A Simple Factorial Program

[1] factorial(0, 1).

[2] factorial(N, Fact) :- M is N - 1,
   factorial(M, FM), Fact is N * FM.


M₁ is 3-1, factorial(M₁, FM₁), Fact₁ is 3 * FM₁.     [is] M₁ → 2

factorial(2, FM₁), Fact₁ is 3 * FM₁.     [2] N₂ → 2, FM₁ → Fact₂

M₂ is 2-1, factorial(M₂, FM₂), Fact₂ is 2 * FM₂, Fact₁ is 3 * FM₁.
   [is] M₂ → 1

factorial(1, FM₂), Fact₂ is 2 * FM₂, Fact₁ is 3 * FM₁.
   [2] N₃ → 1, FM₂ → Fact₃

M₃ is 1-1, factorial(M₃, FM₃), Fact₃ is 1 * FM₃,
   Fact₂ is 2 * FM₂, Fact₁ is 3 * FM₁.     [is] M₃ → 0

factorial(0, FM₃), Fact₃ is 1 * FM₃, Fact₂ is 2 * FM₂,
   Fact₁ is 3 * FM₁.     [1] FM₃ → 1

Fact₃ is 1 * 1, Fact₂ is 2 * FM₂, Fact₁ is 3 * FM₁.     [is] Fact₃ → 1
?- factorial(3, A).

[2] N₁ → 3, A → Fact₁

M₁ is 3-1, factorial(M₁, FM₁), Fact₁ is 3 * FM₁.  [is] M₁ → 2

factorial(2, FM₁), Fact₁ is 3 * FM₁.  [2] N₂ → 2, FM₁ → Fact₂

M₂ is 2-1, factorial(M₂, FM₂), Fact₂ is 2 * FM₂, Fact₁ is 3 * FM₁.  [is] M₂ → 1

factorial(1, FM₂), Fact₂ is 2 * FM₂, Fact₁ is 3 * FM₁.

[2] N₃ → 1, FM₂ → Fact₃

M₃ is 1-1, factorial(M₃, FM₃), Fact₃ is 1 * FM₃,

Fact₂ is 2 * FM₂, Fact₁ is 3 * FM₁.  [is] M₃ → 0

factorial(0, FM₃), Fact₃ is 1 * FM₃, Fact₂ is 2 * FM₂,

Fact₁ is 3 * FM₁.  [1] FM₃ → 1

Fact₃ is 1 * 1, Fact₂ is 2 * FM₂, Fact₁ is 3 * FM₁.  [is] Fact₃ → 1

so now FM₂ → Fact₃ → 1

Fact₂ is 2 * 1, Fact₁ is 3 * FM₁.  [is] Fact₂ → 2

so now FM₁ → Fact₂ → 2

Fact₁ is 3 * 2.  [is] Fact₁ → 6

finally, A → Fact₁ → 6