

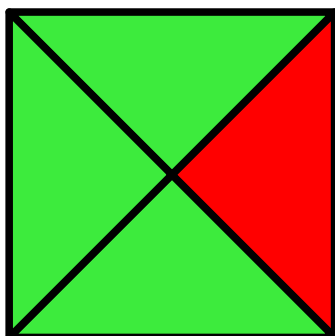
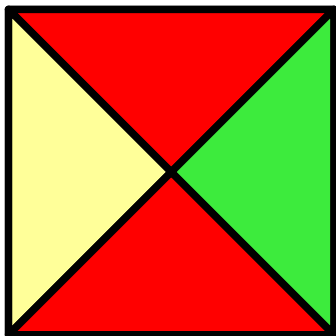
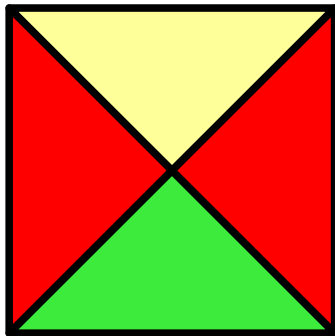
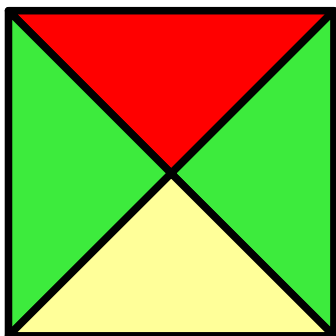
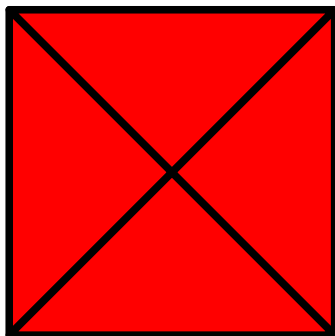
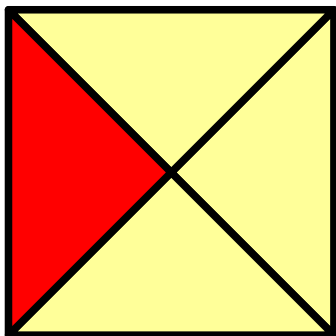
Pavages et machines de Turing

- Pavages
- Encodage d'une exécution d'une machine de Turing dans un pavage
- Problème de pavage d'un carré
- Problème SAT

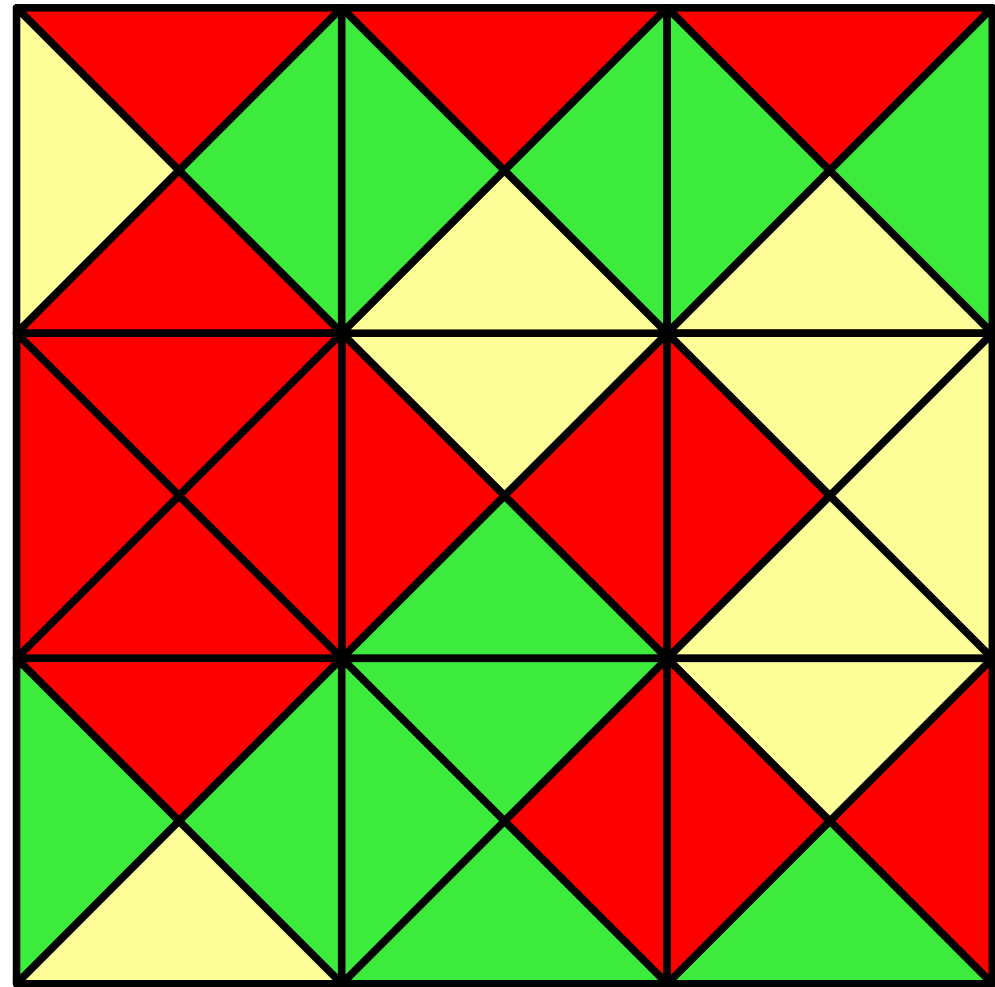
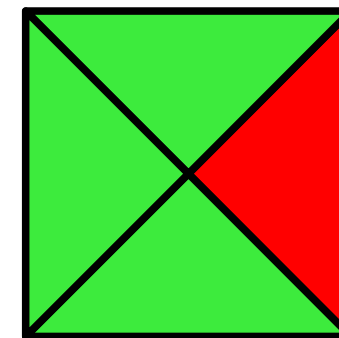
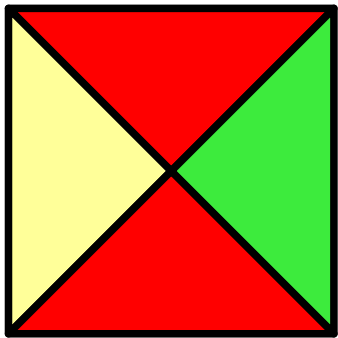
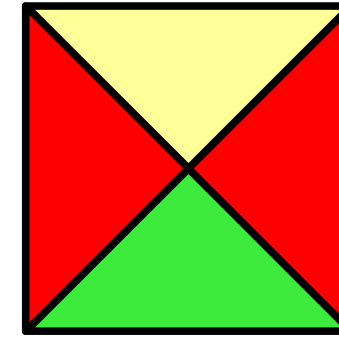
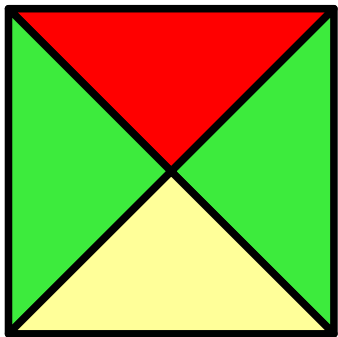
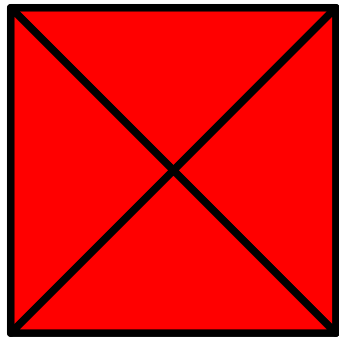
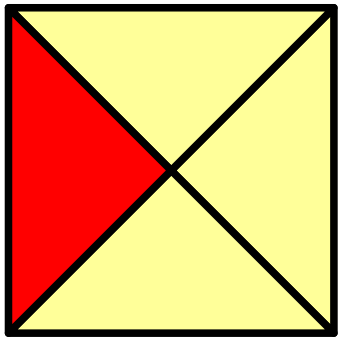
Références

- David Harel. Recurring dominoes: Making the highly undecidable highly understandable.
- Peter Van Emde Boas. The Convenience of Tilings (1997)

Pavage



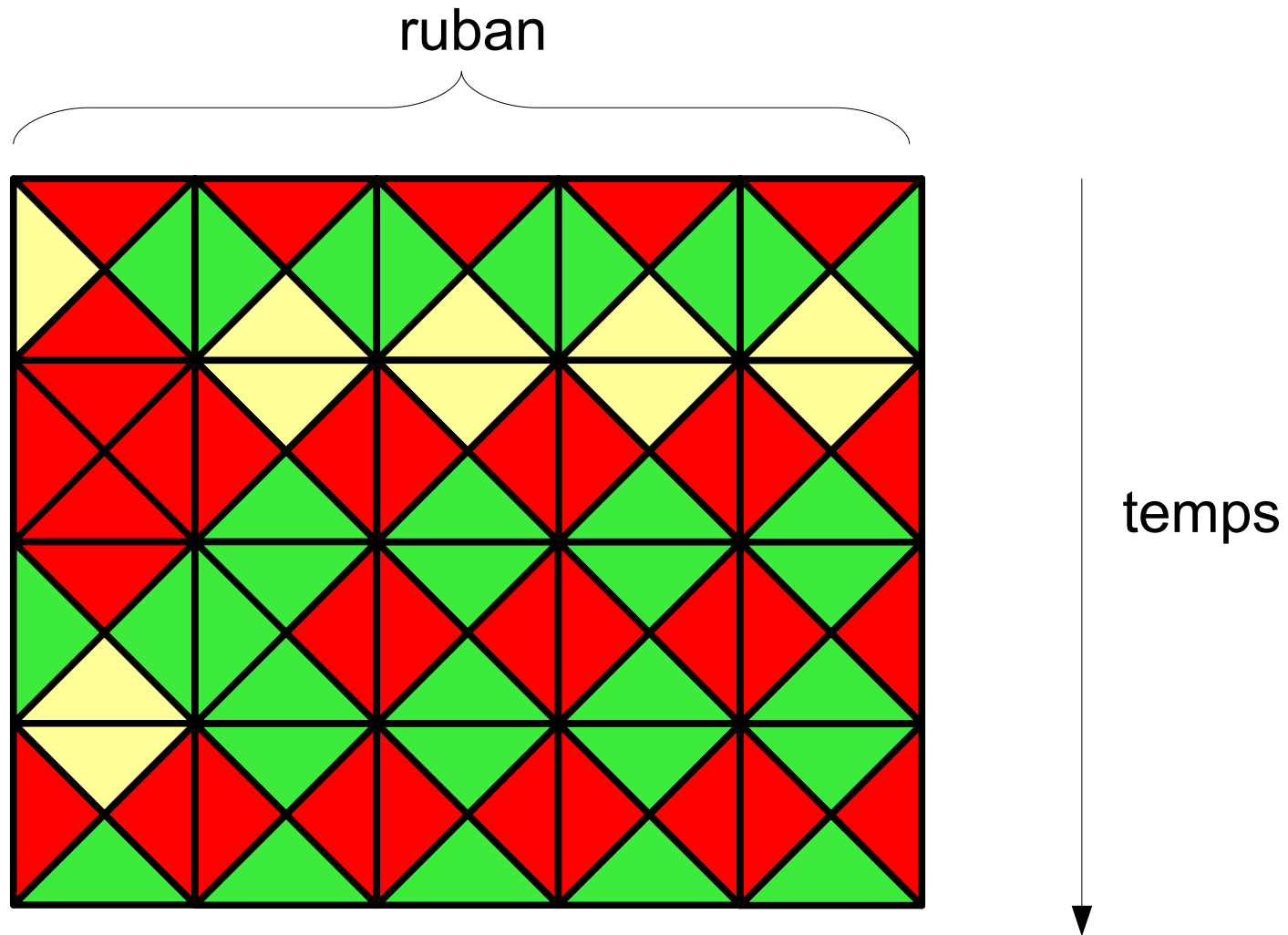
Pavage



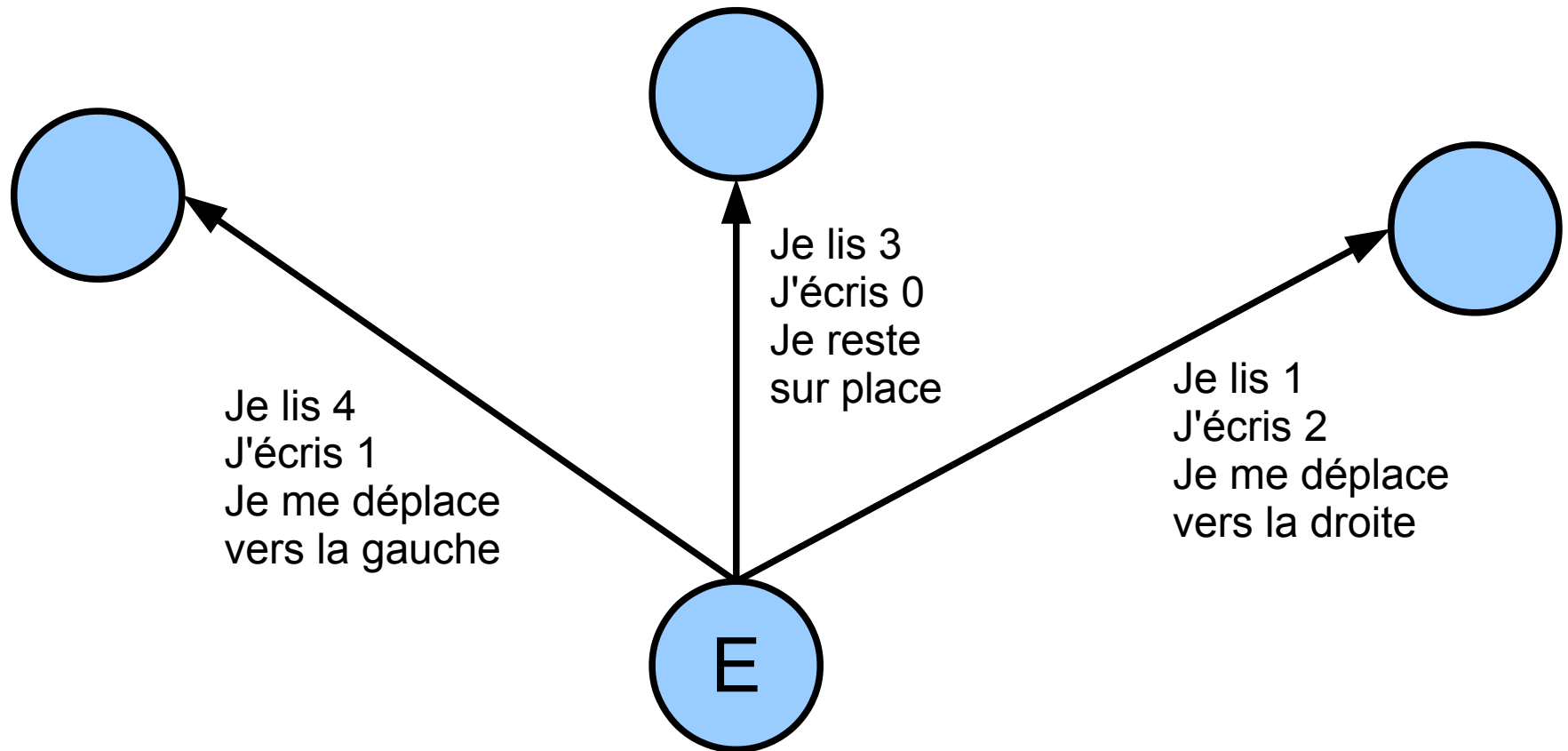
Encoder l'exécution d'une machine de Turing avec des pavages

- Principe général
- Normalisation d'une machine de Turing non déterministe
- Briques à utiliser

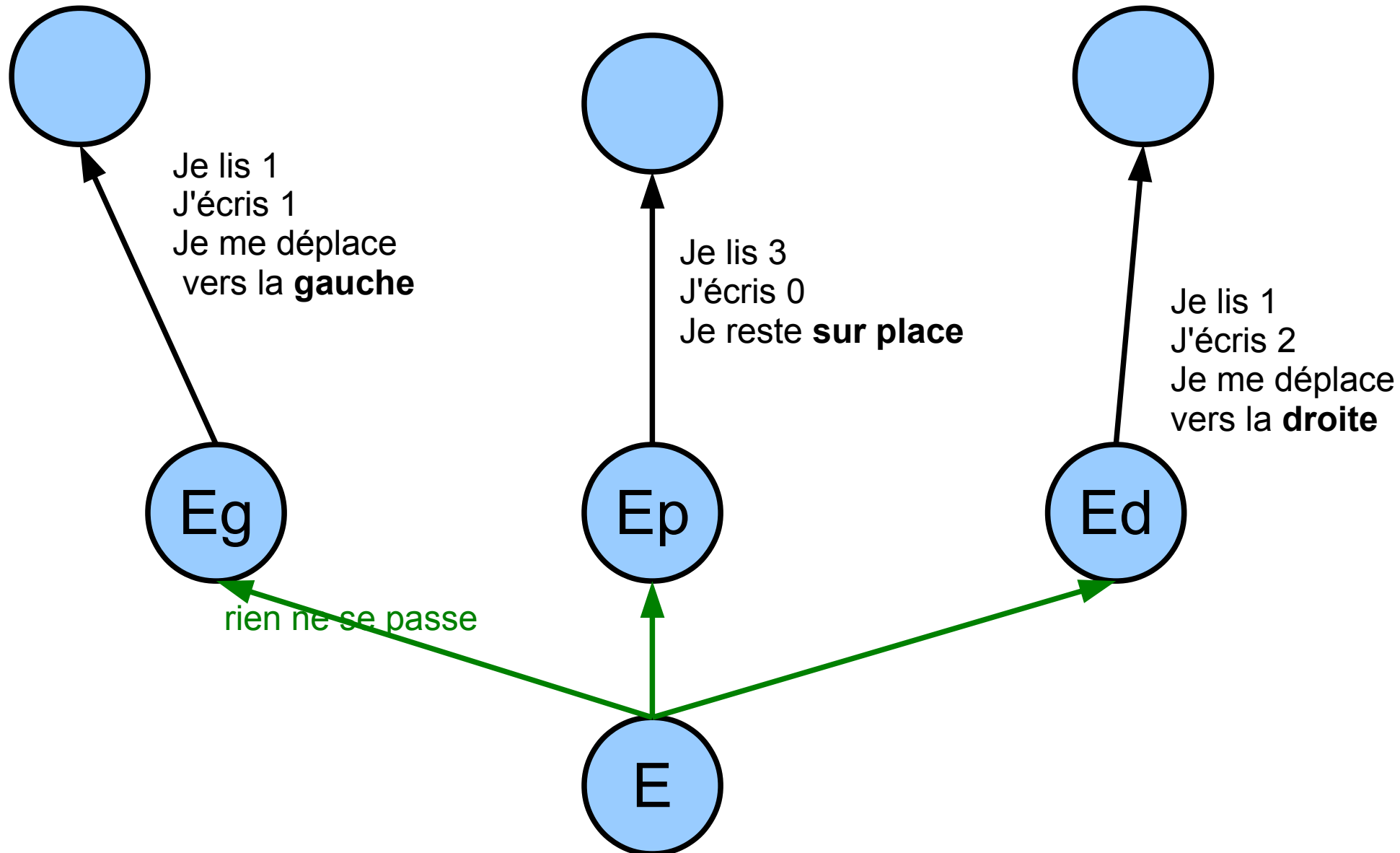
Principe général de l'encodage d'une exécution



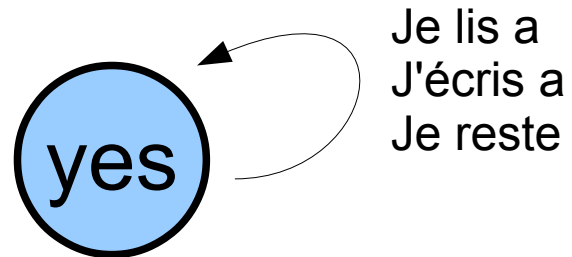
Normalisation d'une machine de Turing non déterministe



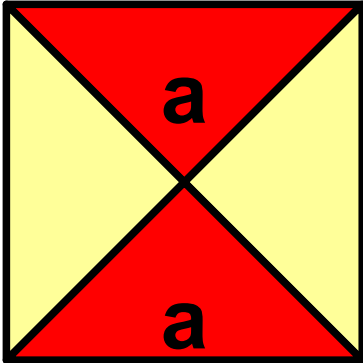
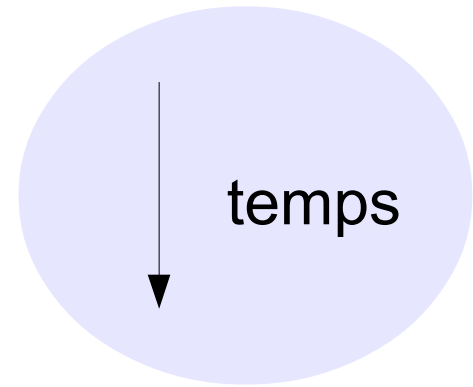
Normalisation d'une machine de Turing non déterministe



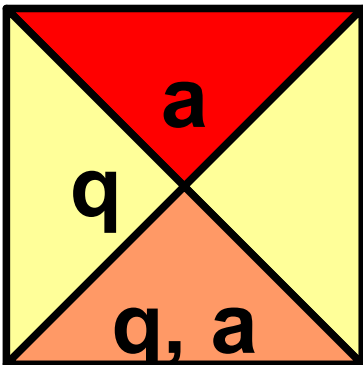
Boucle sur l'état « yes »



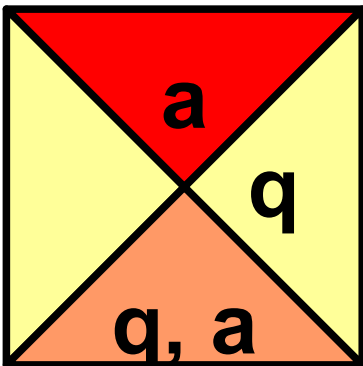
Briques



La tête de lecture
n'est pas là.
Rien ne change.

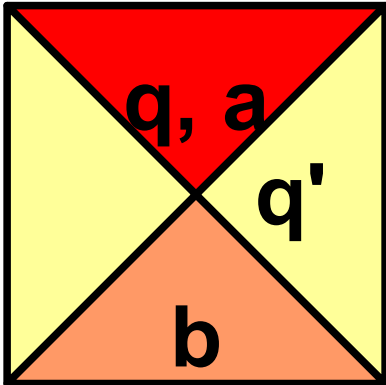
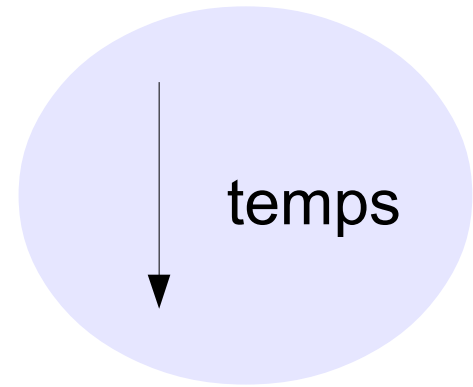


La tête de lecture
va venir de la gauche.

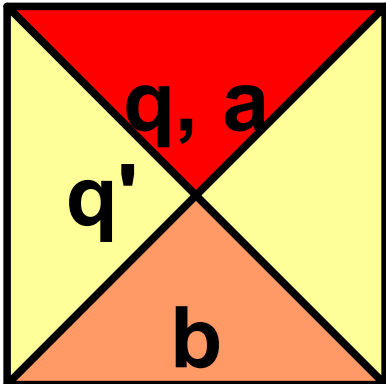


La tête de lecture
va venir de la droite.

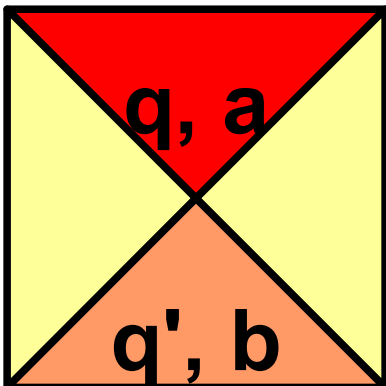
Briques



Si la tête de lecture part vers la droite.

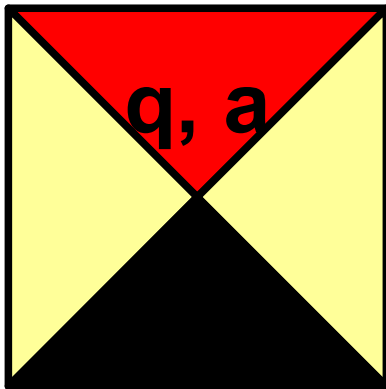
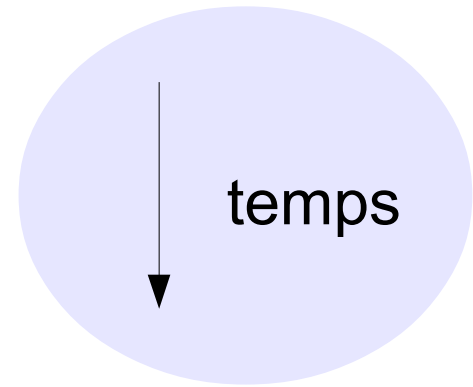


Si la tête de lecture part vers la gauche.



Si la tête de lecture reste sur place.

Briques



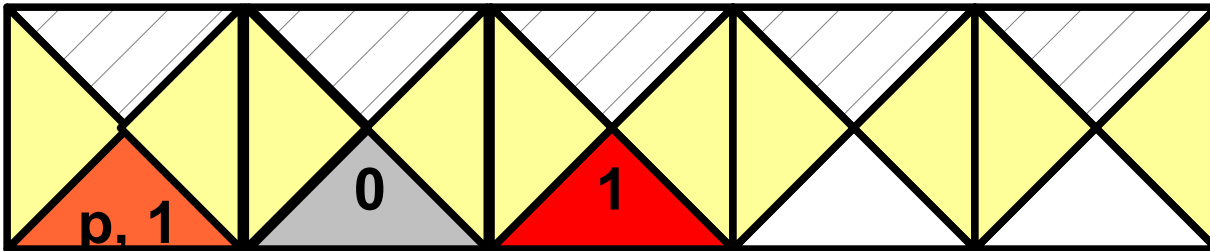
Si l'état q est un état bloquant



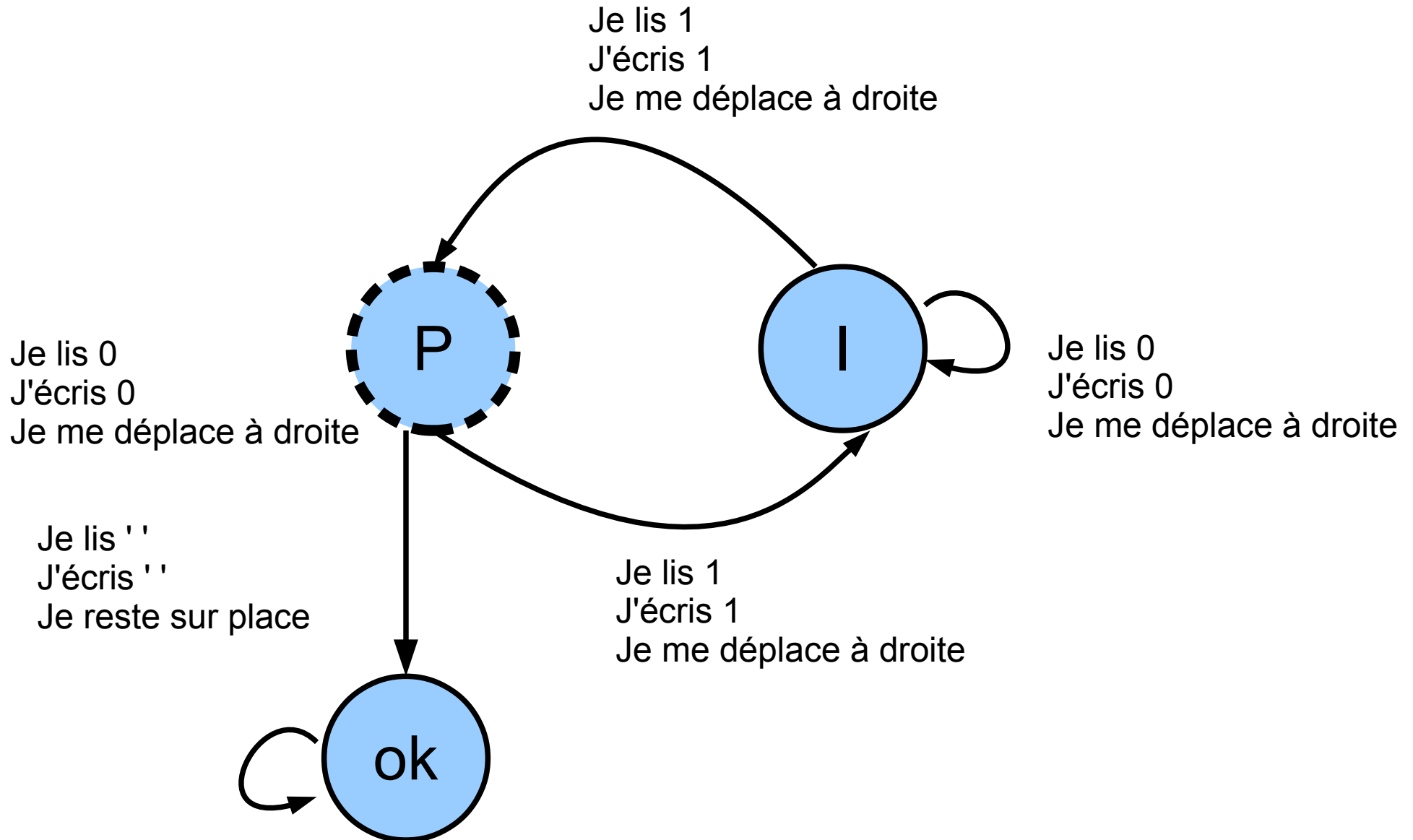
Noir utilisé que là

Ruban d'entrée

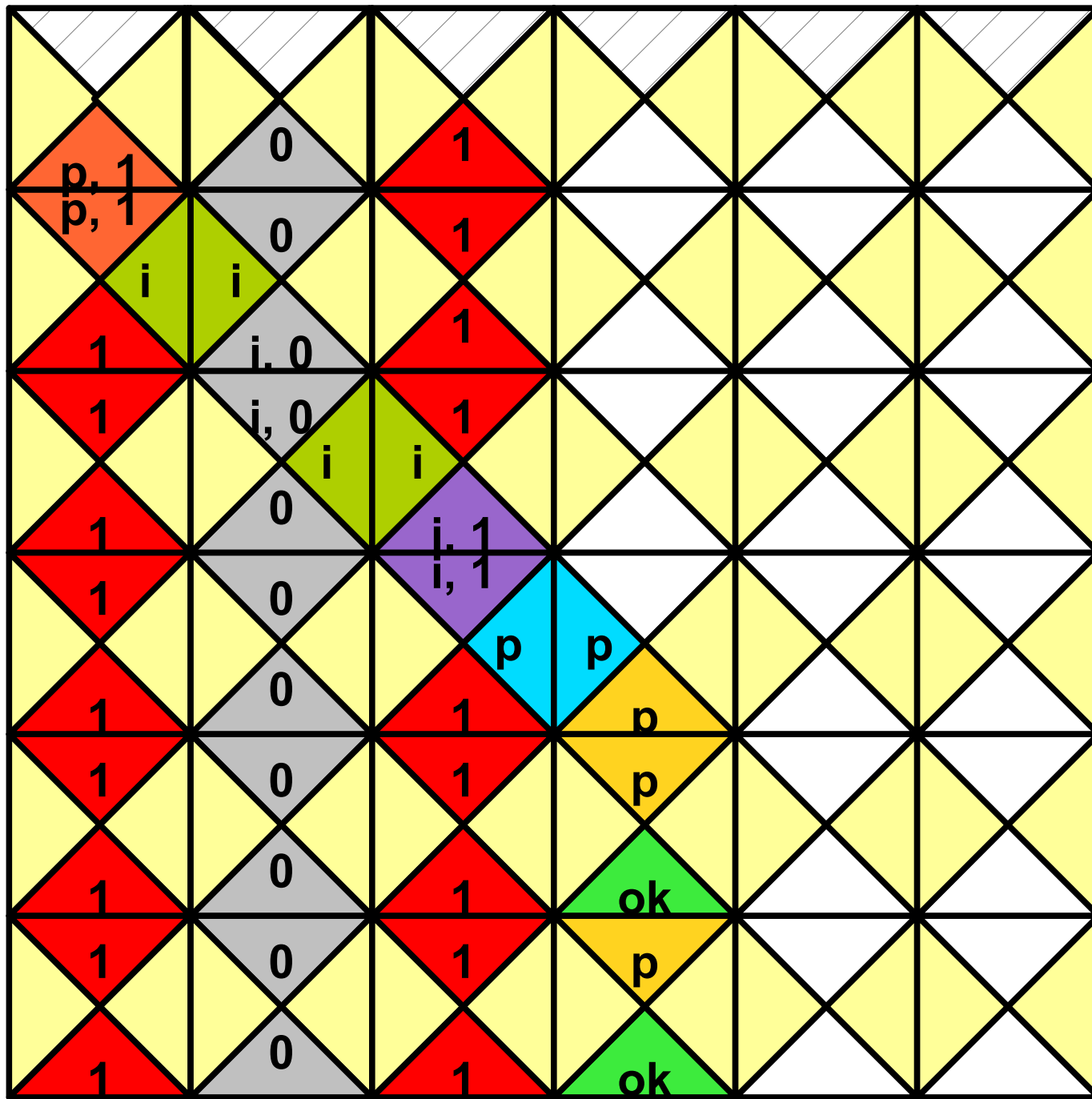
Hachures utilisées que là



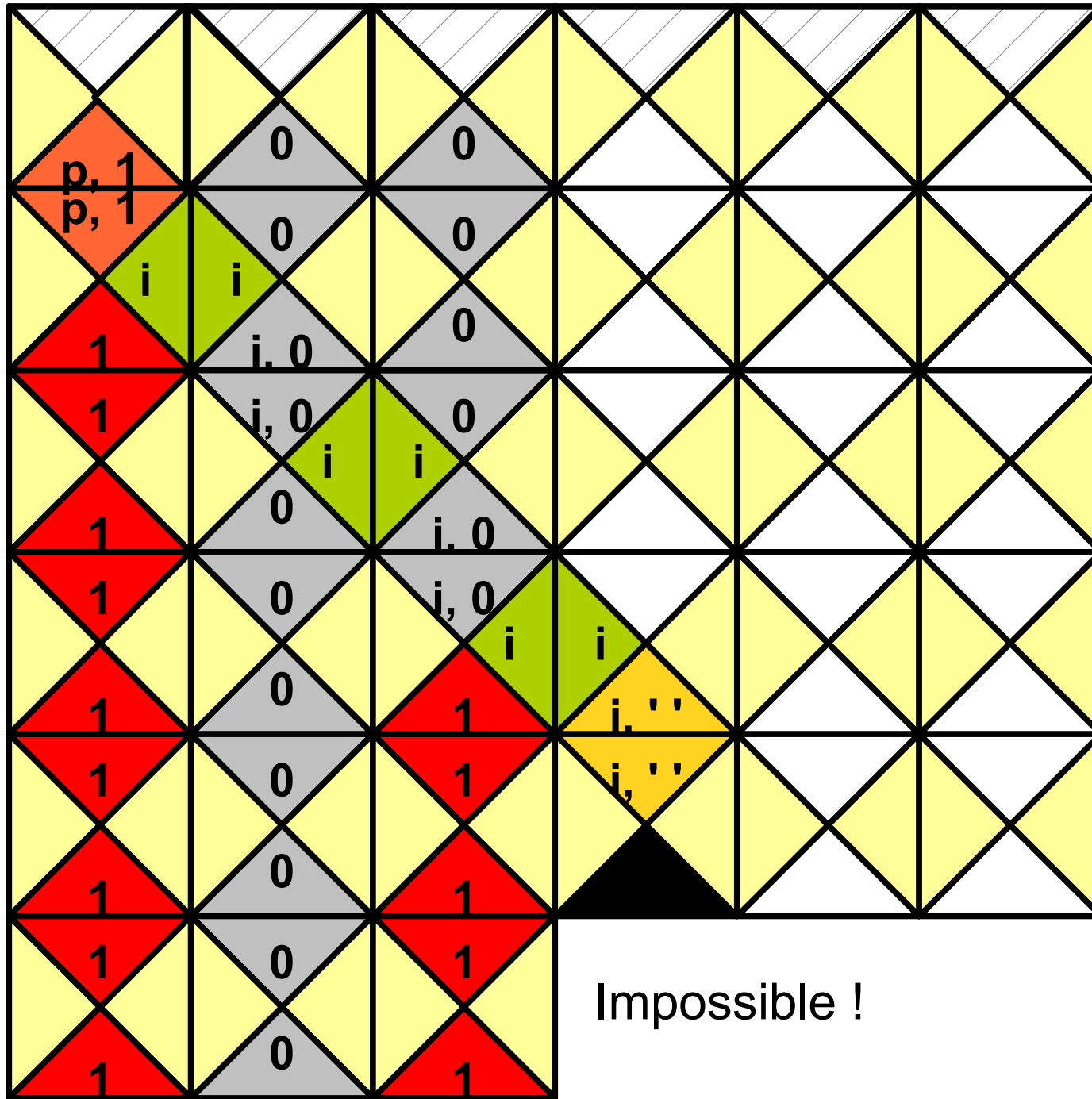
Exemple



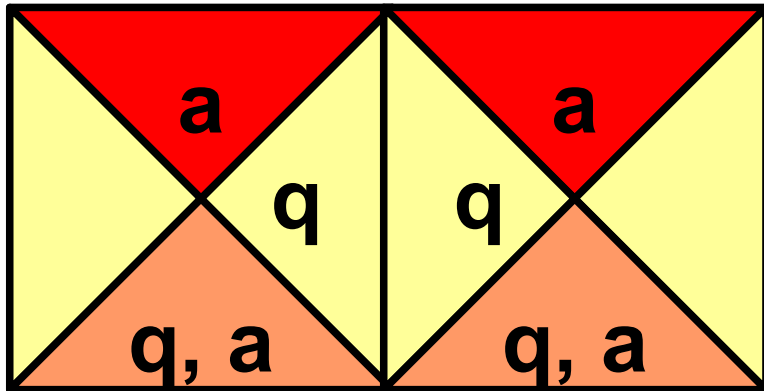
Codage d'une exécution qui réussit



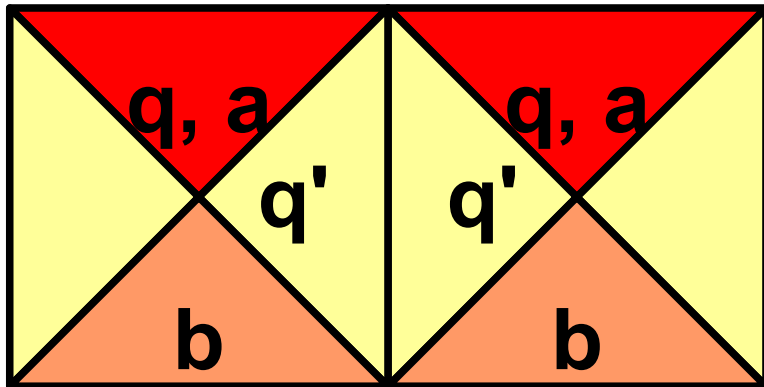
Codage d'une exécution qui échoue



Problème ?



Interdit car la machine est normalisée



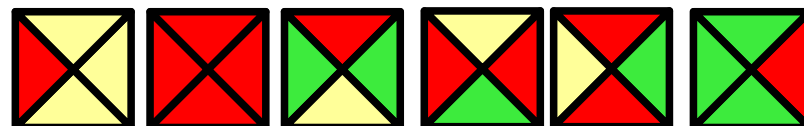
Interdit car un état n'apparaît qu'une fois en haut

Problème de décision NP-complet

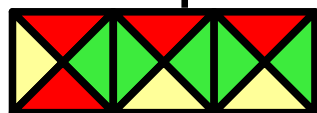
Pavage d'un carré

- Entrée :

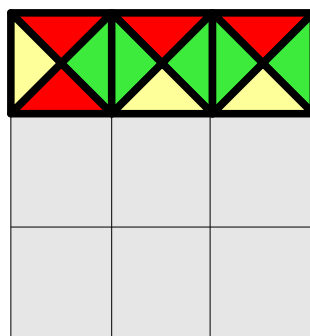
- Des types de briques



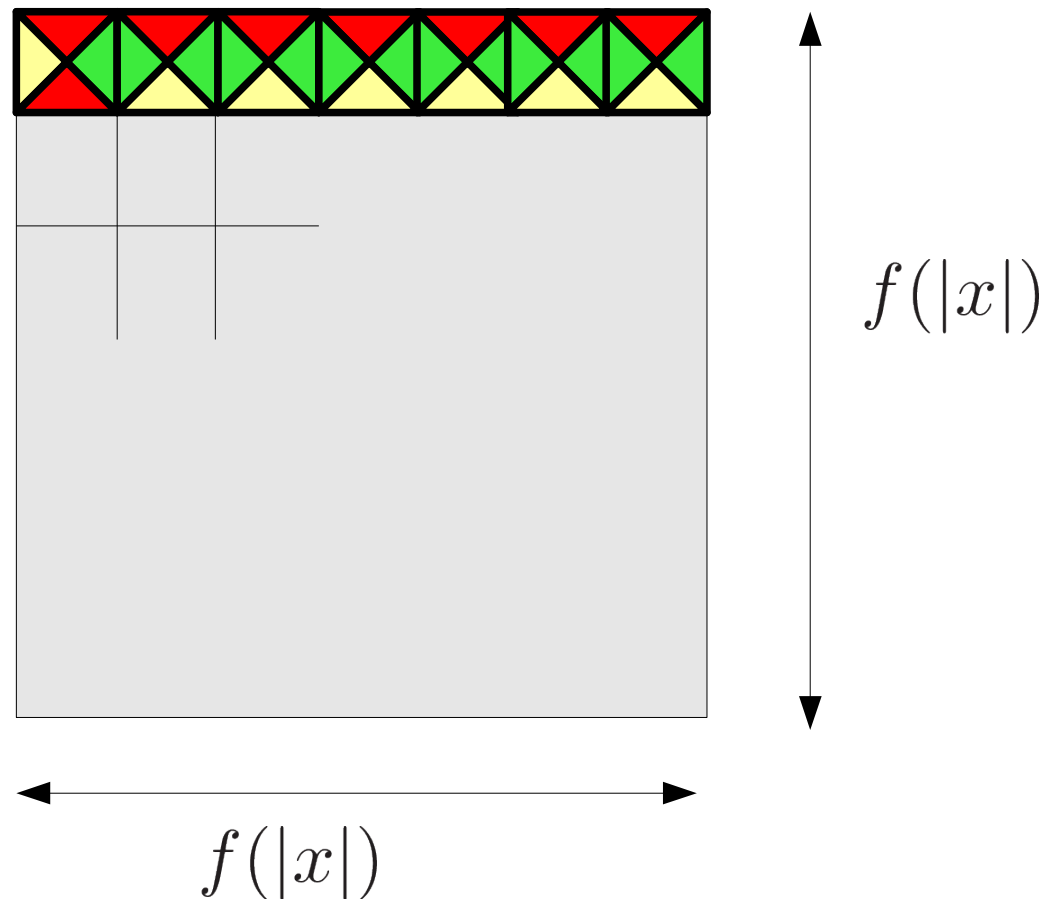
- Une ligne



- Sortie : oui ssi



Encodage de l'exécution d'une machine non-déterministe normalisée en temps polynomial



TILING reduces to SAT

