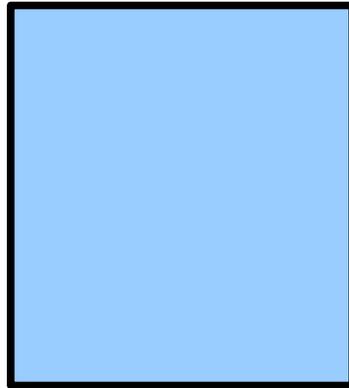
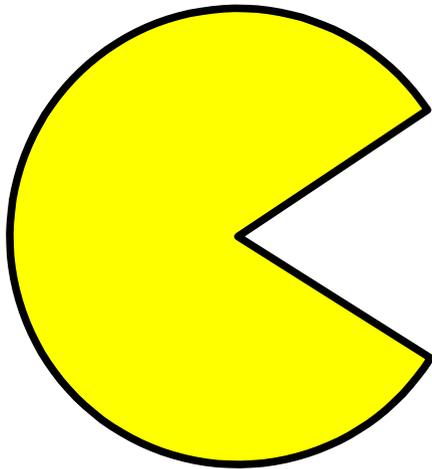


Algorithmes gloutons

ENS Cachan – Antenne de Bretagne

Principe



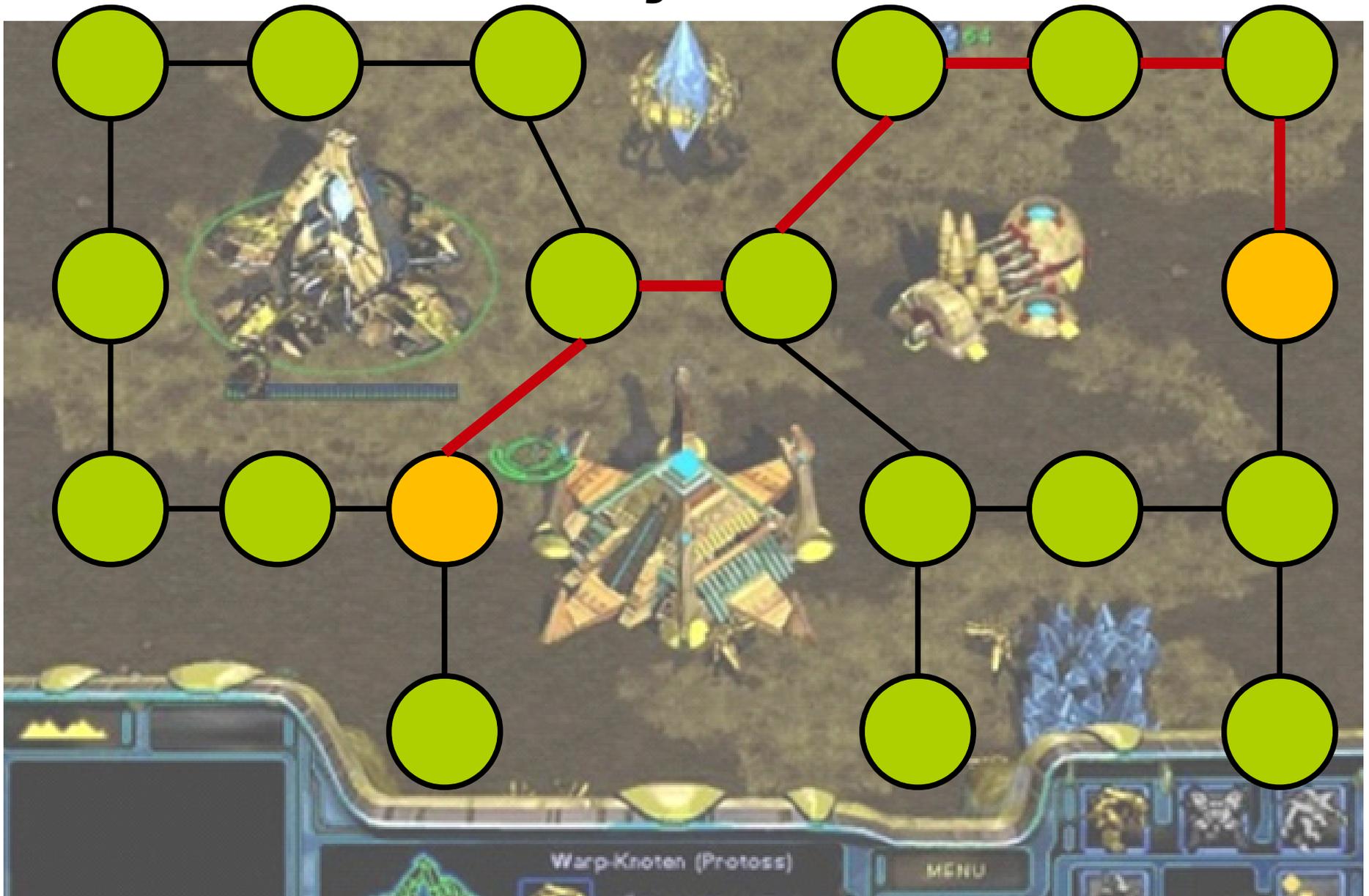
Dès fois ça marche



Des fois ça ne marche pas

échec

Des fois ça marche

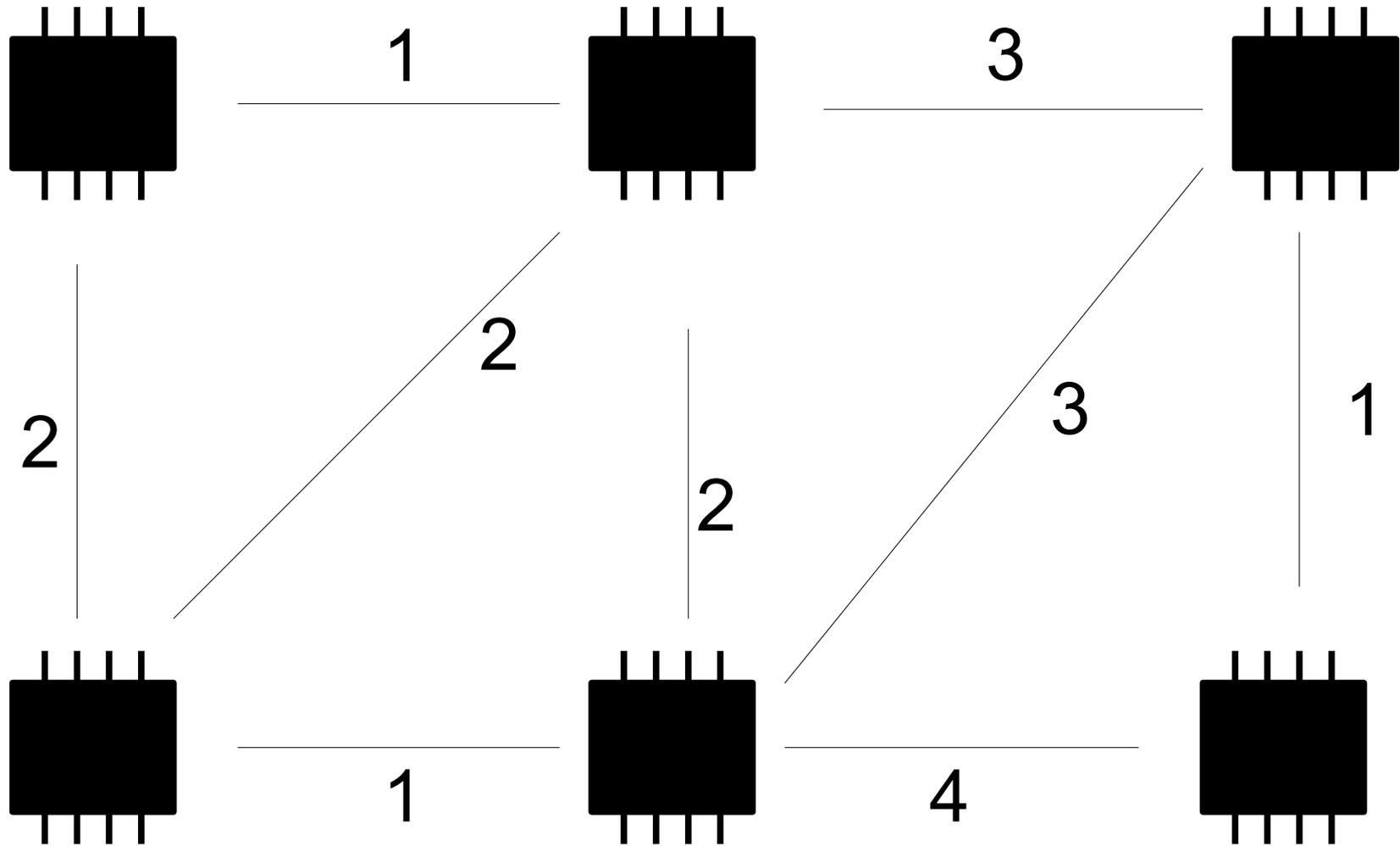


Algorithmes gloutons

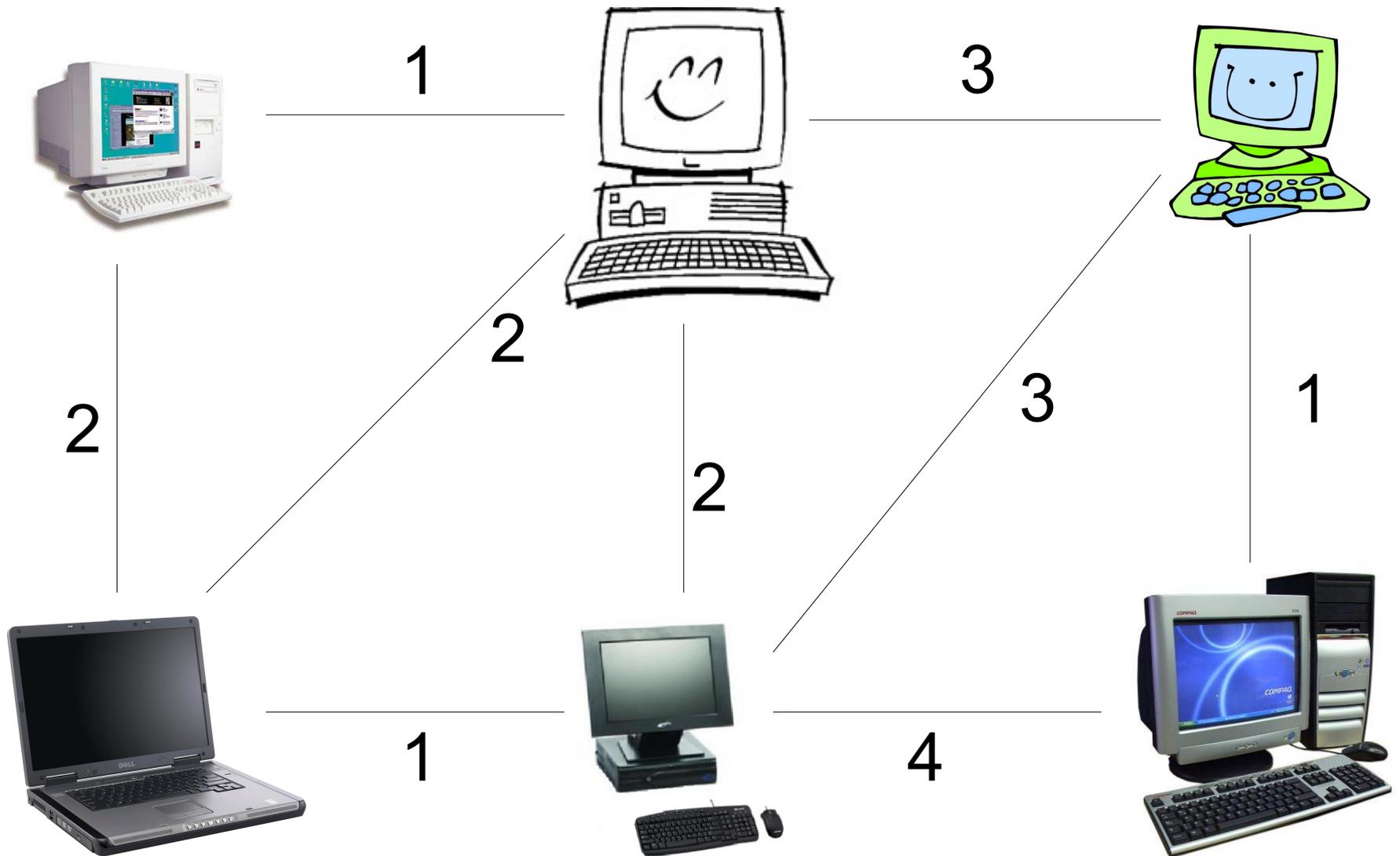
- Arbre couvrant de poids minimal
(algorithme exacte)
 - algorithme de Kruskal
 - Structure de données « Union-find »
 - algorithme de Prim
- Couverture d'ensemble
(algorithme approximatif)
- Encodage de Huffman

Arbre couvrant de poids minimal

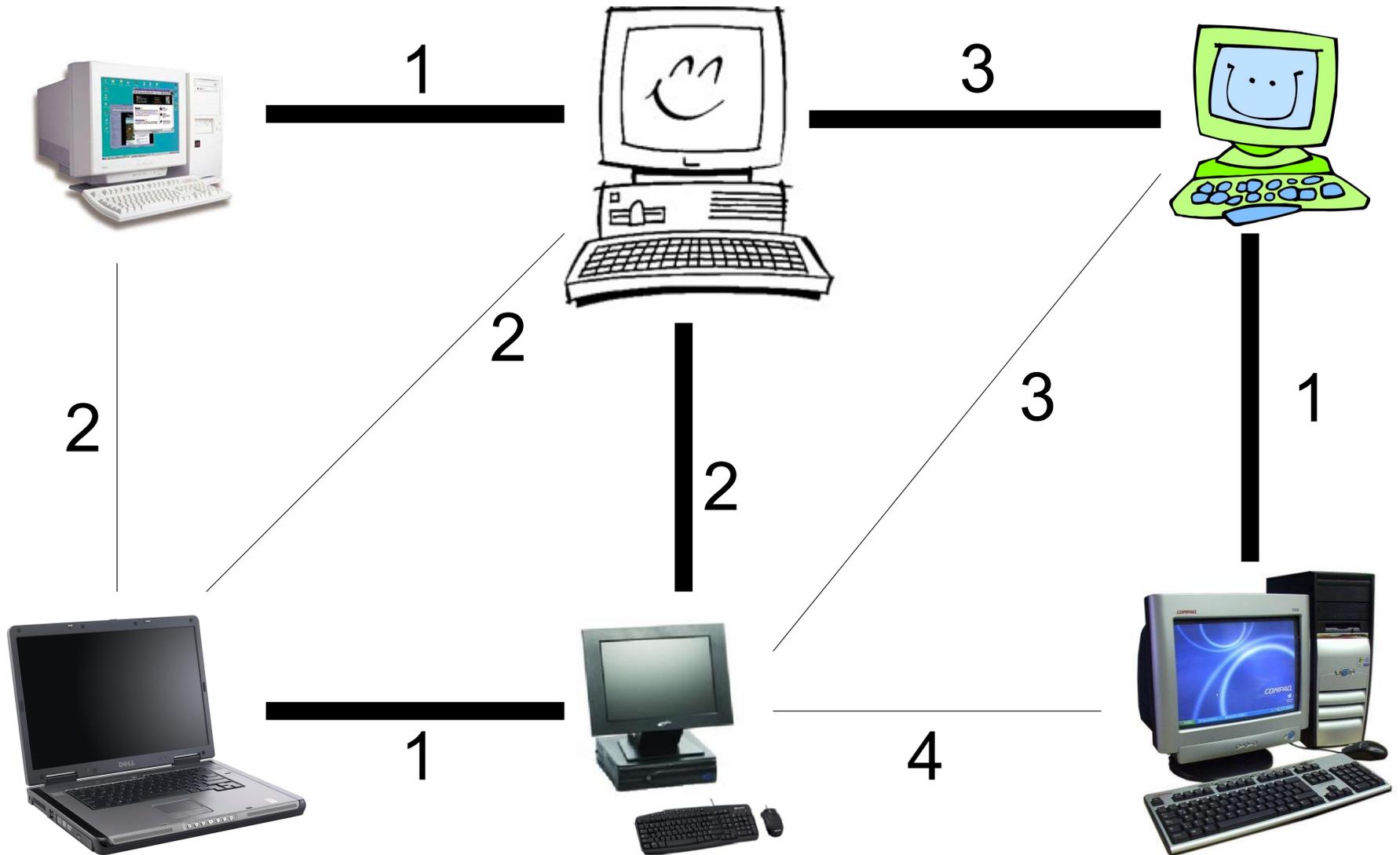
Circuit électronique



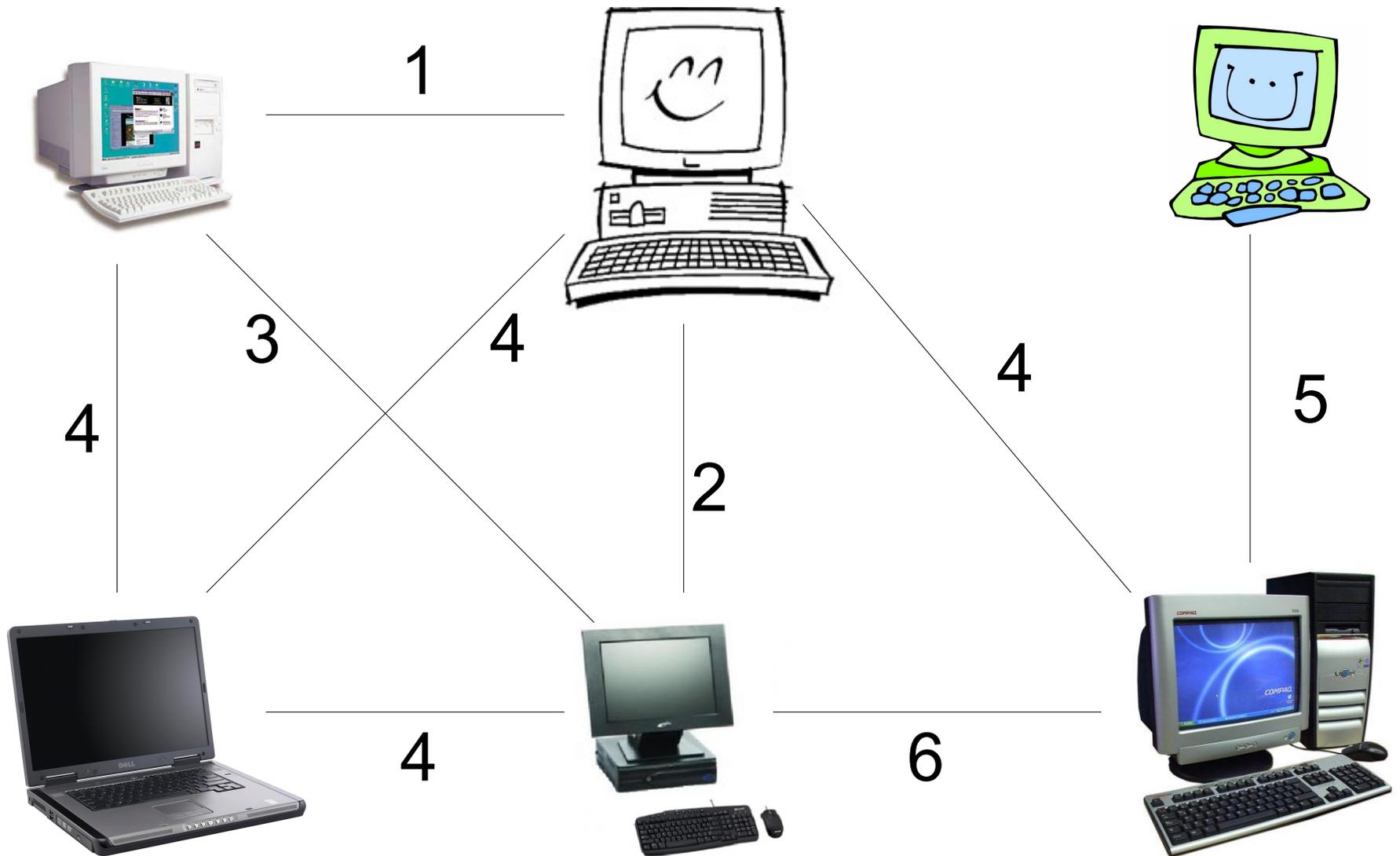
Réseau



Réseau

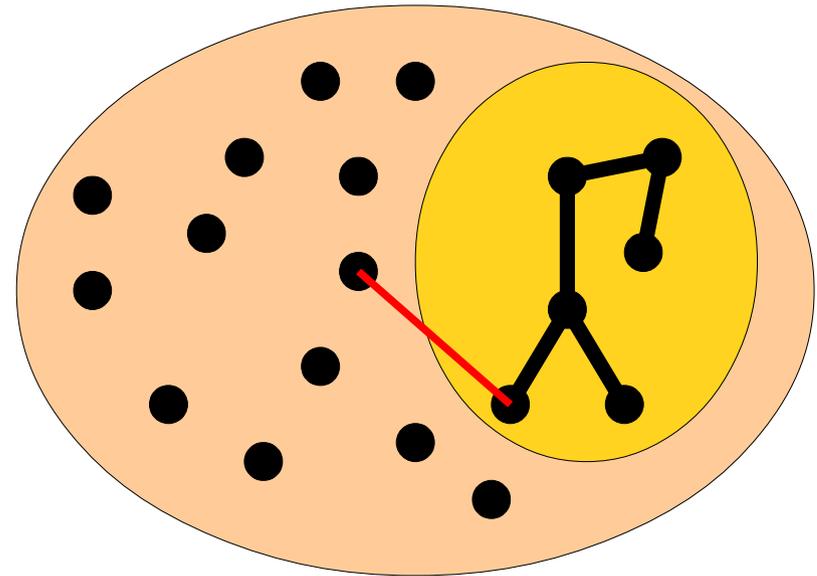
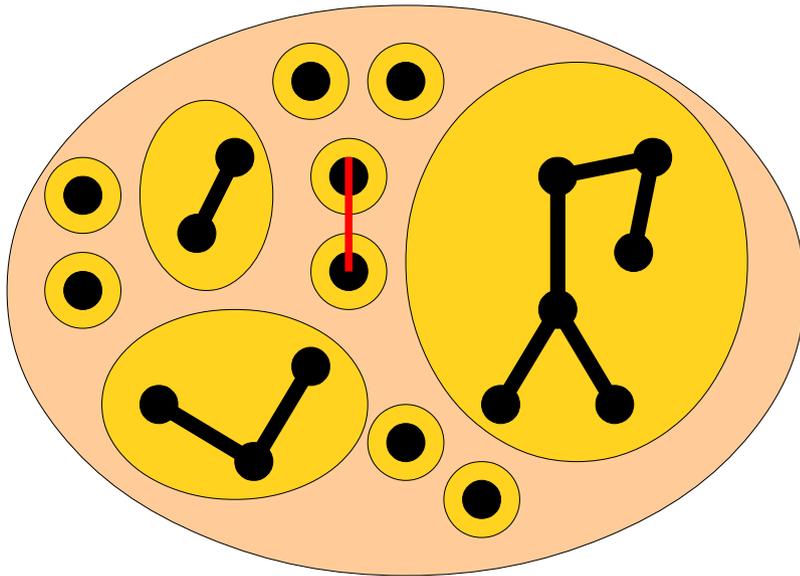


Réseau

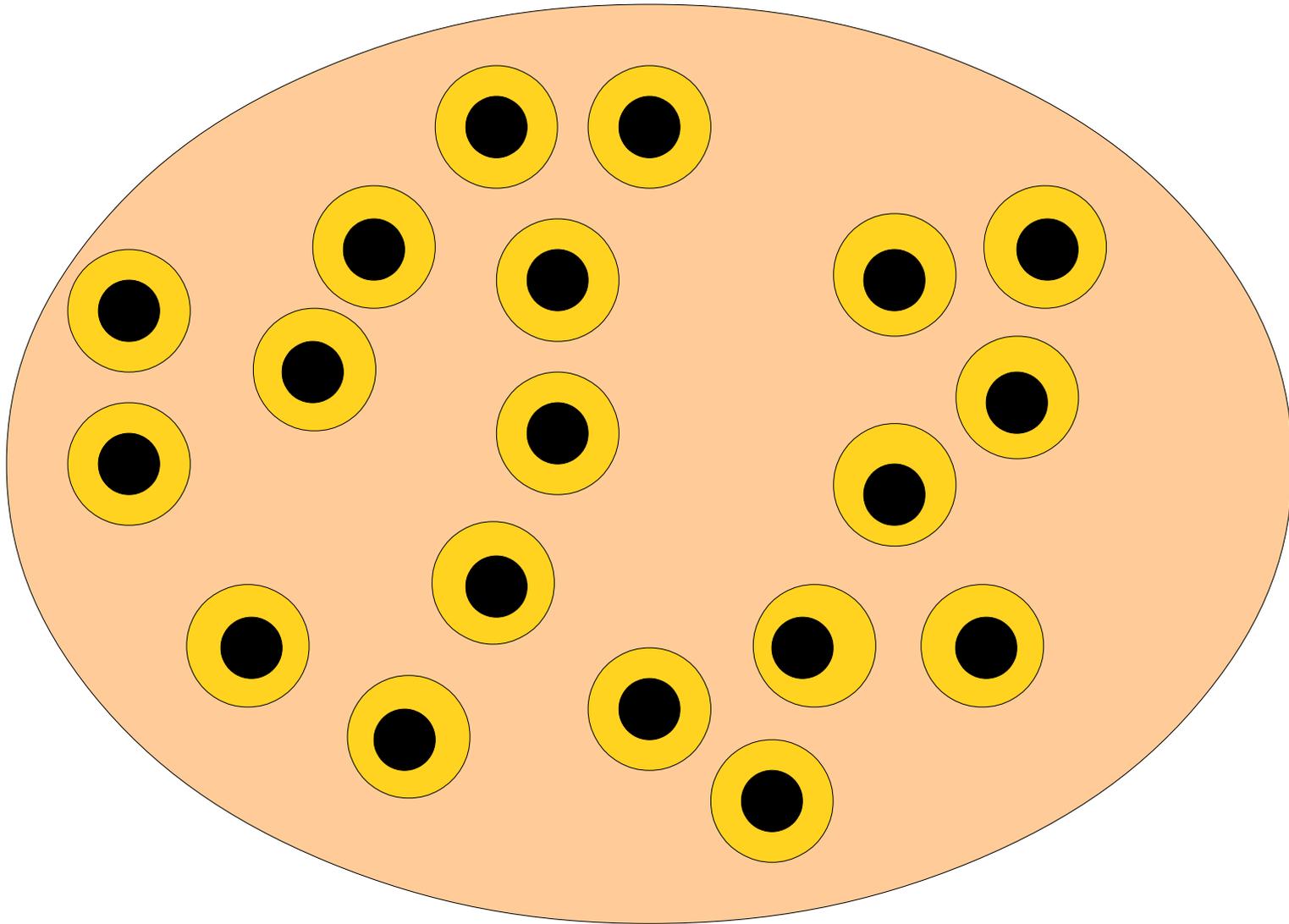


Deux idées

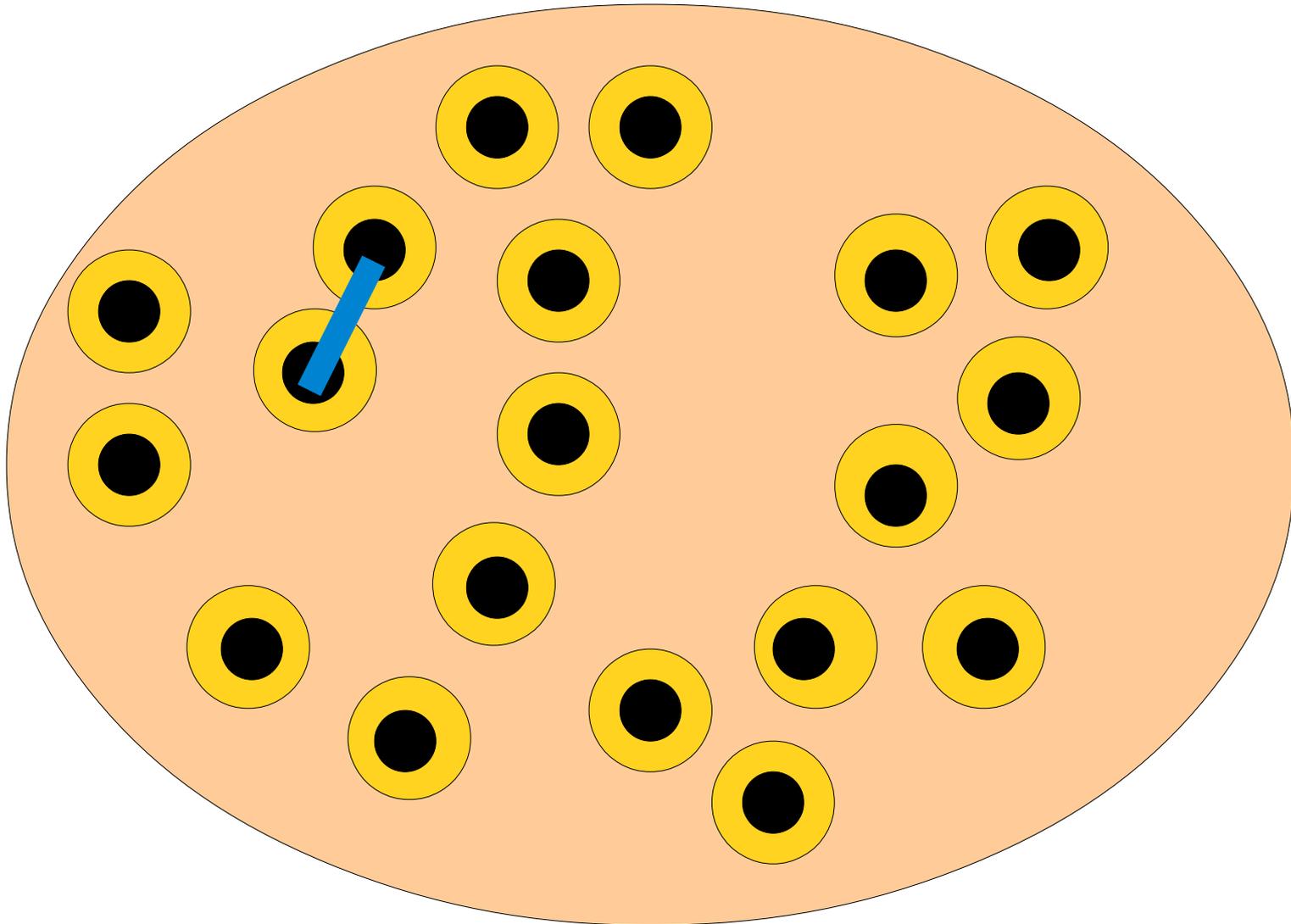
- Algorithme de Kruskal
- Algorithme de Prim



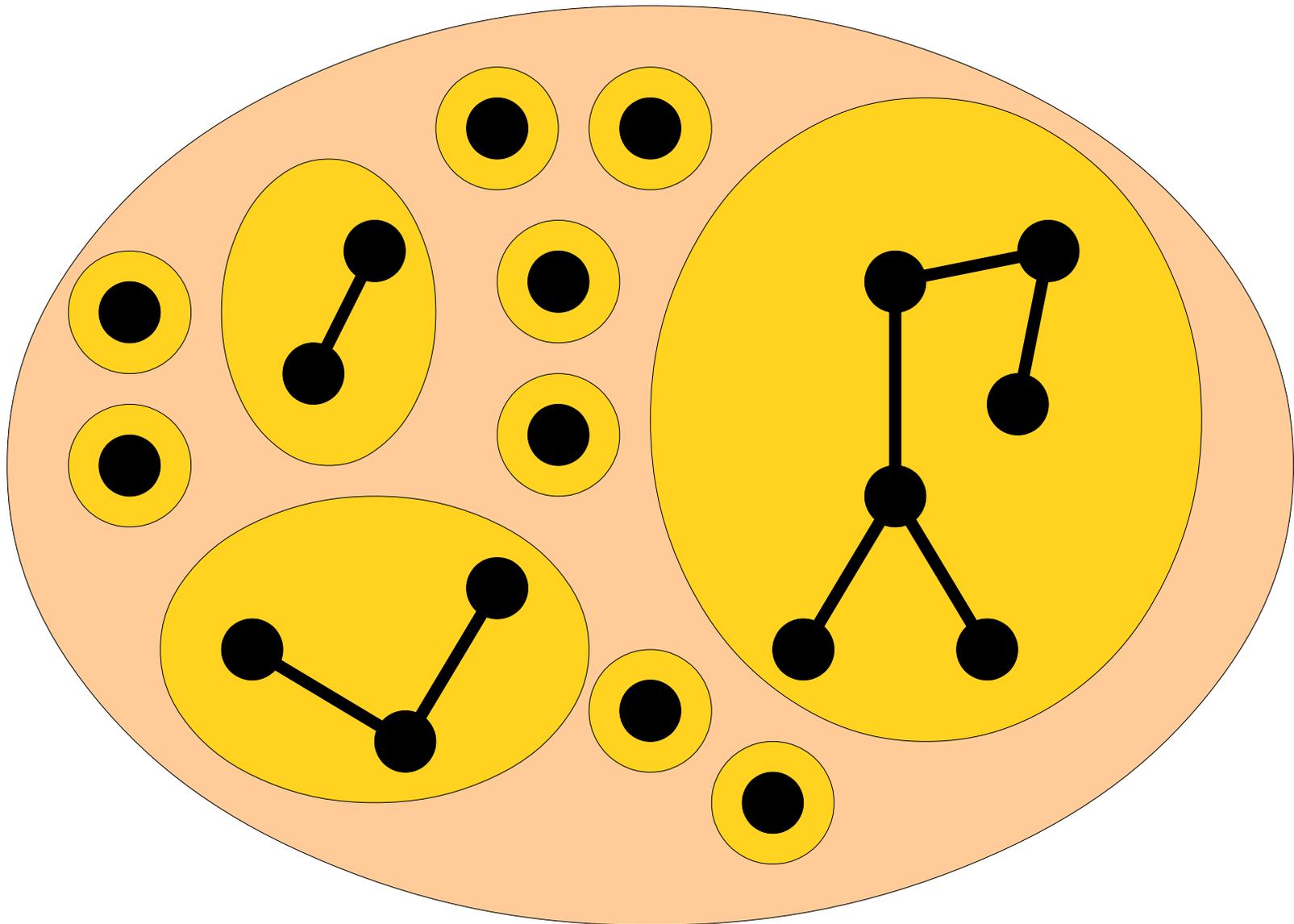
Algorithme de Kruskal



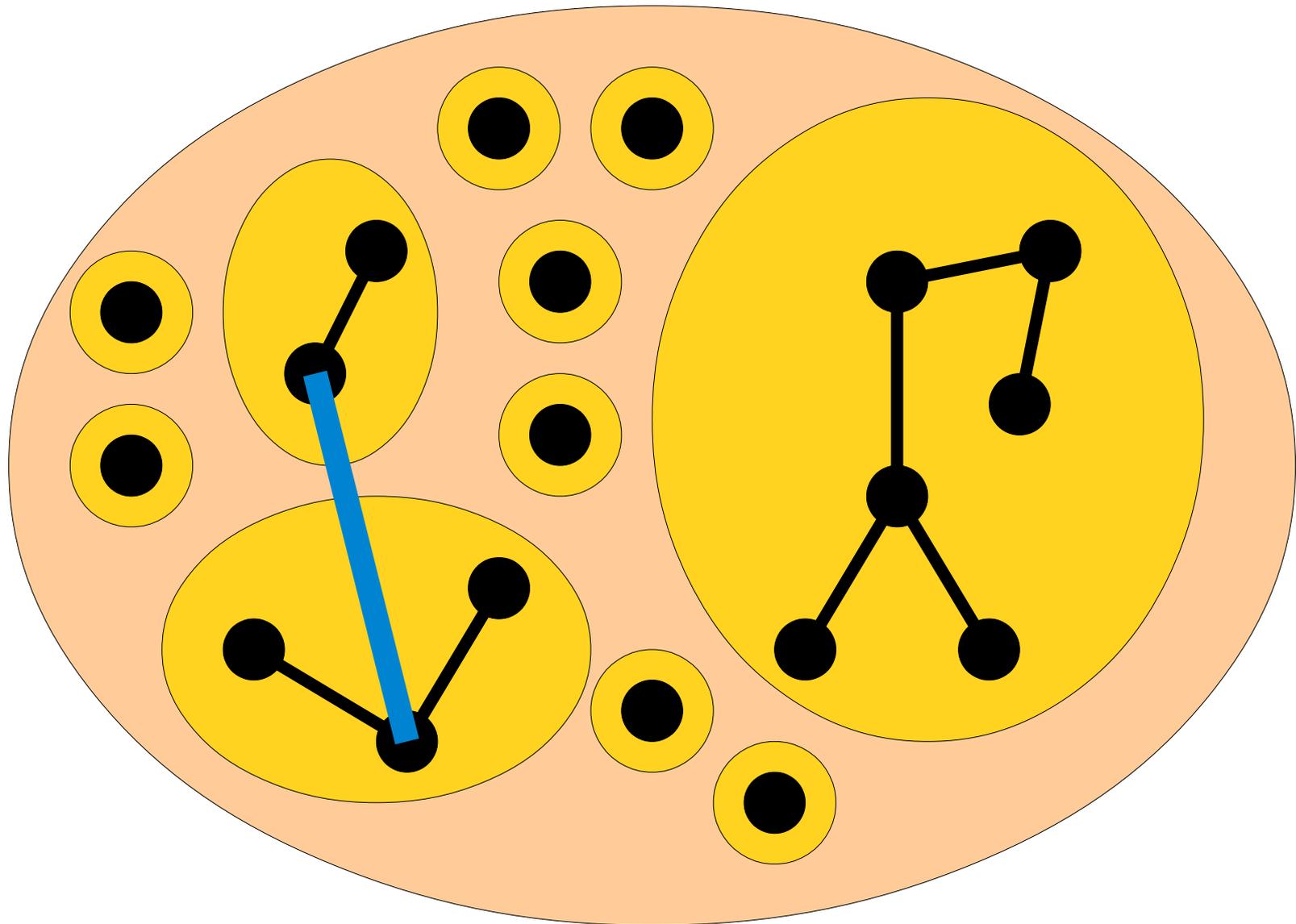
Algorithme de Kruskal



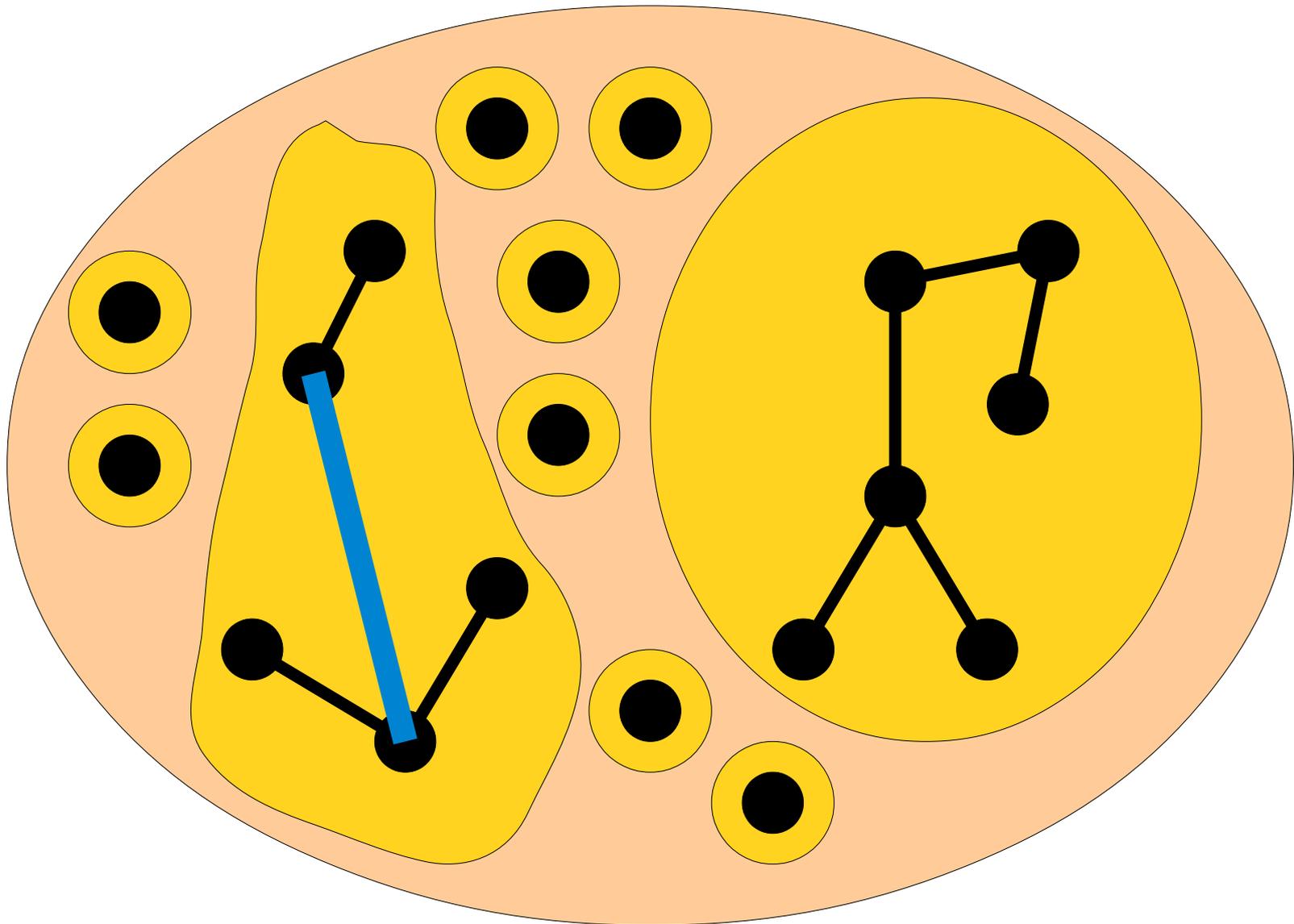
Algorithme de Kruskal



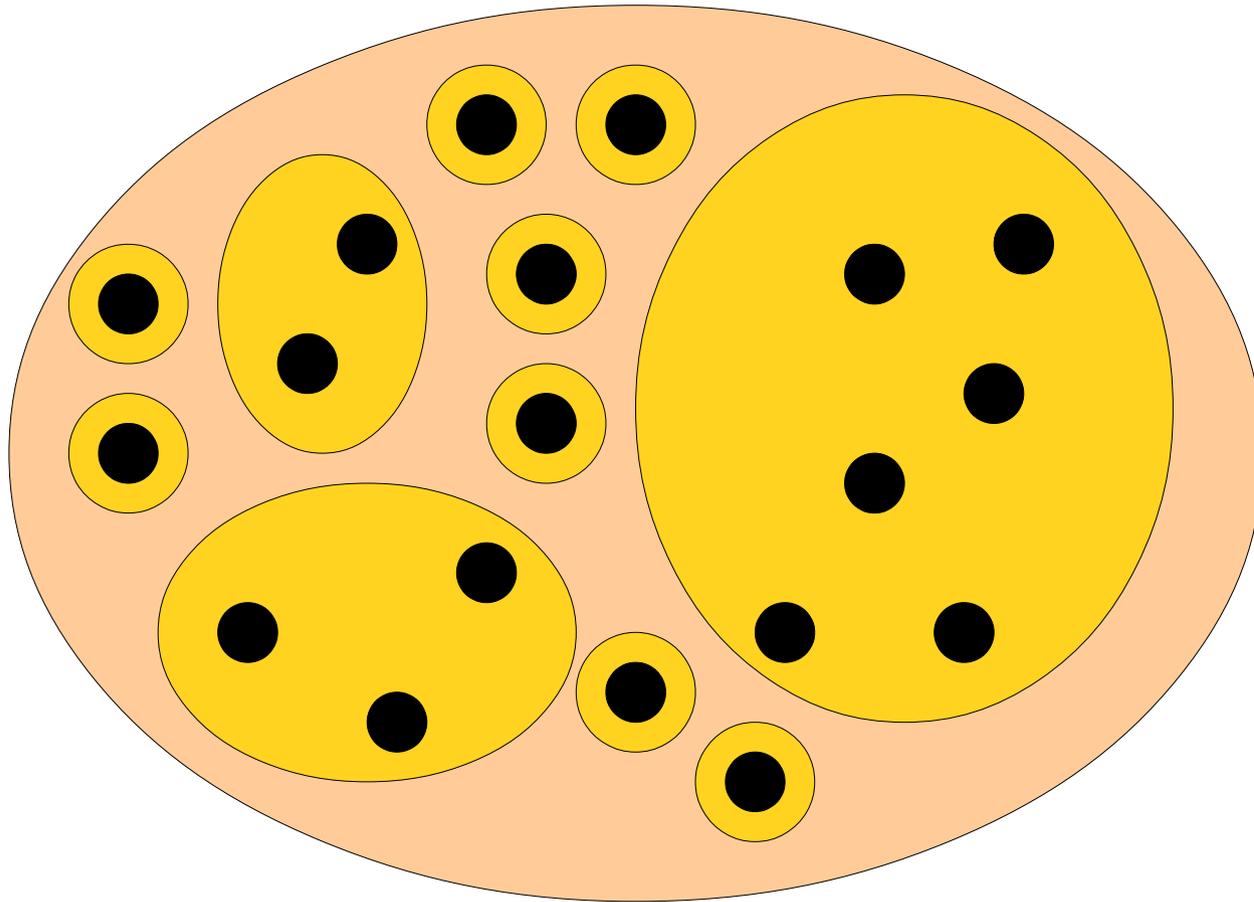
Algorithme de Kruskal



Algorithme de Kruskal



Union-find

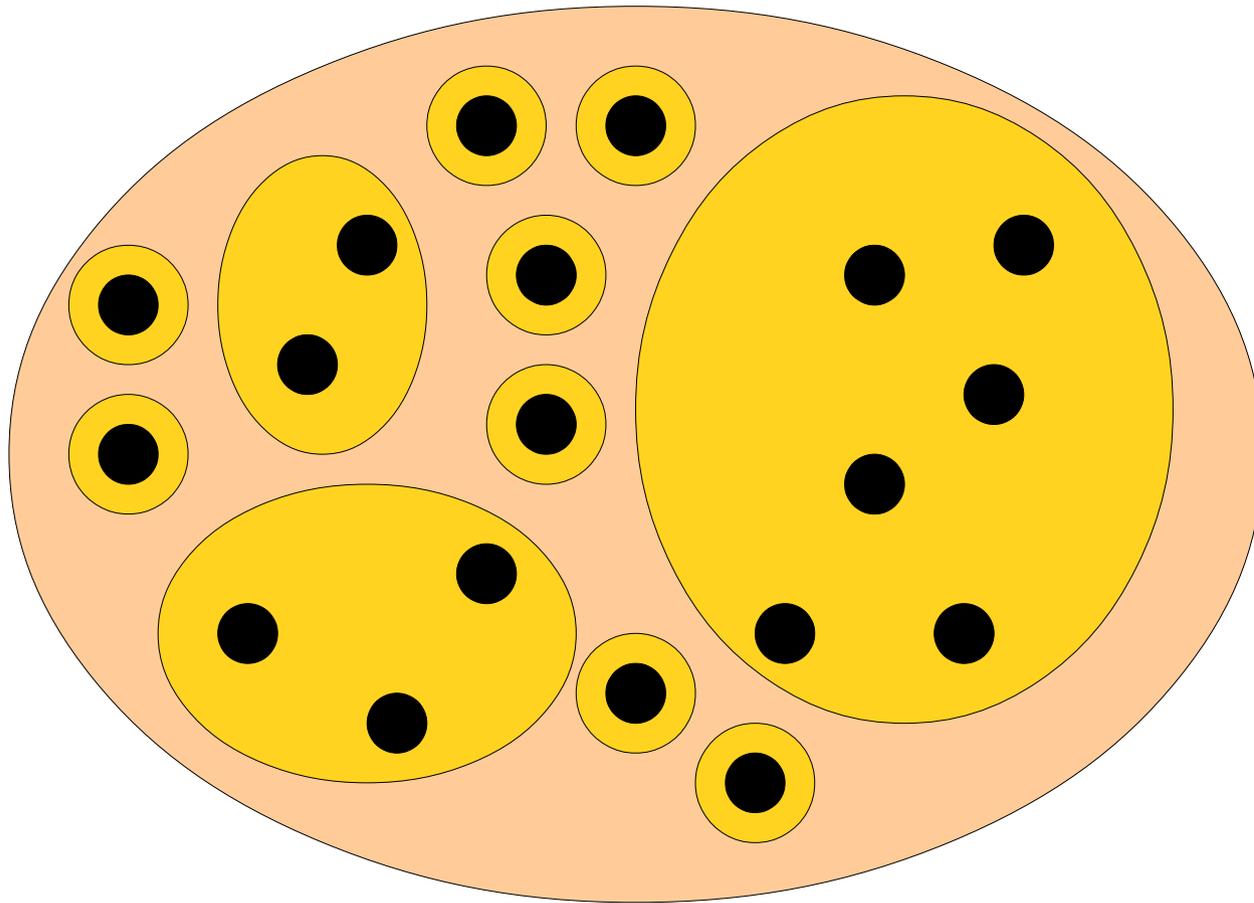


Créer union-find

Find

Union

Union-find

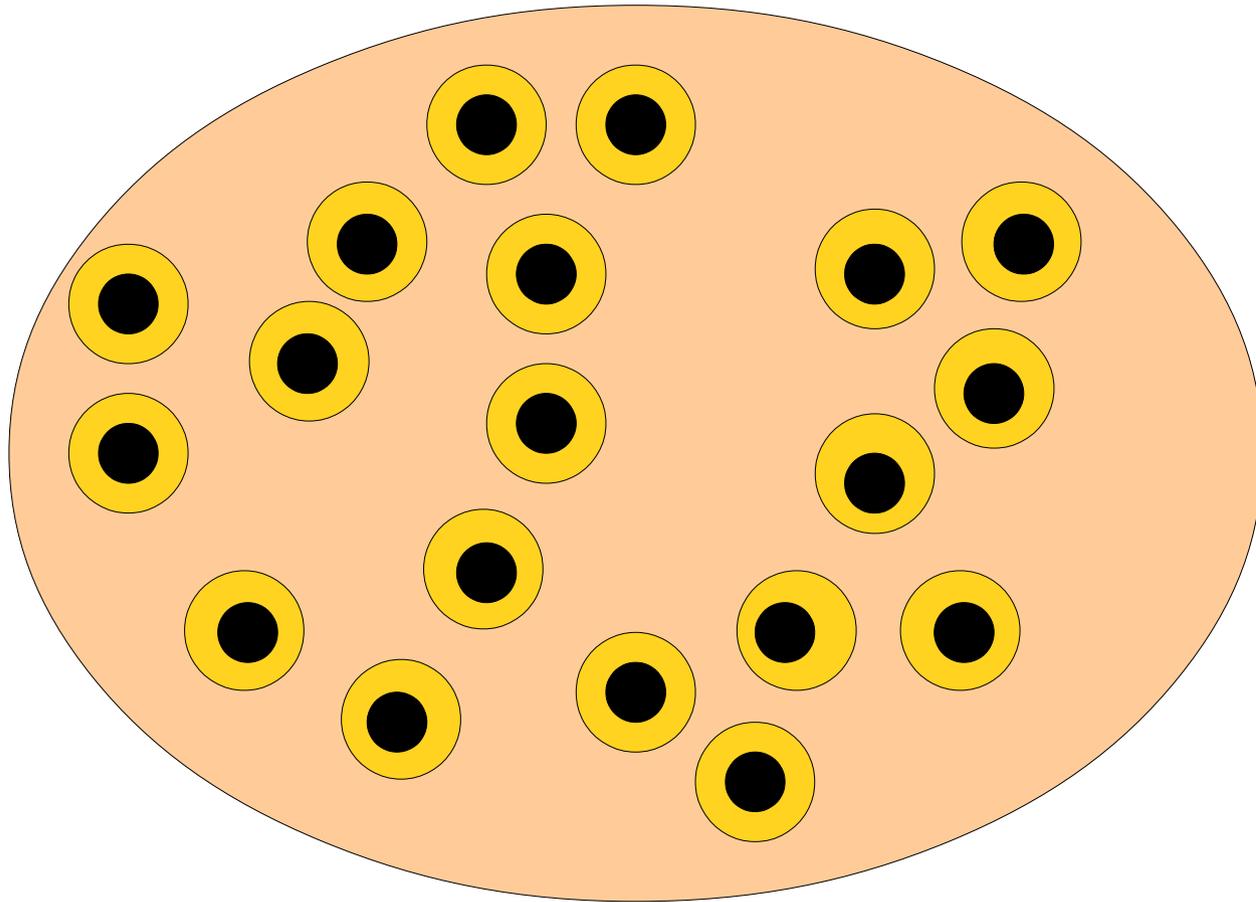


Créer union-find

Find

Union

Union-find

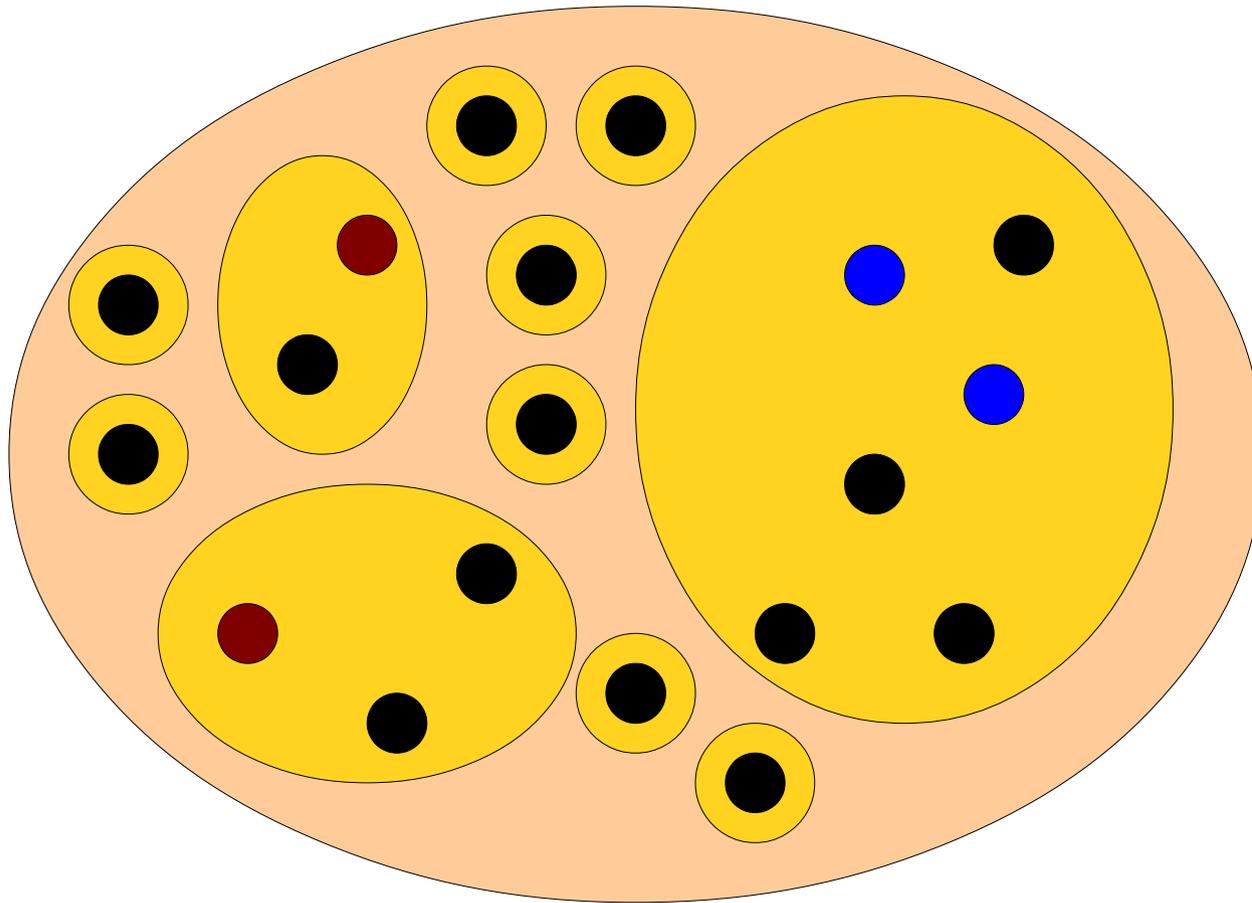


Créer union-find

Find

Union

Union-find

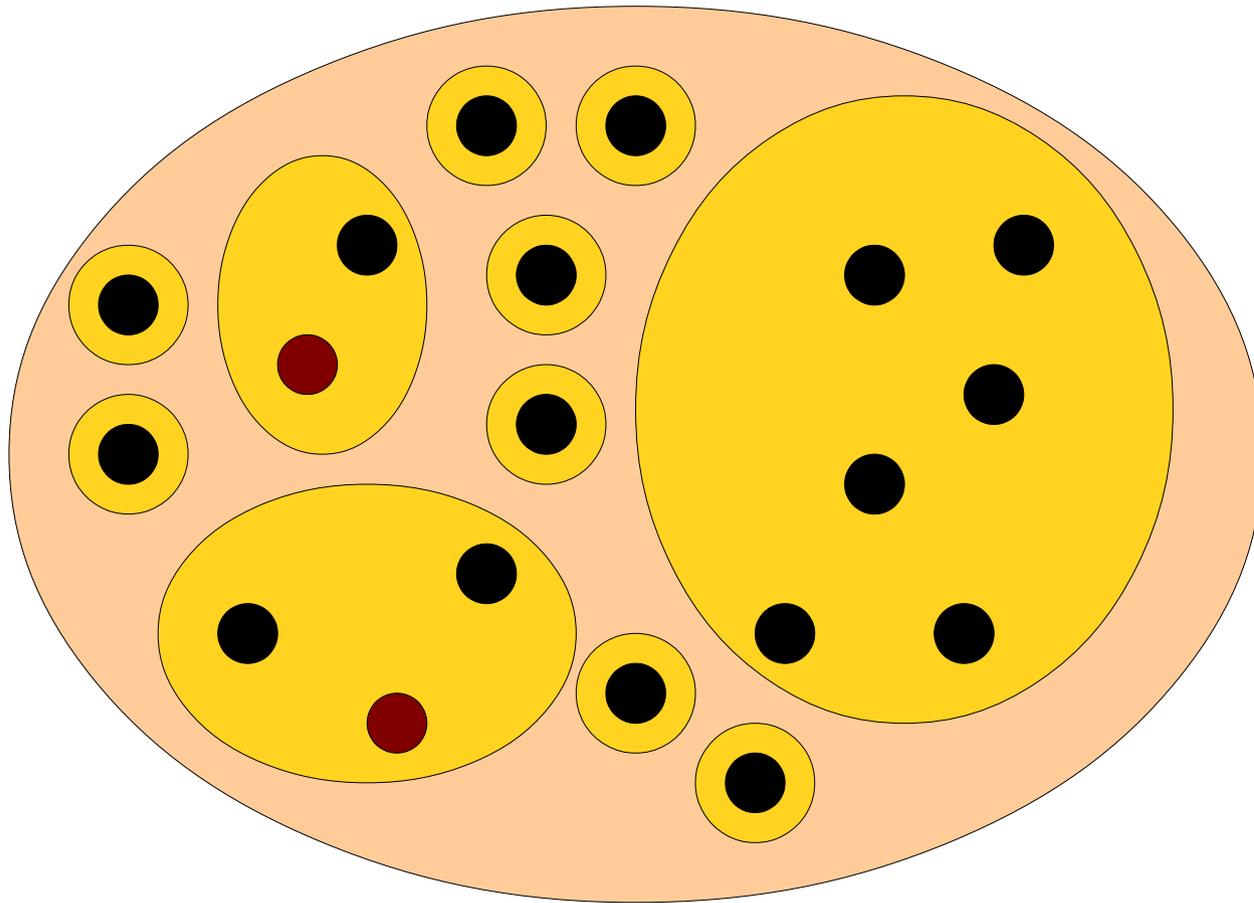


Créer union-find

Find

Union

Union-find

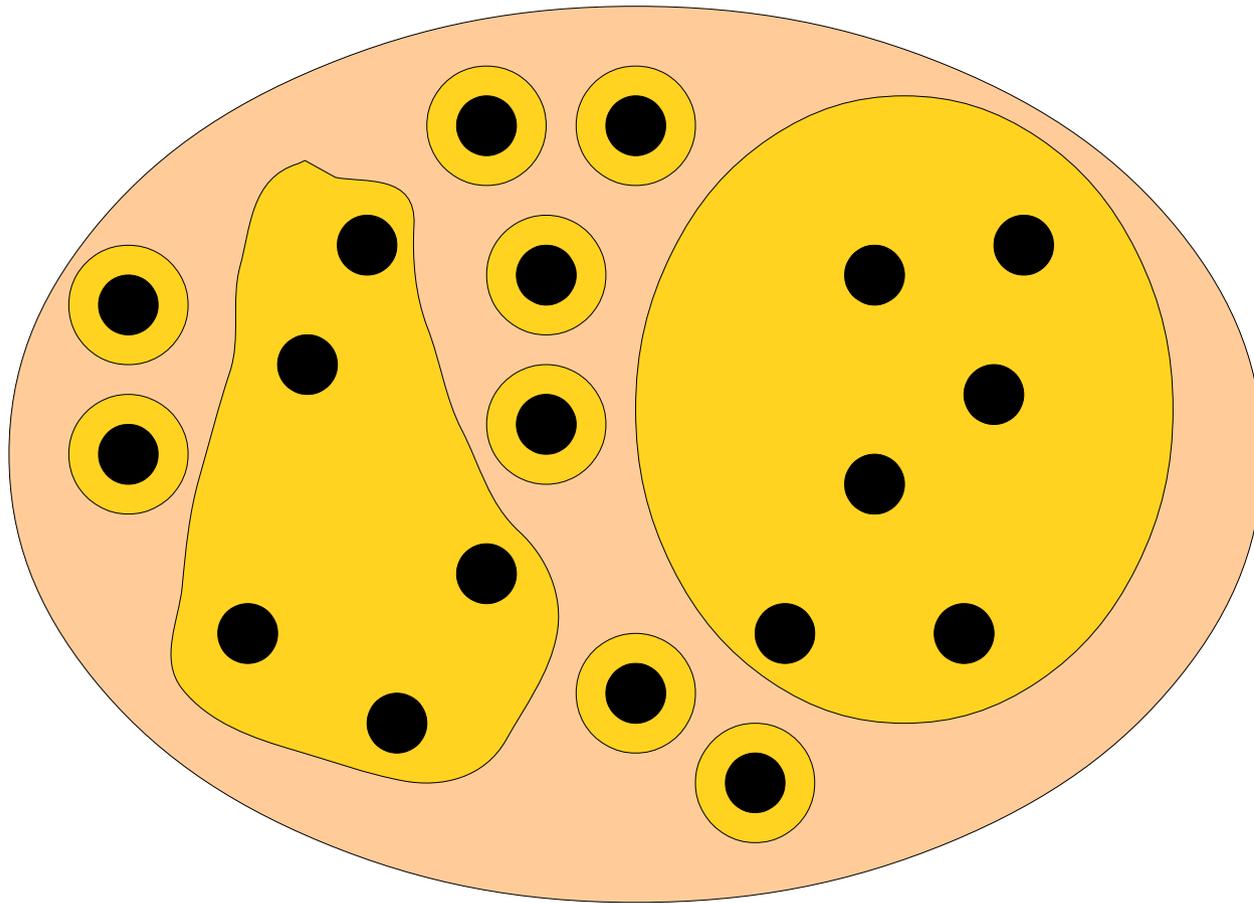


Créer union-find

Find

Union

Union-find



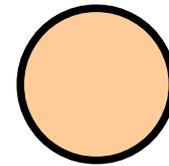
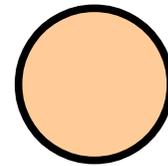
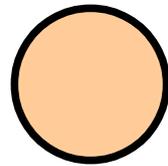
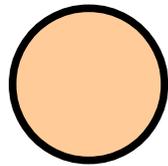
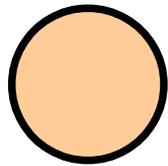
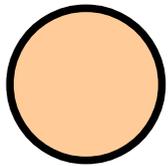
Créer union-find

Find

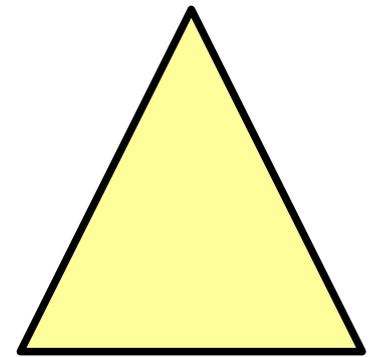
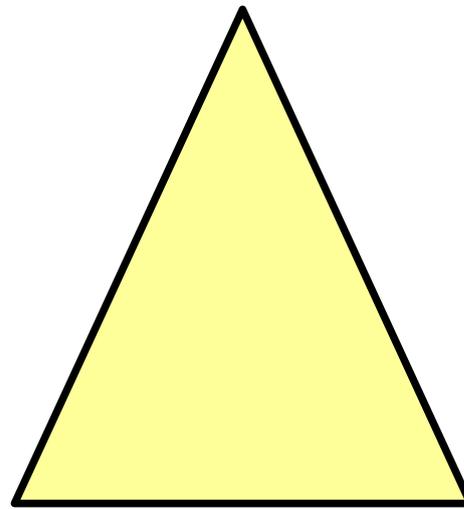
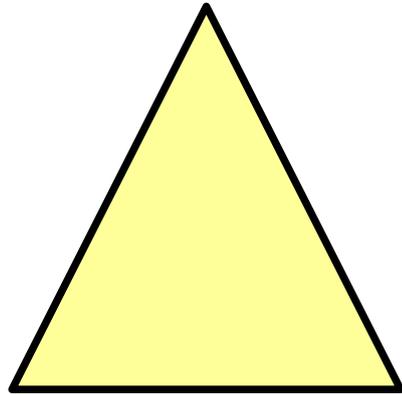
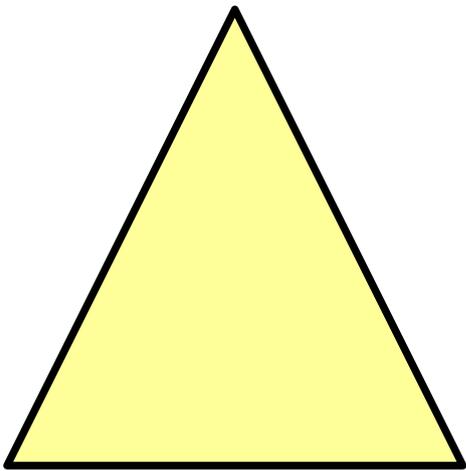
Union

Première implémentation avec des arbres

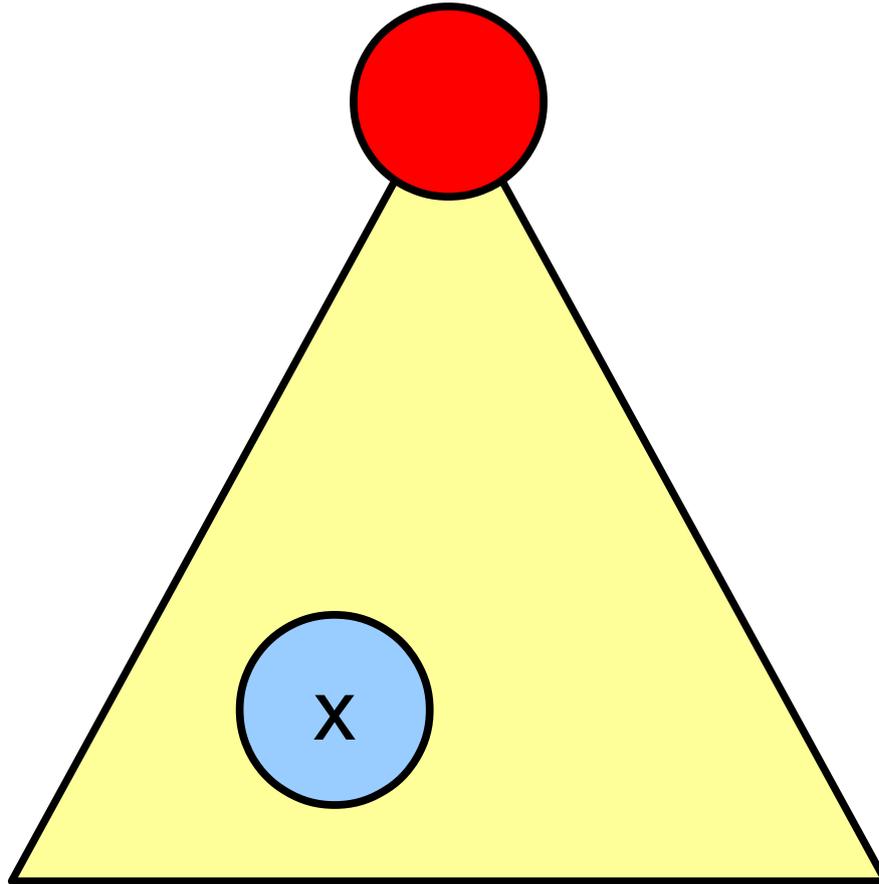
Une partition = une forêt



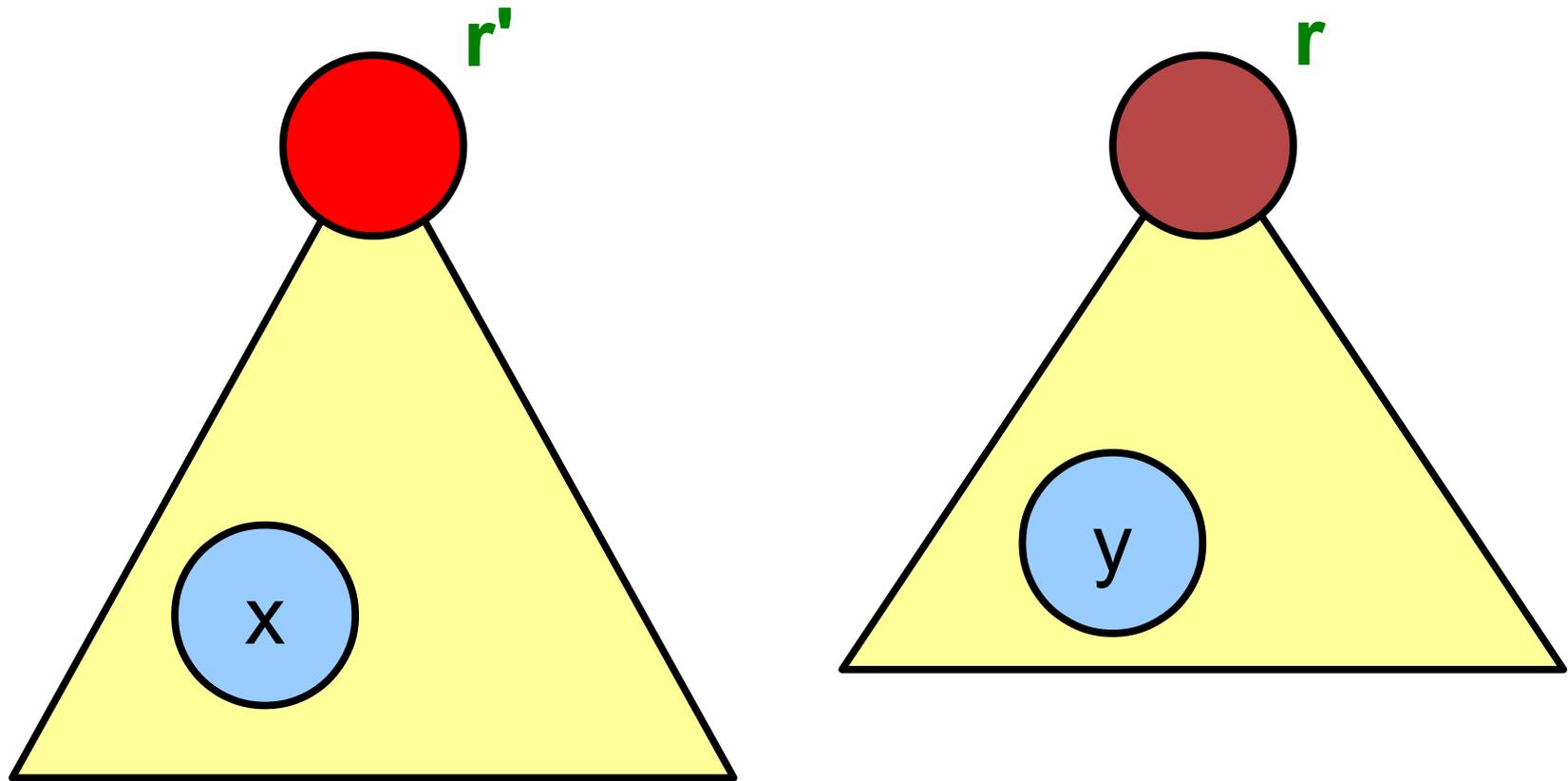
Une partition = une forêt



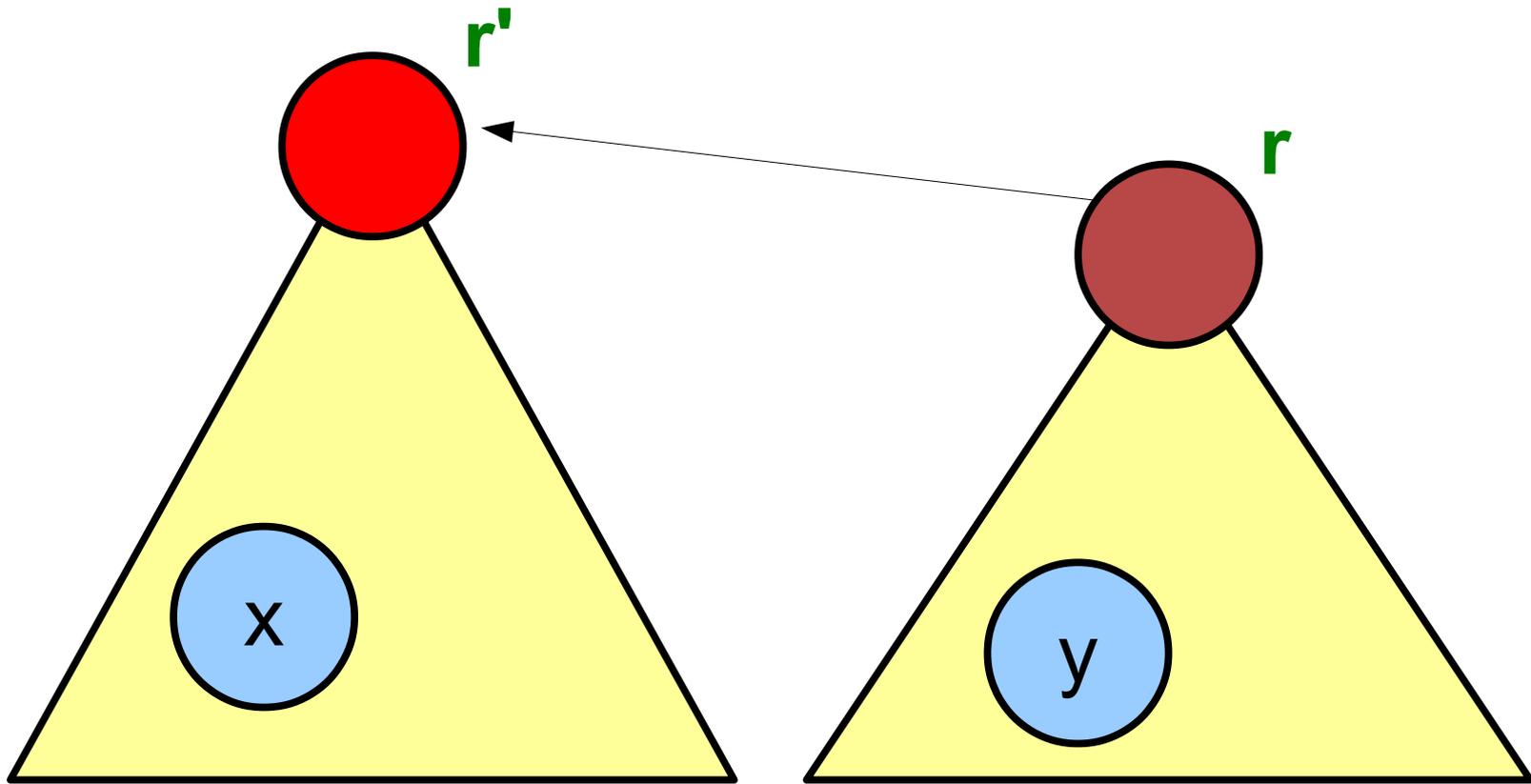
Find(x)



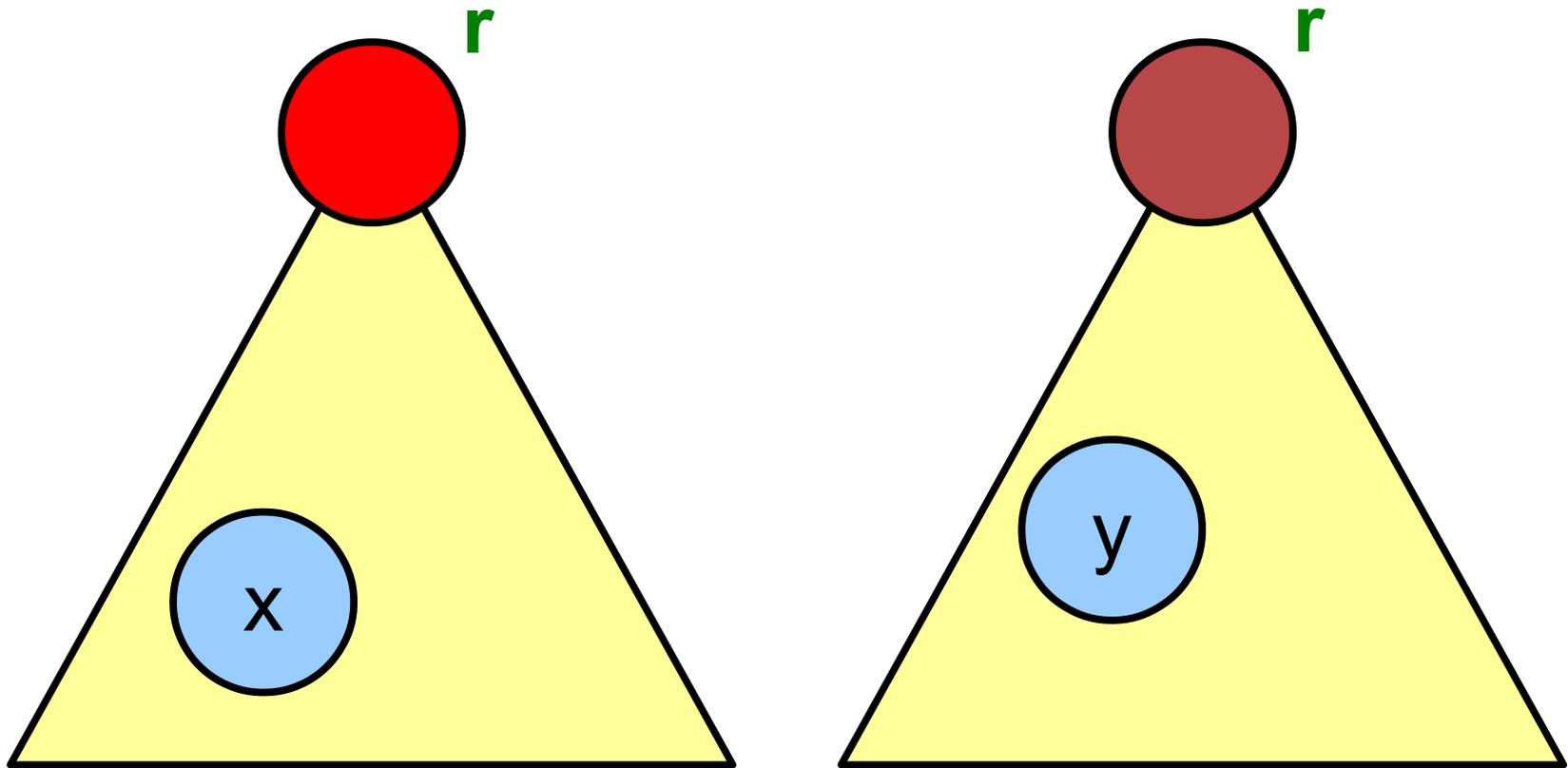
Union(x, y)



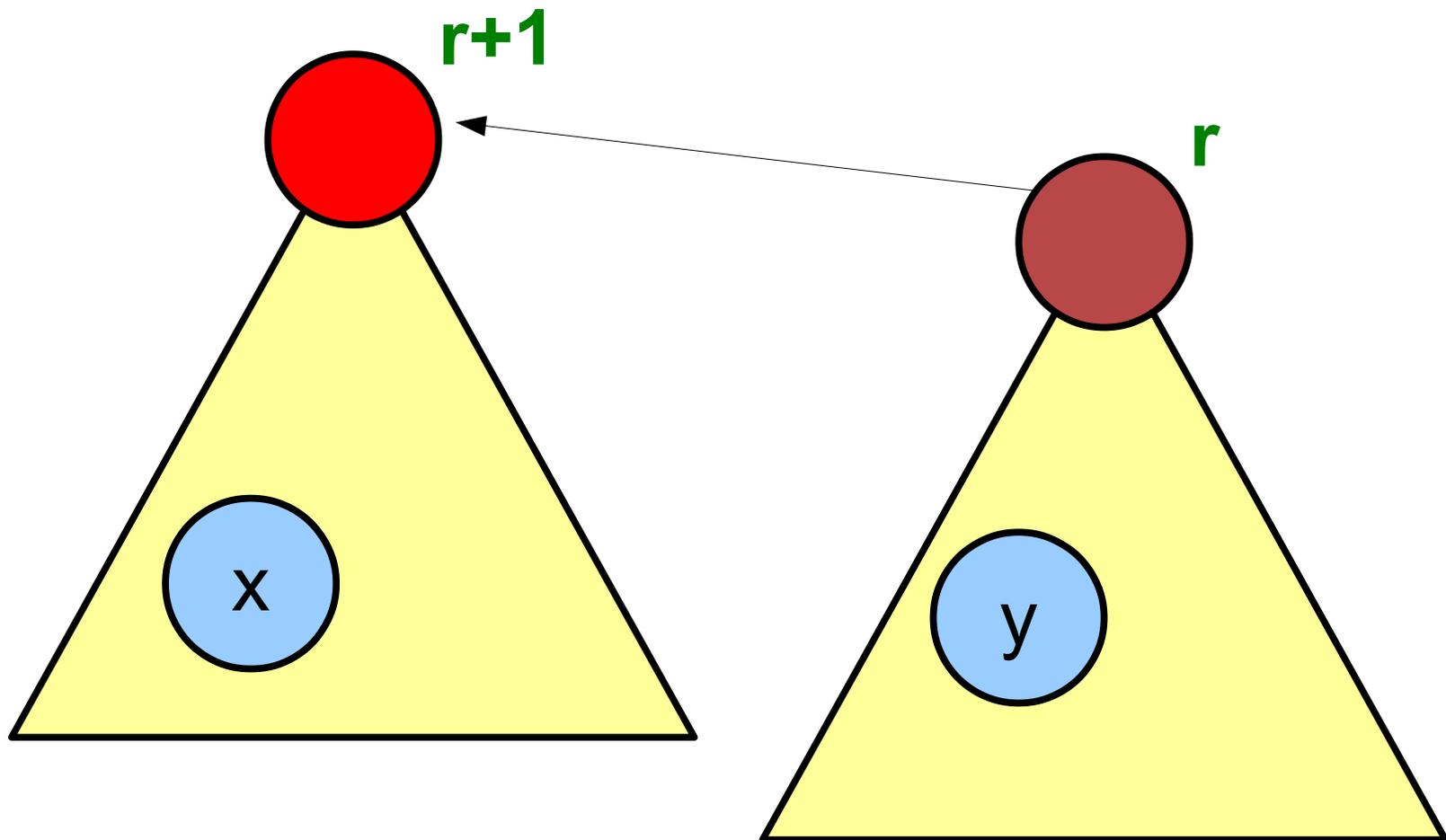
Union(x, y)



Union(x, y)

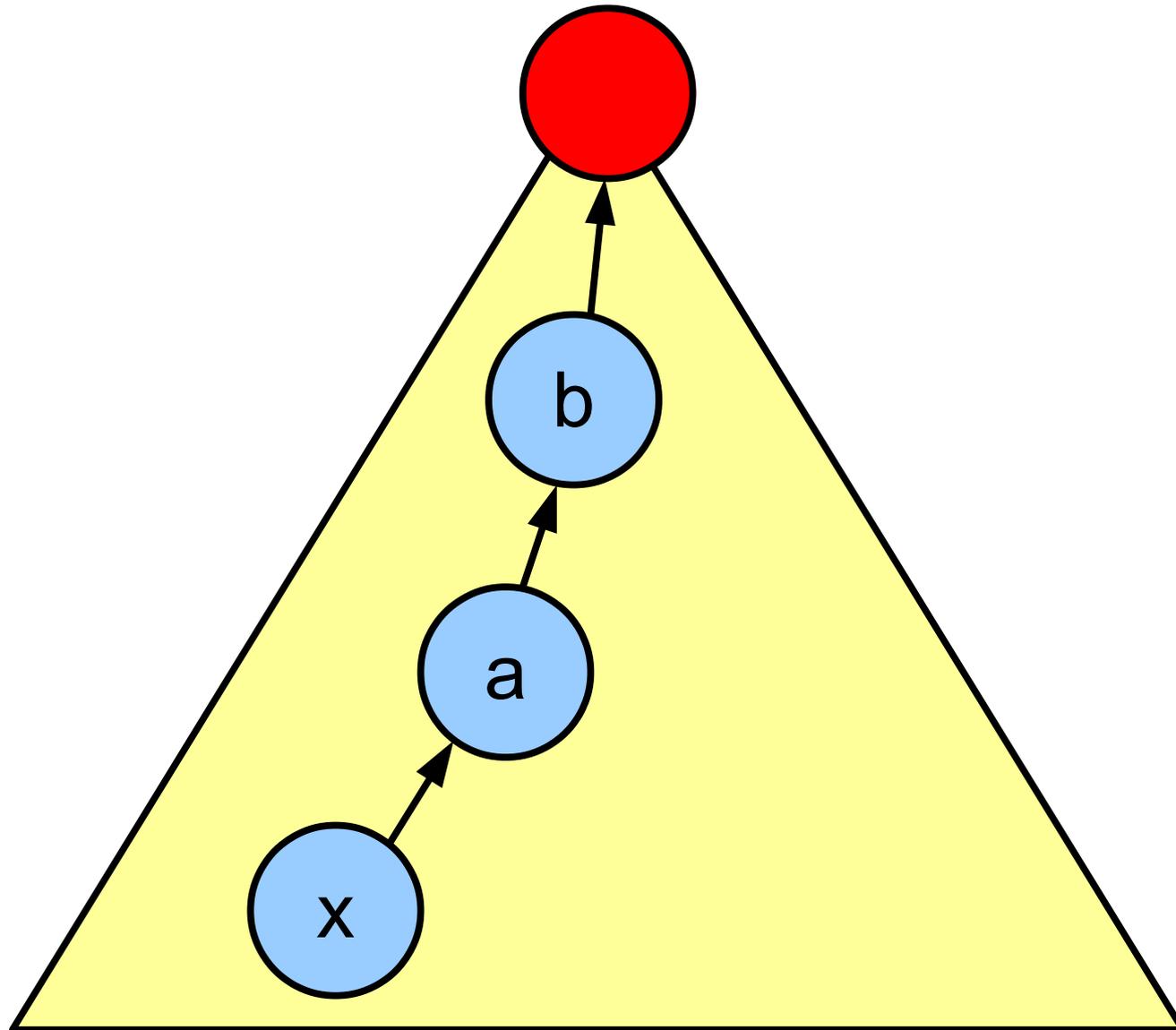


Union(x, y)

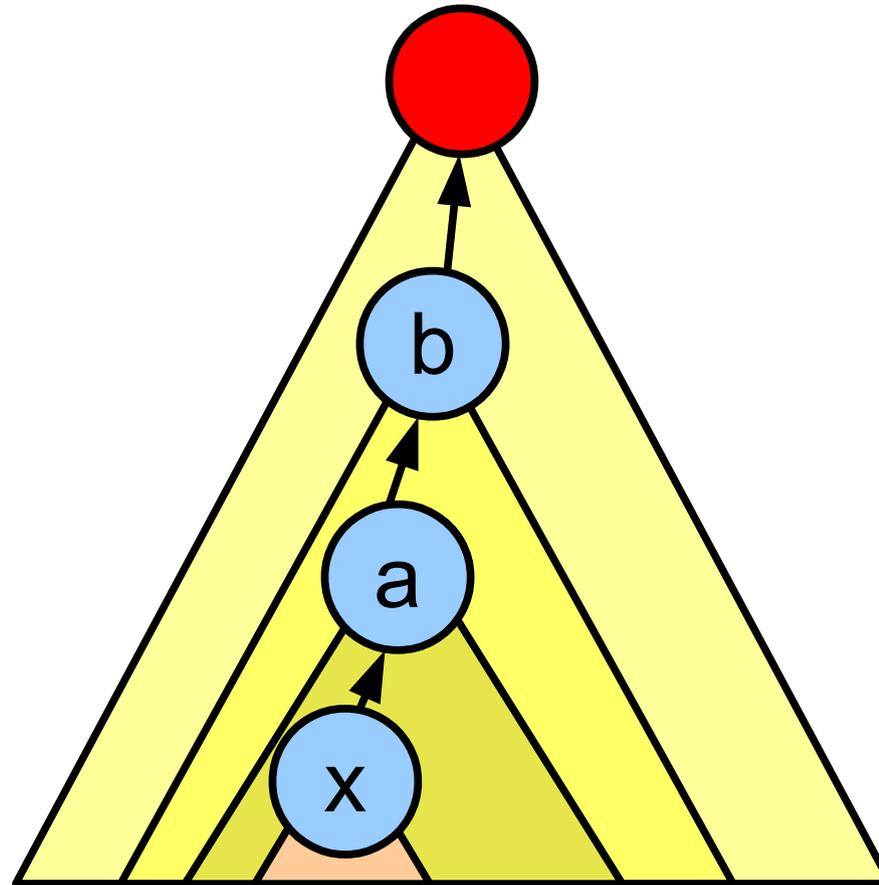


Amélioration de l'implémentation : compression de chemin

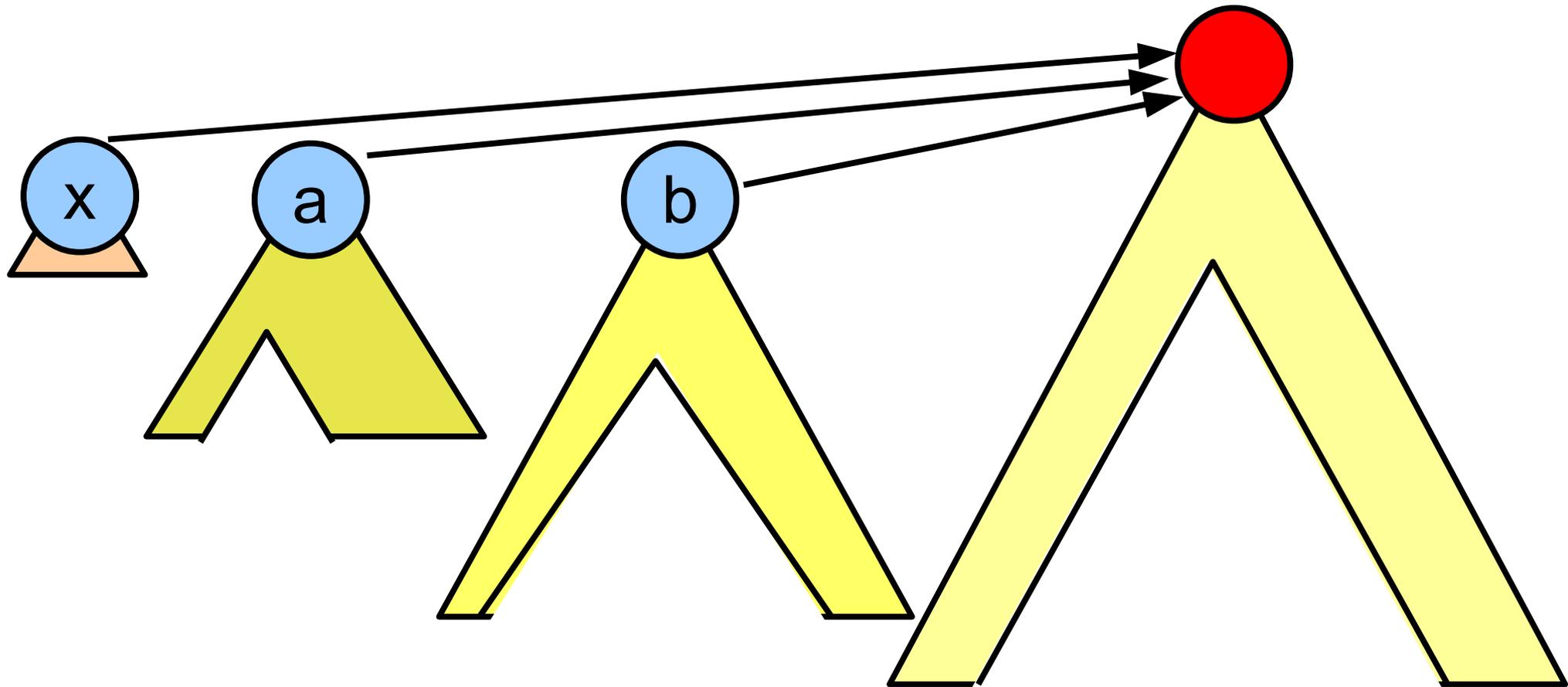
Find(x) avant



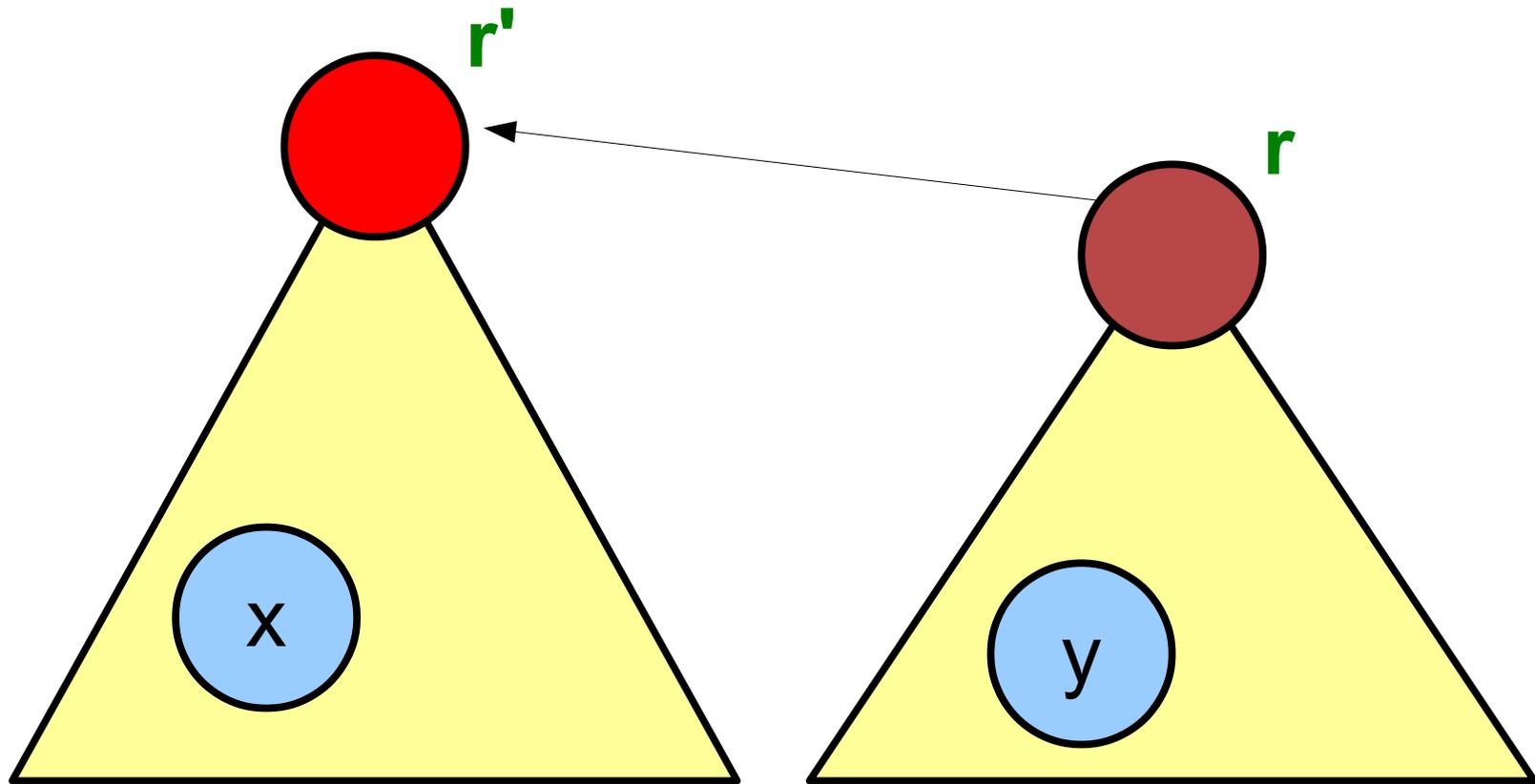
Find(x) avec compression de chemin

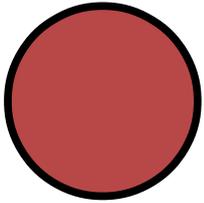


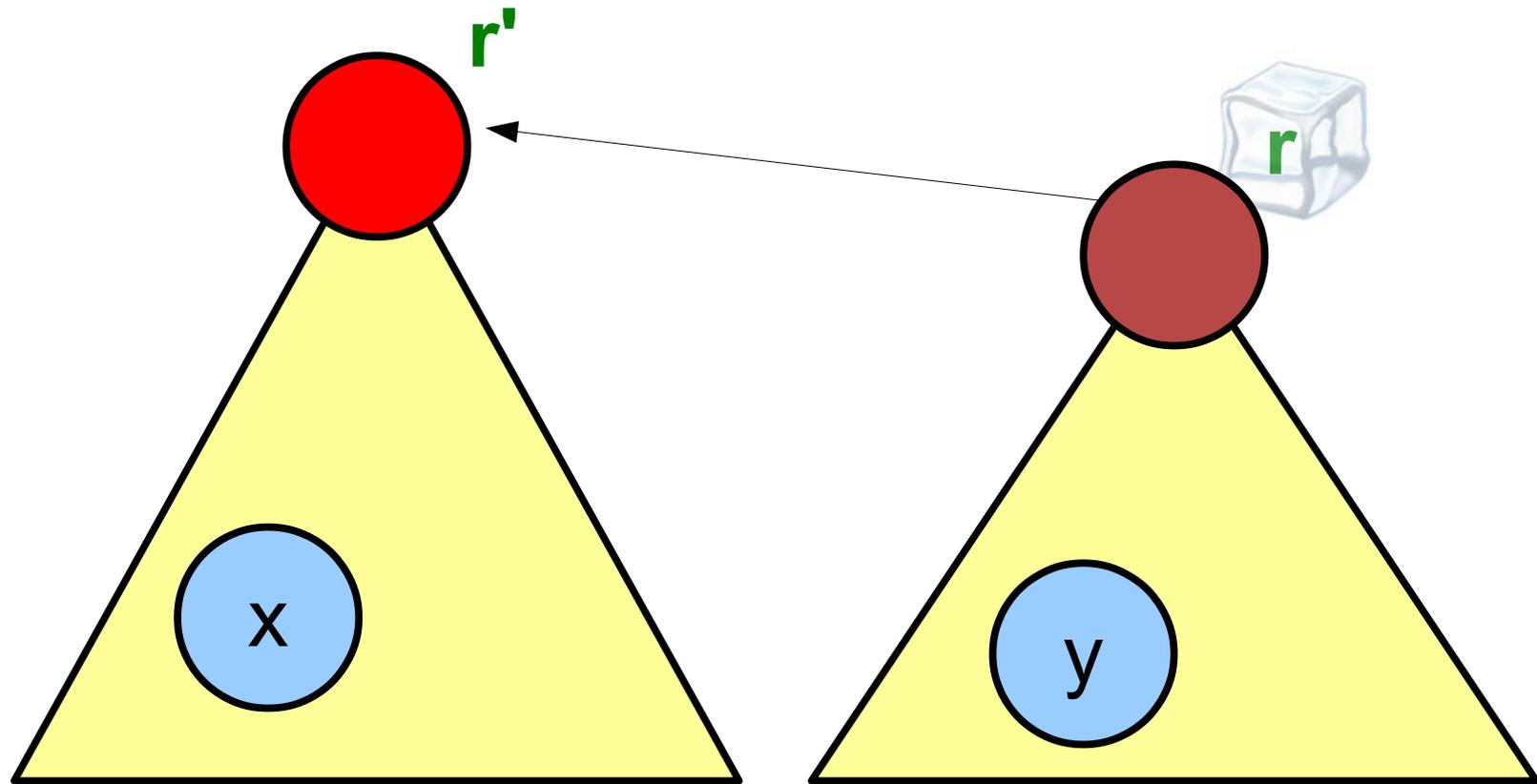
Find(x) avec compression de chemin



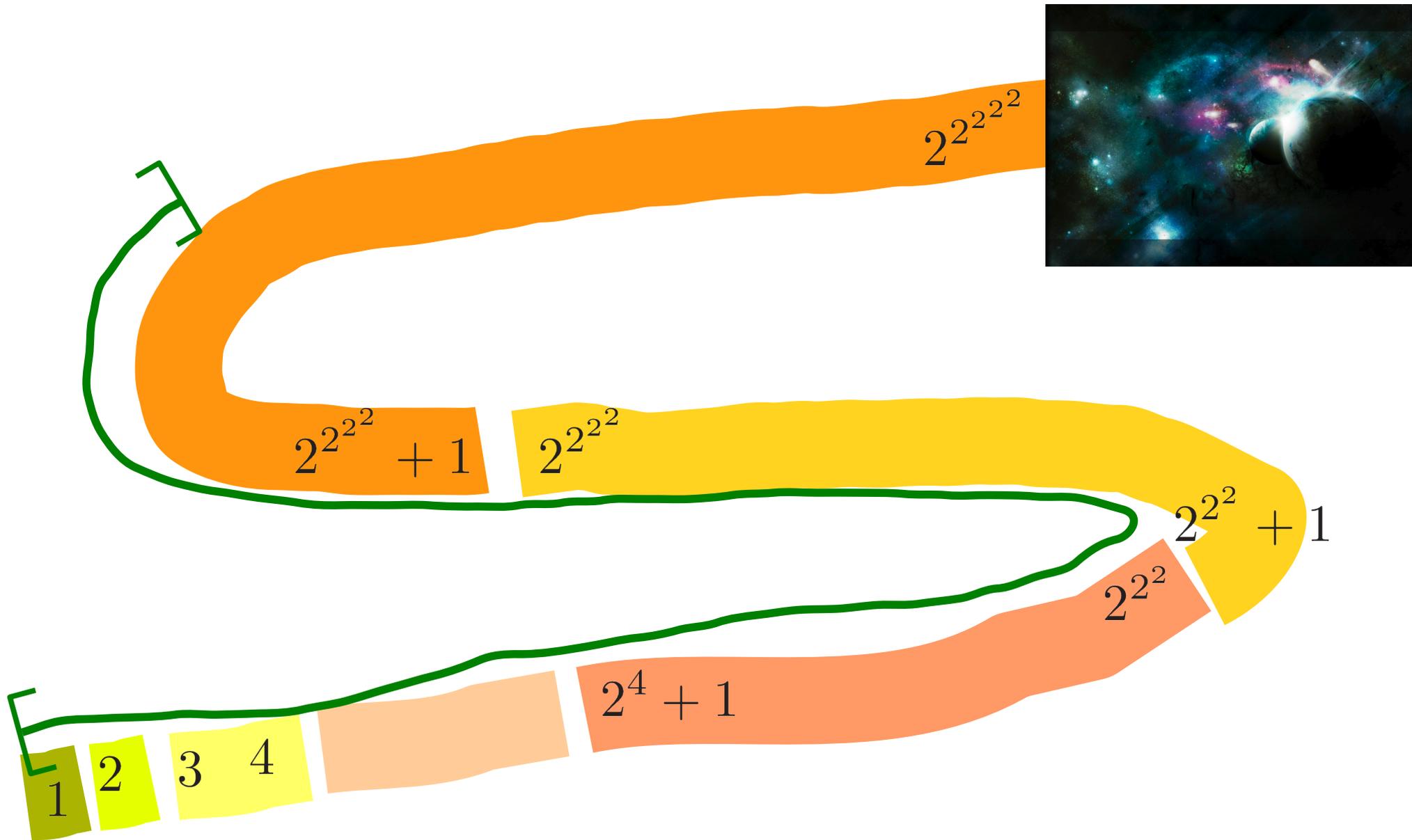
Lors d'une union(x, y)...

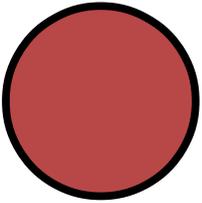


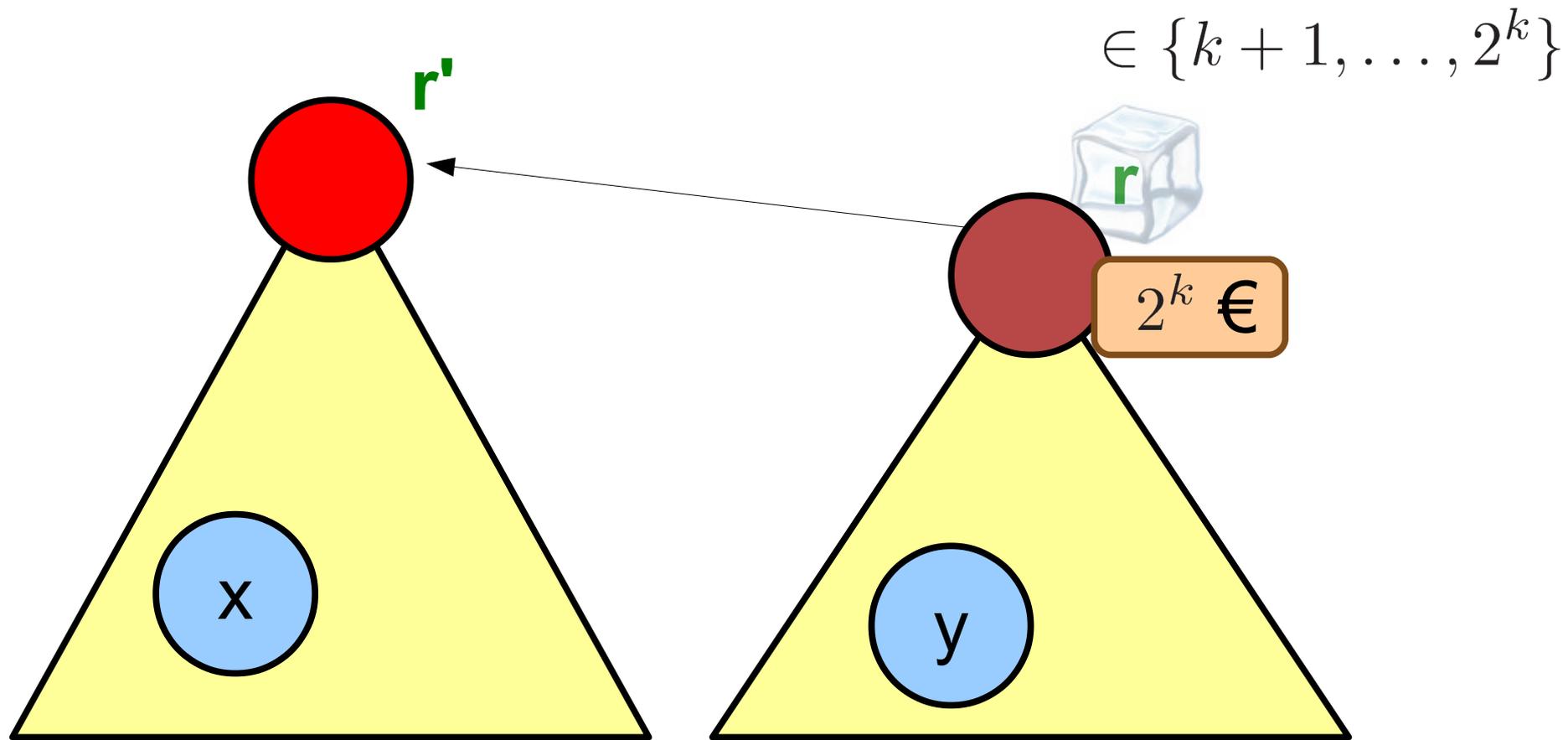
le rang  de ne changera plus.



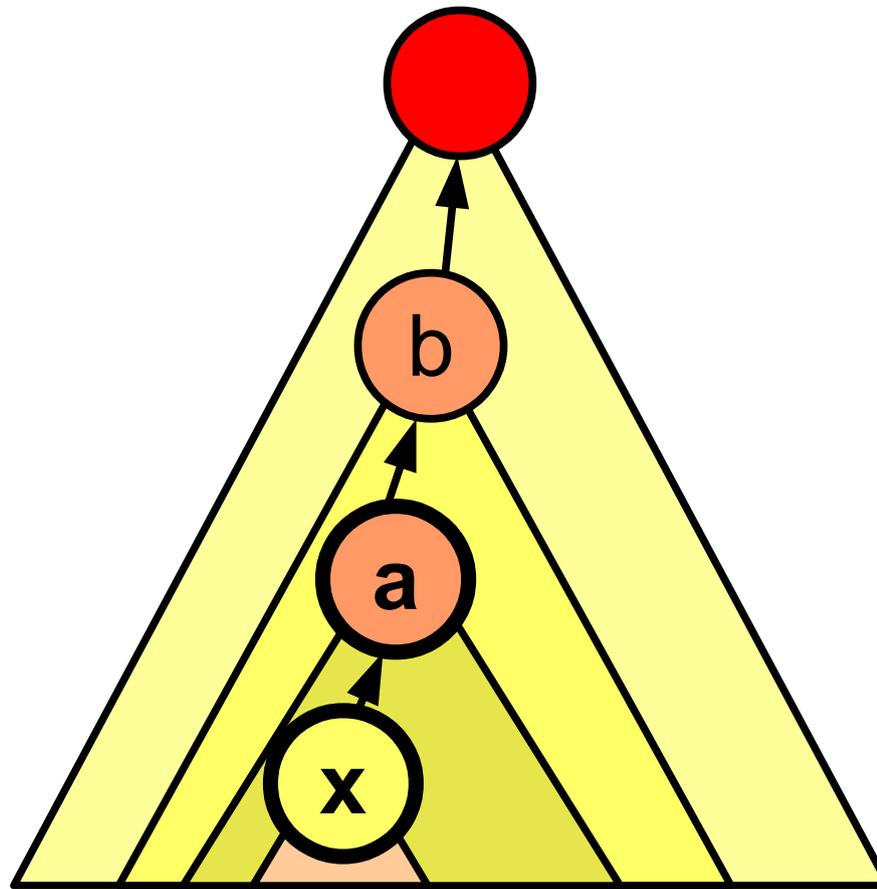
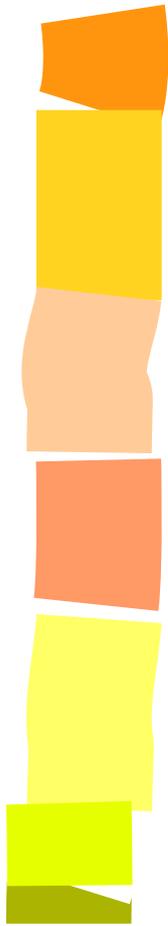
L'intervalle des rangs possibles découpé en sous-intervalles fous !



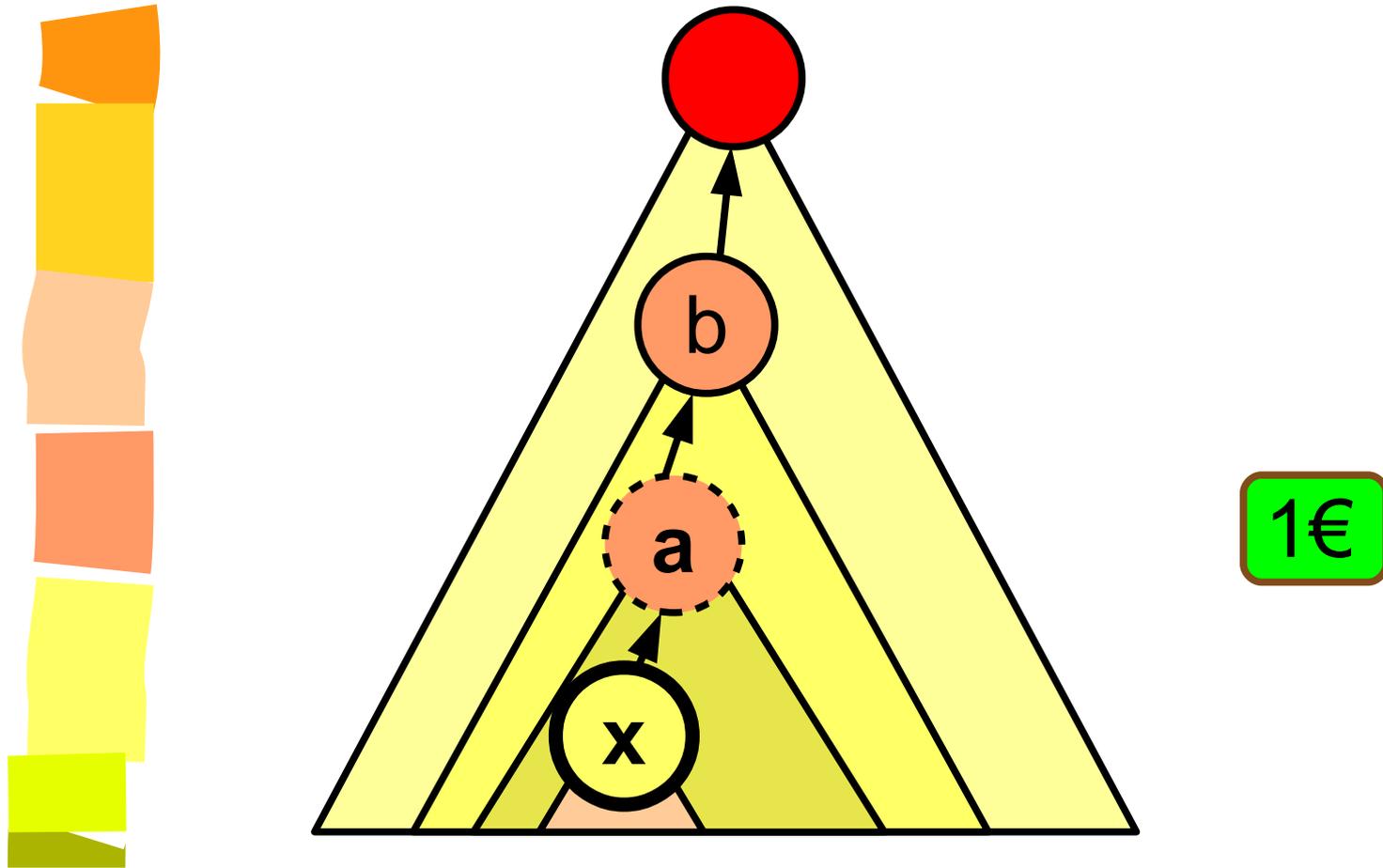
le rang  de ne changera plus.



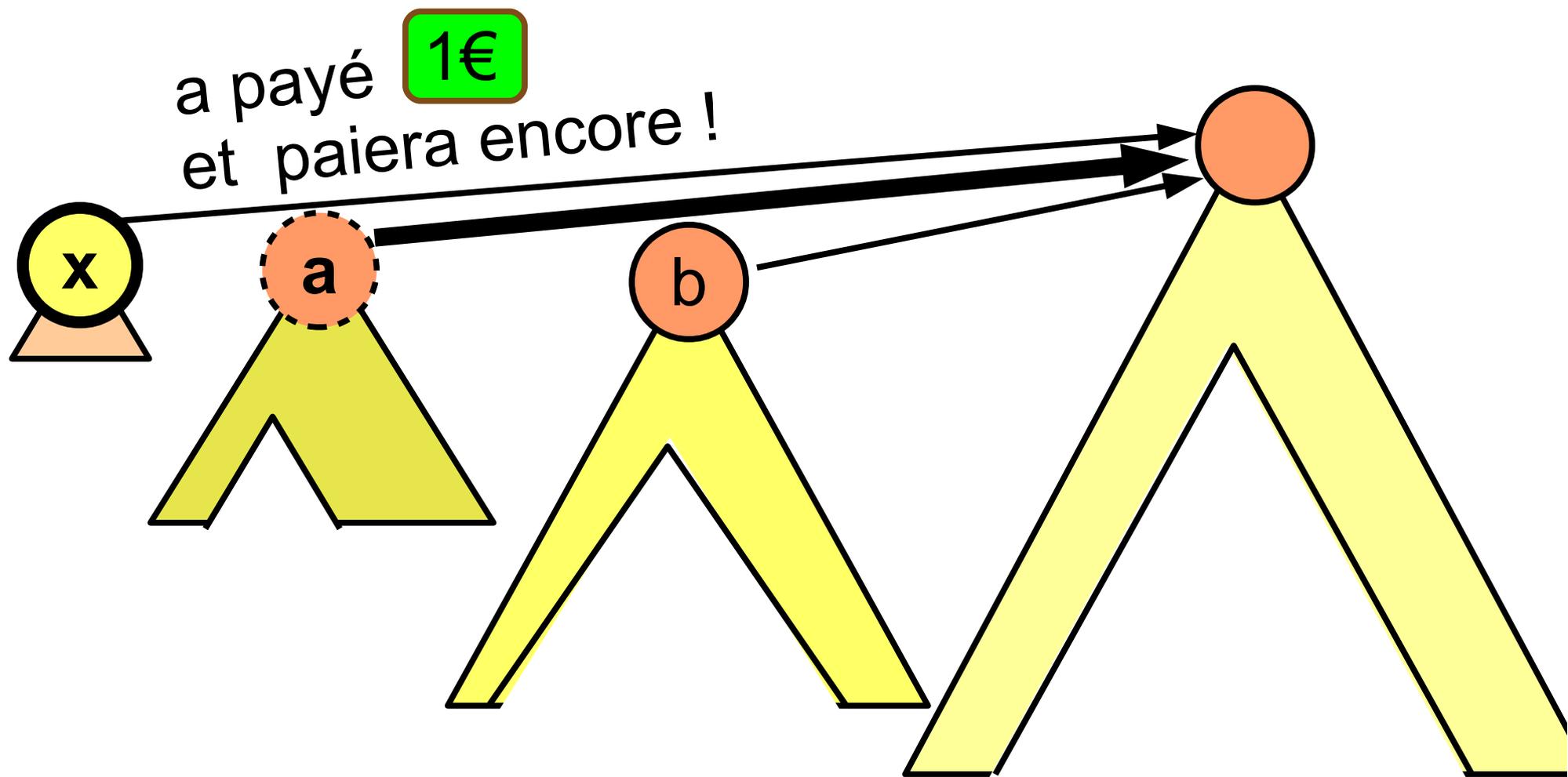
Find... combien d'opérations ?



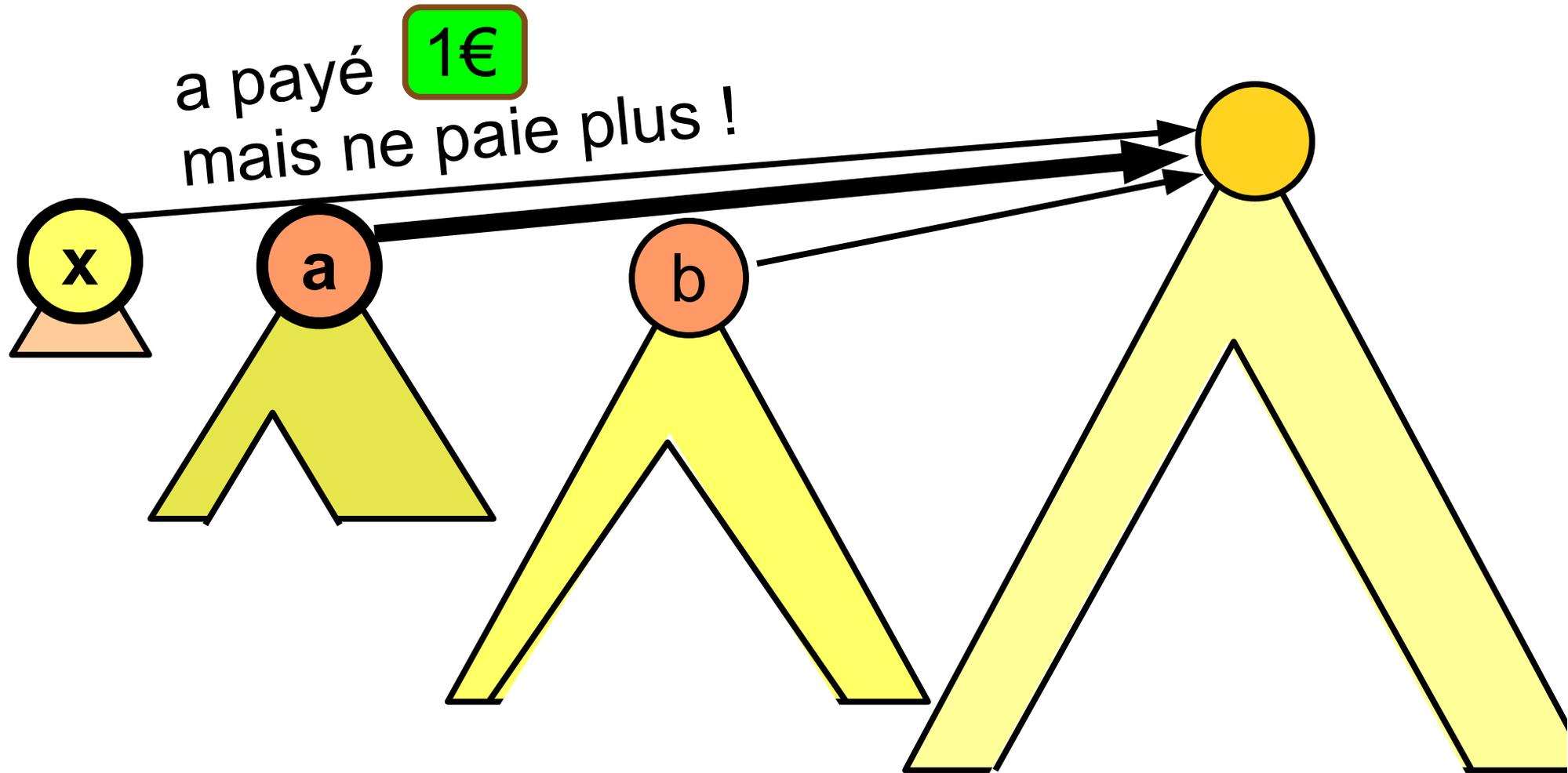
Mais certaines opérations sont comptabilisés comme des paiements !



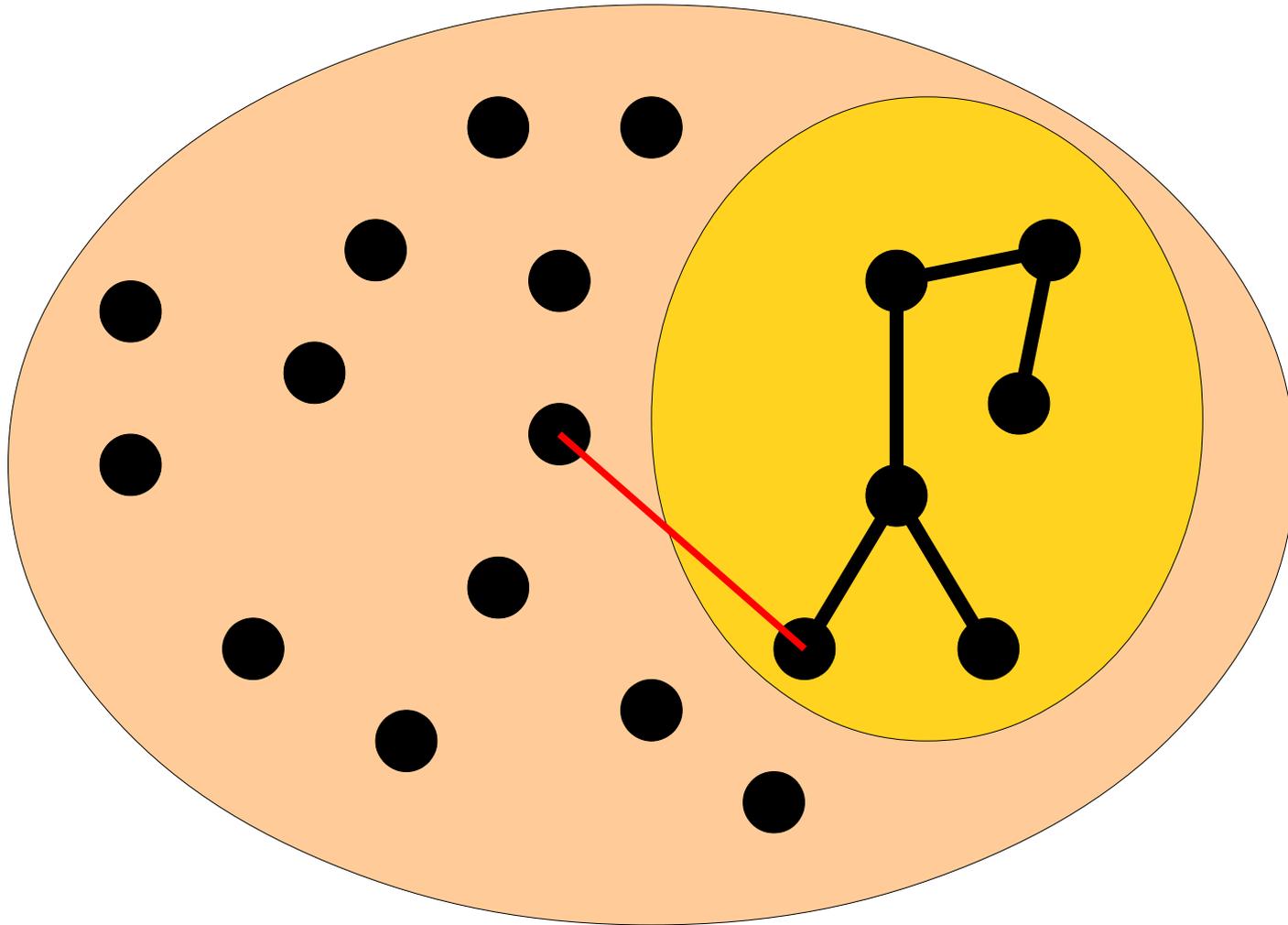
Va-t-il déboursier tout son argent ?



Personne n'a de dettes !

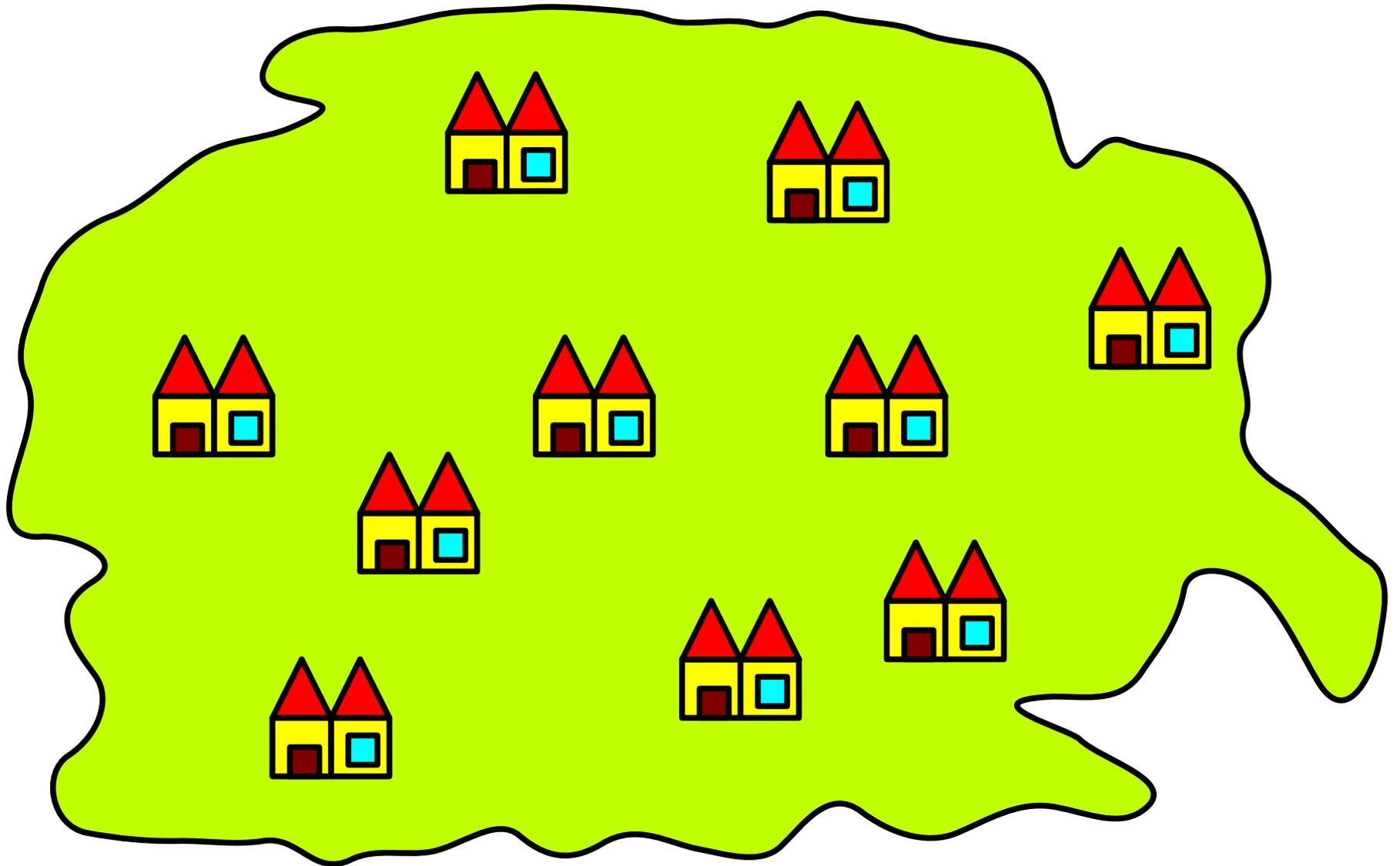


Algorithme de Prim

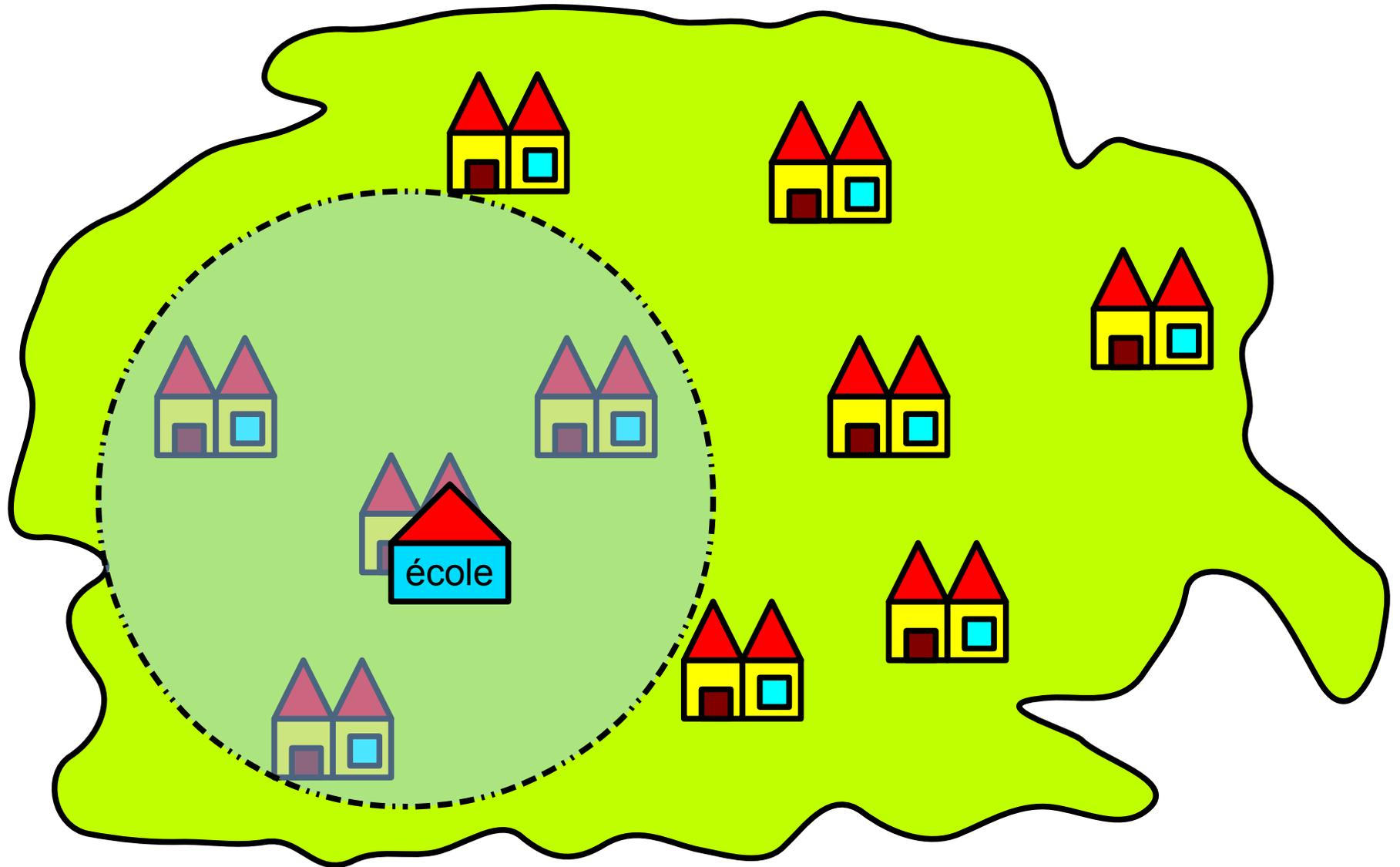


Couverture d'ensemble

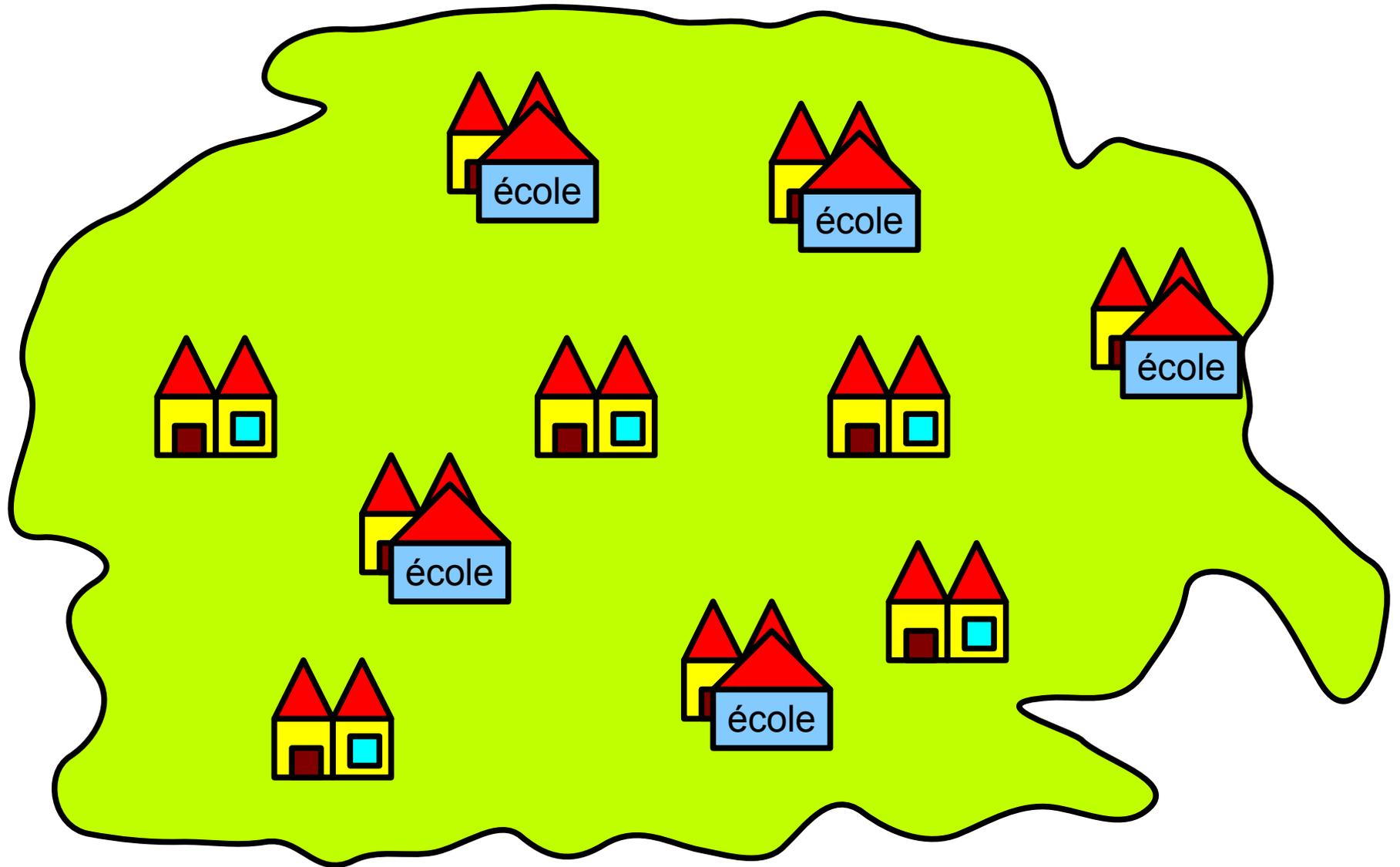
Motivation : l'éducation !



Motivation : l'éducation !



Motivation : l'éducation !



Encodage de Huffman



Savez-vous combien de temps dure
le « chant de la Terre » de Mahler ?

Compression MP3

chant de la Terre



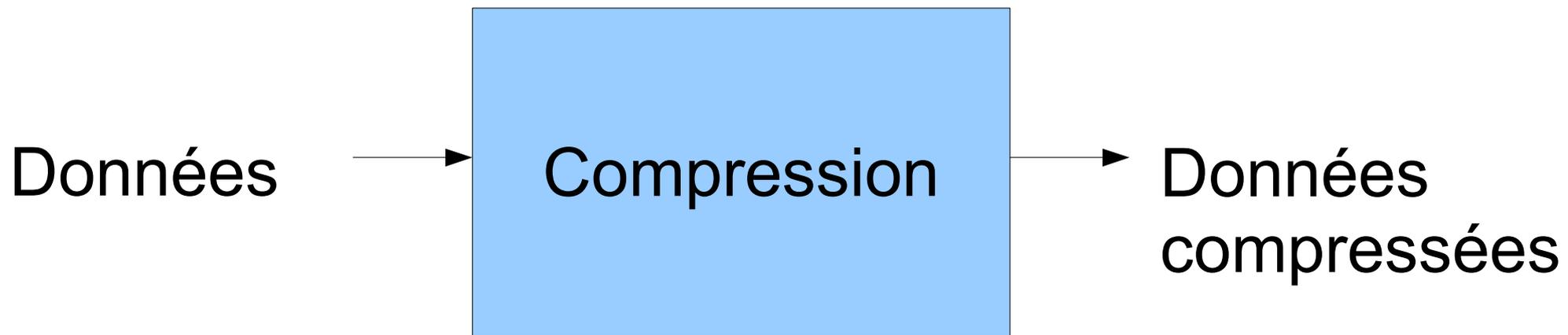
échantillonnage

numérisation

encodage



Compression



Encodage naïf

- ABADACACAADAADACAAAD
- 00010011001000100000110000110010000000
11

Compression... problème : ambiguïté

- ABADACACAADAADACAAAD
- 0001011001001001100110100001

Compression... sans ambiguïté

- ABADACACAADAADACAAAD
- 0101011010101010011001101010001

