

thm\_2Enumeral\_\_bit\_2ENUMERAL\_\_BITWISE  
 (TMRYCNTCbpyn-  
 vyJ3uTjG2De7qA8ZWJvXwZH)

October 26, 2020

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.

$$nonempty\ ty\_2Enum\_2Enum \tag{2}$$

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  $c\_2Emin\_2E\_3D$  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  $c\_2Ebool\_2ET$  to be  $(ap\ (ap\ (c\_2Emin\_2E\_3D\ (2^2))\ (\lambda V0x \in 2.V0x))\ (\lambda V1x \in 2.V1x))$ .

**Definition 4** We define  $c\_2Ebool\_2E\_21$  to be  $\lambda A.\lambda a : \iota.(\lambda V0P \in (2^{A-27a}).(ap\ (ap\ (c\_2Emin\_2E\_3D\ (2^{A-27a}))\ P))$

**Definition 5** We define  $c\_2Earithmic\_2ENUMERAL$  to be  $\lambda V0x \in ty\_2Enum\_2Enum.V0x$ .

**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  $\lambda P \in 2.\lambda Q \in 2.inj\_o (p \Rightarrow Q)$  of type  $\iota$ .

**Definition 8** We define  $c\_2Ebool\_2E\_2F\_5C$  to be  $(\lambda V0t1 \in 2.(\lambda V1t2 \in 2.(ap\ (c\_2Ebool\_2E\_21\ 2)\ (\lambda V2t \in 2.V2t))$

Let  $c\_2Ebit\_2EBITWISE : \iota$  be given. Assume the following.

$$c\_2Ebit\_2EBITWISE \in (((ty\_2Enum\_2Enum^{ty\_2Enum\_2Enum})^{ty\_2Enum\_2Enum})^{((2^2)^2)})^{ty\_2Enum\_2Enum} \tag{4}$$

**Definition 9** We define  $c\_2Enumeral\_bit\_2EiBITWISE$  to be  $c\_2Ebit\_2EBITWISE$ .

Assume the following.

$$True \tag{5}$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow (\forall V0t \in 2.((\forall V1x \in A\_27a.(p\ V0t)) \Leftrightarrow (p\ V0t))) \tag{6}$$

Assume the following.

$$\begin{aligned} & (\forall V0t \in 2.(((True \wedge (p\ V0t)) \Leftrightarrow (p\ V0t)) \wedge (((p\ V0t) \wedge True) \Leftrightarrow \\ & (p\ V0t)) \wedge (((False \wedge (p\ V0t)) \Leftrightarrow False) \wedge (((p\ V0t) \wedge False) \Leftrightarrow False) \wedge \\ & (((p\ V0t) \wedge (p\ V0t)) \Leftrightarrow (p\ V0t)))))) \end{aligned} \tag{7}$$

Assume the following.

$$\forall A\_27a.nonempty\ A\_27a \Rightarrow (\forall V0x \in A\_27a.((V0x = V0x) \Leftrightarrow True)) \tag{8}$$

**Theorem 1**

$$\begin{aligned} & \forall A\_27a.nonempty\ A\_27a \Rightarrow ((\forall V0x \in ty\_2Enum\_2Enum. \\ & (\forall V1f \in ((2^2)^2).(\forall V2a \in A\_27a.((ap\ (ap\ (ap\ (ap\ c\_2Ebit\_2EBITWISE \\ & V0x)\ V1f)\ c\_2Enum\_2E0)\ c\_2Enum\_2E0) = (ap\ c\_2Earithmetic\_2ENUMERAL \\ & (ap\ (ap\ (ap\ (ap\ c\_2Enumeral\_bit\_2EiBITWISE\ V0x)\ V1f)\ c\_2Enum\_2E0) \\ & c\_2Enum\_2E0)))))) \wedge ((\forall V3x \in ty\_2Enum\_2Enum.(\forall V4f \in \\ & ((2^2)^2).(\forall V5a \in ty\_2Enum\_2Enum.((ap\ (ap\ (ap\ (ap\ c\_2Ebit\_2EBITWISE \\ & V3x)\ V4f)\ (ap\ c\_2Earithmetic\_2ENUMERAL\ V5a))\ c\_2Enum\_2E0) = (ap \\ & c\_2Earithmetic\_2ENUMERAL\ (ap\ (ap\ (ap\ (ap\ c\_2Enumeral\_bit\_2EiBITWISE \\ & V3x)\ V4f)\ (ap\ c\_2Earithmetic\_2ENUMERAL\ V5a))\ c\_2Enum\_2E0)))))) \wedge \\ & ((\forall V6x \in ty\_2Enum\_2Enum.(\forall V7f \in ((2^2)^2).(\forall V8b \in \\ & ty\_2Enum\_2Enum.((ap\ (ap\ (ap\ (ap\ c\_2Ebit\_2EBITWISE\ V6x)\ V7f)\ c\_2Enum\_2E0) \\ & (ap\ c\_2Earithmetic\_2ENUMERAL\ V8b)) = (ap\ c\_2Earithmetic\_2ENUMERAL \\ & (ap\ (ap\ (ap\ (ap\ c\_2Enumeral\_bit\_2EiBITWISE\ V6x)\ V7f)\ c\_2Enum\_2E0) \\ & (ap\ c\_2Earithmetic\_2ENUMERAL\ V8b)))))) \wedge (\forall V9x \in ty\_2Enum\_2Enum. \\ & (\forall V10f \in ((2^2)^2).(\forall V11a \in ty\_2Enum\_2Enum.(\forall V12b \in \\ & ty\_2Enum\_2Enum.((ap\ (ap\ (ap\ (ap\ c\_2Ebit\_2EBITWISE\ V9x)\ V10f)\ ( \\ & ap\ c\_2Earithmetic\_2ENUMERAL\ V11a))\ (ap\ c\_2Earithmetic\_2ENUMERAL \\ & V12b)) = (ap\ c\_2Earithmetic\_2ENUMERAL\ (ap\ (ap\ (ap\ (ap\ c\_2Enumeral\_bit\_2EiBITWISE \\ & V9x)\ V10f)\ (ap\ c\_2Earithmetic\_2ENUMERAL\ V11a))\ (ap\ c\_2Earithmetic\_2ENUMERAL \\ & V12b)))))))))) \end{aligned}$$