

## t2\_gate\_5 (TMUtKQuuCgEPQeqgyrMFVEr- Fcx5bC7z5MGE)

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Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $k2\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k10\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_xboole\_0 : \iota$  be given. Let  $k11\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k10\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k11\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k12\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k13\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k38\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k37\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k7\_gate\_5 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k35\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k36\_gate\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\forall X0.\forall X1.(v1\_xboole\_0 X0) \Rightarrow (v1\_xboole\_0 (k2\_gate\_1 X0 X1)) \quad (1)$$

Assume the following.

$$\forall X0.\forall X1.((\neg v1\_xboole\_0 X0) \wedge (\neg v1\_xboole\_0 X1)) \Rightarrow (\neg v1\_xboole\_0 (k2\_gate\_1 X0 X1)) \quad (2)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1\_xboole\_0 X0) \wedge (v1\_xboole\_0 X1)) \Rightarrow (v1\_xboole\_0 (k11\_gate\_1 X2 X0 X1)) \quad (3)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1\_xboole\_0 X0) \wedge (v1\_xboole\_0 X1)) \Rightarrow (v1\_xboole\_0 (k11\_gate\_1 X0 X2 X1)) \quad (4)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1\_xboole\_0 X0) \wedge (v1\_xboole\_0 X1)) \Rightarrow (v1\_xboole\_0 (k11\_gate\_1 X0 X1 X2)) \quad (5)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0) \wedge (\neg v1\_xboole\_0 X1)) \Rightarrow (\neg v1\_xboole\_0 (k11\_gate\_1 X2 X0 X1)) \quad (6)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0)\wedge(\neg v1\_xboole\_0 X1))\Rightarrow(\neg v1\_xboole\_0 (k11\_gate\_1 X0 X2 X1)) \quad (7)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0)\wedge(\neg v1\_xboole\_0 X1))\Rightarrow(\neg v1\_xboole\_0 (k11\_gate\_1 X0 X1 X2)) \quad (8)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0)\wedge((\neg v1\_xboole\_0 X1)\wedge(\neg v1\_xboole\_0 X2)))\Rightarrow(\neg v1\_xboole\_0 (k10\_gate\_1 X0 X1 X2)) \quad (9)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0)\wedge((\neg v1\_xboole\_0 X1)\wedge(v1\_xboole\_0 X2)))\Rightarrow(v1\_xboole\_0 (k10\_gate\_1 X2 X0 X1)) \quad (10)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0)\wedge((\neg v1\_xboole\_0 X1)\wedge(v1\_xboole\_0 X2)))\Rightarrow(v1\_xboole\_0 (k10\_gate\_1 X0 X2 X1)) \quad (11)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((\neg v1\_xboole\_0 X0)\wedge((\neg v1\_xboole\_0 X1)\wedge(v1\_xboole\_0 X2)))\Rightarrow(v1\_xboole\_0 (k10\_gate\_1 X0 X1 X2)) \quad (12)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1\_xboole\_0 X0)\wedge((v1\_xboole\_0 X1)\wedge(\neg v1\_xboole\_0 X2)))\Rightarrow(\neg v1\_xboole\_0 (k10\_gate\_1 X2 X0 X1)) \quad (13)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1\_xboole\_0 X0)\wedge((v1\_xboole\_0 X1)\wedge(\neg v1\_xboole\_0 X2)))\Rightarrow(\neg v1\_xboole\_0 (k10\_gate\_1 X0 X2 X1)) \quad (14)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1\_xboole\_0 X0)\wedge((v1\_xboole\_0 X1)\wedge(\neg v1\_xboole\_0 X2)))\Rightarrow(\neg v1\_xboole\_0 (k10\_gate\_1 X0 X1 X2)) \quad (15)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.((v1\_xboole\_0 X0)\wedge((v1\_xboole\_0 X1)\wedge(v1\_xboole\_0 X2)))\Rightarrow(v1\_xboole\_0 (k10\_gate\_1 X0 X1 X2)) \quad (16)$$

Assume the following.

$$v1\_xboole\_0 k1\_xboole\_0 \quad (17)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k9\_gate\_5 \\ X0\ X1\ X2\ X3\ X4 = & k38\_gate\_1 (k2\_gate\_1\ X1\ X3) (k2\_gate\_1\ X0\ X4) (k2\_gate\_1 \\ & X2\ X3) (k2\_gate\_1\ X1\ X4) k1\_xboole\_0 (k2\_gate\_1\ X2\ X4) k1\_xboole\_0 \end{aligned} \quad (18)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k8\_gate\_5 \\ X0\ X1\ X2\ X3\ X4 = & k37\_gate\_1 (k2\_gate\_1\ X1\ X3) (k2\_gate\_1\ X0\ X4) (k2\_gate\_1 \\ & X2\ X3) (k2\_gate\_1\ X1\ X4) k1\_xboole\_0 (k2\_gate\_1\ X2\ X4) k1\_xboole\_0 \end{aligned} \quad (19)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k7\_gate\_5 \\ X0\ X1\ X2\ X3\ X4 = & k35\_gate\_1 (k2\_gate\_1\ X1\ X3) (k2\_gate\_1\ X0\ X4) (k2\_gate\_1 \\ & X2\ X3) (k2\_gate\_1\ X1\ X4) k1\_xboole\_0 \end{aligned} \quad (20)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k6\_gate\_5 \\ X0\ X1\ X2\ X3\ X4 = & k10\_gate\_1 (k2\_gate\_1\ X1\ X3) (k2\_gate\_1\ X0\ X4) k1\_xboole\_0 \end{aligned} \quad (21)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k5\_gate\_5 \\ X0\ X1\ X2\ X3\ X4 = & k2\_gate\_1\ X0\ X3 \end{aligned} \quad (22)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ \forall X6.k38\_gate\_1\ X0\ X1\ X2\ X3\ X4\ X5\ X6 = & k11\_gate\_1\ X4\ X5 (k36\_gate\_1 \\ & X0\ X1\ X2\ X3\ X6) \end{aligned} \quad (23)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ \forall X6.k37\_gate\_1\ X0\ X1\ X2\ X3\ X4\ X5\ X6 = & k10\_gate\_1\ X4\ X5 (k36\_gate\_1 \\ & X0\ X1\ X2\ X3\ X6) \end{aligned} \quad (24)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k36\_gate\_1 \\ X0\ X1\ X2\ X3\ X4 = & k11\_gate\_1\ X2\ X3 (k11\_gate\_1\ X0\ X1\ X4) \end{aligned} \quad (25)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.k35\_gate\_1 \\ X0\ X1\ X2\ X3\ X4 = & k10\_gate\_1\ X2\ X3 (k11\_gate\_1\ X0\ X1\ X4) \end{aligned} \quad (26)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & k13\_gate\_5 X0 X1 X2 X3 X4 X5 = k38\_gate\_1 (k7\_gate\_5 X0 X1 X2 X3 X4) ( \\ & k2\_gate\_1 X0 X5) (k8\_gate\_5 X0 X1 X2 X3 X4) (k2\_gate\_1 X1 X5) (k9\_gate\_5 \\ & X0 X1 X2 X3 X4) (k2\_gate\_1 X2 X5) k1\_xboole\_0 \end{aligned} \quad (27)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & k12\_gate\_5 X0 X1 X2 X3 X4 X5 = k37\_gate\_1 (k7\_gate\_5 X0 X1 X2 X3 X4) ( \\ & k2\_gate\_1 X0 X5) (k8\_gate\_5 X0 X1 X2 X3 X4) (k2\_gate\_1 X1 X5) (k9\_gate\_5 \\ & X0 X1 X2 X3 X4) (k2\_gate\_1 X2 X5) k1\_xboole\_0 \end{aligned} \quad (28)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & k11\_gate\_5 X0 X1 X2 X3 X4 X5 = k35\_gate\_1 (k7\_gate\_5 X0 X1 X2 X3 X4) ( \\ & k2\_gate\_1 X0 X5) (k8\_gate\_5 X0 X1 X2 X3 X4) (k2\_gate\_1 X1 X5) k1\_xboole\_0 \end{aligned} \quad (29)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.\forall X5. \\ & k10\_gate\_5 X0 X1 X2 X3 X4 X5 = k10\_gate\_1 (k7\_gate\_5 X0 X1 X2 X3 X4) ( \\ & k2\_gate\_1 X0 X5) k1\_xboole\_0 \end{aligned} \quad (30)$$

Assume the following.

$$\forall X0.\forall X1.k2\_gate\_1 X0 X1 = k2\_gate\_1 X1 X0 \quad (31)$$

