V0n)))) \wedge \\
 & (p (ap c_2Earithmetic_2EODD (ap c_2Earithmetic_2EBIT1 V0n)))))))))) \\
 \end{aligned} \tag{40}$$

Assume the following.

$$\begin{aligned}
& (\forall V0acc \in ty_2Enum_2Enum. (\forall V1n \in ty_2Enum_2Enum. \\
& (((ap (ap c_2Enumeral_2Etexp_help c_2Earithmetic_2ZERO) V0acc) = \\
& (ap c_2Earithmetic_2EBIT2 V0acc)) \wedge ((ap (ap c_2Enumeral_2Etexp_help \\
& (ap c_2Earithmetic_2EBIT1 V1n)) V0acc) = (ap (ap c_2Enumeral_2Etexp_help \\
& (ap c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT1 V1n))) (ap \\
& c_2Earithmetic_2EBIT1 V0acc))) \wedge ((ap (ap c_2Enumeral_2Etexp_help \\
& (ap c_2Earithmetic_2EBIT2 V1n)) V0acc) = (ap (ap c_2Enumeral_2Etexp_help \\
& (ap c_2Earithmetic_2EBIT1 V1n)) (ap c_2Earithmetic_2EBIT1 V0acc)))))) \\
& (41)
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& (\forall V0n \in ty_2Enum_2Enum. (((ap (ap c_2Earithmetic_2EXP \\
& (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT2 c_2Earithmetic_2ZERO))) \\
& c_2Enum_2E0) = (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 \\
& c_2Earithmetic_2ZERO))) \wedge (((ap (ap c_2Earithmetic_2EXP (ap \\
& c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT2 c_2Earithmetic_2ZERO))) \\
& (ap c_2Earithmetic_2ENUMERAL (ap c_2Earithmetic_2EBIT1 V0n))) = \\
& (ap c_2Earithmetic_2ENUMERAL (ap (ap c_2Enumeral_2Etexp_help \\
& (ap c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT1 V0n))) c_2Earithmetic_2ZERO))) \wedge \\
& ((ap (ap c_2Earithmetic_2EXP (ap c_2Earithmetic_2ENUMERAL (\\
& ap c_2Earithmetic_2EBIT2 c_2Earithmetic_2ZERO))) (ap c_2Earithmetic_2ENUMERAL \\
& (ap c_2Earithmetic_2EBIT2 V0n))) = (ap c_2Earithmetic_2ENUMERAL \\
& (ap (ap c_2Enumeral_2Etexp_help (ap c_2Earithmetic_2EBIT1 V0n) \\
& c_2Earithmetic_2ZERO)))))) \\
& (42)
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& ((\forall V0x \in ty_2Enum_2Enum. ((ap (ap c_2Enumeral_2Eonecount \\
& c_2Earithmetic_2ZERO) V0x) = V0x)) \wedge (\forall V1n \in ty_2Enum_2Enum. \\
& (\forall V2x \in ty_2Enum_2Enum. ((ap (ap c_2Enumeral_2Eonecount \\
& (ap c_2Earithmetic_2EBIT1 V1n)) V2x) = (ap (ap c_2Enumeral_2Eonecount \\
& V1n) (ap c_2Enum_2ESUC V2x)))))) \wedge (\forall V3n \in ty_2Enum_2Enum. \\
& (\forall V4x \in ty_2Enum_2Enum. ((ap (ap c_2Enumeral_2Eonecount \\
& (ap c_2Earithmetic_2EBIT2 V3n)) V4x) = c_2Earithmetic_2ZERO)))))) \\
& (43)
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& (((ap c_2EEnumeral_2Exactlog c_2Earithmetic_2ZERO) = c_2Earithmetic_2ZERO) \wedge \\
& \quad ((\forall V0n \in ty_2Enum_2Enum.((ap c_2EEnumeral_2Exactlog \\
& \quad (ap c_2Earithmetic_2EBIT1 V0n)) = c_2Earithmetic_2ZERO)) \wedge (\forall V1n \in \\
& \quad ty_2Enum_2Enum.((ap c_2EEnumeral_2Exactlog (ap c_2Earithmetic_2EBIT2 \\
& \quad V1n)) = (ap (ap (c_2Ebool_2ELET ty_2Enum_2Enum ty_2Enum_2Enum) \\
& \quad (\lambda V2x \in ty_2Enum_2Enum.(ap (ap (ap (c_2Ebool_2ECOND ty_2Enum_2Enum) \\
& \quad (ap (ap (c_2Emin_2E_3D ty_2Enum_2Enum) V2x) c_2Earithmetic_2ZERO) \\
& \quad c_2Earithmetic_2ZERO) (ap c_2Earithmetic_2EBIT1 V2x)))) (ap \\
& \quad (ap c_2EEnumeral_2Eonecount V1n) c_2Earithmetic_2ZERO))))))) \\
& \quad (44)
\end{aligned}$$

Assume the following.

$$(\forall V0x \in ty_2Enum_2Enum.((ap c_2Earithmetic_2EDIV2 (ap c_2Earithmetic_2EBIT1 V0x)) = V0x)) \quad (45)$$

Assume the following.

$$\begin{aligned}
& (\forall V0n \in ty_2Enum_2Enum. (\forall V1x \in ty_2Enum_2Enum. (\forall V2y \in ty_2Enum_2Enum. (((ap (ap c_2Earithmetic_2E_2A c_2Earithmetic_2EZERO) \\
V0n) = c_2Earithmetic_2EZERO) \wedge (((ap (ap c_2Earithmetic_2E_2A \\
V0n) c_2Earithmetic_2EZERO) = c_2Earithmetic_2EZERO) \wedge (((ap \\
(ap c_2Earithmetic_2E_2A (ap c_2Earithmetic_2EBIT1 V1x)) (ap \\
c_2Earithmetic_2EBIT1 V2y)) = (ap (ap c_2Enumeral_2Einternal_mult \\
(ap c_2Earithmetic_2EBIT1 V1x)) (ap c_2Earithmetic_2EBIT1 V2y))) \wedge \\
(((ap (ap c_2Earithmetic_2E_2A (ap c_2Earithmetic_2EBIT1 V1x)) \\
(ap c_2Earithmetic_2EBIT2 V2y)) = (ap (ap (c_2Ebool_2ELET ty_2Enum_2Enum \\
ty_2Enum_2Enum) (\lambda V3n \in ty_2Enum_2Enum. (ap (ap (c_2Ebool_2ECOND \\
ty_2Enum_2Enum) (ap c_2Earithmetic_2EODD V3n)) (ap (ap c_2Enumeral_2Eexp_help \\
(ap c_2Earithmetic_2EDIV2 V3n)) (ap c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT1 \\
V1x)))) (ap (ap c_2Enumeral_2Einternal_mult (ap c_2Earithmetic_2EBIT1 \\
V1x)) (ap c_2Earithmetic_2EBIT2 V2y)))))) (ap c_2Enumeral_2Eexactlog \\
(ap c_2Earithmetic_2EBIT2 V2y)))) \wedge (((ap (ap c_2Earithmetic_2E_2A \\
(ap c_2Earithmetic_2EBIT2 V1x)) (ap c_2Earithmetic_2EBIT1 V2y)) = \\
(ap (ap (c_2Ebool_2ELET ty_2Enum_2Enum ty_2Enum_2Enum) (\lambda V4m \in \\
ty_2Enum_2Enum. (ap (ap (c_2Ebool_2ECOND ty_2Enum_2Enum) \\
(ap c_2Earithmetic_2EODD V4m)) (ap (ap c_2Enumeral_2Eexp_help \\
(ap c_2Earithmetic_2EDIV2 V4m)) (ap c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT1 \\
V2y)))))) (ap (ap c_2Enumeral_2Einternal_mult (ap c_2Earithmetic_2EBIT2 \\
V1x)) (ap c_2Earithmetic_2EBIT1 V2y)))))) (ap c_2Enumeral_2Eexactlog \\
(ap c_2Earithmetic_2EBIT2 V1x)))) \wedge ((ap (ap c_2Earithmetic_2E_2A \\
(ap c_2Earithmetic_2EBIT2 V1x)) (ap c_2Earithmetic_2EBIT2 V2y)) = \\
(ap (ap (c_2Ebool_2ELET ty_2Enum_2Enum ty_2Enum_2Enum) (\lambda V5m \in \\
ty_2Enum_2Enum. (ap (ap (c_2Ebool_2ELET ty_2Enum_2Enum ty_2Enum_2Enum) \\
(\lambda V6n \in ty_2Enum_2Enum. (ap (ap (ap (c_2Ebool_2ECOND ty_2Enum_2Enum) \\
(ap c_2Earithmetic_2EODD V5m)) (ap (ap c_2Enumeral_2Eexp_help \\
(ap c_2Earithmetic_2EDIV2 V5m)) (ap c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT2 \\
V2y)))))) (ap (ap (ap (c_2Ebool_2ECOND ty_2Enum_2Enum) (ap c_2Earithmetic_2EODD \\
V6n)) (ap (ap c_2Enumeral_2Eexp_help (ap c_2Earithmetic_2EDIV2 \\
V6n)) (ap c_2Eprim_rec_2EPRE (ap c_2Earithmetic_2EBIT2 V1x)))) \\
(ap (ap c_2Enumeral_2Einternal_mult (ap c_2Earithmetic_2EBIT2 \\
V1x)) (ap c_2Earithmetic_2EBIT2 V2y)))))) (ap c_2Enumeral_2Eexactlog \\
(ap c_2Earithmetic_2EBIT2 V2y)))))) (ap c_2Enumeral_2Eexactlog \\
(ap c_2Earithmetic_2EBIT2 V1x))))))))))) \\
(46)
\end{aligned}$$

Assume the following.

$$\begin{aligned}
& (\forall V0n \in ty_2Enum_2Enum. (\forall V1m \in ty_2Enum_2Enum. \\
& ((ap (ap c_2EEnumeral_2Einternal_mult c_2Earithmetic_2EZERO) \\
& V0n) = c_2Earithmetic_2EZERO) \wedge (((ap (ap c_2EEnumeral_2Einternal_mult \\
& V0n) c_2Earithmetic_2EZERO) = c_2Earithmetic_2EZERO) \wedge (((ap \\
& (ap c_2EEnumeral_2Einternal_mult (ap c_2Earithmetic_2EBIT1 \\
& V0n)) V1m) = (ap c_2EEnumeral_2EiZ (ap (ap c_2Earithmetic_2E_2B \\
& (ap c_2EEnumeral_2EiDUB (ap (ap c_2EEnumeral_2Einternal_mult \\
& V0n) V1m))) V1m))) \wedge ((ap (ap c_2EEnumeral_2Einternal_mult (ap \\
& c_2Earithmetic_2EBIT2 V0n)) V1m) = (ap c_2EEnumeral_2EiDUB (ap \\
& c_2EEnumeral_2EiZ (ap (ap c_2Earithmetic_2E_2B (ap (ap c_2EEnumeral_2Einternal_mult \\
& V0n) V1m))))))) \\
&)
\end{aligned} \tag{47}$$

Assume the following.

$$\begin{aligned}
& \forall A_27a.\text{nonempty } A_27a \Rightarrow ((\forall V0w \in (ty_2Efcp_2Ecart \\
& 2 A_27a).((ap (ap (c_2Ewords_2Eword_add A_27a) V0w) (ap (c_2Ewords_2En2w \\
& A_27a) c_2Enum_2E0)) = V0w)) \wedge (\forall V1w \in (ty_2Efcp_2Ecart 2 \\
& A_27a).((ap (ap (c_2Ewords_2Eword_add A_27a) (ap (c_2Ewords_2En2w \\
& A_27a) c_2Enum_2E0)) V1w) = V1w)))
\end{aligned} \tag{48}$$

Assume the following.

$$\begin{aligned}
& \forall A_27a.\text{nonempty } A_27a \Rightarrow (\forall V0v \in (ty_2Efcp_2Ecart \\
& 2 A_27a).(\forall V1w \in (ty_2Efcp_2Ecart 2 A_27a).(\forall V2x \in \\
& (ty_2Efcp_2Ecart 2 A_27a).((ap (ap (c_2Ewords_2Eword_mul A_27a) \\
& V0v) (ap (ap (c_2Ewords_2Eword_mul A_27a) V1w) V2x)) = (ap (ap \\
& c_2Ewords_2Eword_mul A_27a) (ap (ap (c_2Ewords_2Eword_mul \\
& A_27a) V0v) V1w))) V2x))))
\end{aligned} \tag{49}$$

Assume the following.

$$\begin{aligned}
& \forall A_27a.\text{nonempty } A_27a \Rightarrow (\forall V0v \in (ty_2Efcp_2Ecart \\
& 2 A_27a).(\forall V1w \in (ty_2Efcp_2Ecart 2 A_27a).((ap (ap (c_2Ewords_2Eword_add \\
& A_27a) V0v) V1w) = (ap (ap (c_2Ewords_2Eword_add A_27a) V1w) V0v))))
\end{aligned} \tag{50}$$

Assume the following.

$$\begin{aligned}
& \forall A_27a.\text{nonempty } A_27a \Rightarrow (\forall V0v \in (ty_2Efcp_2Ecart \\
& 2 A_27a).(\forall V1w \in (ty_2Efcp_2Ecart 2 A_27a).((ap (ap (c_2Ewords_2Eword_mul \\
& A_27a) V0v) V1w) = (ap (ap (c_2Ewords_2Eword_mul A_27a) V1w) V0v))))
\end{aligned} \tag{51}$$

Assume the following.

$$\begin{aligned} \forall A_{27a}.nonempty\ A_{27a} \Rightarrow & (\forall V0w \in (ty_2Efcop_2Ecart \\ 2\ A_{27a}).((ap\ (c_2Ewords_2Eword_2comp\ A_{27a})\ V0w) = (ap\ (ap\ (\\ c_2Ewords_2Eword_mul\ A_{27a})\ (ap\ (c_2Ewords_2Eword_2comp\ A_{27a})\ \\ (ap\ (c_2Ewords_2En2w\ A_{27a})\ (ap\ c_2Earithmetic_2ENUMERAL\ (ap\ \\ c_2Earithmetic_2EBIT1\ c_2Earithmetic_2EZERO)))))\ V0w))) \end{aligned} \quad (52)$$

Assume the following.

$$\begin{aligned} \forall A_{27a}.nonempty\ A_{27a} \Rightarrow & \forall A_{27b}.nonempty\ A_{27b} \Rightarrow \\ & (\forall V0m \in ty_2Enum_2Enum.(\forall V1n \in ty_2Enum_2Enum.\\ (ap\ (ap\ (c_2Ewords_2Eword_mul\ A_{27a})\ (ap\ (c_2Ewords_2En2w\ A_{27a})\ \\ V0m))\ (ap\ (c_2Ewords_2Eword_2comp\ A_{27a})\ (ap\ (c_2Ewords_2En2w\ \\ A_{27a})\ V1n))) = (ap\ (c_2Ewords_2Eword_2comp\ A_{27a})\ (ap\ (c_2Ewords_2En2w\ \\ A_{27a})\ (ap\ (ap\ c_2Earithmetic_2E_2A\ V0m)\ V1n)))))) \wedge \\ & (\forall V2m \in ty_2Enum_2Enum.(\forall V3n \in ty_2Enum_2Enum.((ap\ (ap\ (c_2Ewords_2Eword_mul\ \\ A_{27b})\ (ap\ (c_2Ewords_2Eword_2comp\ A_{27b})\ (ap\ (c_2Ewords_2En2w\ \\ A_{27b})\ V2m))\ (ap\ (c_2Ewords_2Eword_2comp\ A_{27b})\ (ap\ (c_2Ewords_2En2w\ \\ A_{27b})\ V3n))) = (ap\ (c_2Ewords_2En2w\ A_{27b})\ (ap\ (ap\ c_2Earithmetic_2E_2A\ \\ V2m)\ V3n))))))) \end{aligned} \quad (53)$$

Assume the following.

$$\begin{aligned} \forall A_{27a}.nonempty\ A_{27a} \Rightarrow & (\forall V0n \in ty_2Enum_2Enum.(\ \\ (ap\ (ap\ (c_2Ewords_2Eword_lsl\ A_{27a})\ (ap\ (c_2Ewords_2En2w\ A_{27a})\ \\ (ap\ c_2Earithmetic_2ENUMERAL\ (ap\ c_2Earithmetic_2EBIT1\ c_2Earithmetic_2EZERO)))))) \\ V0n) = (ap\ (c_2Ewords_2En2w\ A_{27a})\ (ap\ (ap\ c_2Earithmetic_2EXP\ \\ (ap\ c_2Earithmetic_2ENUMERAL\ (ap\ c_2Earithmetic_2EBIT2\ c_2Earithmetic_2EZERO)))\\ V0n)))) \end{aligned} \quad (54)$$

Theorem 1