```
nth_tl_lem1  THM

⊢  ∀x,y:ℕ, as:T*. nth_tl(x;nth_tl(y;as)) = nth_tl(x+y;as)
| by (Analyze 0) THEN (Analyze 0)
|
1. T : Type
2. x : ℕ
⊢  ∀y:ℕ, as:T*. nth_tl(x;nth_tl(y;as)) = nth_tl(x+y;as)  by NatInd 2
|
|\
| .....basecase .....
| 1. T : Type
| ⊢  ∀y:ℕ, as:T*. nth_tl(0;nth_tl(y;as)) = nth_tl(0+y;as)
|   by (ArithSimp 0) THEN (RecUnfold `nth_tl` 0) THEN (Reduce 0)
|
.\
. .....upcase .....
. 2. x : ℤ
. 3. 0<x
. 4. ∀y:ℕ, as:T*. nth_tl(x-1;nth_tl(y;as)) = nth_tl(x-1+y;as)
. ⊢   by RepD
. |
. 5. y : ℕ
. 6. as : T*
. ⊢  nth_tl(x;nth_tl(y;as)) = nth_tl(x+y;as)
. | by RecCaseSplit `nth_tl`
. |
. |\
. | .....truecase .....
. | 7. x≤0
. | ⊢  nth_tl(y;as) = nth_tl(x+y;as)  by Auto
. |
. .\
. . .....falsecase .....
. . 7. 0<x
. . ⊢  nth_tl(x-1;tl(nth_tl(y;as))) = nth_tl(x+y;as)
. . | by Inst
. . |    Thm* ∀y:ℕ, as:T*. tl(nth_tl(y;as)) = nth_tl(y+1;as)
. . |    {nth_tl_lem0}
. . |    [T;y;as]
. . |
. . 8. tl(nth_tl(y;as)) = nth_tl(y+1;as)
. . ⊢   by (RWH (HypC -1) 0) THEN (InstHyp [y+1;as] 4)
. . |
. . 9. nth_tl(x-1;nth_tl(y+1;as)) = nth_tl(x-1+y+1;as)
. . ⊢  nth_tl(x-1;nth_tl(y+1;as)) = nth_tl(x+y;as)
. .   by (ArithSimp 0) THEN (ArithSimp -1)
END
```