Détermination d'un plan d'évacuation incendie.

PLAN D'EVACUATION

Rez-de-Chaussée

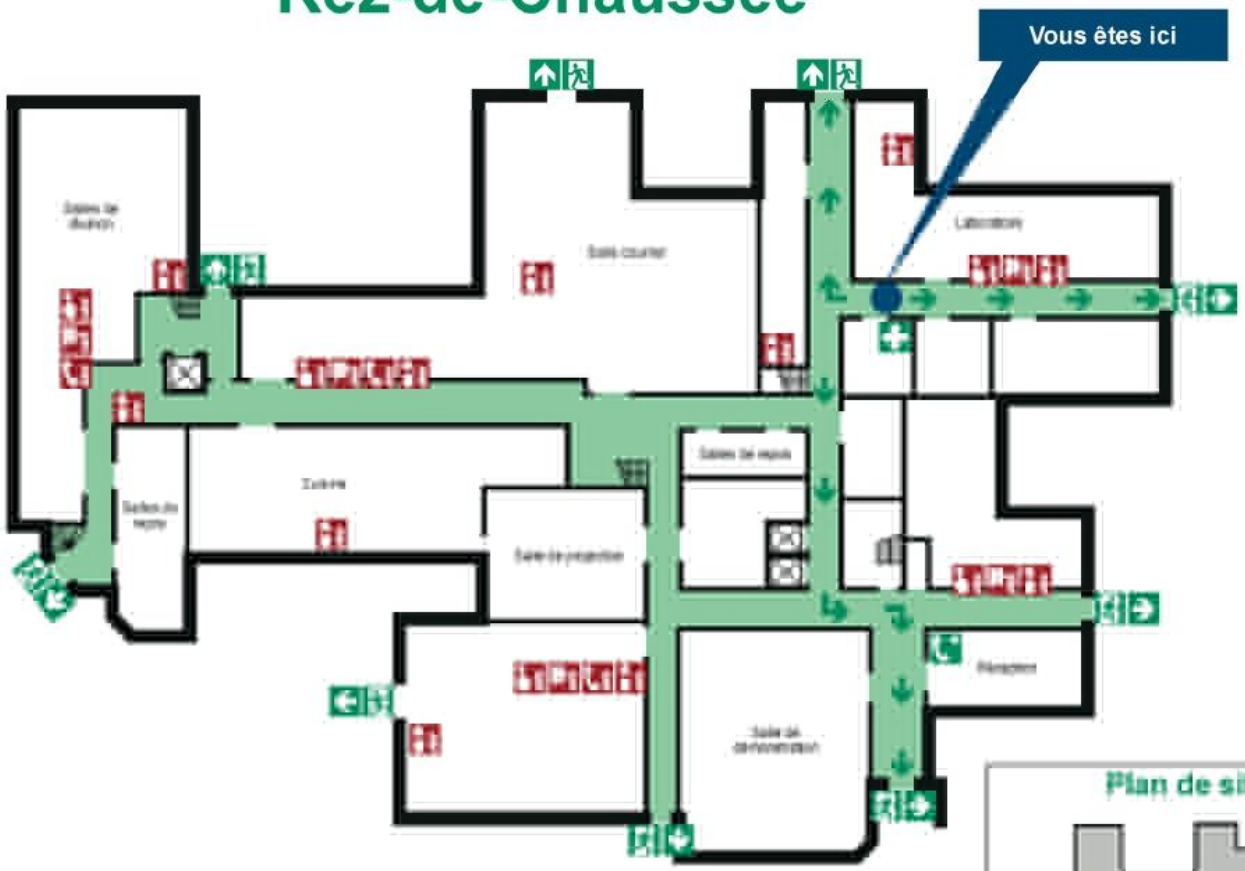
Consignes de sécurité

INCENDIE
- Appuyez sur le bouton d'alarme-incendie
- Téléphonez au 333
- Indiquez votre nom et l'endroit où vous vous trouvez
- [illegible]
- [illegible]

EVACUATION
- [illegible]
- [illegible]
- [illegible]
- [illegible]

LEGENDE

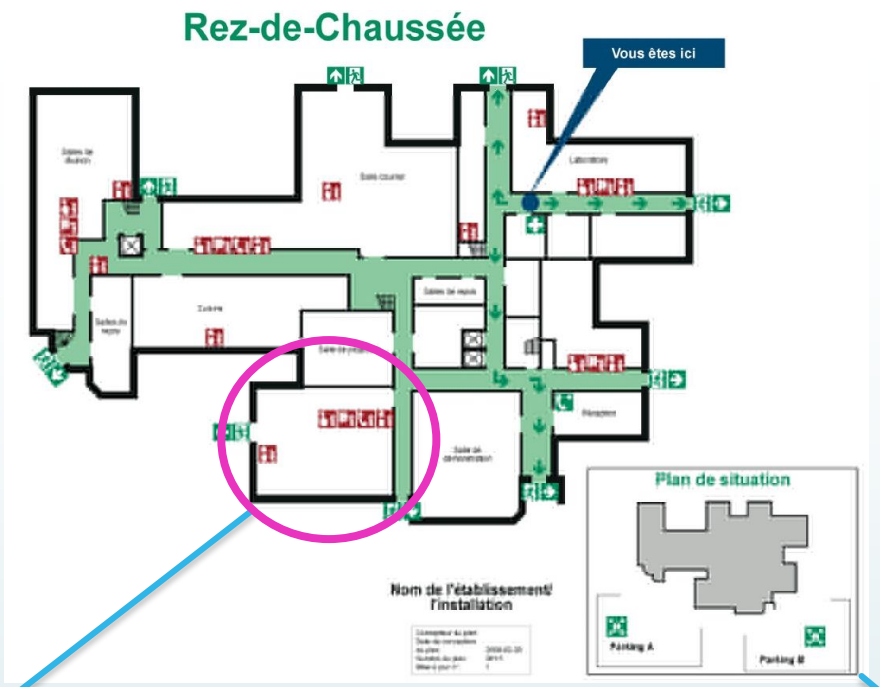
- Vous êtes ici
- Evacuation obligatoire
- Evacuation sens libre
- Poste d'appel d'urgence manuel
- Equipement de premier secours
- Point de rassemblement
- Extincteur
- RIA (Robinet d'incendie armé)
- Déclencheur manuel d'alarme incendie
- Poste d'appel d'urgence incendie
- Ascenseur
- Escaliers



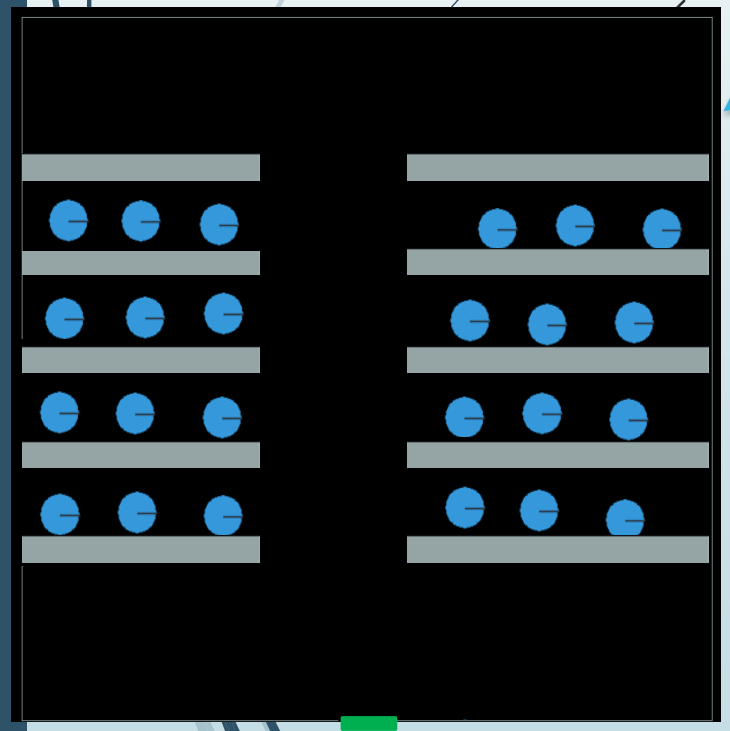
Nom de l'établissement/ l'installation

Impossible de se limiter à une étude locale

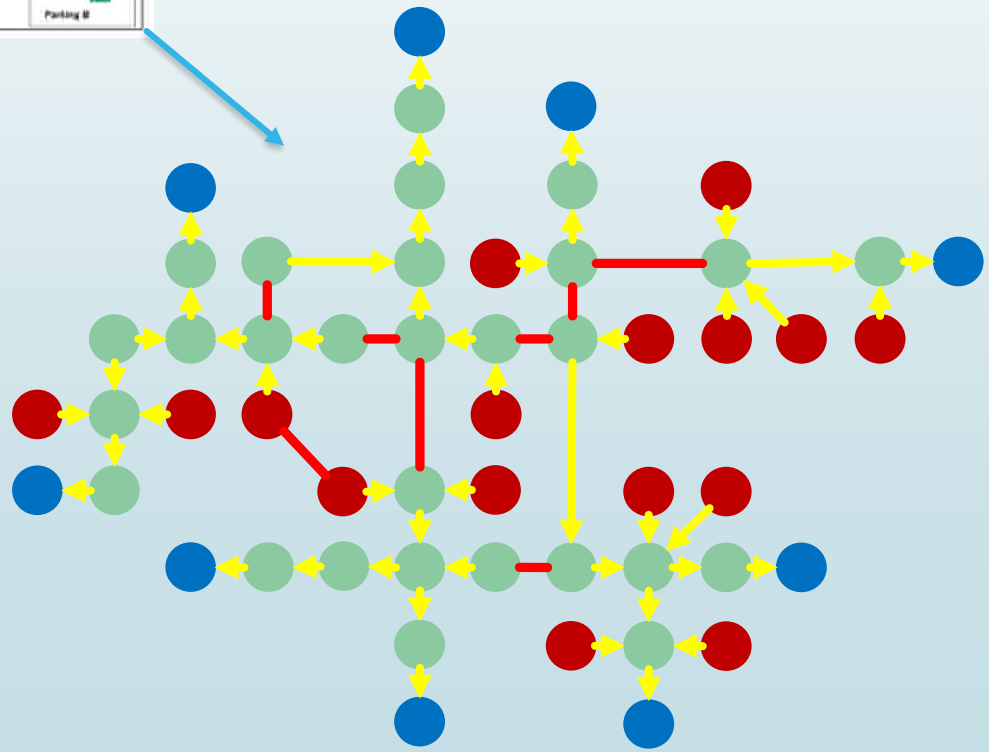
- Pour 15 secondes de simulation, il faut **900** mises à jour (60 mises à jour par secondes).
- Une mise à jour pour une personne prend 3.10^{-4} secondes.
- Il faut donc, pour 15 secondes de simulation avec 2k personnes, **1h30** de calcul !



Simulation locale, par flux



Simulation globale, par graphe



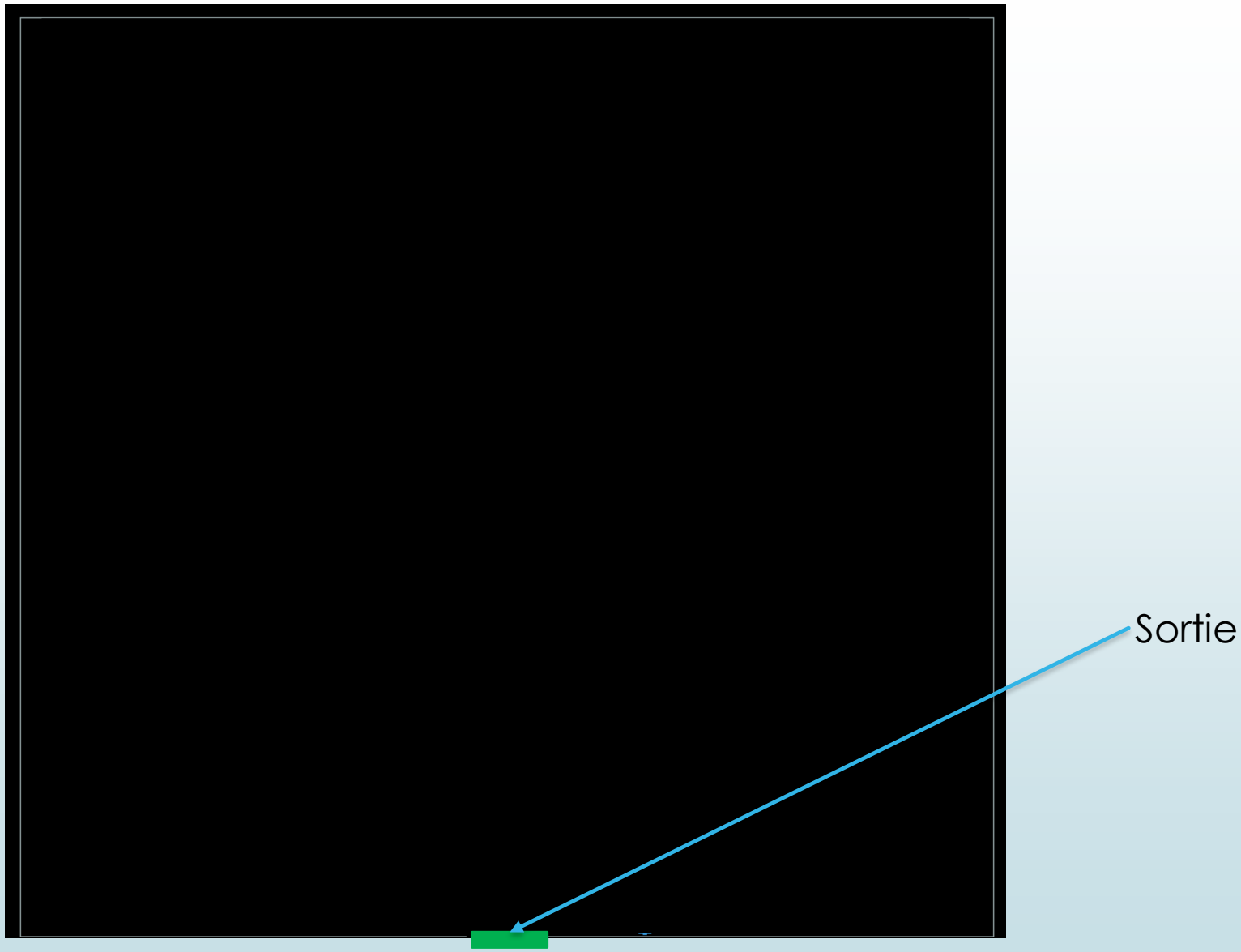
Simulation locale

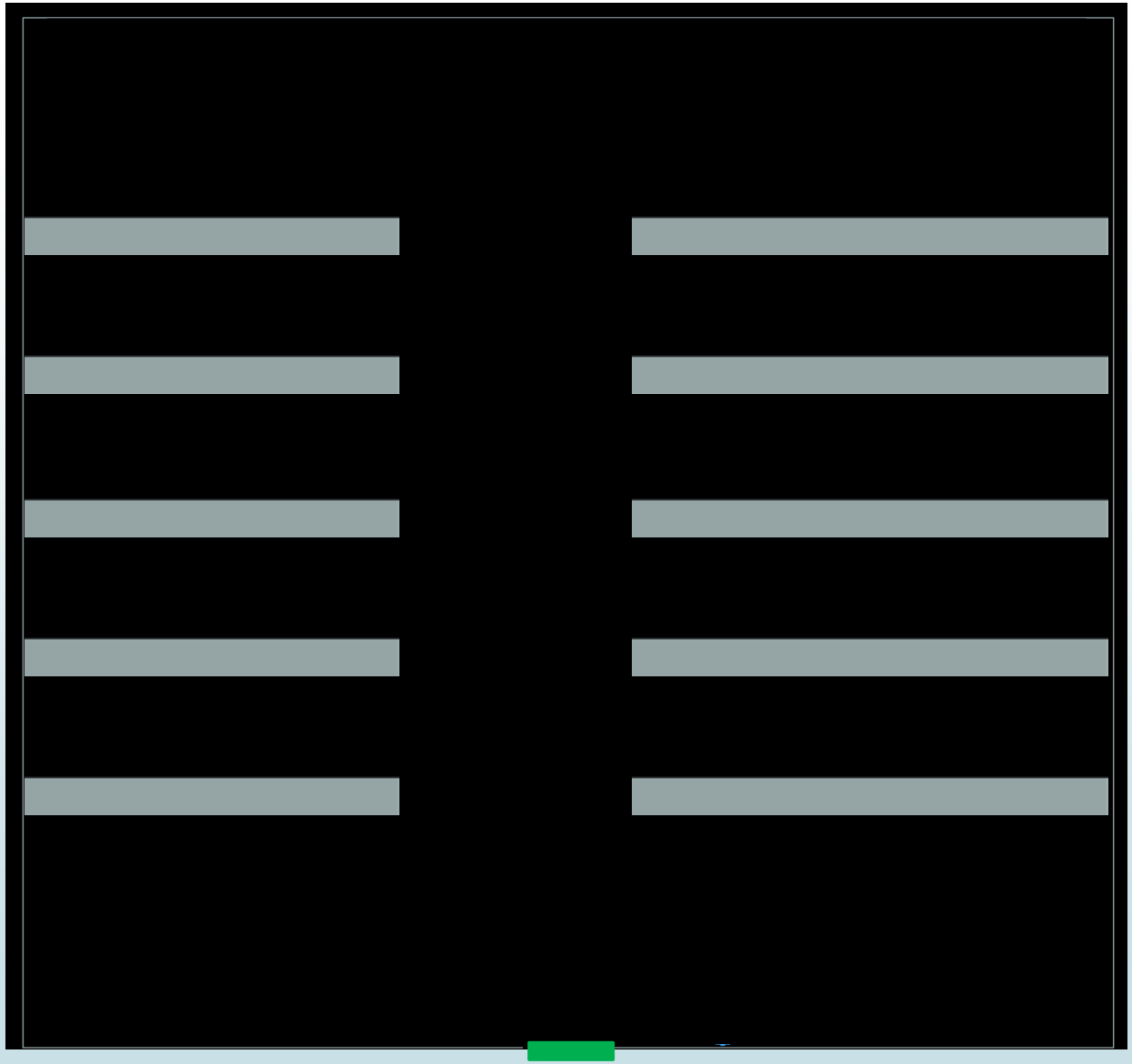
Paramètres significatifs négligés

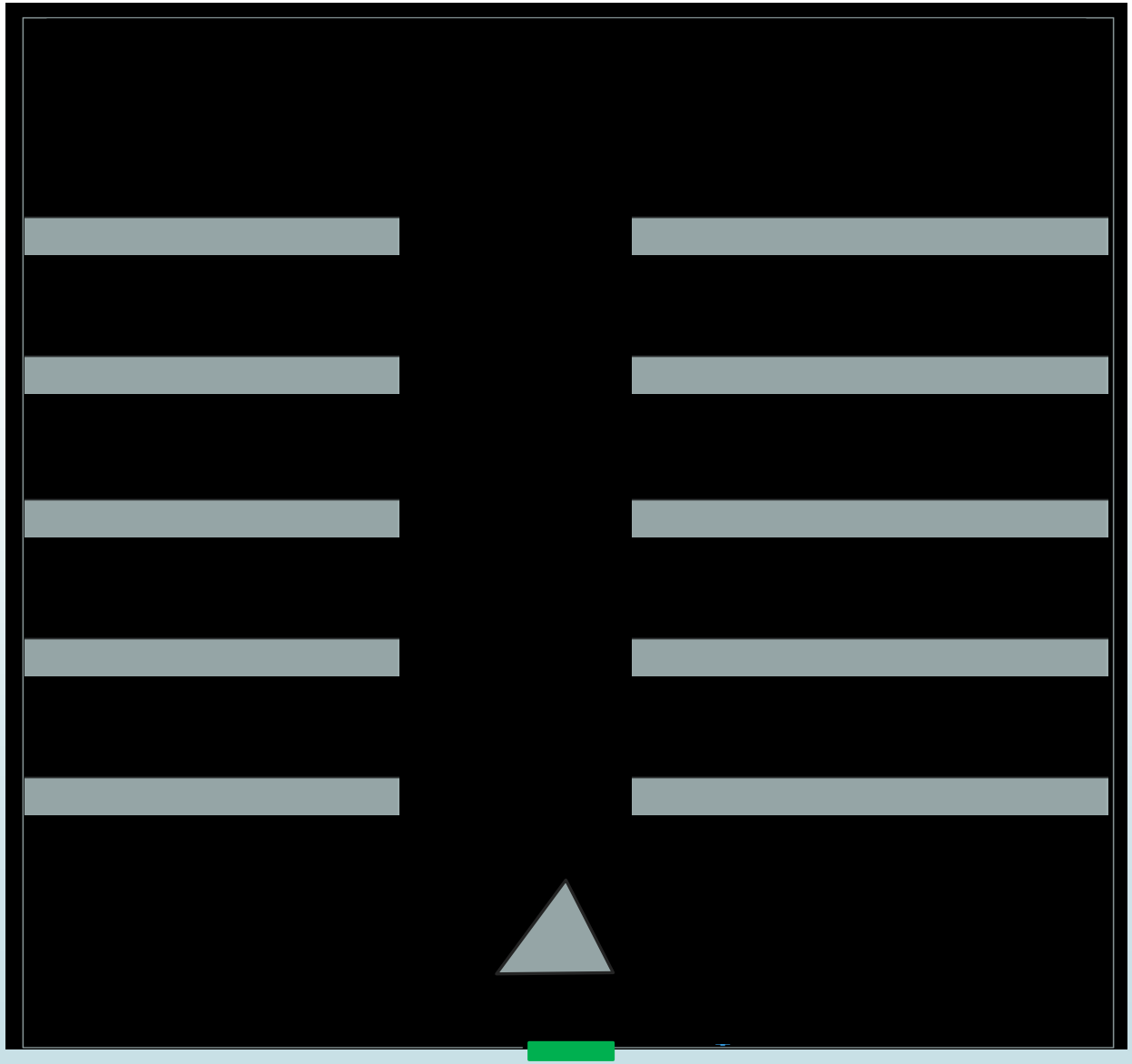
- Panique
- Instinct grégaire, initiatives personnelles
- Congestion
- les personnes sont représentés par des cercles, et non des ellipses

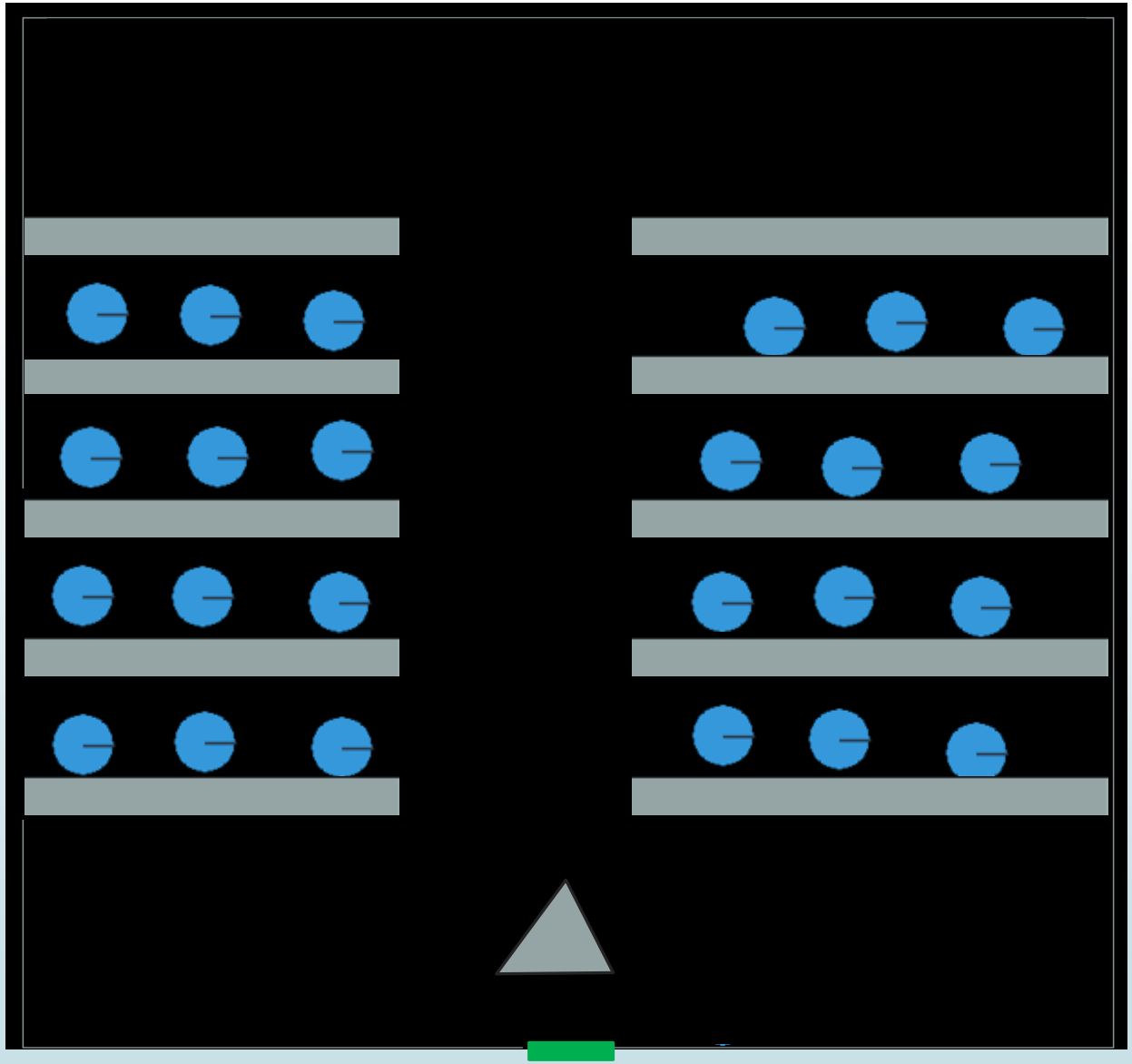
Utilisation d'un moteur physique

Construction d'une salle


Sortie

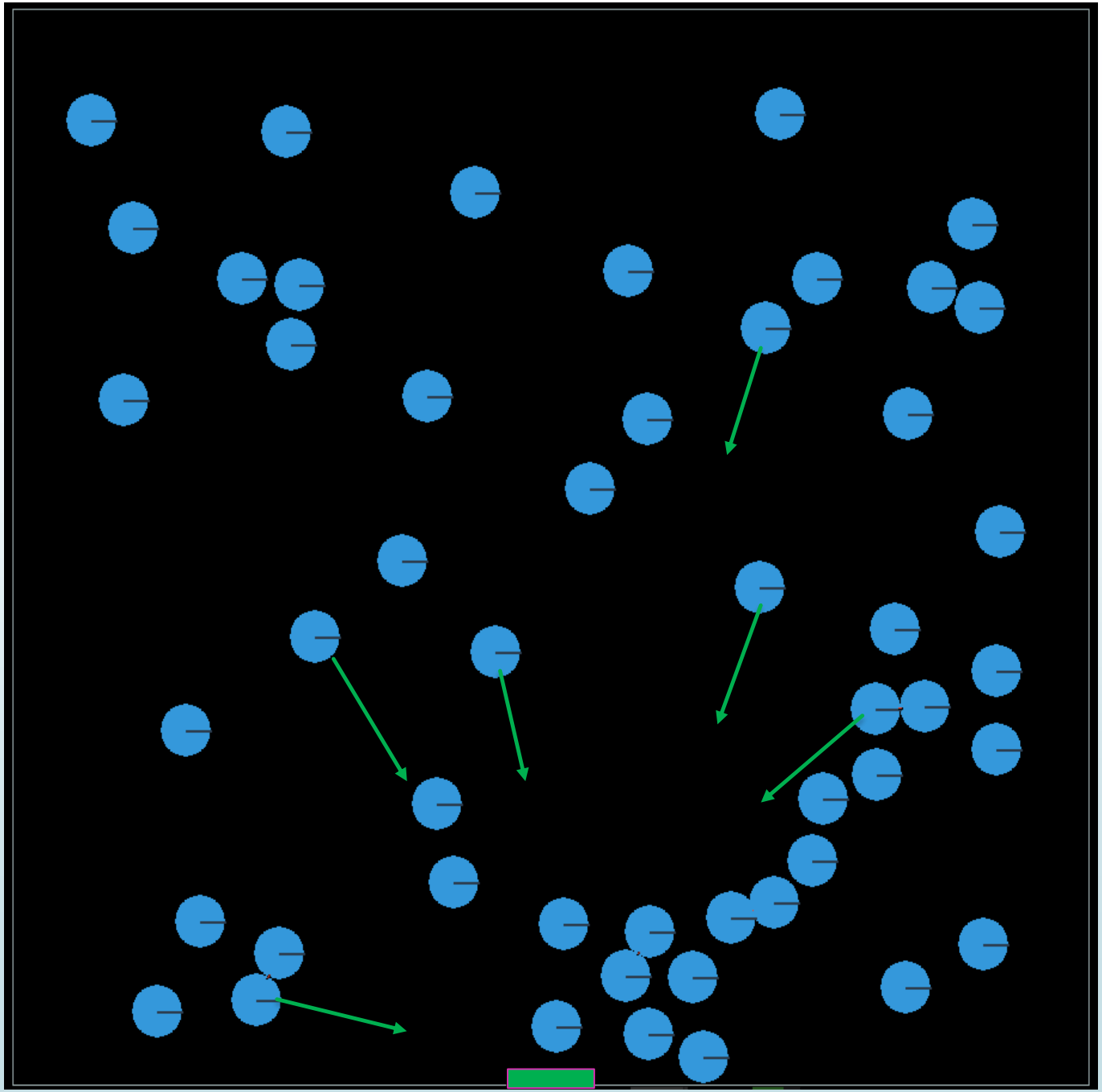




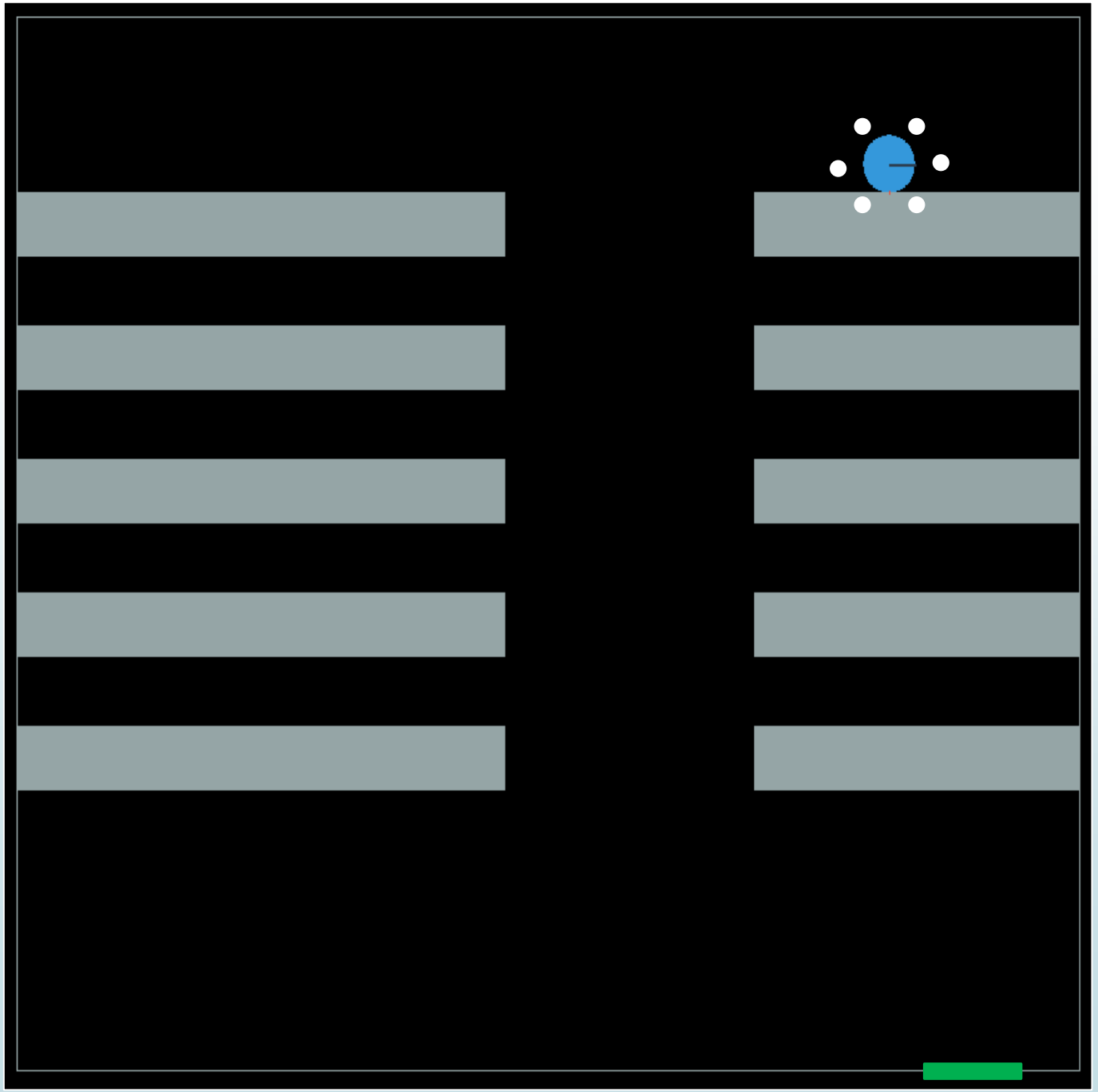


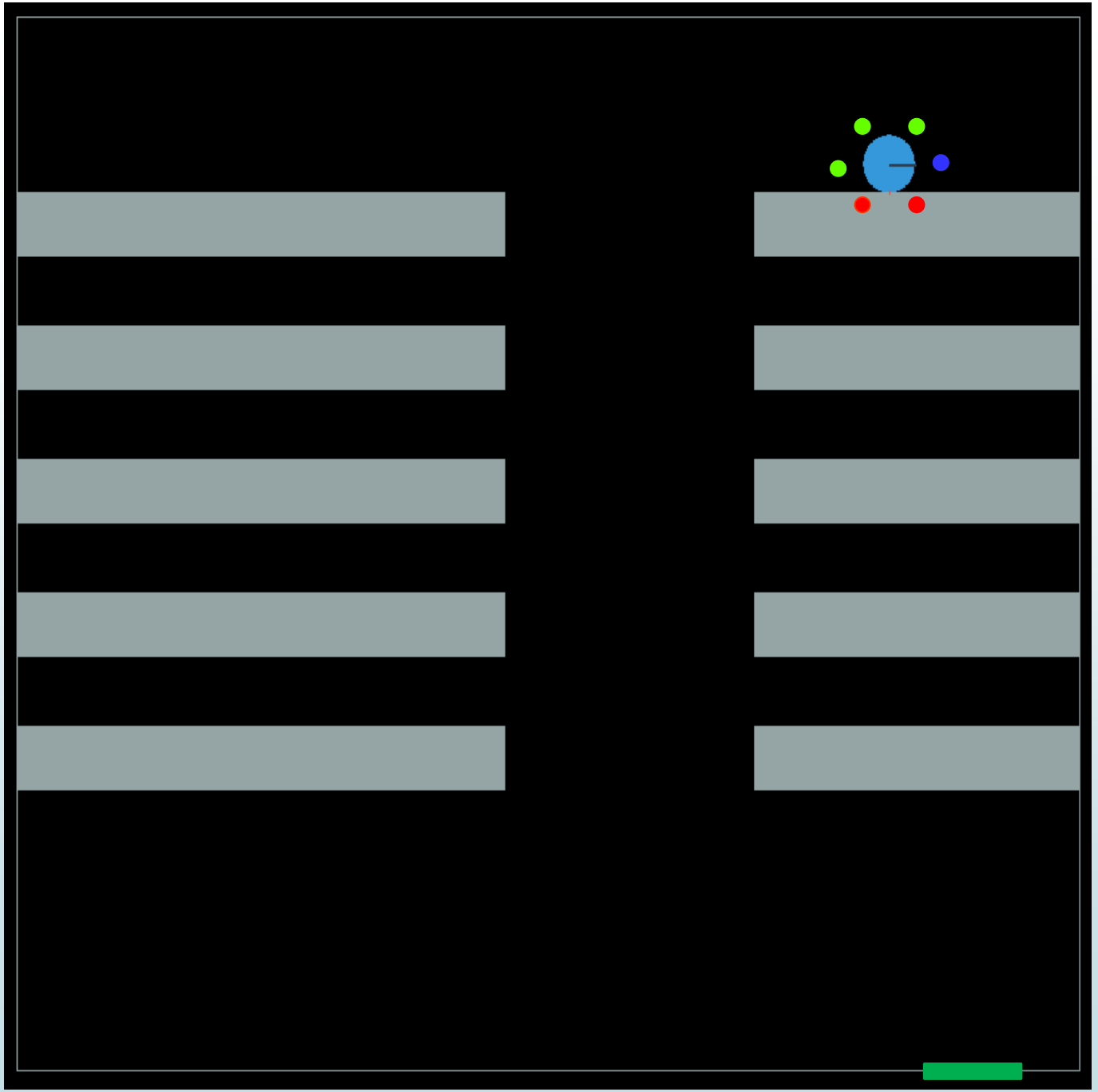
Déplacer les personnes

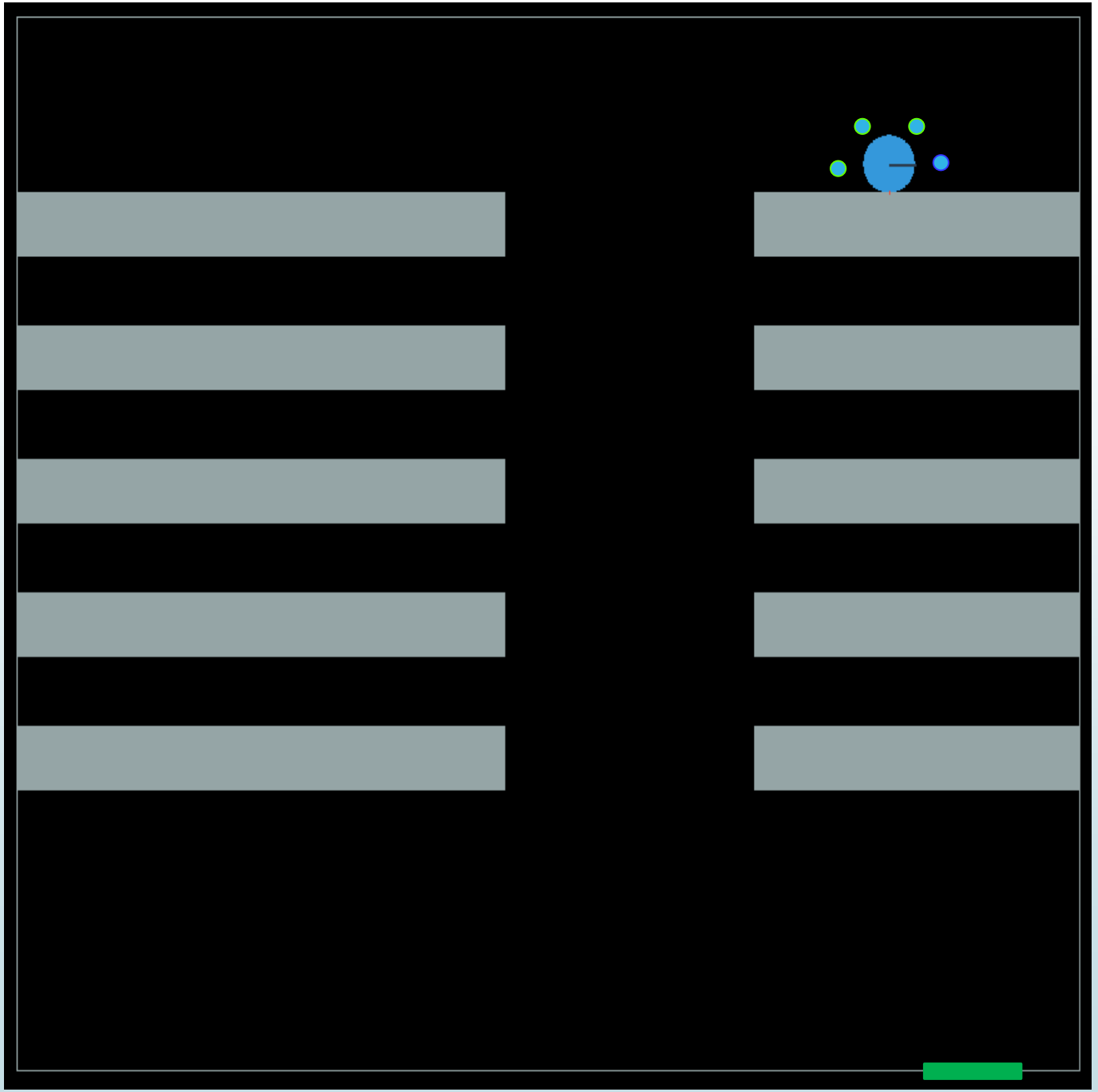
Choix de la direction

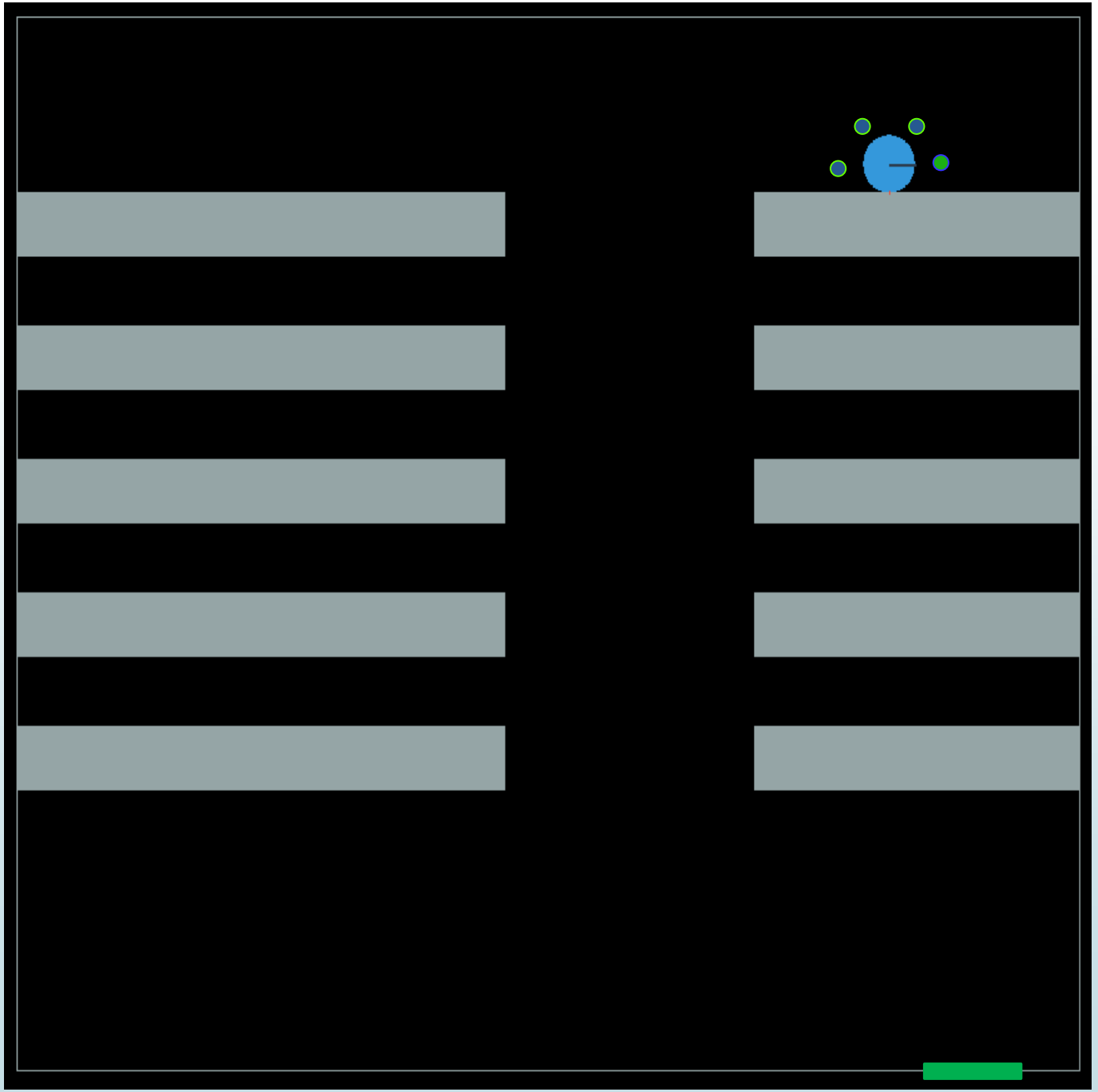


Une première approche : le test de proximité

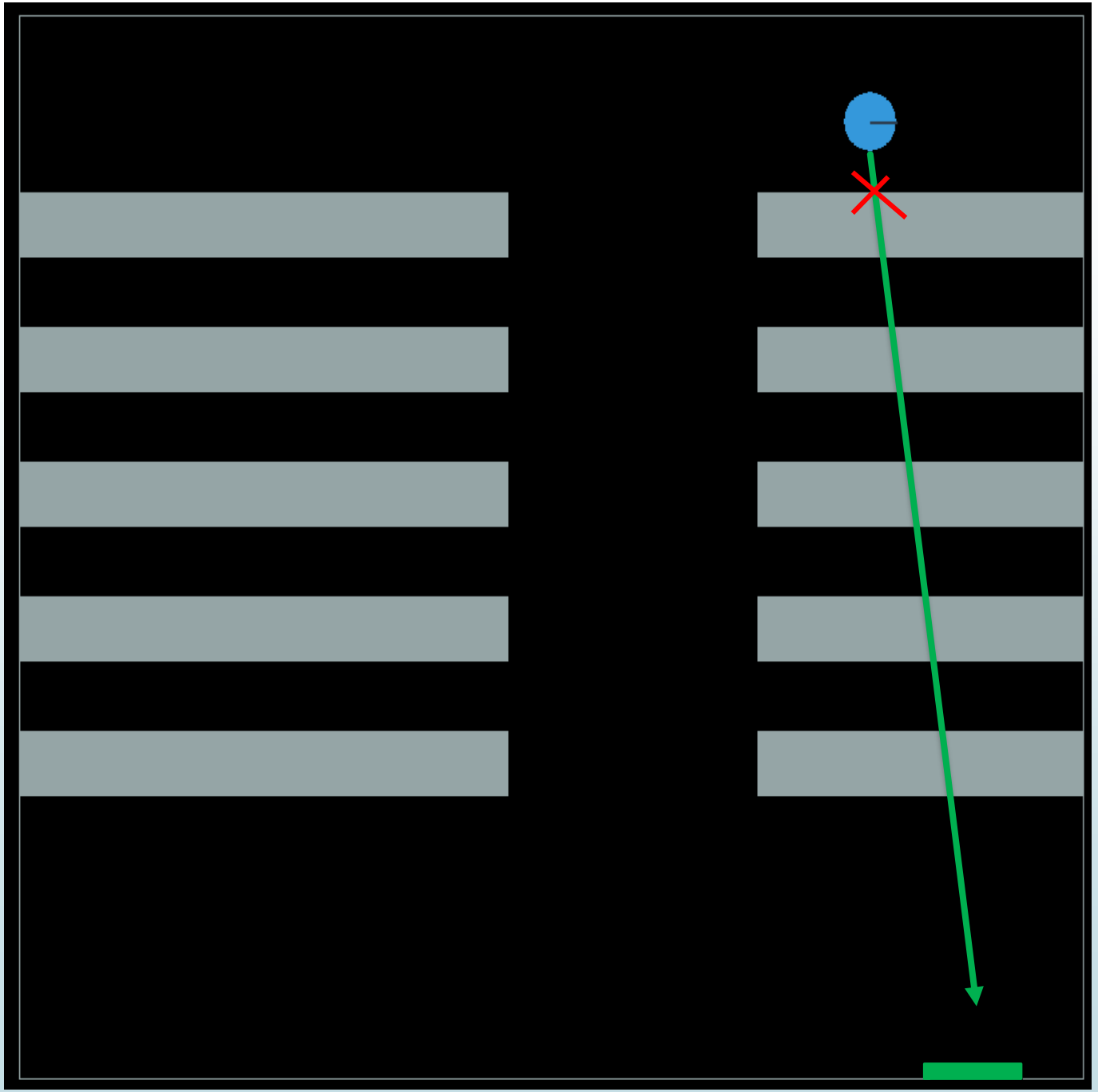


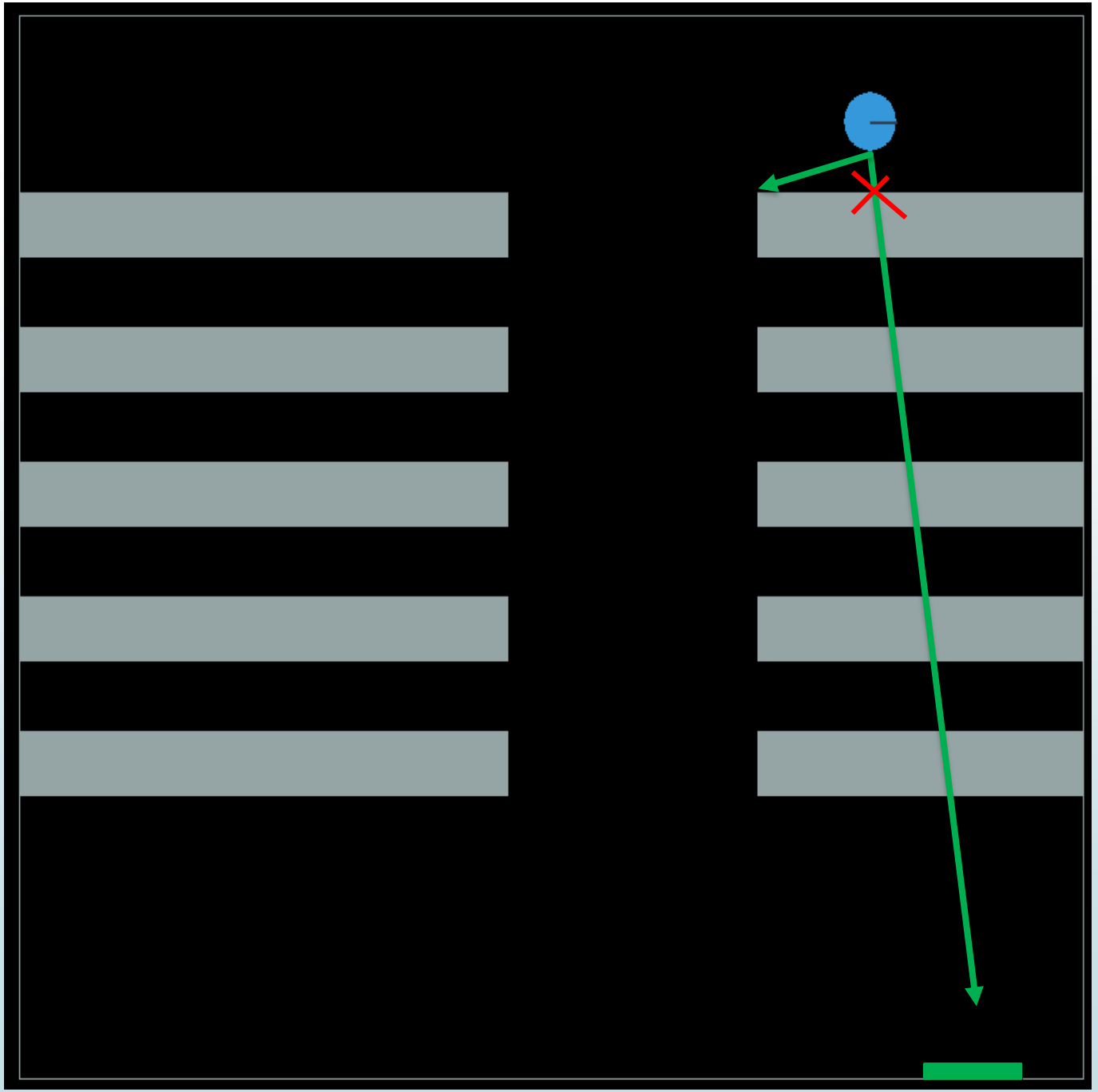




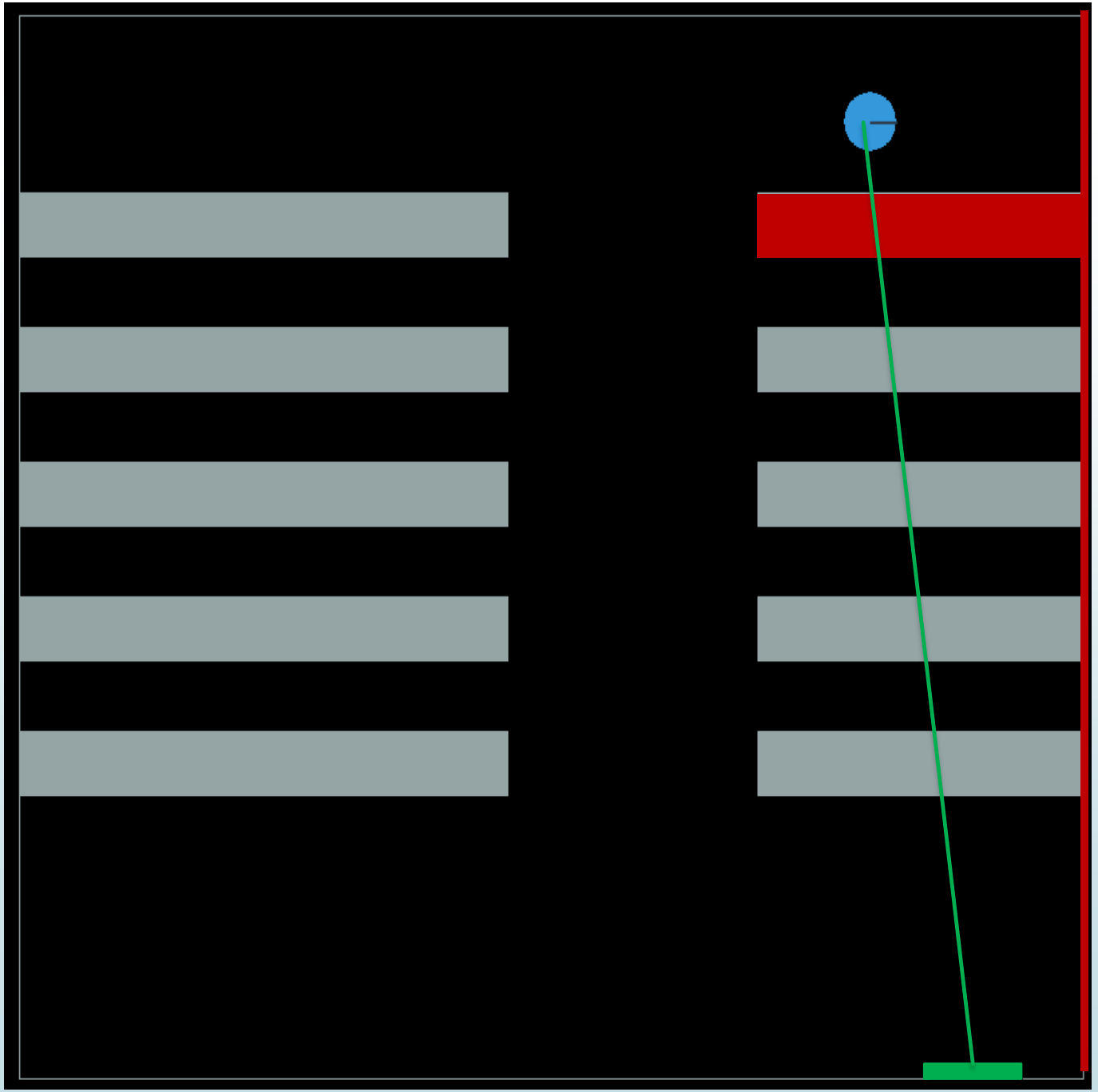


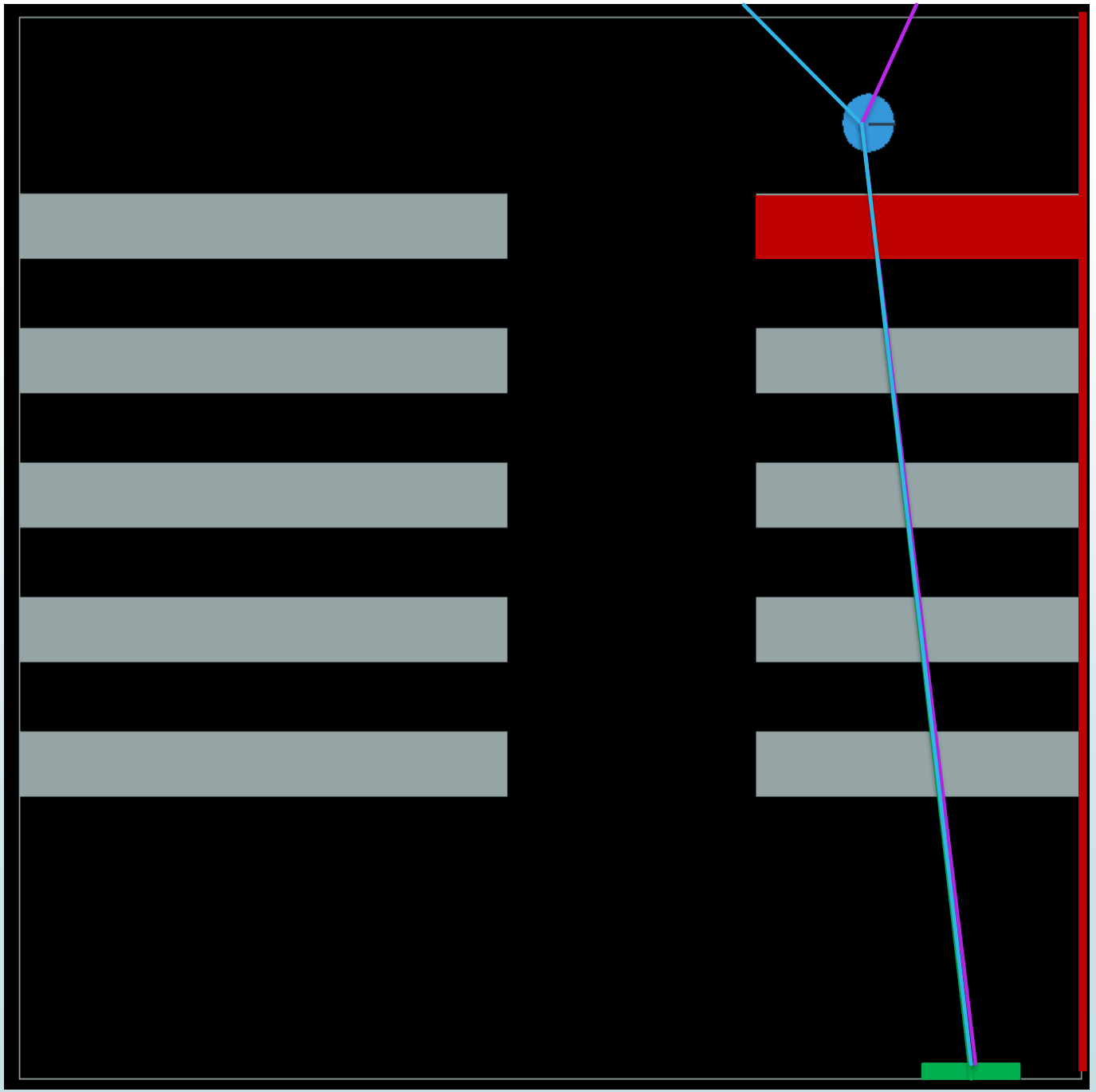
Une seconde approche : le lancer de rayon

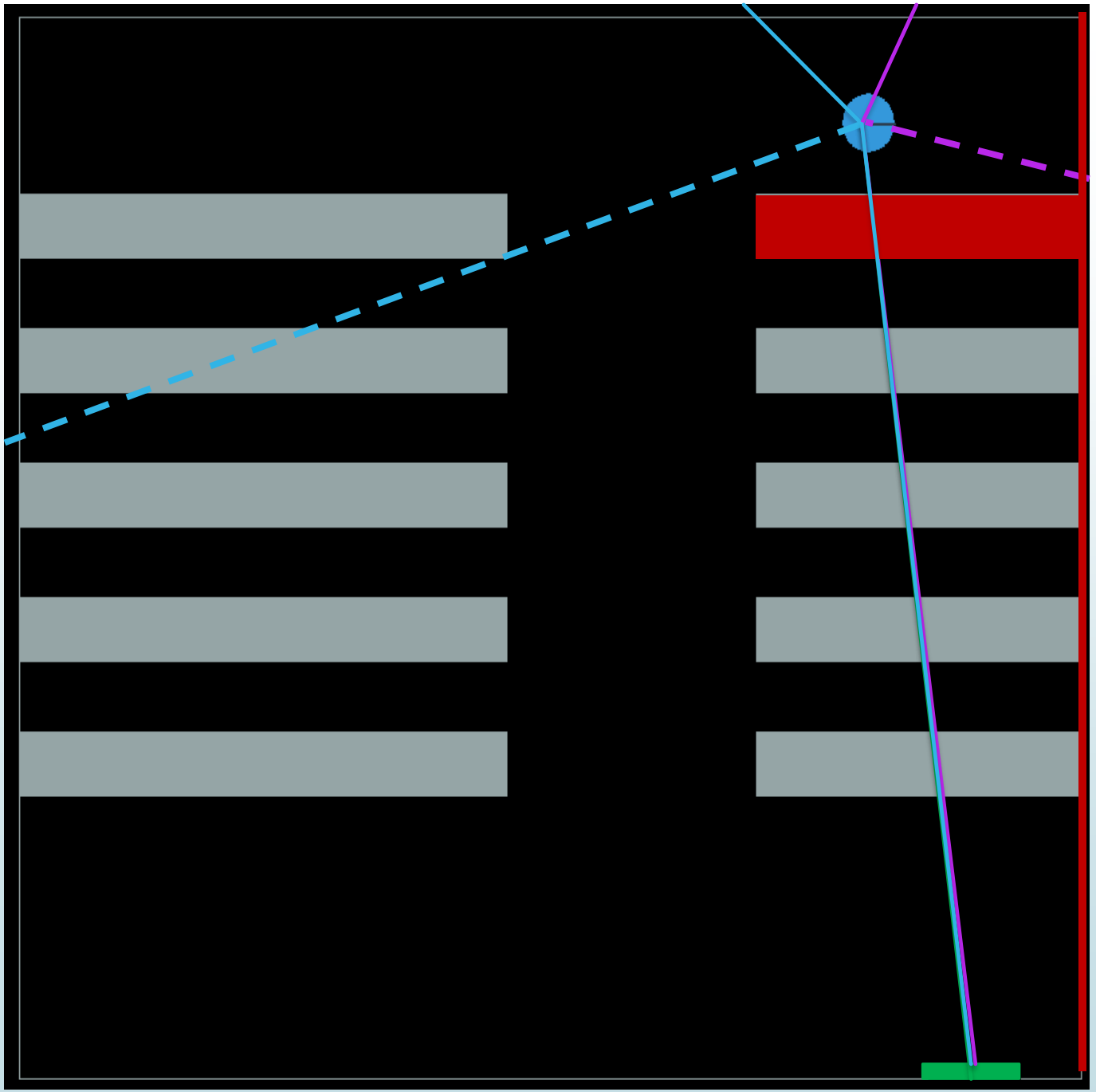


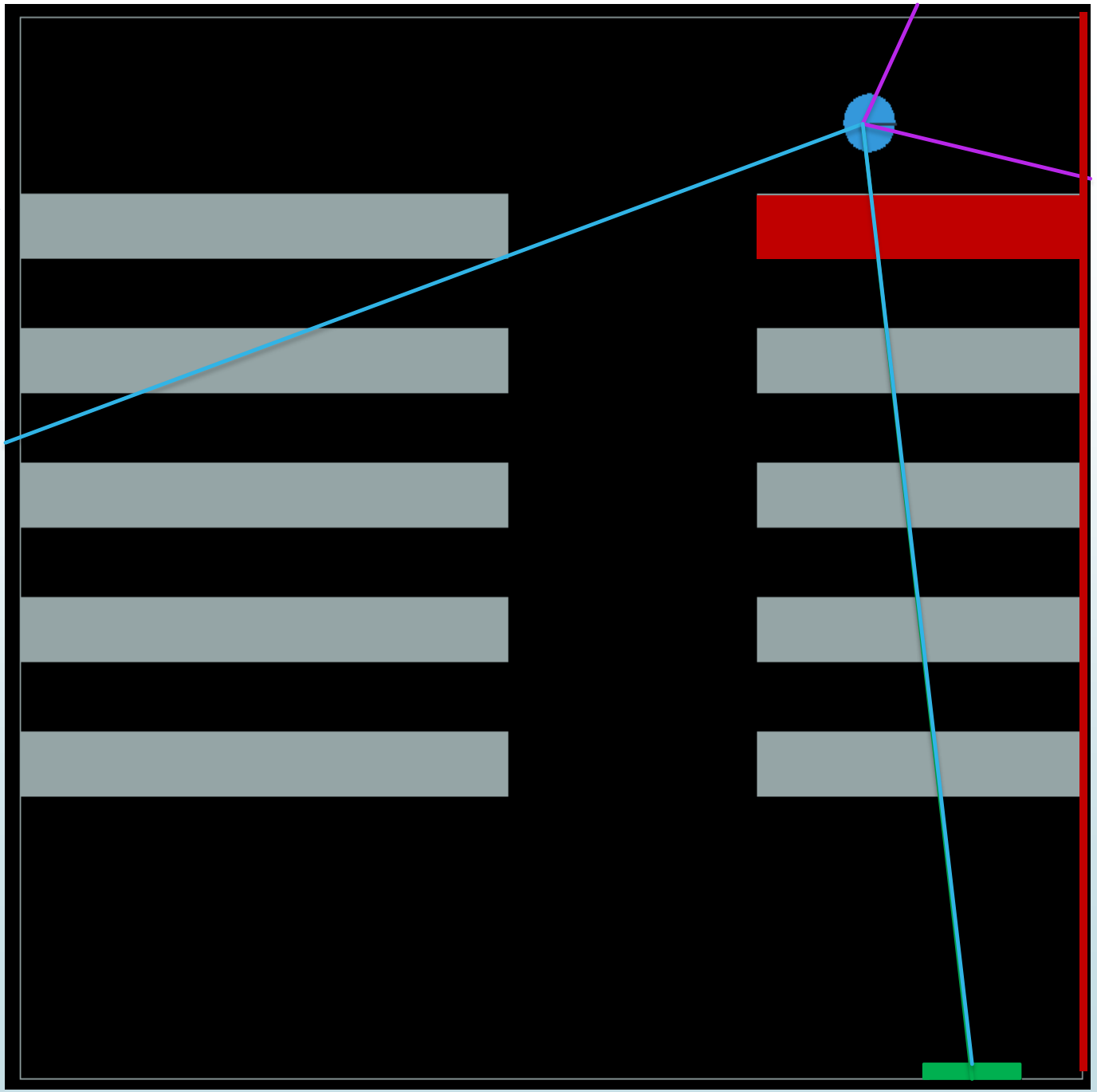


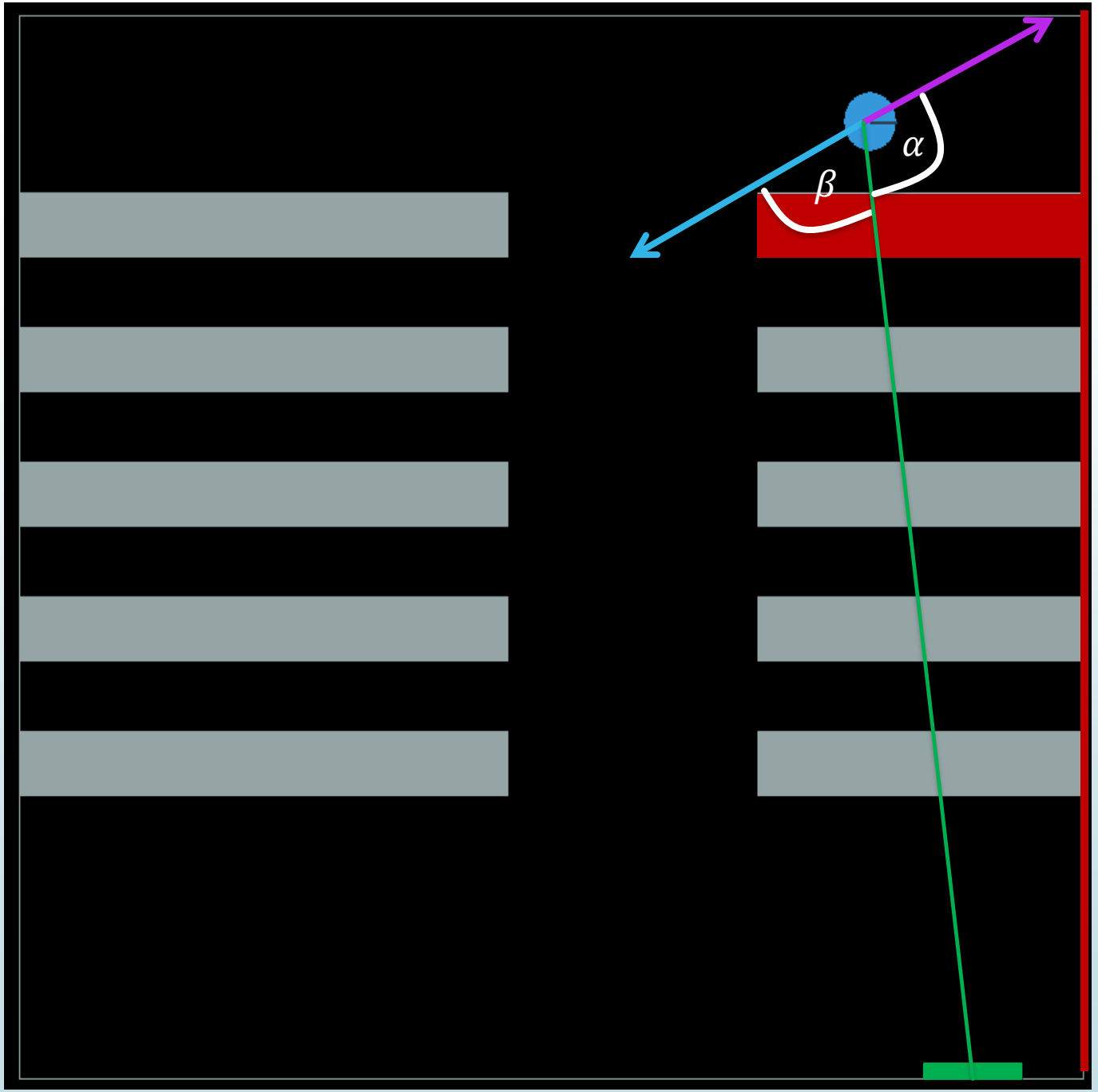
Troisième approche : la dichotomie

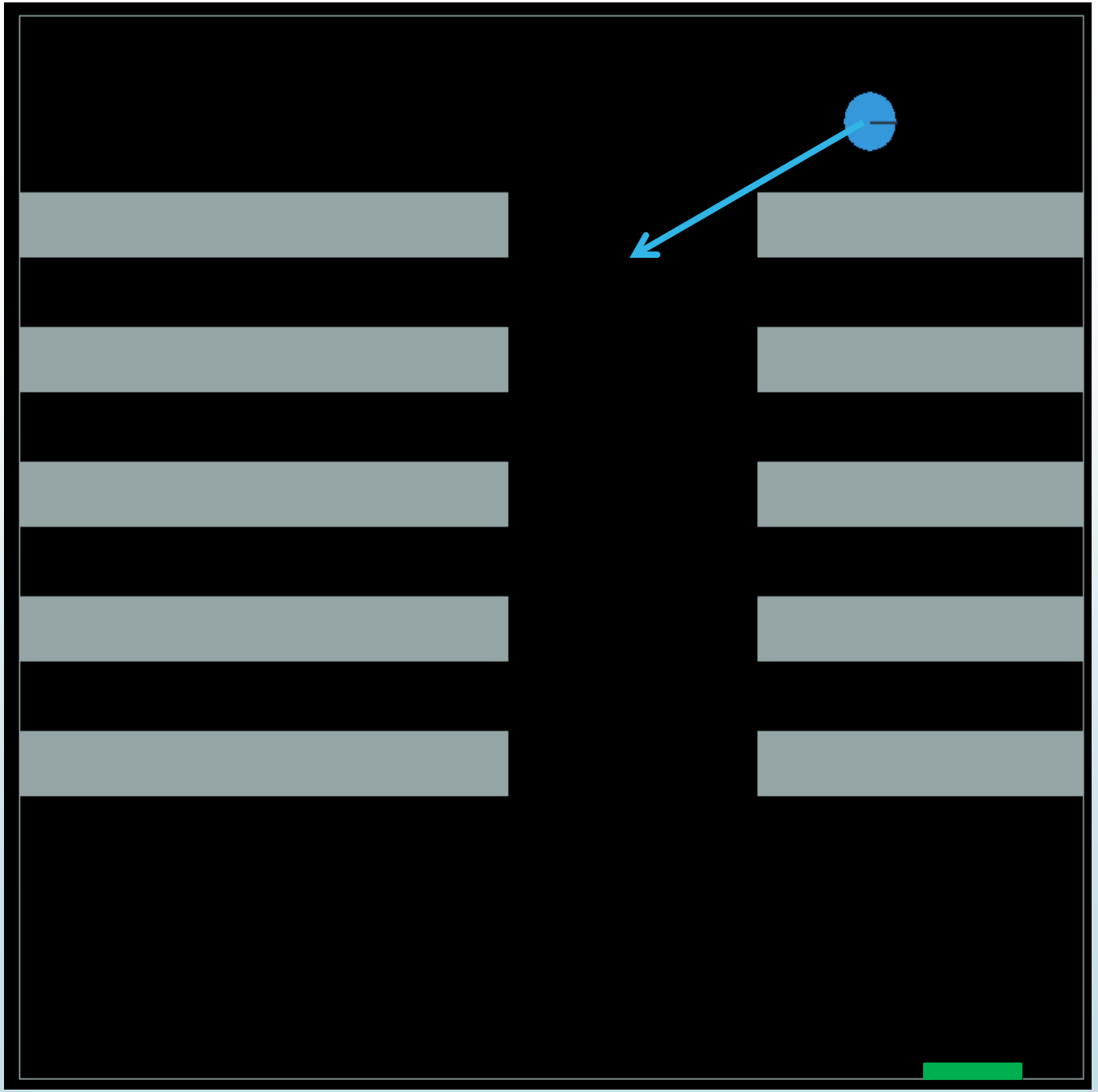




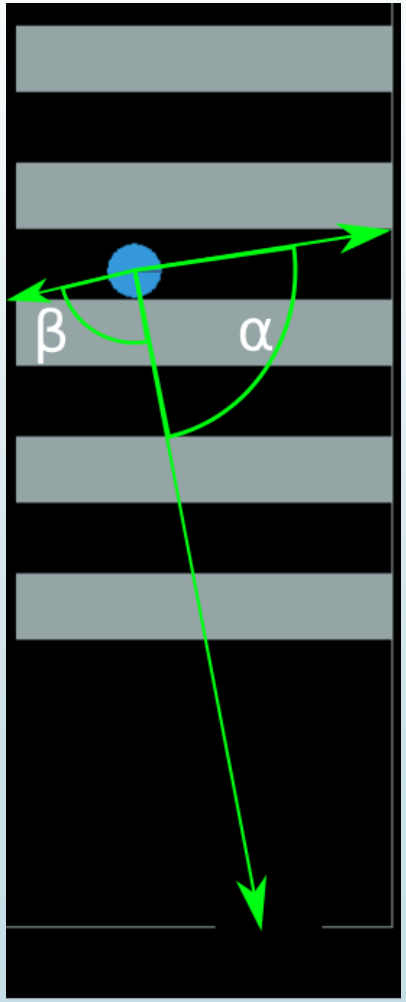





α
β

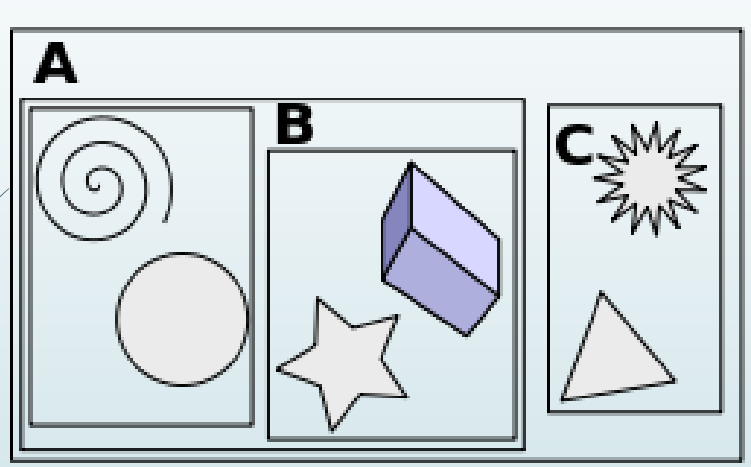


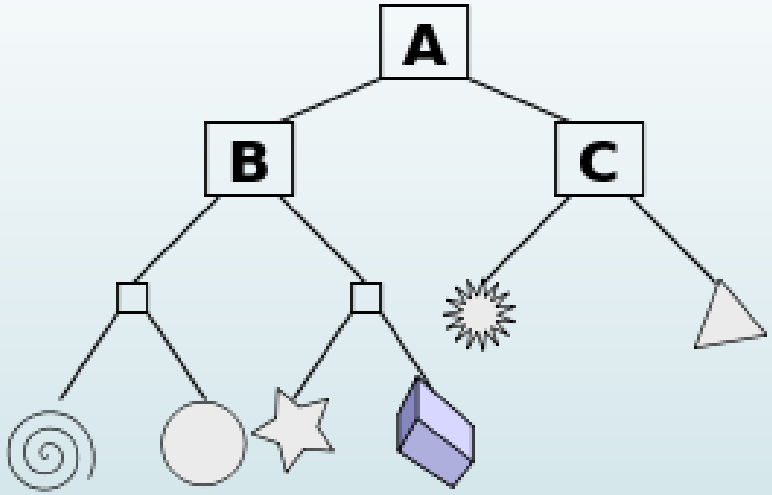
Problème : l'équilibre stable



Hiérarchie des volumes englobant

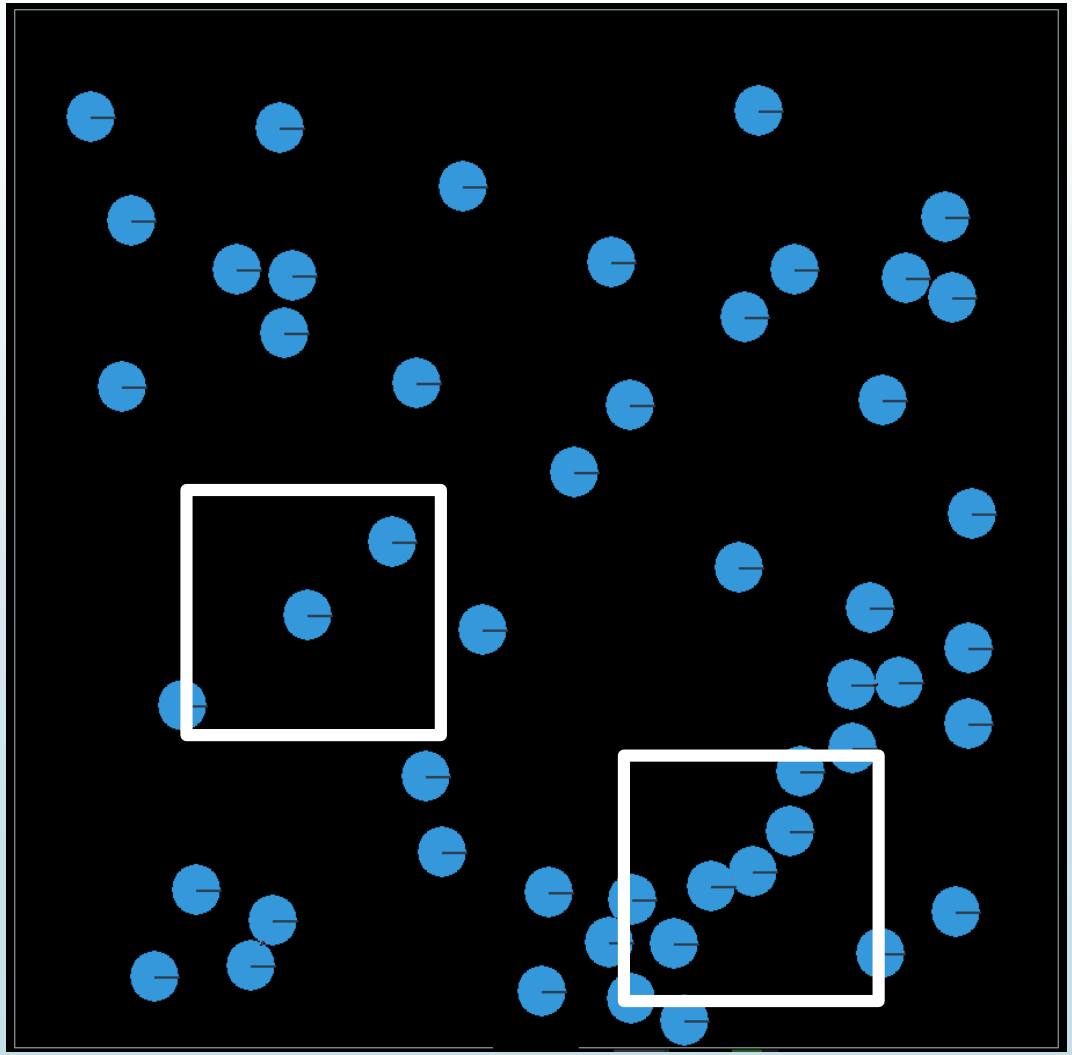
Pour les recherches dans l'espace


A
B
C

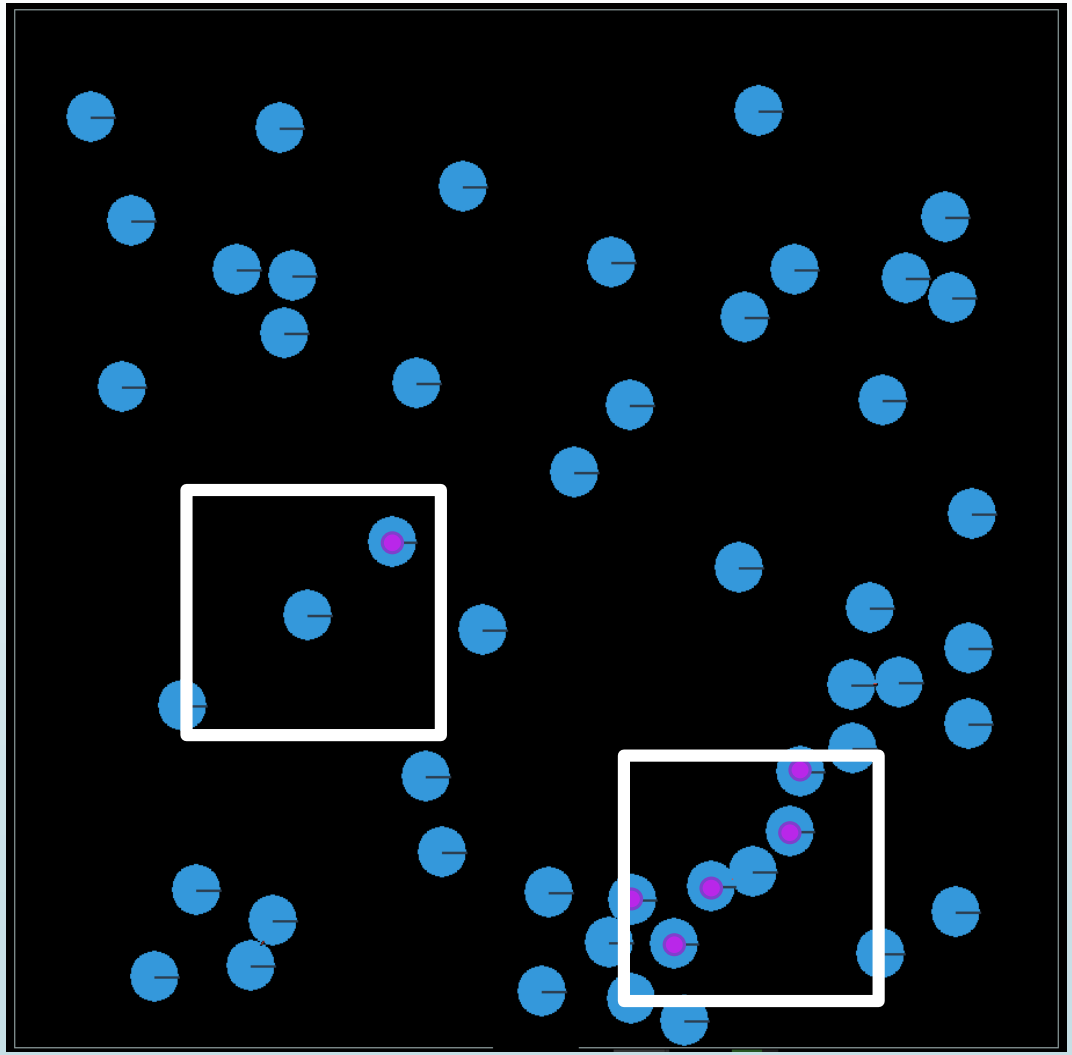

A
B
C

Variation de la vitesse

Influence de la densité



Influence de la densité



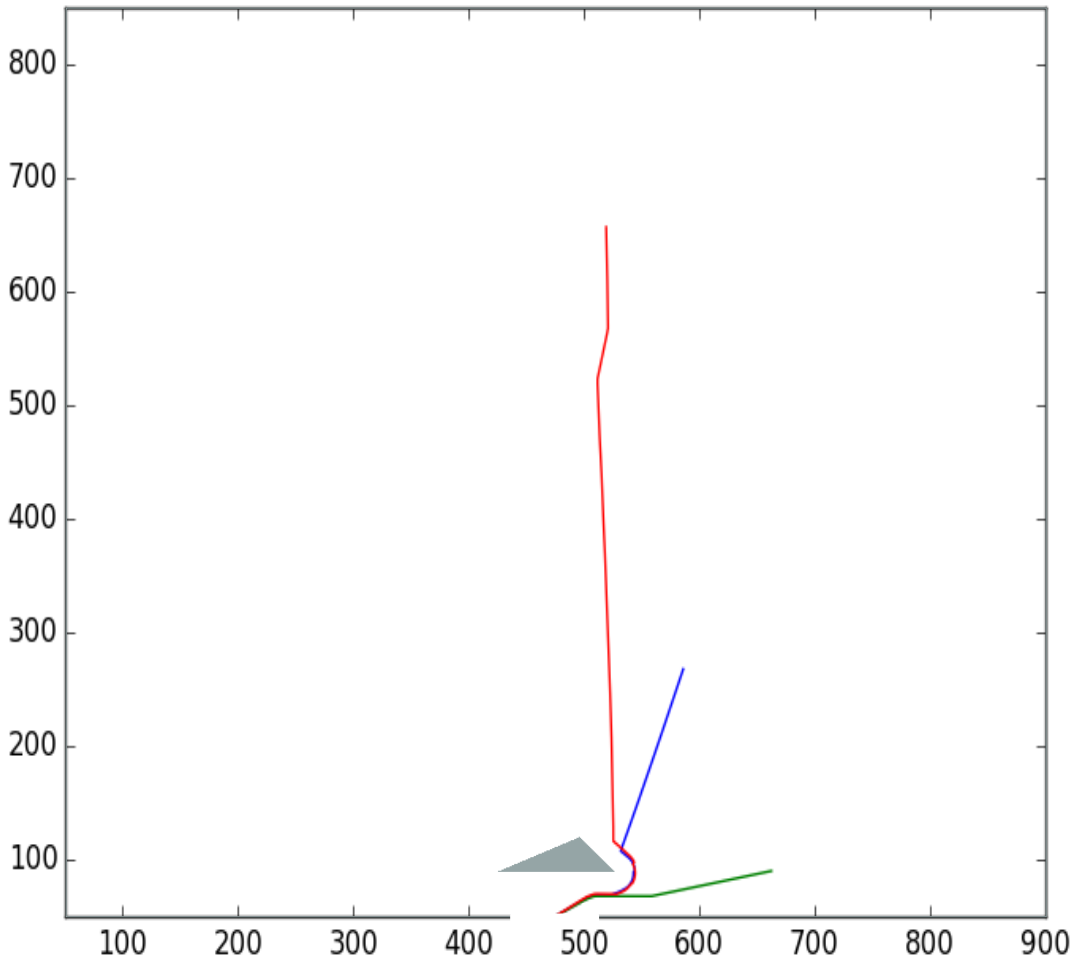
Formule de Togawa :

$$V = 1.3 * min(\{1, d^{-0.8}\})$$

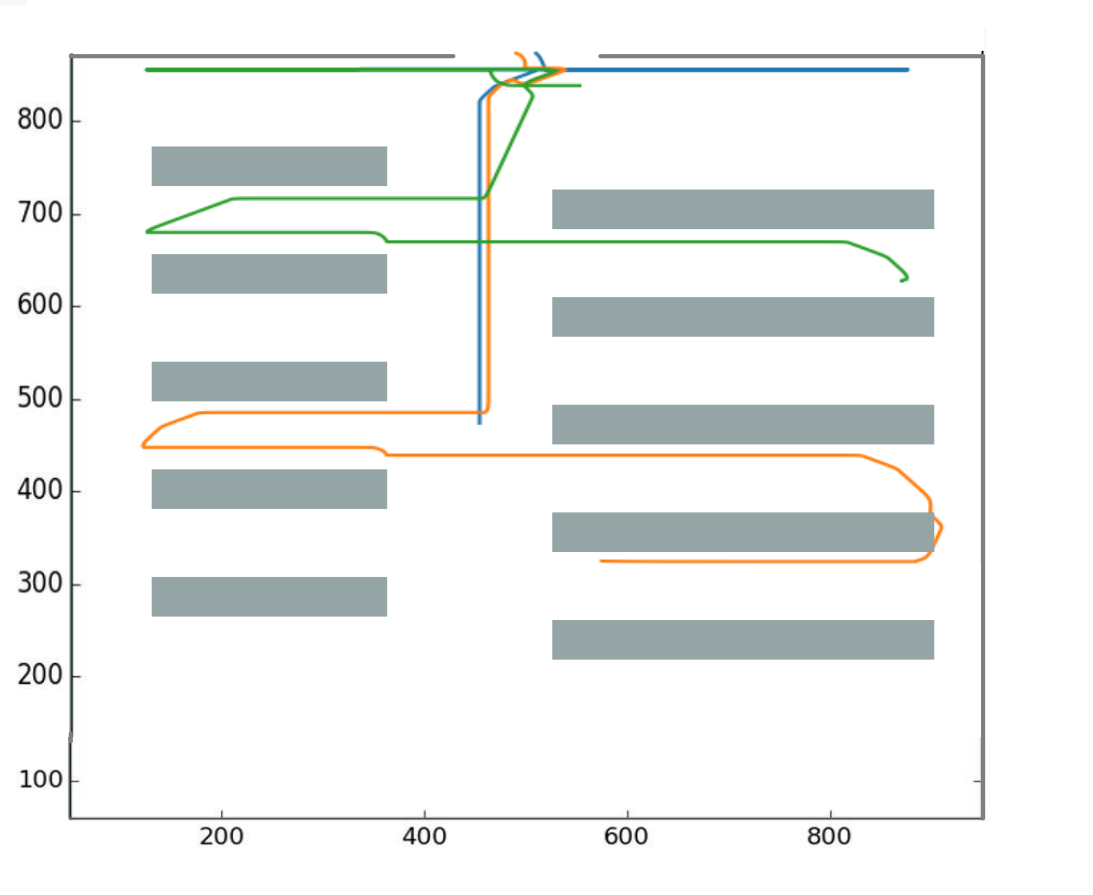
Les résultats

Le comportement des agents

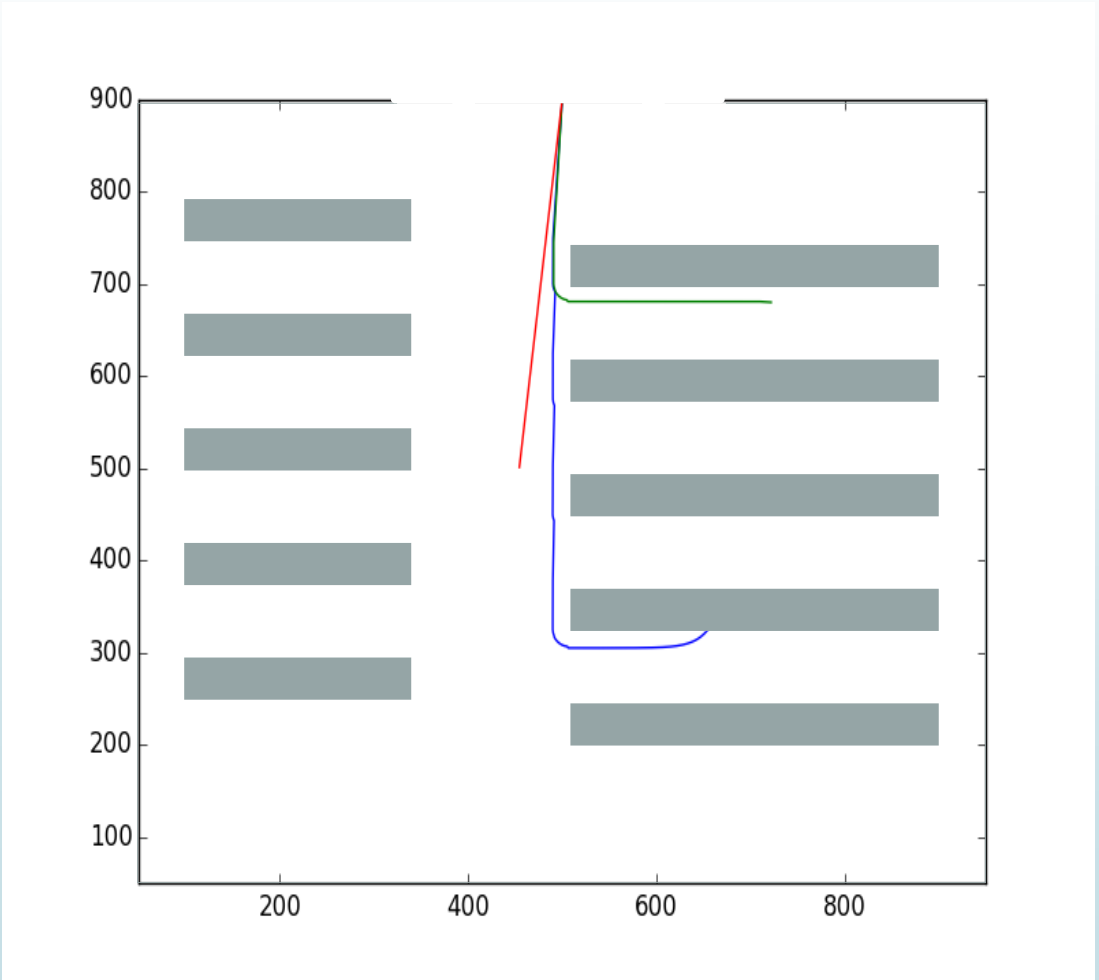
Contournement d’un obstacle



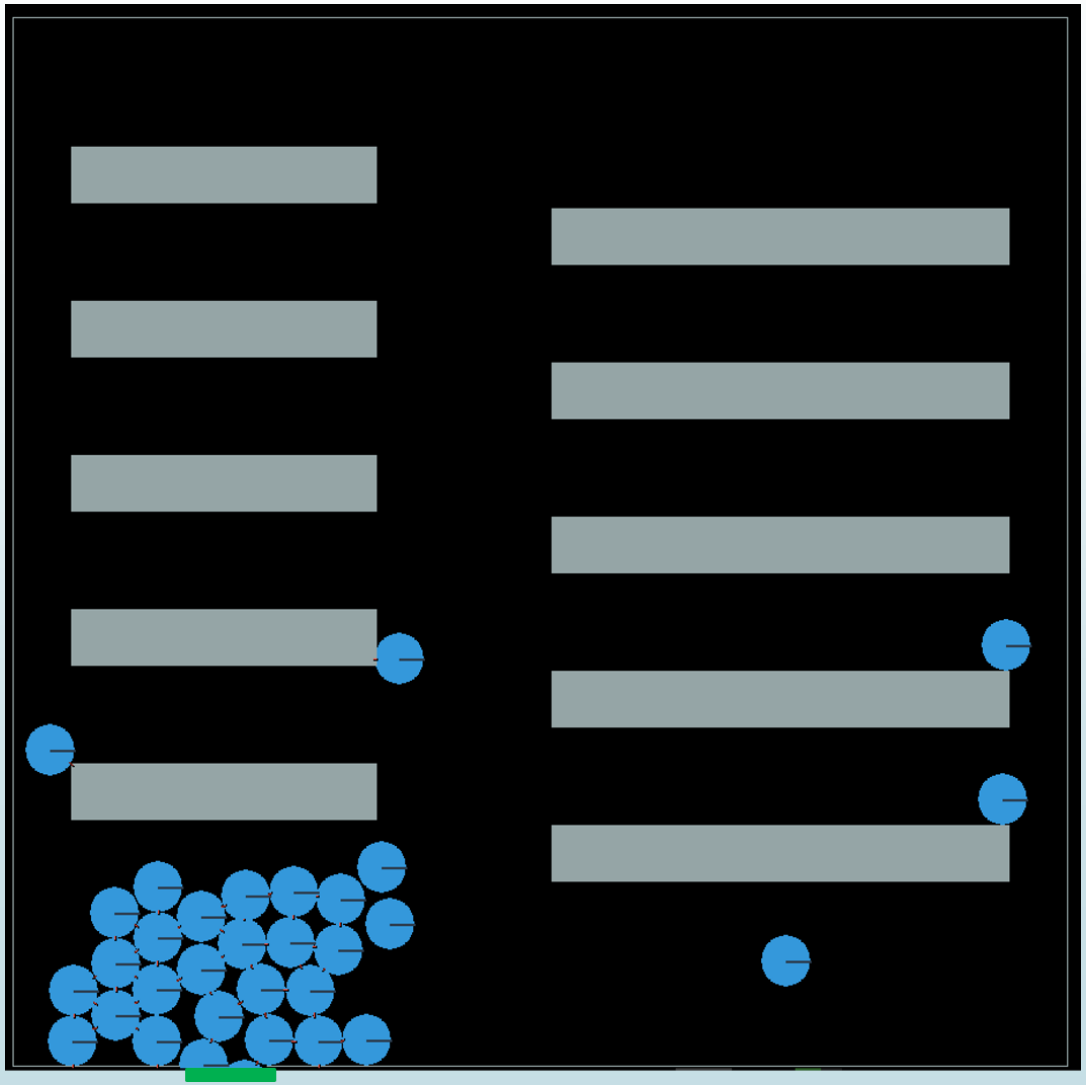
comportement avec le test de proximité



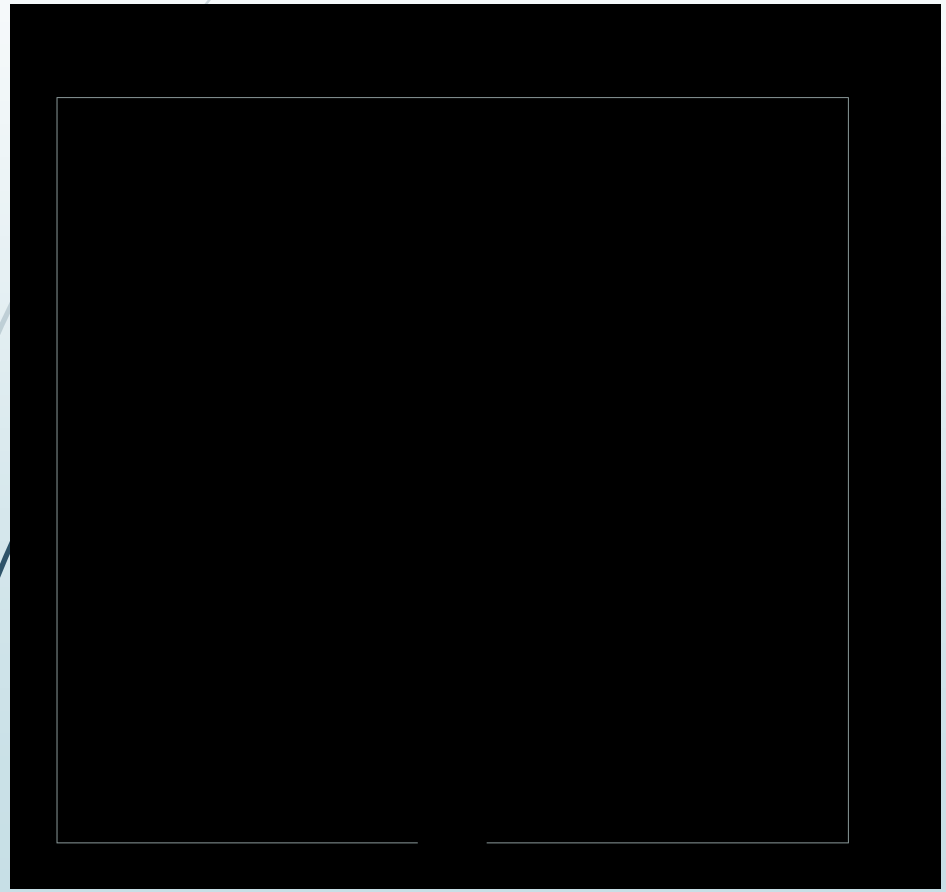
Comportement des agents avec la dichotomie

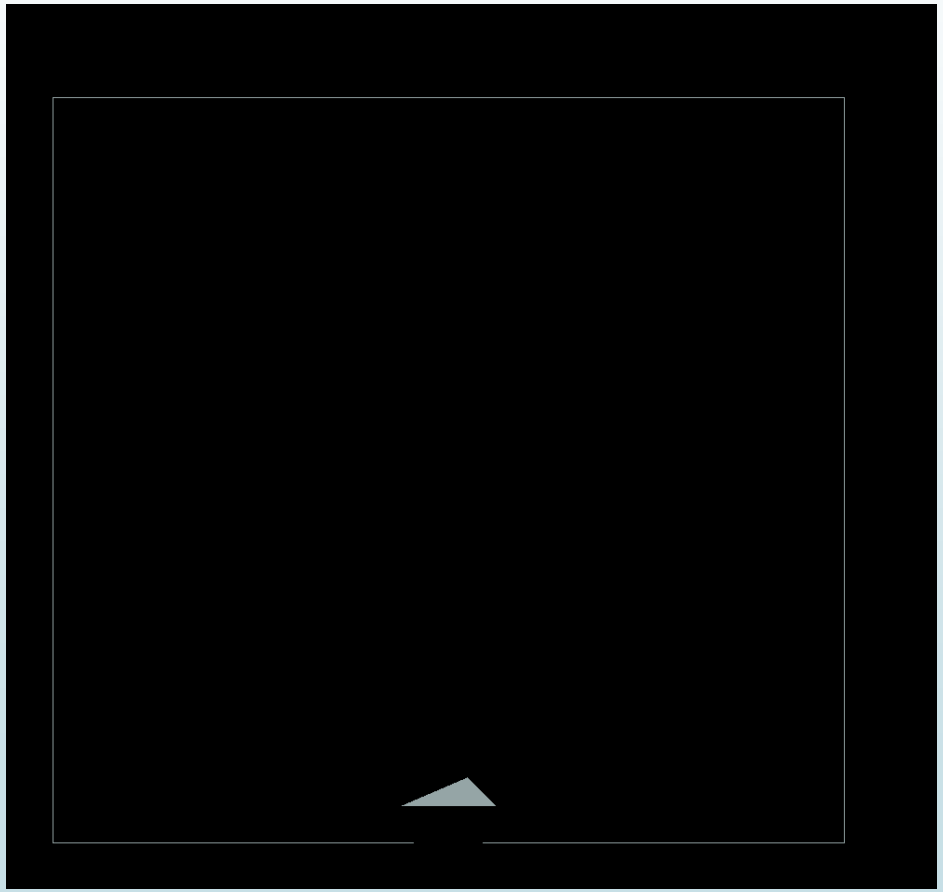


Phénomènes d'engorgement

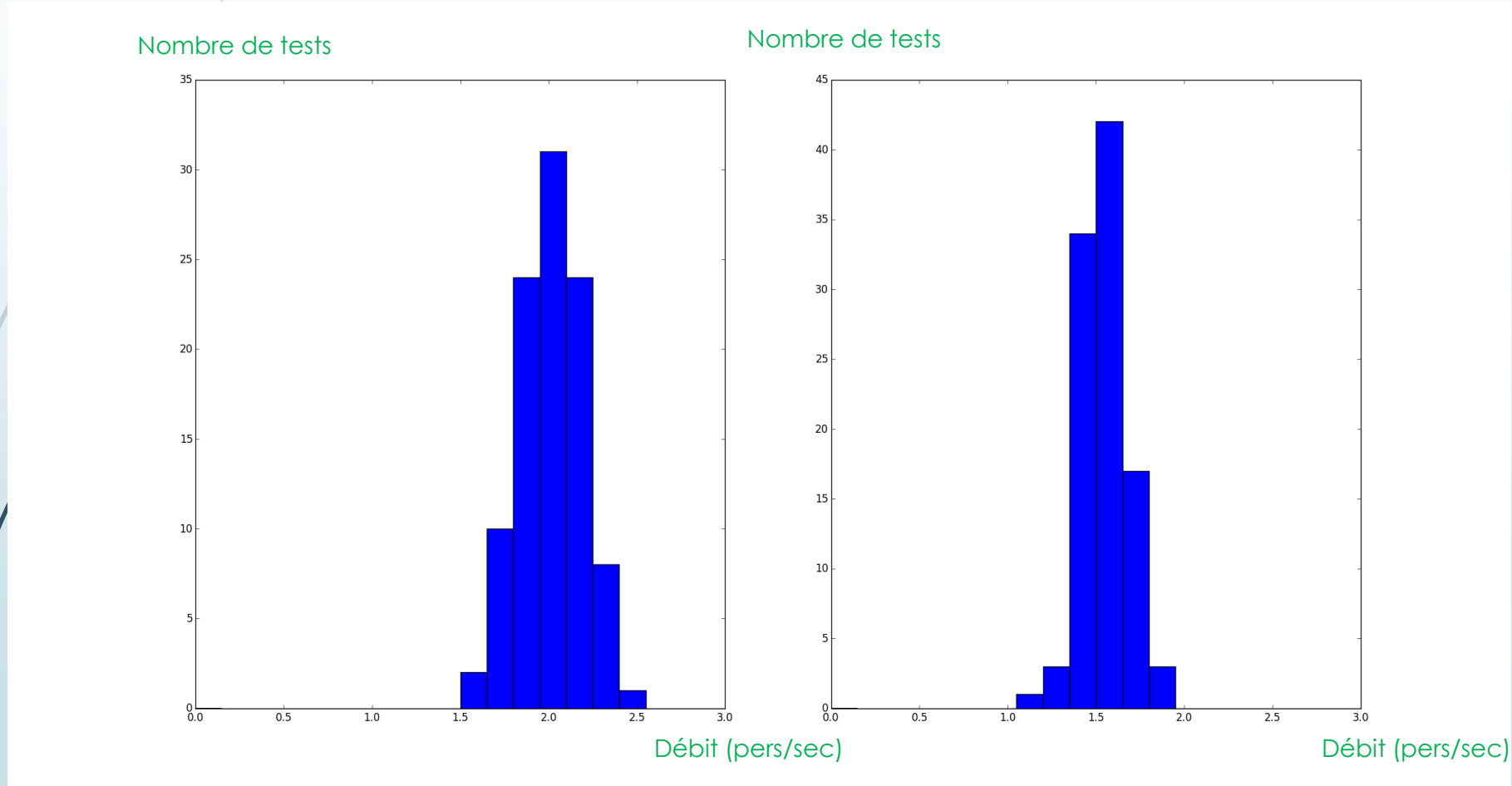


Rôle de l'obstacle devant la porte





Rôle de l'obstacle devant la porte

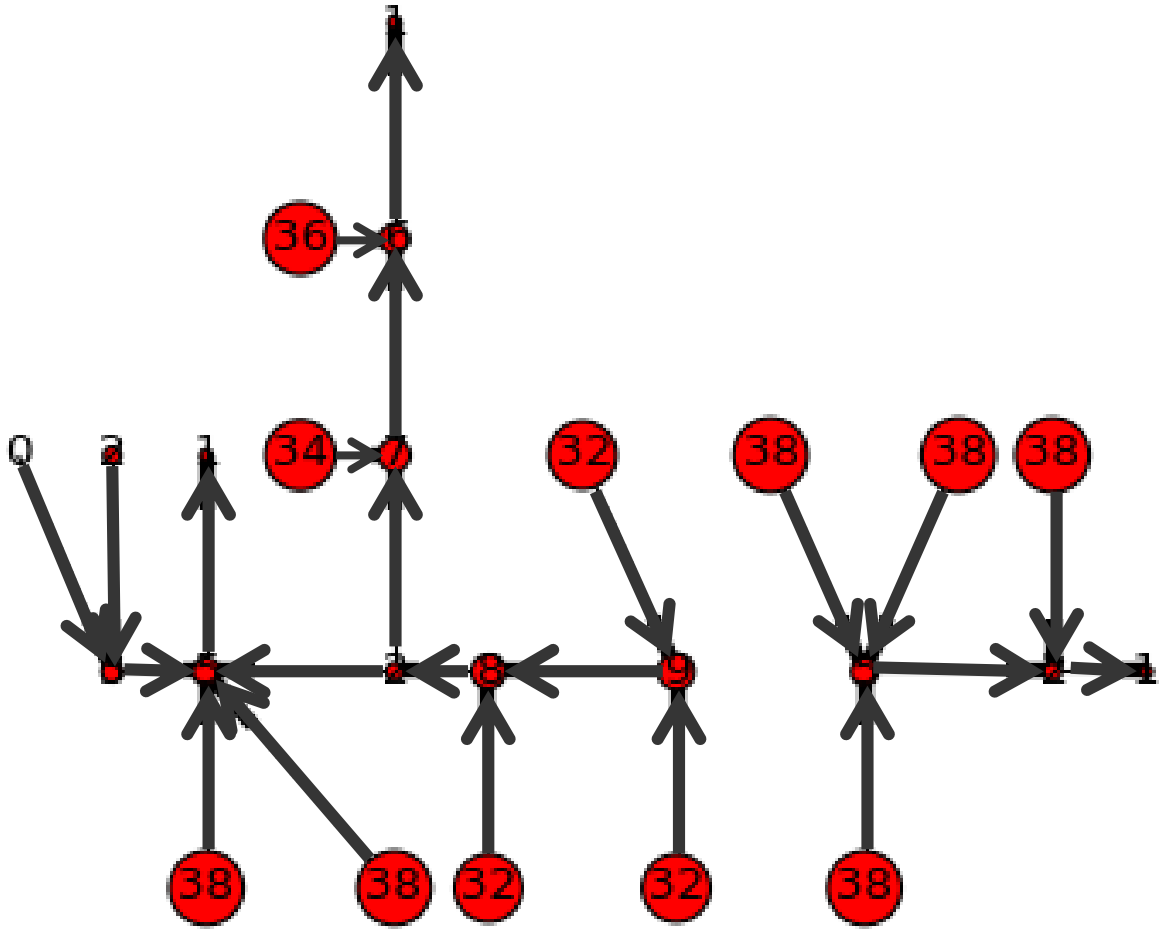


Sans obstacle

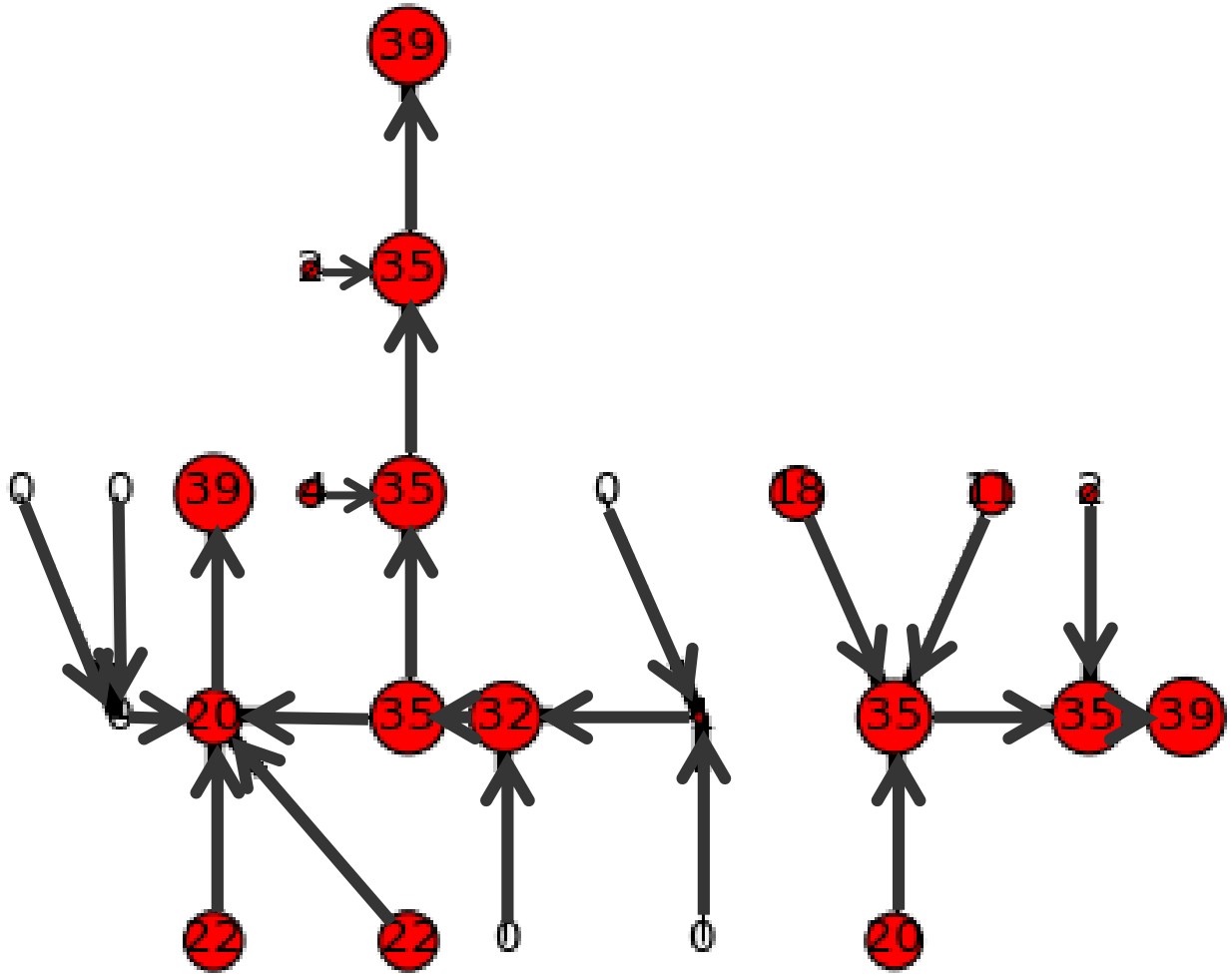
avec obstacle

Simulation globale (qq mots)

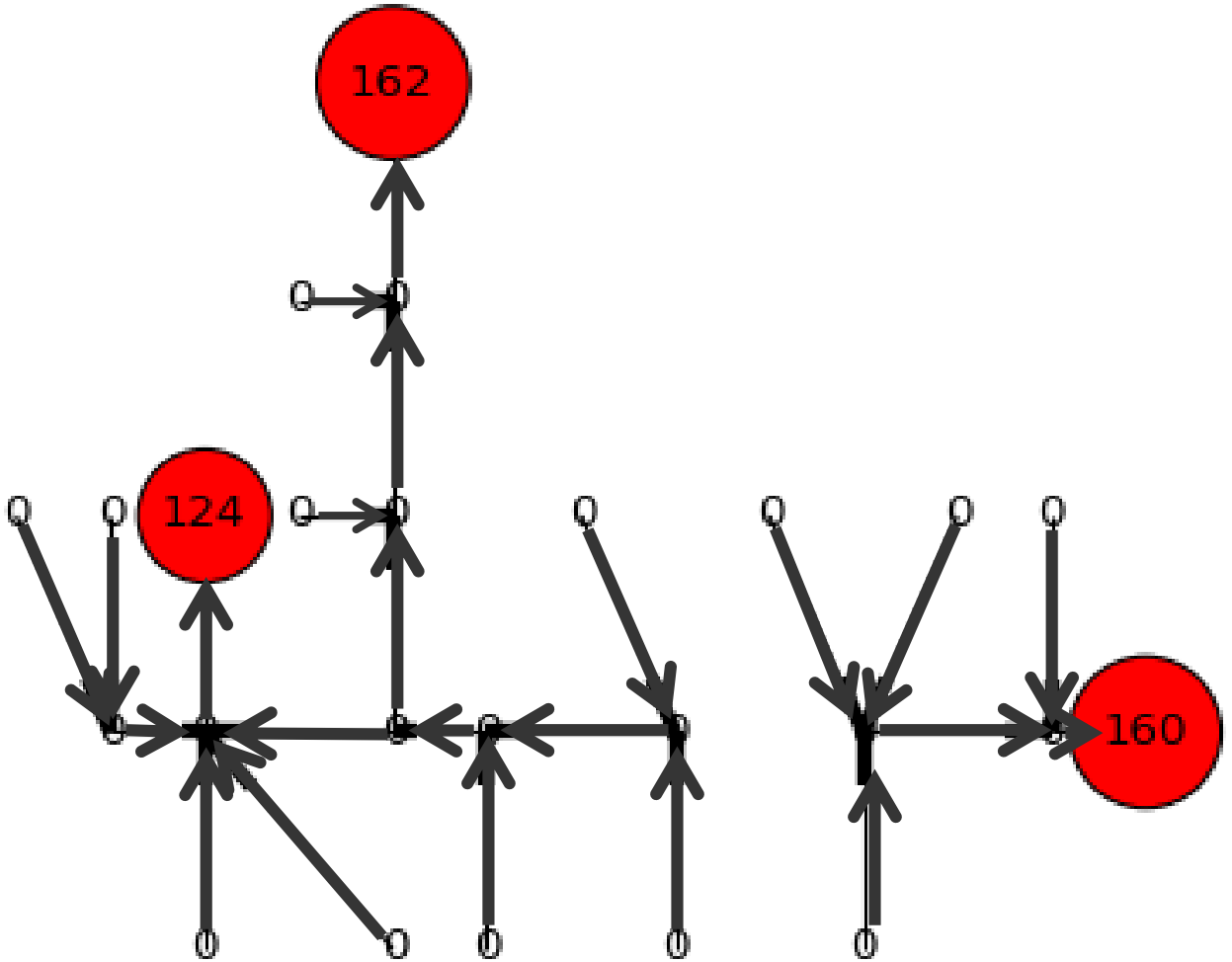
Etat initial



Etat intermédiaire



Etat final



Couplage, conclusion