Inference at $*$ 1
of proof for Lemma append_overlapping_sublists:

1. T : Type
2. L_1 : T List
3. L_2 : T List
4. L : T List
5. x : T
6. $\forall i, j{:}\mathbb{N}.\ (i < \|L\|) \Rightarrow (j < \|L\|) \Rightarrow (\neg(i = j)) \Rightarrow (\neg(L[i] = L[j]))$
7. f_1 : $\{0..\|L_1 @ [x]\|^{-}\} \rightarrow \{0..\|L\|^{-}\}$
8. increasing(f_1;$\|L_1 @ [x]\|$)
9. $\forall j{:}\{0..\|L_1 @ [x]\|^{-}\}.\ (L_1 @ [x])[j] = L[(f_1(j))]$
10. f : $\{0..(\|L_2\|+1)^{-}\} \rightarrow \{0..\|L\|^{-}\}$
11. increasing(f;$\|L_2\|+1$)
12. $\forall j{:}\{0..(\|L_2\|+1)^{-}\}.\ [x / L_2][j] = L[(f(j))]$

$\vdash \exists f{:}\{0..\|L_1 @ [x / L_2]\|^{-}\} \rightarrow \{0..\|L\|^{-}\}$
(increasing(f;$\|L_1 @ [x / L_2]\|$)
& $(\forall j{:}\{0..\|L_1 @ [x / L_2]\|^{-}\}.\ (L_1 @ [x / L_2])[j] = L[(f(j))]))$

by Assert $\|L_1 @ [x / L_2]\| = \|L_1\|+\|L_2\|+1$

1: .....assertion..... NILNIL

$\vdash \|L_1 @ [x / L_2]\| = \|L_1\|+\|L_2\|+1$

2:

13. $\|L_1 @ [x / L_2]\| = \|L_1\|+\|L_2\|+1$

$\vdash \exists f{:}\{0..\|L_1 @ [x / L_2]\|^{-}\} \rightarrow \{0..\|L\|^{-}\}$
(increasing(f;$\|L_1 @ [x / L_2]\|$)
& $(\forall j{:}\{0..\|L_1 @ [x / L_2]\|^{-}\}.\ (L_1 @ [x / L_2])[j] = L[(f(j))]))$

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