

Cours - Systèmes de Transition

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1. Mise en pratique : La factorielle

```
1  ----- MODULE Fact0 -----
2
3  EXTENDS Naturals
4  CONSTANT N
5  VARIABLE res
6
7  Init == res = Fact[N]
8  Next == UNCHANGED res (*ou FALSE*)
9  Spec == Init \land [Next]_res
10 =====
```

Liste 1. – 0 transition

```
1  ----- MODULE Fact1 -----
2
3  EXTENDS Naturals
4  CONSTANT N
5  ASSUME N \in Nat
6  VARIABLES res, i
7
8  Init ==
9      /\ res = 1
10     /\ i = 1
11
12  Mult ==
13     /\ i <= N
14     /\ res' = res * i
15     /\ i' = i + 1
16
17  Next == Mult
18
19  Spec == Init \land [Next]_{res,i}
20 =====
```

Liste 2. – Avec transitions

```
1  ----- MODULE Fact1 -----
2
3  EXTENDS Naturals
4  CONSTANT N
5  ASSUME N \in Nat
6  VARIABLES res, factors
7
8  Init ==
9      /\ res = 1
10     /\ factors = 1..N
11
12  Mult(i) ==
13     /\ res' = res * i
14     /\ factors' = factors \ {i}
15
16
17  Next == \E i \in factors : Mult (i)
18
19  Spec == Init \land [Next]_{res,factors}
20 =====
```

Liste 3. – Sans ordre particulier

```
1  ----- MODULE Fact1 -----
2
3  EXTENDS Naturals
4  CONSTANT N
5  ASSUME N \in Nat
6  VARIABLES res, factors
7
8  Init ==
9      /\ res = 1
10     /\ factors = 1..N
11
12  Mult(I) ==
13     /\ res' = (*on multiplie les éléments de I à res*)
14     /\ factors = 1..N
15
16  Next == \E I \in SUBSET factors : Mult (i)
17  Spec == Init \land [Next]_{res,factors}
18 =====
```

Liste 4. – Sans ordre particulier