(ξπ)(Example) 0.0.1. (SCRATCH: `conjI` sequent notation experiments)

```
❒ 1) Sequents with an assumes/shows theorem: Item a below is okay. Item
     b is not because "⟦A;B⟧ ⟹ (A ∧ B)" includes both the premise and
     conclusion of the theorem, but when stated that way, it needs a
     different proof.
  a) A, B, ⟨i(conjI),r(`A`),r(`B`)⟩ ⊢ "(A ∧ B)"
  b) ⊢ "⟦A;B⟧ ⟹ (A ∧ B)", ⟨i(conjI),r(`A`),r(`B`)⟩ ❑
theorem conjI_1:
  assumes "A" and "B"
  shows "A ∧ B"
                       ❒ Goal: A ∧ B ❑
apply(intro conjI) ❒ Goal: A ❑
apply(rule `A`)    ❒ Goal: B ❑
   by(rule `B`)
thm conjI_1         ❒ ⟦?A;?B⟧ ⟹ ?A ∧ ?B ❑

❒ 2) Sequents when assumptions are stated with meta implication: Item a
     does not work because A, B needs to mean the same as 1 above. Item b
     is wrong because ⟦A;B⟧ is not the premise. Items c and d are okay.
  a) A, B, ⟨i(conjI),a,a⟩ ⊢ "(A ∧ B)"
  b) ⟦A;B⟧, ⟨i(conjI),a,a⟩ ⊢ "(A ∧ B)"
  c) ⟨i(conjI),a,a⟩ ⊢ "⟦A;B⟧ ⟹ (A ∧ B)"
  d) ⊢ "⟦A;B⟧ ⟹ (A ∧ B)", ⟨i(conjI),a,a⟩ ❑
theorem conjI_2:
  "⟦A;B⟧ ⟹ (A ∧ B)"
                       ❒ Goal: ⟦A;B⟧ ⟹ A ∧ B ❑
apply(intro conjI) ❒ Goal: ⟦A;B⟧ ⟹ A ❑
apply(assumption)  ❒ Goal: ⟦A;B⟧ ⟹ B ❑
   by(assumption)
thm conjI_2         ❒ ⟦?A;?B⟧ ⟹ ?A ∧ ?B ❑

❒ 3) ⊢ "⟦A;B⟧ ⟹ (A ∧ B)", ⟨e(conjI),a⟩ ❑
theorem
  "⟦A;B⟧ ⟹ (A ∧ B)"
                      ❒ Goal: ⟦A;B⟧ ⟹ A ∧ B ❑
apply(elim conjI) ❒ Goal: B ⟹ B ❑
   by(assumption)

❒ 4) The backwards proof of conjI_1 shows how to do a forward proof. ❑
theorem
  assumes "A" and "B"
  shows "A ∧ B"
proof-
  have "B"
    by (rule `B`)
  have "A"
    by (rule `A`)
  with `B` show
    "A ∧ B"
  by(intro conjI)
qed
```