thm_2Elbtree_2Ebf__flatten__eq__lnil (TMGV8k6zNMr5V9aMkt37Dvn4DzxBxoKJrhh)

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Definition 1 *We define* c_2Emin_2E_40 *to be* $\lambda A.\lambda P \in 2^A.$**if** $(\exists x \in A.p\ (ap\ P\ x))$ **then** $(the\ (\lambda x.x \in A \wedge p$
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* $\lambda A_27a : \iota.(\lambda V0P \in (2^{A_27a}).(ap\ V0P\ (ap\ ($c_2Emin_2E_40 A

Let $ty_2Elist_2Elist : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty_2Elist_2Elist\ A0) \tag{1}$$

Let $c_2Elist_2EAPPEND : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Elist_2EAPPEND\ A_27a \in (((ty_2Elist_2Elist\ A_27a)^{(ty_2Elist_2Elist\ A_27a)})^{(ty_2Elist_2Elist\ A_27a)}) \tag{2}$$

Let $ty_2Eoption_2Eoption : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty_2Eoption_2Eoption\ A0) \tag{3}$$

Let $ty_2Elbtree_2Elbtree : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty_2Elbtree_2Elbtree\ A0) \tag{4}$$

Let $c_2Elbtree_2Elbtree__rep : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Elbtree_2Elbtree__rep\ A_27a \in (((ty_2Eoption_2Eoption\ A_27a)^{(ty_2Elist_2Elist\ 2)})^{(ty_2Elbtree_2Elbtree\ A_27a)}) \tag{5}$$

Definition 4 *We define* c_2Ebool_2ET *to be* $(ap\ (ap\ ($c_2Emin_2E_3D $(2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V1$

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 $(2^{A_27a}$

Definition 6 *We define* c_2Ebool_2EF *to be* $(ap\ ($c_2Ebool_2E_21 $2)\ (\lambda V0t \in 2.V0t))$.

Definition 7 *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 8 *We define* c_2Ebool_2E_2F_5C *to be* $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap\ (\mathsf{c_2Ebool_2E_21}\ 2)\ (\lambda V2t \in 2$

Definition 9 *We define* c_2Ebool_2ECOND *to be* $\lambda A_27a : \iota.(\lambda V0t \in 2.(\lambda V1t1 \in A_27a.(\lambda V2t2 \in A_27a.(a$

Let $ty_2Eone_2Eone : \iota$ be given. Assume the following.

$$nonempty\ ty_2Eone_2Eone \tag{6}$$

Let $ty_2Esum_2Esum : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow \forall A1.nonempty\ A1 \Rightarrow nonempty\ (ty_2Esum_2Esum\ A0\ A1) \tag{7}$$

Let $c_2Esum_2EABS__sum : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow c_2Esum_2EABS__sum\ A_27a\ A_27b \in ((ty_2Esum_2Esum\ A_27a\ A_27b)^{(((2^{A_27b})^{A_27a})^{2})}) \tag{8}$$

Definition 10 *We define* c_2Esum_2EINL *to be* $\lambda A_27a : \iota.\lambda A_27b : \iota.\lambda V0e \in A_27a.(ap\ (c_2Esum_2EABS$

Let $c_2Eoption_2Eoption__ABS : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Eoption_2Eoption__ABS\ A_27a \in ((ty_2Eoption_2Eoption\ A_27a)^{(ty_2Esum_2Esum\ A_27a\ ty_2Eone_2Eone)}) \tag{9}$$

Definition 11 *We define* c_2Eoption_2ESOME *to be* $\lambda A_27a : \iota.\lambda V0x \in A_27a.(ap\ (c_2Eoption_2Eoption__$

Let $c_2Elist_2Elist__CASE : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow \forall A_27b.nonempty\ A_27b \Rightarrow c_2Elist_2Elist__CASE\ A_27a\ A_27b \in (((A_27b^{((A_27b^{(ty_2Elist_2Elist\ A_27a)})^{A_27a})})^{A_27b})^{(ty_2Elist_2Elist\ A_27a)}) \tag{10}$$

Definition 12 *We define* c_2Elbtree_2ENdrep *to be* $\lambda A_27a : \iota.\lambda V0a \in A_27a.\lambda V1t1 \in ((ty_2Eoption_2Eop$

Let $c_2Elbtree_2Elbtree__abs : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Elbtree_2Elbtree__abs\ A_27a \in ((ty_2Elbtree_2Elbtree\ A_27a)^{((ty_2Eoption_2Eoption\ A_27a)^{(ty_2Elist_2Elist\ 2)})}) \tag{11}$$

Definition 13 *We define* c_2Elbtree_2ENd *to be* $\lambda A_27a : \iota.\lambda V0a \in A_27a.\lambda V1t1 \in (ty_2Elbtree_2Elbtree$

Definition 14 *We define* c_2Eone_2Eone *to be* $(ap\ (\mathsf{c_2Emin_2E_40}\ ty_2Eone_2Eone)\ (\lambda V0x \in ty_2Eone_2$

Definition 15 *We define* c_2Ebool_2E_7E *to be* $(\lambda V0t \in 2.(ap\ (ap\ \mathsf{c_2Emin_2E_3D_3D_3E}\ V0t)\ \mathsf{c_2Ebool_2E}$

Definition 16 *We define* c_2Esum_2EINR *to be* $\lambda A_27a : \iota.\lambda A_27b : \iota.\lambda V0e \in A_27b.(ap\ (c_2Esum_2EABS$

Definition 17 *We define* c_2Eoption_2ENONE *to be* $\lambda A_27a : \iota.(ap\ (c_2Eoption_2Eoption__ABS\ A_27a)\ ($

Definition 18 *We define* c_2Elbtree_2ELfrep *to be* $\lambda A_27a : \iota.\lambda A_27b : \iota.(\lambda V0l \in A_27a.($c_2Eoption_2ENON

Definition 19 *We define* c_2Elbtree_2ELf *to be* $\lambda A_27a : \iota.(ap\ (c_2Elbtree_2Elbtree__abs\ A_27a)\ ($c_2Elbtre

Let $ty_2Ellist_2Ellist : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A0.nonempty\ A0 \Rightarrow nonempty\ (ty_2Ellist_2Ellist\ A0) \tag{12}$$

Let $c_2Elbtree_2Ebf__flatten : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Elbtree_2Ebf__flatten\ A_27a \in ((ty_2Ellist_2Ellist\ A_27a)^{(ty_2Elist_2Elist\ (ty_2Elbtree_2Elbtree\ A_27a))}) \tag{13}$$

Let $c_2Elist_2EEVERY : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Elist_2EEVERY\ A_27a \in ((2^{(ty_2Elist_2Elist\ A_27a)})^{(2^{A_27a})}) \tag{14}$$

Let $c_2Elist_2ECONS : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Elist_2ECONS\ A_27a \in (((ty_2Elist_2Elist\ A_27a)^{(ty_2Elist_2Elist\ A_27a)})^{A_27a}) \tag{15}$$

Let $c_2Elist_2ENIL : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Elist_2ENIL\ A_27a \in (ty_2Elist_2Elist\ A_27a) \tag{16}$$

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

$$nonempty\ ty_2Enum_2Enum \tag{17}$$

Let $c_2Ellist_2Ellist__abs : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Ellist_2Ellist__abs\ A_27a \in ((ty_2Ellist_2Ellist\ A_27a)^{((ty_2Eoption_2Eoption\ A_27a)^{ty_2Enum_2Enum})}) \tag{18}$$

Definition 20 *We define* c_2Ellist_2ELNIL *to be* $\lambda A_27a : \iota.(ap\ (c_2Ellist_2Ellist__abs\ A_27a)\ (\lambda V0n \in ty_$

Let $c_2Enum_2EZERO__REP : \iota$ be given. Assume the following.

$$c_2Enum_2EZERO__REP \in omega \tag{19}$$

Let $c_2Enum_2EABS__num : \iota$ be given. Assume the following.

$$c_2Enum_2EABS__num \in (ty_2Enum_2Enum^{omega}) \tag{20}$$

Definition 21 *We define* c_2Enum_2E0 *to be* $(ap\ c_2Enum_2EABS__num\ c_2Enum_2EZERO__REP)$.

Definition 22 *We define* c_2Earithmetic_2EZERO *to be* c_2Enum_2E0.

Let $c_2Enum_2EREP__num : \iota$ be given. Assume the following.

$$c_2Enum_2EREP__num \in (omega^{ty_2Enum_2Enum}) \tag{21}$$

Let $c_2Enum_2ESUC__REP : \iota$ be given. Assume the following.

$$c_2Enum_2ESUC__REP \in (omega^{omega}) \tag{22}$$

Definition 23 *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.

$$c_2Earithmetic_2E_2B \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \tag{23}$$

Definition 24 *We define* c_2Earithmetic_2EBIT1 *to be* $\lambda V0n \in ty_2Enum_2Enum.(ap\ (ap\ c_2Earithmetic$

Definition 25 *We define* c_2Earithmetic_2ENUMERAL *to be* $\lambda V0x \in ty_2Enum_2Enum.V0x$.

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

$$c_2Earithmetic_2E_2D \in ((ty_2Enum_2Enum^{ty_2Enum_2Enum})^{ty_2Enum_2Enum}) \tag{24}$$

Let $c_2Ellist_2Ellist__rep : \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow c_2Ellist_2Ellist__rep\ A_27a \in (((ty_2Eoption_2Eoption\ A_27a)^{ty_2Enum_2Enum})^{(ty_2Ellist_2Ellist\ A_27a)}) \tag{25}$$

Definition 26 *We define* c_2Ellist_2ELCONS *to be* $\lambda A_27a : \iota.\lambda V0h \in A_27a.\lambda V1t \in (ty_2Ellist_2Ellist\ A$

Definition 27 *We define* c_2Ebool_2E_5C_2F *to be* $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap\ (\mathsf{c_2Ebool_2E_21}\ 2)\ (\lambda V2t \in$

Assume the following.

$$True \tag{26}$$

Assume the following.

$$(\forall V0t1 \in 2.(\forall V1t2 \in 2.(((p\ V0t1) \Rightarrow (p\ V1t2)) \Rightarrow (((p\ V1t2) \Rightarrow (p\ V0t1)) \Rightarrow ((p\ V0t1) \Leftrightarrow (p\ V1t2)))))) \tag{27}$$

Assume the following.

$$(\forall V0t \in 2.(False \Rightarrow (p\ V0t))) \tag{28}$$

Assume the following.

$$(\forall V0t \in 2.(((True \wedge (p\ V0t)) \Leftrightarrow (p\ V0t)) \wedge ((((p\ V0t) \wedge True) \Leftrightarrow (p\ V0t)) \wedge (((False \wedge (p\ V0t)) \Leftrightarrow False) \wedge ((((p\ V0t) \wedge False) \Leftrightarrow False) \wedge (((p\ V0t) \wedge (p\ V0t)) \Leftrightarrow (p\ V0t))))))) \tag{29}$$

Assume the following.

$$(\forall V0t \in 2.(((True \Rightarrow (p\ V0t)) \Leftrightarrow (p\ V0t)) \wedge ((((p\ V0t) \Rightarrow True) \Leftrightarrow True) \wedge (((False \Rightarrow (p\ V0t)) \Leftrightarrow True) \wedge ((((p\ V0t) \Rightarrow (p\ V0t)) \Leftrightarrow True) \wedge (((p\ V0t) \Rightarrow False) \Leftrightarrow (\neg (p\ V0t)))))))) \tag{30}$$

Assume the following.

$$((\forall V0t \in 2.((\neg(\neg(p\ V0t))) \Leftrightarrow (p\ V0t))) \wedge (((\neg True) \Leftrightarrow False) \wedge ((\neg False) \Leftrightarrow True))) \tag{31}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0x \in A_27a.(V0x = V0x)) \tag{32}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0x \in A_27a.((V0x = V0x) \Leftrightarrow True)) \tag{33}$$

Assume the following.

$$(\forall V0t \in 2.(((True \Leftrightarrow (p\ V0t)) \Leftrightarrow (p\ V0t)) \wedge ((((p\ V0t) \Leftrightarrow True) \Leftrightarrow (p\ V0t)) \wedge (((False \Leftrightarrow (p\ V0t)) \Leftrightarrow (\neg (p\ V0t))) \wedge (((p\ V0t) \Leftrightarrow False) \Leftrightarrow (\neg (p\ V0t))))))) \tag{34}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0P \in 2.(\forall V1Q \in (2^{A_27a}).(((p\ V0P) \wedge (\forall V2x \in A_27a.(p\ (ap\ V1Q\ V2x)))) \Leftrightarrow (\forall V3x \in A_27a.((p\ V0P) \wedge (p\ (ap\ V1Q\ V3x))))))) \tag{35}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0t \in (ty_2Elbtree_2Elbtree\ A_27a).((V0t = (\mathsf{c_2Elbtree_2ELf}\ A_27a)) \vee (\exists V1a \in A_27a.(\exists V2t1 \in (ty_2Elbtree_2Elbtree\ A_27a).(\exists V3t2 \in (ty_2Elbtree_2Elbtree\ A_27a).(V0t = (ap\ (ap\ (ap\ (\mathsf{c_2Elbtree_2ENd}\ A_27a)\ V1a)\ V2t1)\ V3t2))))))) \tag{36}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0a \in A_27a.(\forall V1t1 \in (ty_2Elbtree_2Elbtree\ A_27a).(\forall V2t2 \in (ty_2Elbtree_2Elbtree\ A_27a).(\neg((\mathsf{c_2Elbtree_2ELf}\ A_27a) = (ap\ (ap\ (ap\ (\mathsf{c_2Elbtree_2ENd}\ A_27a)\ V0a)\ V1t1)\ V2t2)))))) \tag{37}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (((ap\ (c_2Elbtree_2Ebf__flatten\ A_27a)\ (c_2Elist_2ENIL\ (ty_2Elbtree_2Elbtree\ A_27a))) = (\mathsf{c_2Ellist_2ELNIL}\ A_27a)) \wedge ((\forall V0ts \in (ty_2Elist_2Elist\ (ty_2Elbtree_2Elbtree\ A_27a)).((ap\ (c_2Elbtree_2Ebf__flatten\ A_27a)\ (ap\ (ap\ (c_2Elist_2ECONS\ (ty_2Elbtree_2Elbtree\ A_27a))\ (\mathsf{c_2Elbtree_2ELf}\ A_27a))\ V0ts)) = (ap\ (c_2Elbtree_2Ebf__flatten\ A_27a)\ V0ts))) \wedge (\forall V1a \in A_27a.(\forall V2t1 \in (ty_2Elbtree_2Elbtree\ A_27a).(\forall V3t2 \in (ty_2Elbtree_2Elbtree\ A_27a).(\forall V4ts \in (ty_2Elist_2Elist\ (ty_2Elbtree_2Elbtree\ A_27a)).((ap\ (c_2Elbtree_2Ebf__flatten\ A_27a)\ (ap\ (ap\ (c_2Elist_2ECONS\ (ty_2Elbtree_2Elbtree\ A_27a))\ (ap\ (ap\ (ap\ (\mathsf{c_2Elbtree_2ENd}\ A_27a)\ V1a)\ V2t1)\ V3t2))\ V4ts)) = (ap\ (ap\ (\mathsf{c_2Ellist_2ELCONS}\ A_27a)\ V1a)\ (ap\ (c_2Elbtree_2Ebf__flatten\ A_27a)\ (ap\ (ap\ (c_2Elist_2EAPPEND\ (ty_2Elbtree_2Elbtree\ A_27a))\ V4ts)\ (ap\ (ap\ (c_2Elist_2ECONS\ (ty_2Elbtree_2Elbtree\ A_27a))\ V2t1)\ (ap\ (ap\ (c_2Elist_2ECONS\ (ty_2Elbtree_2Elbtree\ A_27a))\ V3t2)\ (c_2Elist_2ENIL\ (ty_2Elbtree_2Elbtree\ A_27a)))))))))))))) \tag{38}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow ((\forall V0P \in (2^{A_27a}).((p\ (ap\ (ap\ (c_2Elist_2EEVERY\ A_27a)\ V0P)\ (c_2Elist_2ENIL\ A_27a))) \Leftrightarrow True)) \wedge (\forall V1P \in (2^{A_27a}).(\forall V2h \in A_27a.(\forall V3t \in (ty_2Elist_2Elist\ A_27a).((p\ (ap\ (ap\ (c_2Elist_2EEVERY\ A_27a)\ V1P)\ (ap\ (ap\ (c_2Elist_2ECONS\ A_27a)\ V2h)\ V3t))) \Leftrightarrow ((p\ (ap\ V1P\ V2h)) \wedge (p\ (ap\ (ap\ (c_2Elist_2EEVERY\ A_27a)\ V1P)\ V3t)))))))) \tag{39}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0P \in (2^{(ty_2Elist_2Elist\ A_27a)}).(((p\ (ap\ V0P\ (c_2Elist_2ENIL\ A_27a))) \wedge (\forall V1t \in (ty_2Elist_2Elist\ A_27a).((p\ (ap\ V0P\ V1t)) \Rightarrow (\forall V2h \in A_27a.(p\ (ap\ V0P\ (ap\ (ap\ (c_2Elist_2ECONS\ A_27a)\ V2h)\ V1t))))))) \Rightarrow (\forall V3l \in (ty_2Elist_2Elist\ A_27a).(p\ (ap\ V0P\ V3l))))) \tag{40}$$

Assume the following.

$$\forall A_27a.nonempty\ A_27a \Rightarrow (\forall V0h \in A_27a.(\forall V1t \in (ty_2Ellist_2Ellist\ A_27a).((\neg((ap\ (ap\ (\mathsf{c_2Ellist_2ELCONS}\ A_27a)\ V0h)\ V1t) = (\mathsf{c_2Ellist_2ELNIL}\ A_27a))) \wedge (\neg((\mathsf{c_2Ellist_2ELNIL}\ A_27a) = (ap\ (ap\ (\mathsf{c_2Ellist_2ELCONS}\ A_27a)\ V0h)\ V1t)))))) \tag{41}$$

Assume the following.

$$(\forall V0t \in 2.((\neg(\neg(p\ V0t))) \Leftrightarrow (p\ V0t))) \tag{42}$$

Assume the following.

$$(\forall V0A \in 2.((p\ V0A) \Rightarrow ((\neg(p\ V0A)) \Rightarrow False))) \tag{43}$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(((\neg((p\ V0A)\vee(p\ V1B)))\Rightarrow False)\Leftrightarrow (((p\ V0A)\Rightarrow False)\Rightarrow((\neg(p\ V1B))\Rightarrow False))))) \tag{44}$$

Assume the following.

$$(\forall V0A \in 2.(\forall V1B \in 2.(((\neg((\neg(p\ V0A))\vee(p\ V1B)))\Rightarrow False)\Leftrightarrow ((p\ V0A)\Rightarrow((\neg(p\ V1B))\Rightarrow False))))) \tag{45}$$

Assume the following.

$$(\forall V0A \in 2.(((\neg(p\ V0A))\Rightarrow False)\Rightarrow(((p\ V0A)\Rightarrow False)\Rightarrow False))) \tag{46}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(\forall V2r \in 2.(((p\ V0p)\Leftrightarrow((p\ V1q)\Leftrightarrow(p\ V2r)))\Leftrightarrow(((p\ V0p)\vee((p\ V1q)\vee(p\ V2r)))\wedge(((p\ V0p)\vee((\neg(p\ V2r))\vee(\neg(p\ V1q))))\wedge(((p\ V1q)\vee((\neg(p\ V2r))\vee(\neg(p\ V0p))))\wedge((p\ V2r)\vee ((\neg(p\ V1q))\vee(\neg(p\ V0p))))))))))) \tag{47}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(\forall V2r \in 2.(((p\ V0p)\Leftrightarrow((p\ V1q)\wedge(p\ V2r)))\Leftrightarrow(((p\ V0p)\vee((\neg(p\ V1q))\vee(\neg(p\ V2r))))\wedge(((p\ V1q)\vee (\neg(p\ V0p)))\wedge((p\ V2r)\vee(\neg(p\ V0p)))))))))) \tag{48}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(\forall V2r \in 2.(((p\ V0p)\Leftrightarrow((p\ V1q)\vee(p\ V2r)))\Leftrightarrow(((p\ V0p)\vee(\neg(p\ V1q)))\wedge(((p\ V0p)\vee(\neg(p\ V2r)))\wedge ((p\ V1q)\vee((p\ V2r)\vee(\neg(p\ V0p)))))))))) \tag{49}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(\forall V2r \in 2.(((p\ V0p)\Leftrightarrow((p\ V1q)\Rightarrow(p\ V2r)))\Leftrightarrow(((p\ V0p)\vee(p\ V1q))\wedge(((p\ V0p)\vee(\neg(p\ V2r)))\wedge((\neg(p\ V1q))\vee((p\ V2r)\vee(\neg(p\ V0p)))))))))) \tag{50}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.(((p\ V0p)\Leftrightarrow(\neg(p\ V1q)))\Leftrightarrow(((p\ V0p)\vee (p\ V1q))\wedge((\neg(p\ V1q))\vee(\neg(p\ V0p)))))))) \tag{51}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.((\neg((p\ V0p)\Rightarrow(p\ V1q)))\Rightarrow(p\ V0p)))) \tag{52}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.((\neg((p\ V0p)\Rightarrow(p\ V1q)))\Rightarrow(\neg(p\ V1q))))) \tag{53}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.((\neg((p\ V0p)\vee(p\ V1q)))\Rightarrow(\neg(p\ V0p))))) \tag{54}$$

Assume the following.

$$(\forall V0p \in 2.(\forall V1q \in 2.((\neg((p\ V0p)\vee(p\ V1q)))\Rightarrow(\neg(p\ V1q))))) \tag{55}$$

Assume the following.

$$(\forall V0p \in 2.((\neg(\neg(p\ V0p)))\Rightarrow(p\ V0p))) \tag{56}$$

Theorem 1

$$\forall A_27a.nonempty\ A_27a\Rightarrow(\forall V0l \in (ty_2Elist_2Elist\ (ty_2Elbtree_2Elbtree\ A_27a)).(((ap\ (c_2Elbtree_2Ebf__flatten\ A_27a)\ V0l) = (\mathsf{c_2Ellist_2ELNIL}\ A_27a))\Leftrightarrow(p\ (ap\ (ap\ (c_2Elist_2EEVERY\ (ty_2Elbtree_2Elbtree\ A_27a))\ (ap\ (\mathsf{c_2Emin_2E_3D}\ (ty_2Elbtree_2Elbtree\ A_27a))\ (\mathsf{c_2Elbtree_2ELf}\ A_27a)))\ V0l))))$$