```
mem_f_dec  THM

⊢  ∀s:S, l:S*. Fin(S) ⇒ Dec(mem_f(S;s;l))  by RepD
|
1. S : Type
2. s : S
3. l : S*
4. Fin(S)
⊢  Dec(mem_f(S;s;l))  by ListInd 3
|
|\
| ⊢  Dec(mem_f(S;s;nil))  by Reduce 0
|
.\
. 5. u : S
. 6. v : S*
. 7. Dec(mem_f(S;s;v))
. ⊢  Dec(mem_f(S;s;u.v))  by Reduce 0
. |
. ⊢  Dec(u = s ∨ mem_f(S;s;v))  by Assert Dec(u = s)
. |
. |\
. | .....assertion .....
. | ⊢  Dec(u = s)
. | | by Analyze 4
. | |    THEN
. | |    RWH
. | |    (LemmaC
. | |     Thm* (∃f:(A→B). Bij(A; B; f)) ⟺ (A ∼ B)
. | |     {bij_iff_1_1_corr})
. | |    5
. | |
. | 4. n : ℕ
. | 5. ℕn ∼ S
. | 6. u : S
. | 7. v : S*
. | 8. Dec(mem_f(S;s;v))
. | ⊢   by Analyze 5 THEN Analyze 6
. | |
. | 5. f : ℕn→S
. | 6. g : S→ℕn
. | 7. InvFuns(ℕn; S; f; g)
. | 8. u : S
. | 9. v : S*
. | 10. Dec(mem_f(S;s;v))
. | ⊢   by Assert (u = s ⟺ g(u) = g(s))
. | |
. | |\
. | | .....assertion .....
. | | ⊢  u = s ⟺ g(u) = g(s)  by GenRepD
. | | |
. | | |\
. | | | 11. u = s
. | | | ⊢  g(u) = g(s)  by RWH (HypC -1) 0
. | | |
```

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. | | .\
. | | . 11. g(u) = g(s)
. | | . ⊢  u = s  by Assert ((f o g)(u) = (f o g)(s))
. | | . |
. | | . |\
. | | . | .....assertion .....
. | | . | ⊢  (f o g)(u) = (f o g)(s)
. | | . |   by Reduce 0 THEN RWH (HypC -1) 0
. | | . |
. | | . .\
. | | . . 12. (f o g)(u) = (f o g)(s)
. | | . . ⊢   by Analyze 7 THEN RWH (HypC 8) -1
. | | . . |
. | | . . 7. g o f = Id
. | | . . 8. f o g = Id
. | | . . 9. u : S
. | | . . 10. v : S*
. | | . . 11. Dec(mem_f(S;s;v))
. | | . . 12. g(u) = g(s)
. | | . . 13. Id(u) = Id(s)
. | | . . ⊢   by Reduce -1
. | |
. | .\
. | . 11. u = s ⟺ g(u) = g(s)
. | . ⊢   by RWH (HypC -1) 0
. |
. .\
. . 8. Dec(u = s)
. . ⊢   by Auto
END
```