```
mem_select  THM

⊢  ∀L:T*, t:T. mem_f(T;t;L) ⇒ (∃i:ℕ||L||. L[i] = t)
| by RepD THEN (ListInd 2) THEN (Reduce 0)
|
1. T : Type
2. T*
3. t : T
4. u : T
5. v : T*
6. mem_f(T;t;v) ⇒ (∃i:ℕ||v||. v[i] = t)
7. u = t ∨ mem_f(T;t;v)
⊢  ∃i:ℕ(||v||+1). (u.v)[i] = t  by Analyze -1
|
|\
| 7. u = t
| ⊢   by (InstConcl [0]) THEN (Reduce 0)
| |
| |\
| | ⊢  0<||v||+1
| |   by Inst Thm* ∀l:A*. ||l||≥0    {non_neg_length} [T;v]
| |
| .\
| . 8. i : ℕ(||v||+1)
| . ⊢  i<||u.v||  by Reduce 0
|
.\
. 7. mem_f(T;t;v)
. ⊢   by FwdThru 6 [7] THEN Analyze -1
. |
. 8. i : ℕ||v||
. 9. v[i] = t
. ⊢   by InstConcl [i+1]
. |
. |\
. | ⊢  (u.v)[(i+1)] = t
. | | by Unfold `select` 0 THEN RecUnfold `nth_tl` 0
. | |    THEN
. | |    SplitOnConclITE
. | |
. | .....falsecase .....
. | 10. 0<i+1
. | ⊢  hd(nth_tl(i+1-1;tl((u.v)))) = t
. |   by Fold `select` 0 THEN Reduce 0 THEN ArithSimp 0
. |
. .\
. . 10. i1 : ℕ(||v||+1)
. . ⊢  i1<||u.v||  by Reduce 0
END
```