



Détermination d'un plan d'évacuation incendie.



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



Paramètres significatifs négligés

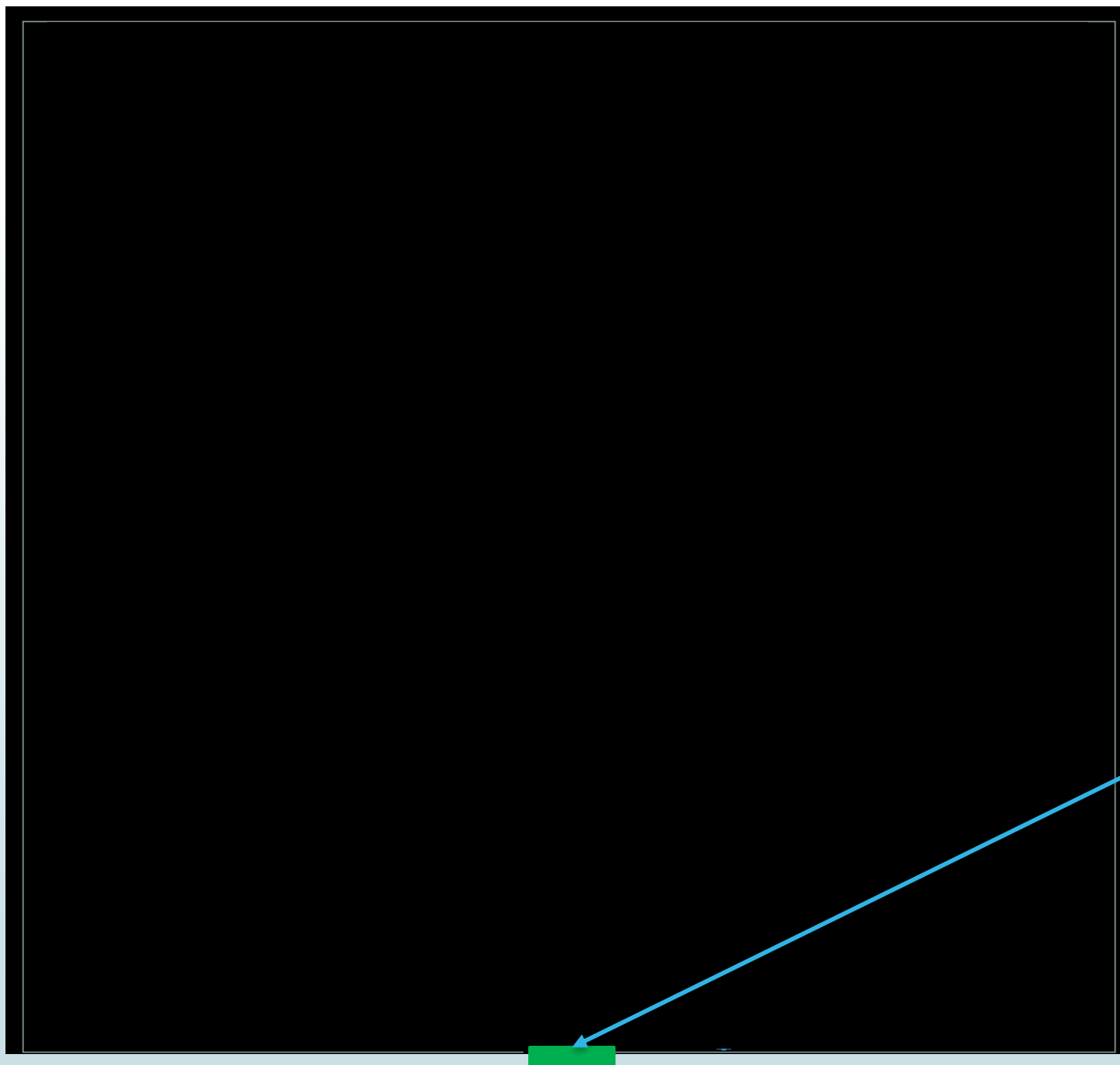
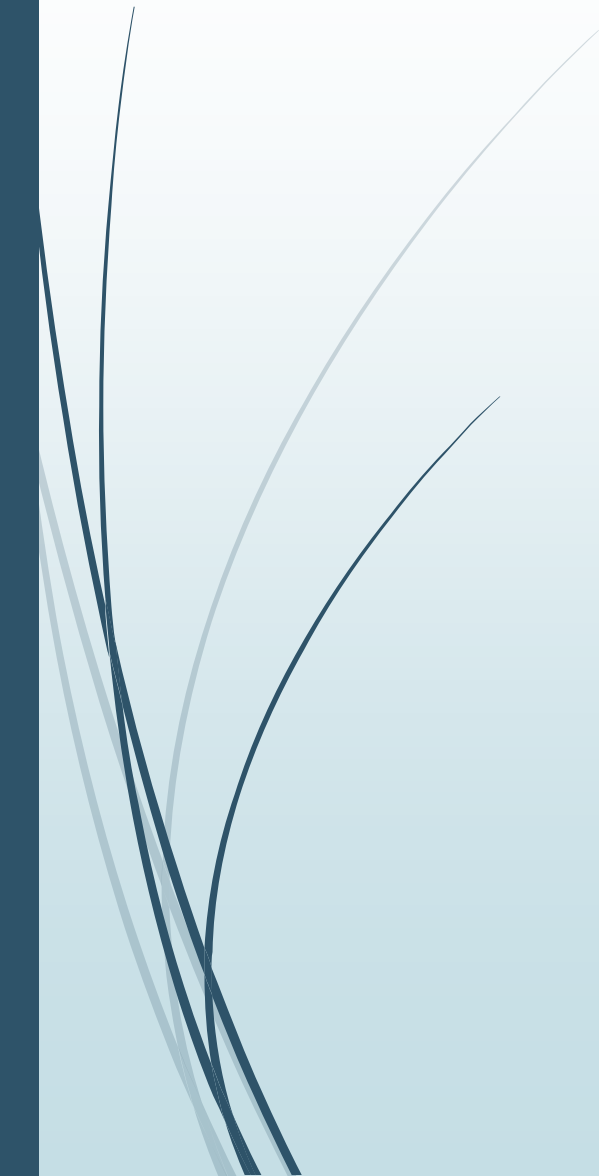
- Panique
- Instinct grégaire, initiatives personnelles
- Congestion
- les personnes sont représentés par des cercles, et non des ellipses

Utilisation d'un moteur physique



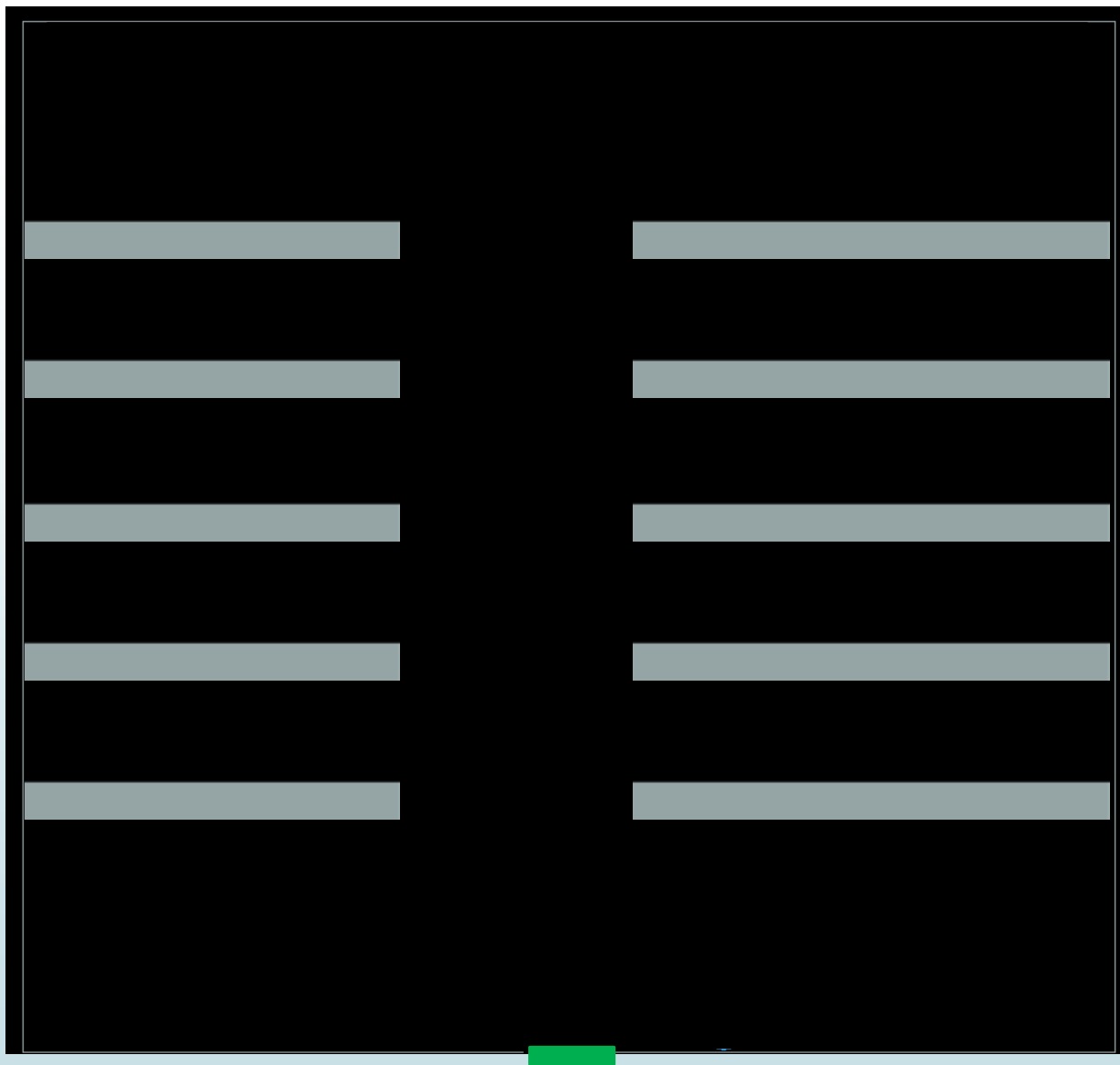
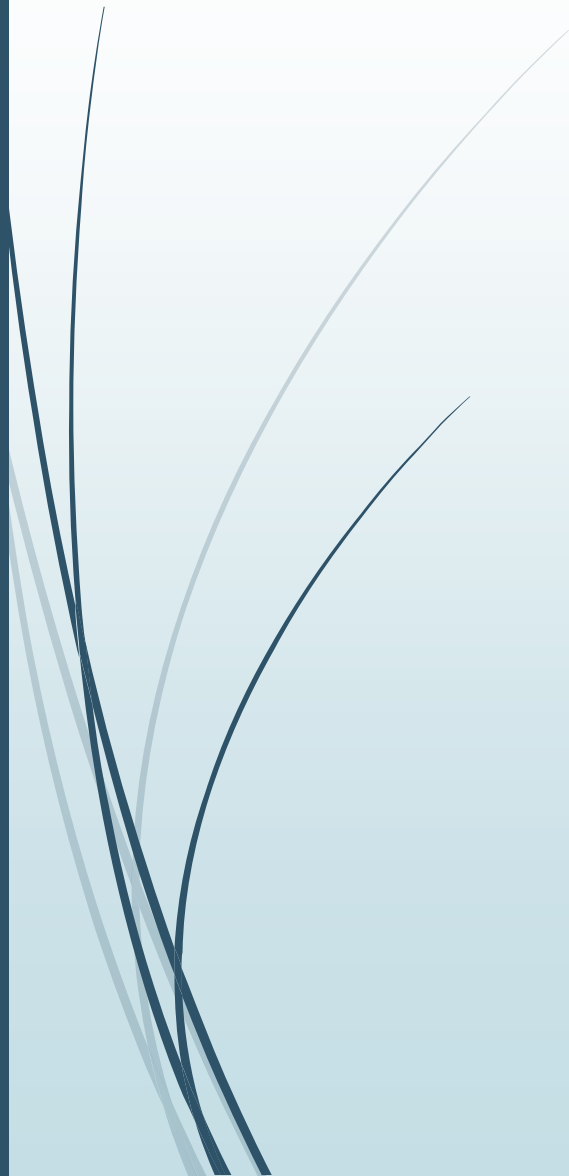


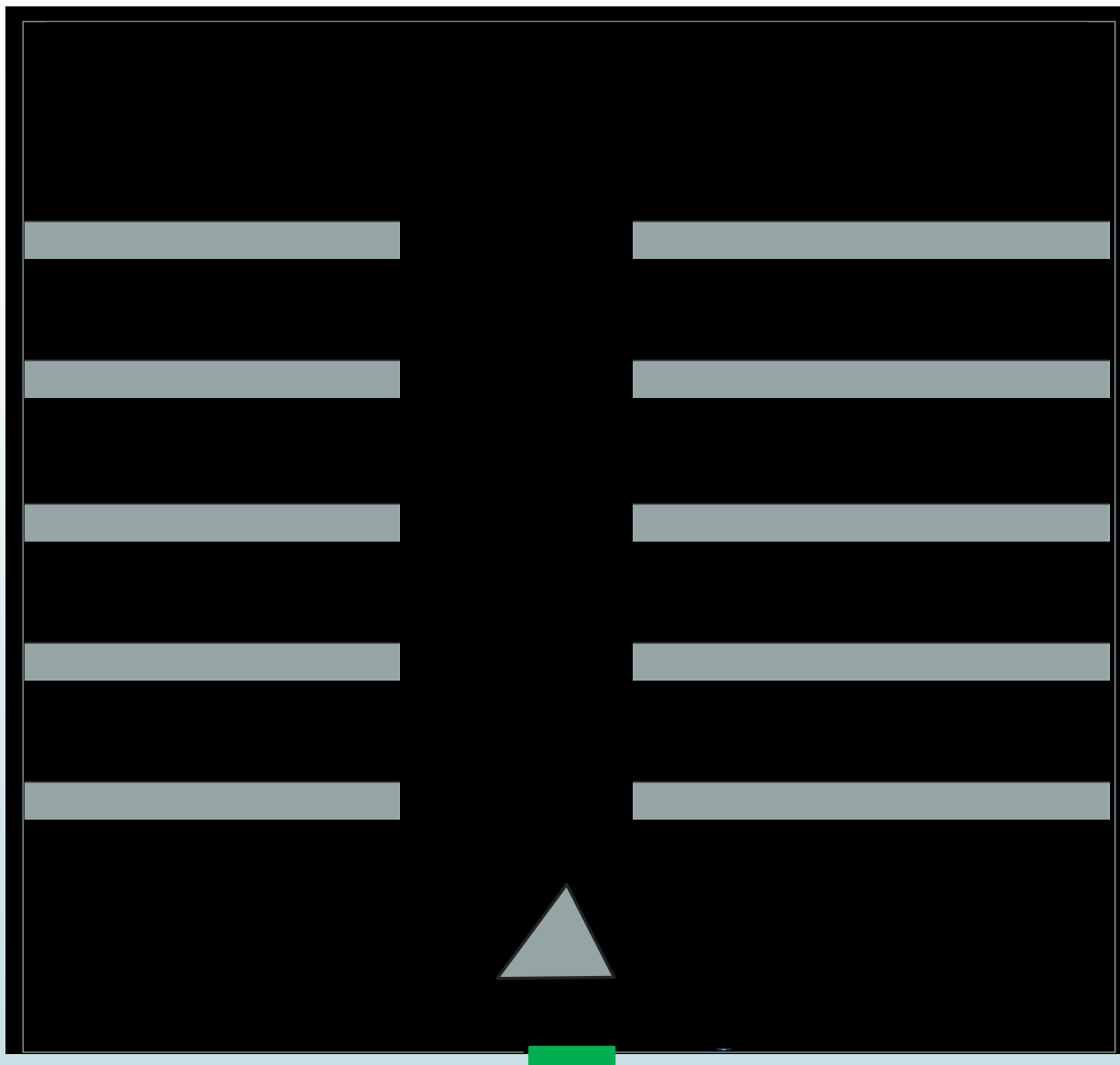
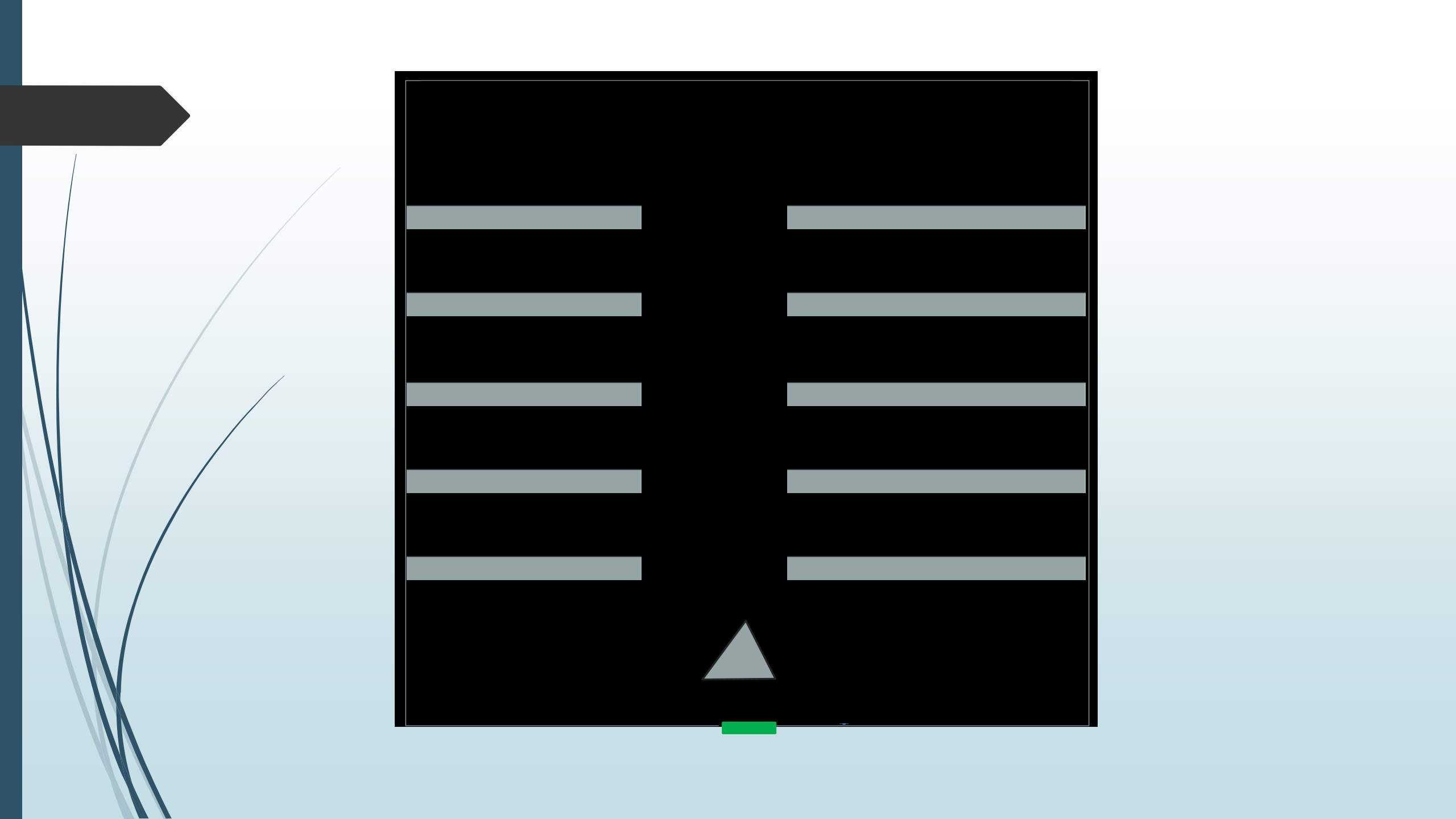
Construction d'une salle

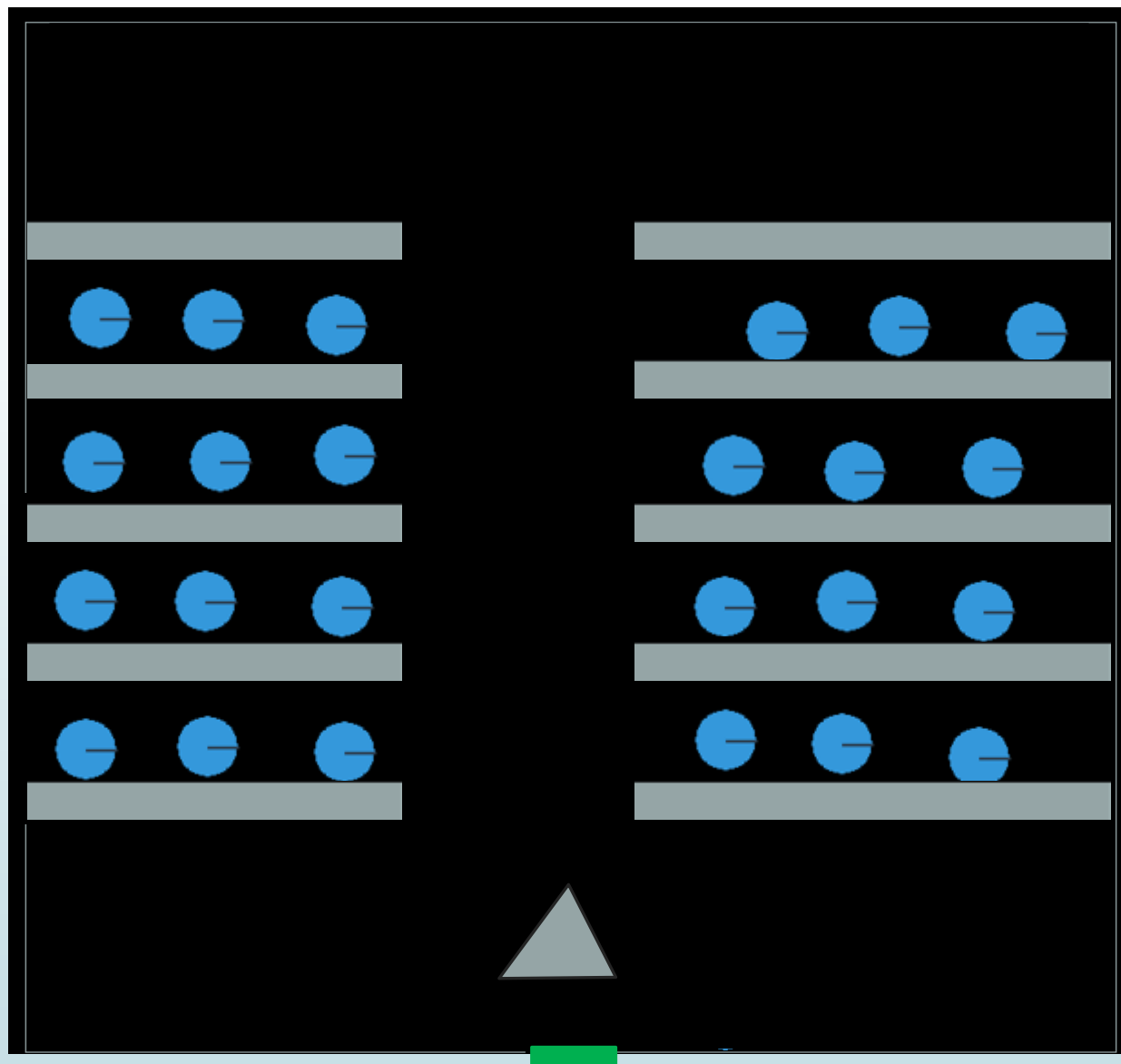
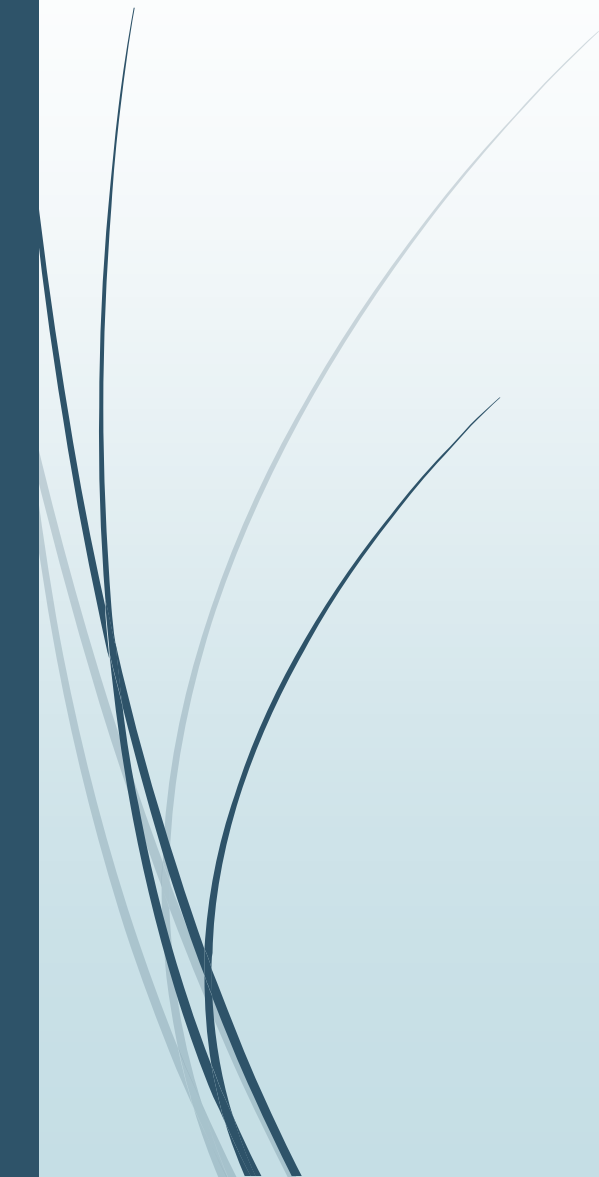


Sortie







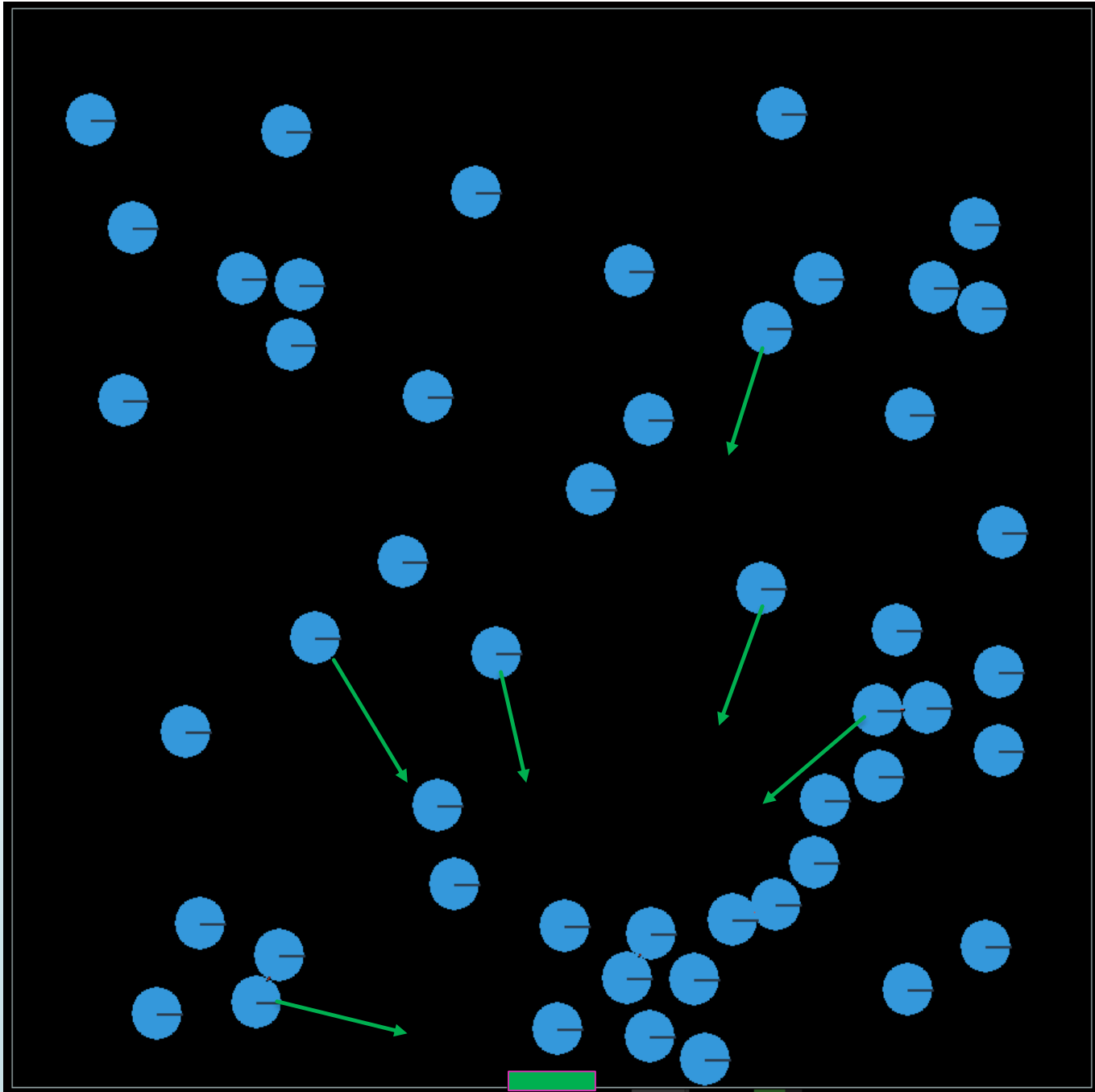
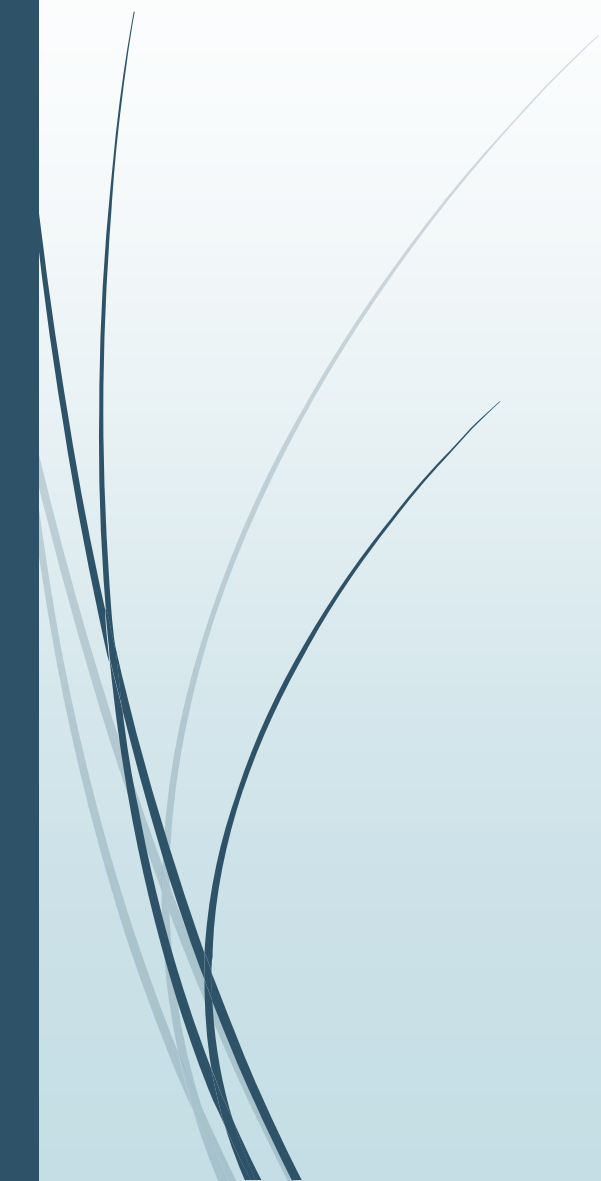




Déplacer les personnes

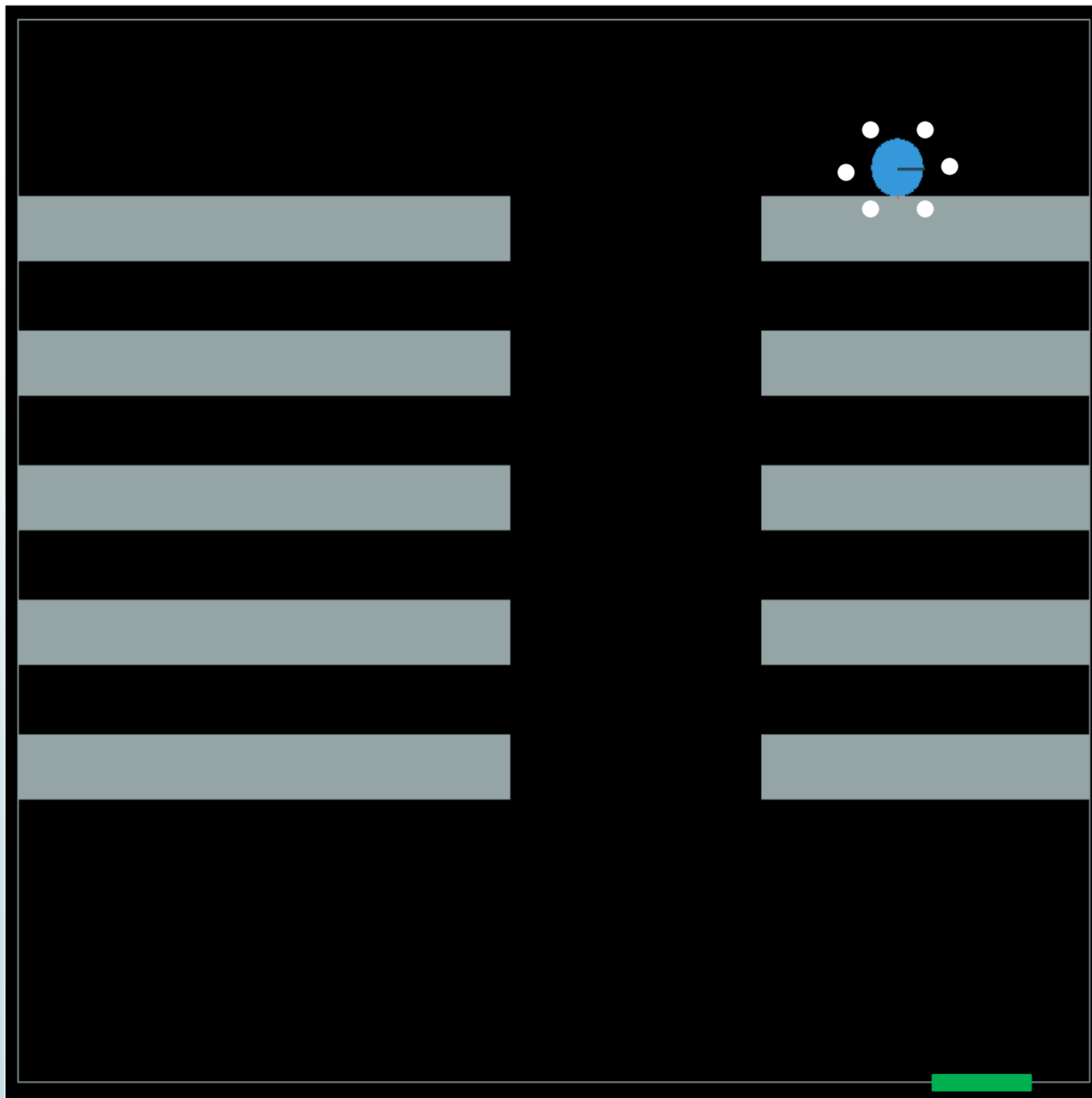
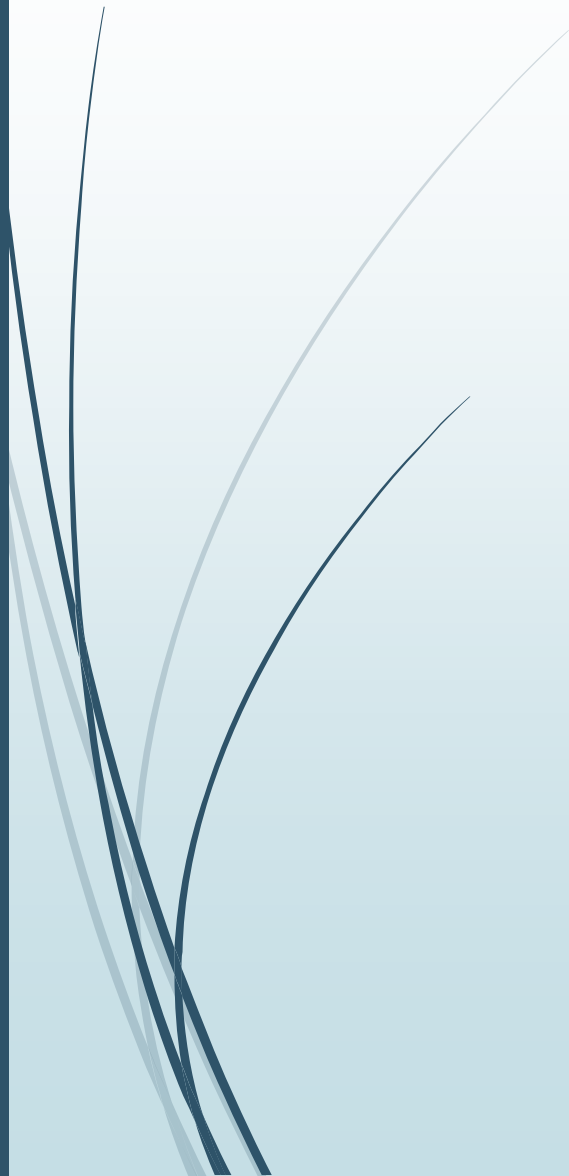


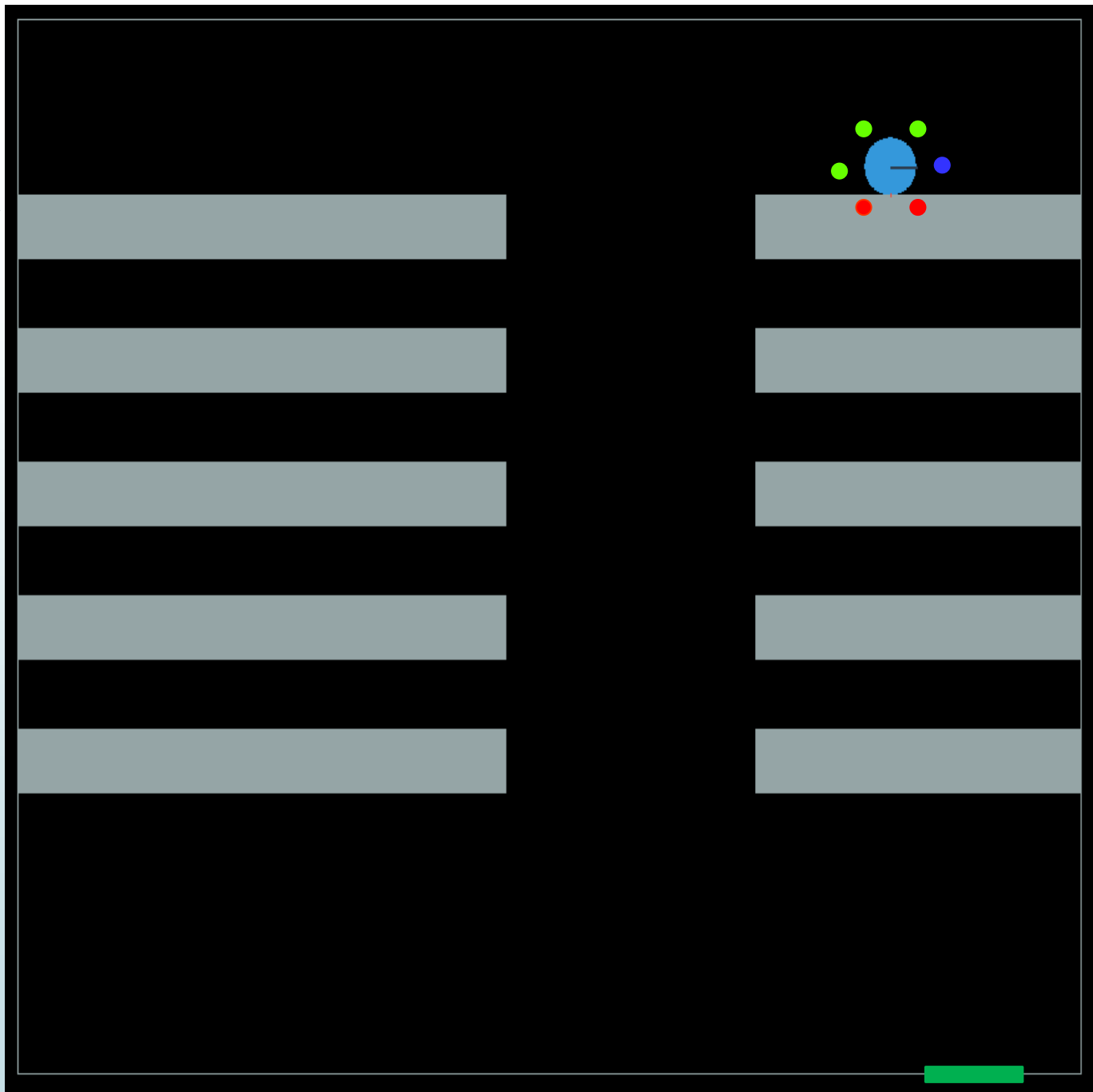
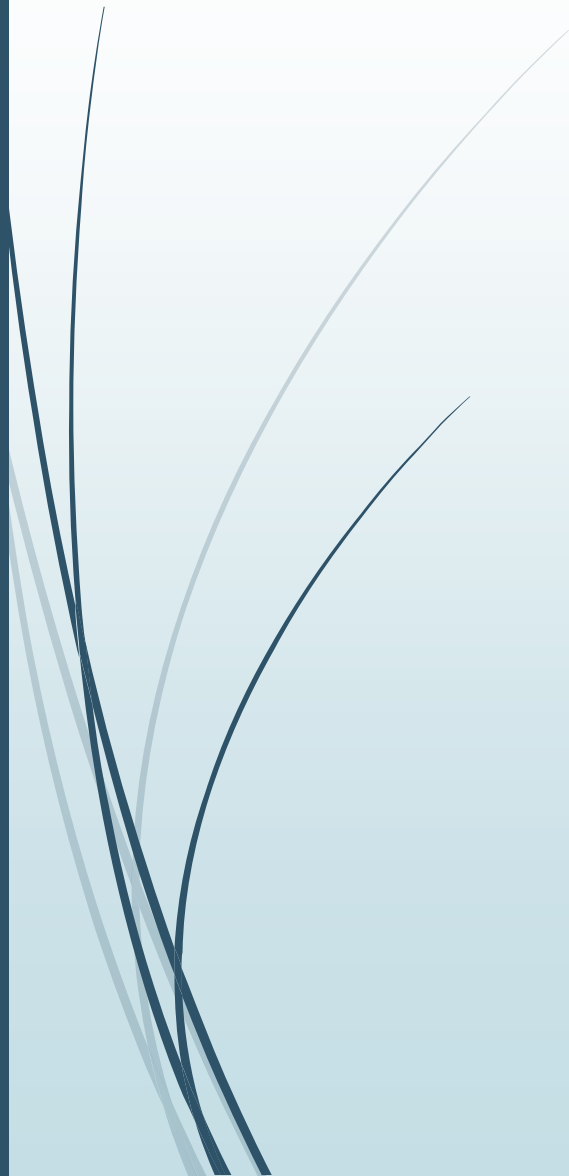
Choix de la direction

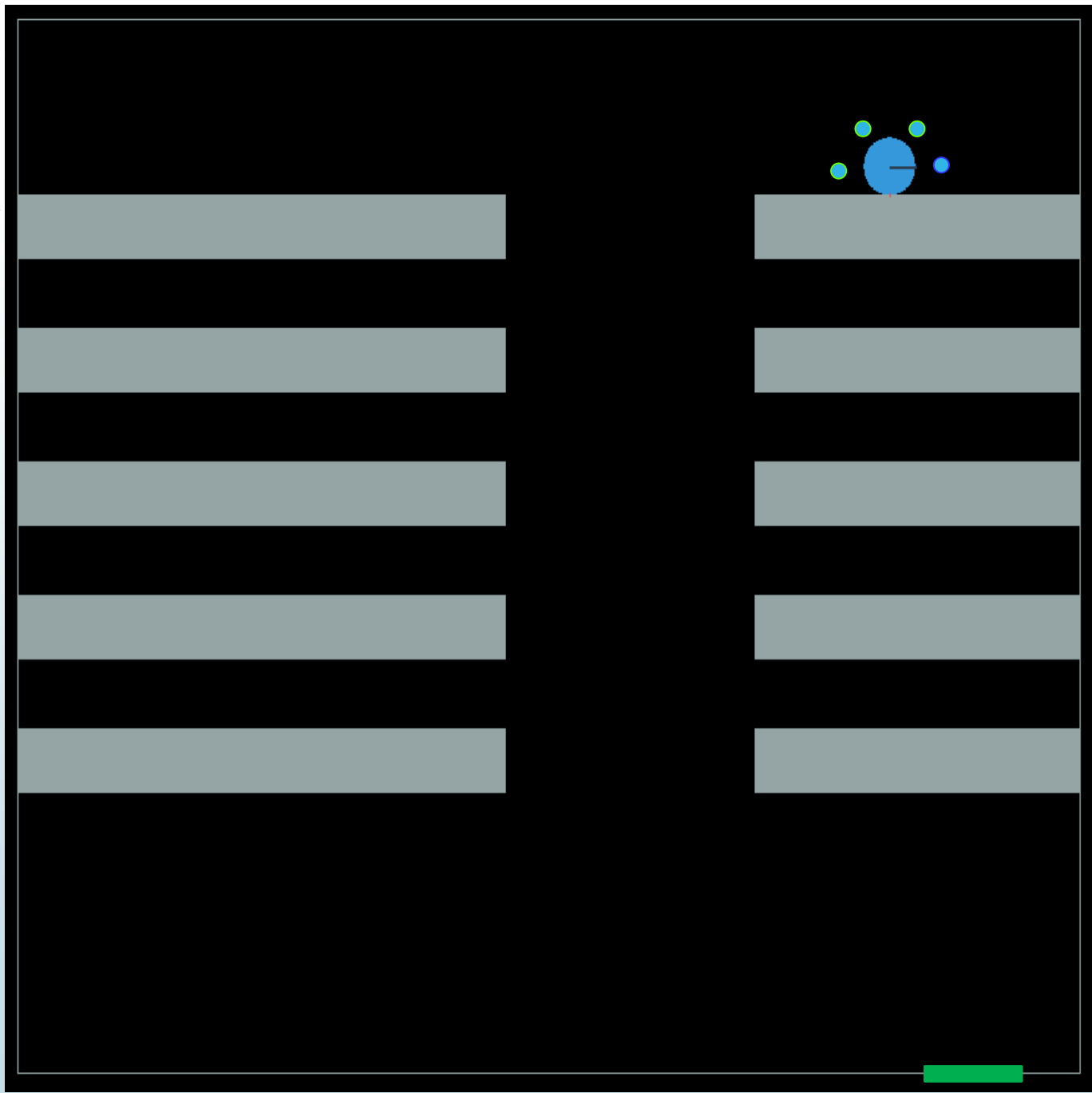
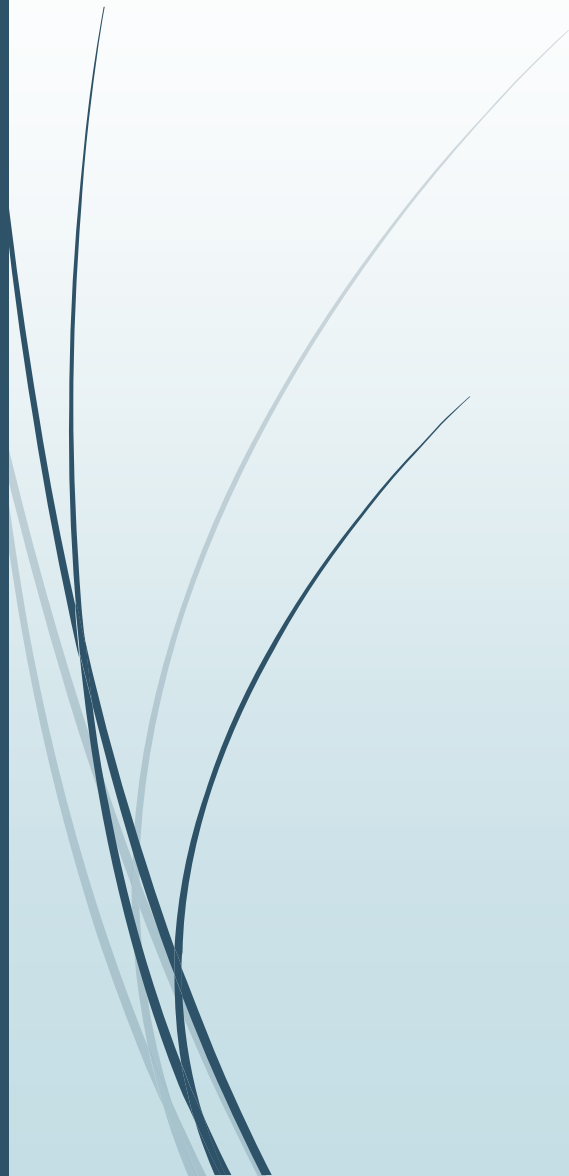


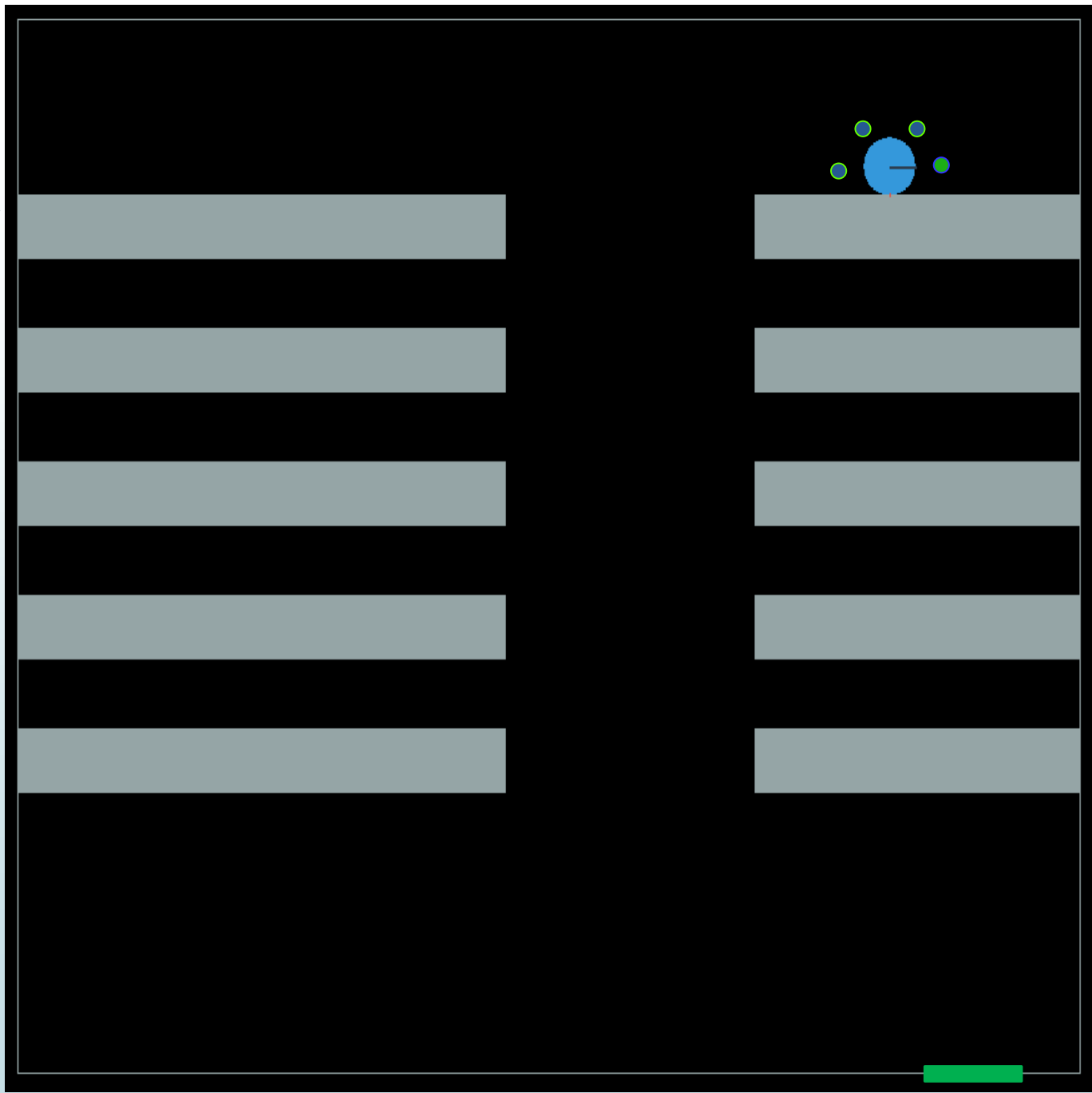
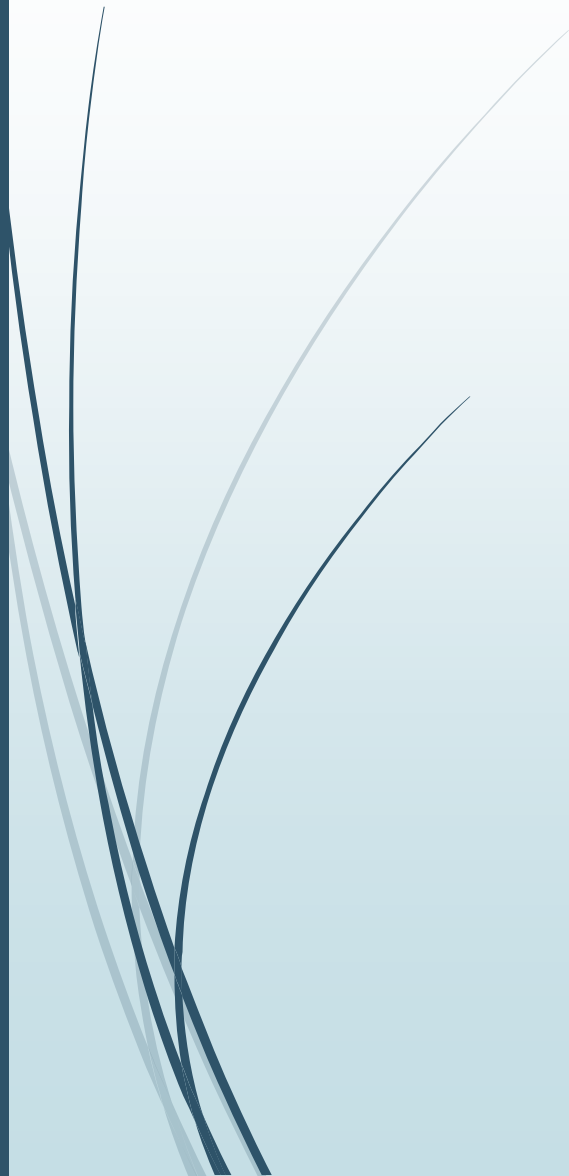


Une première approche : le test de proximité



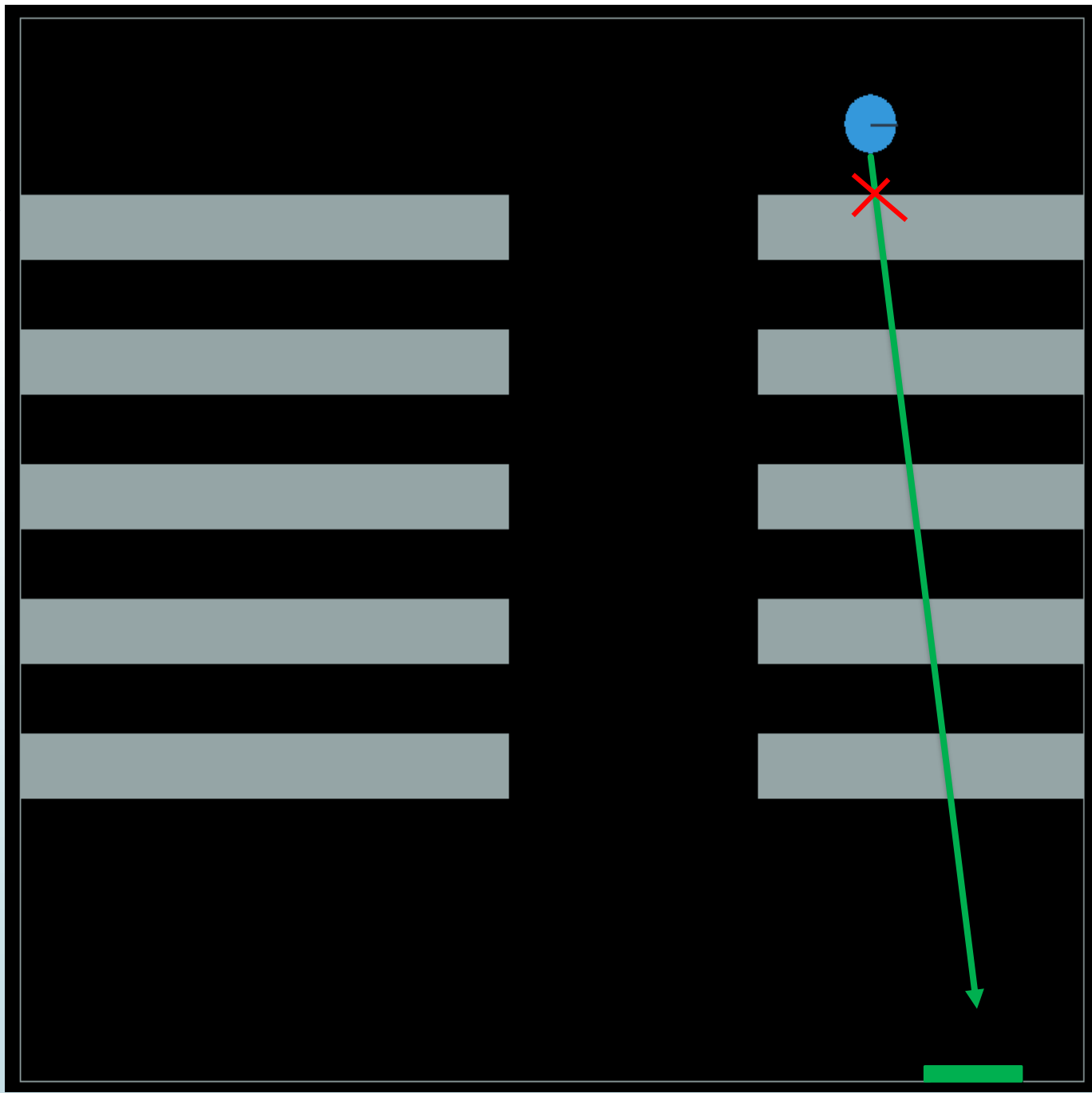
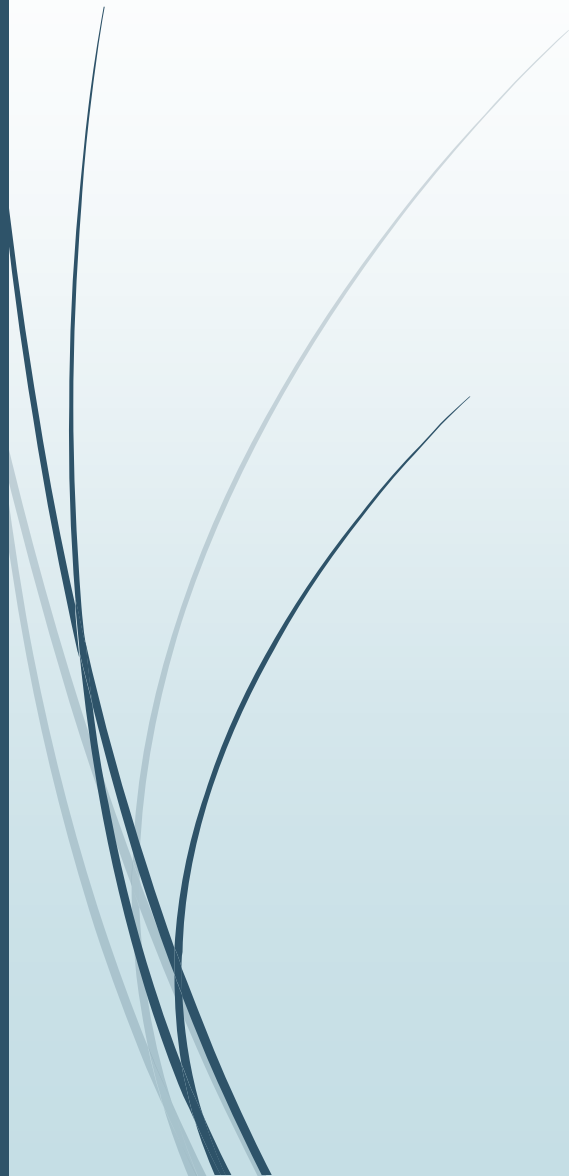


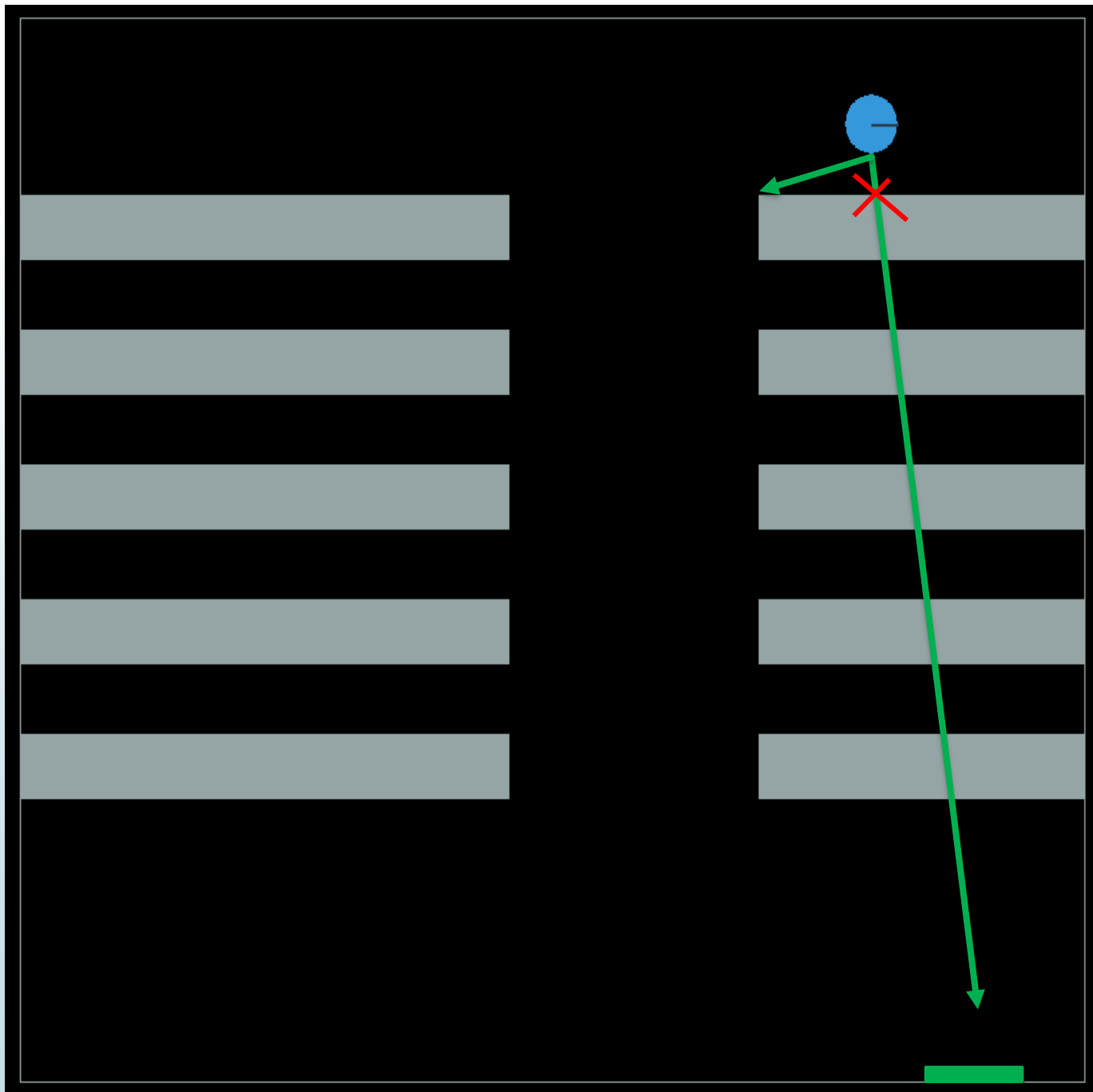
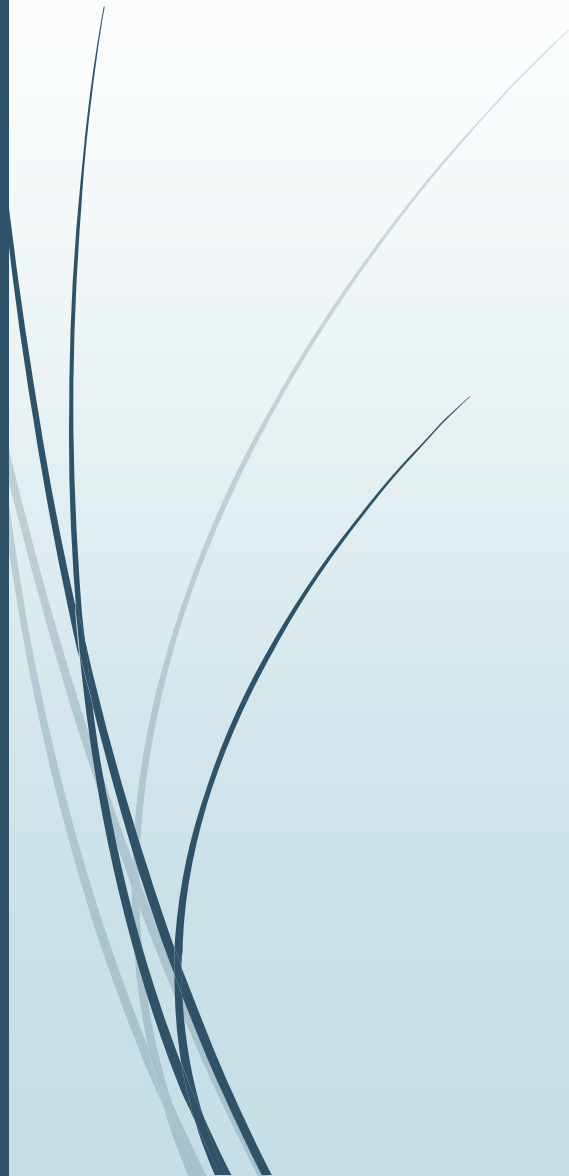






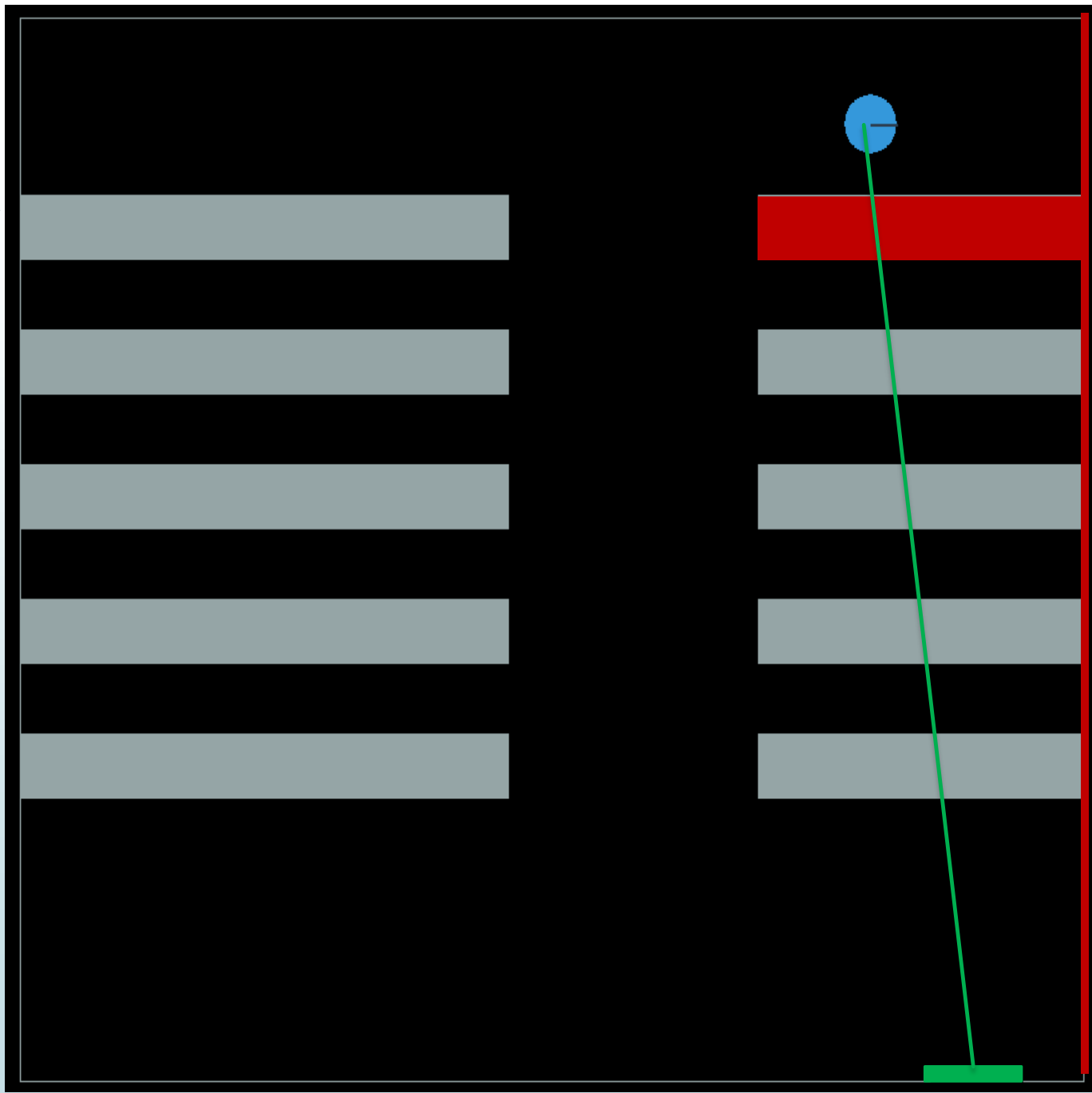
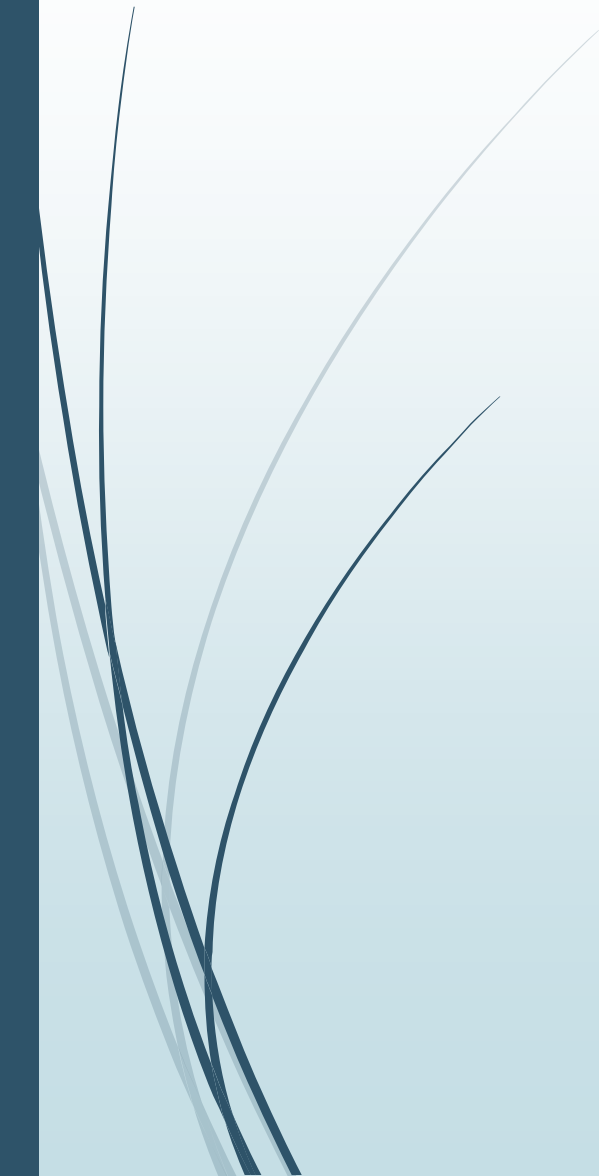
Une seconde approche : le lancer
de rayon

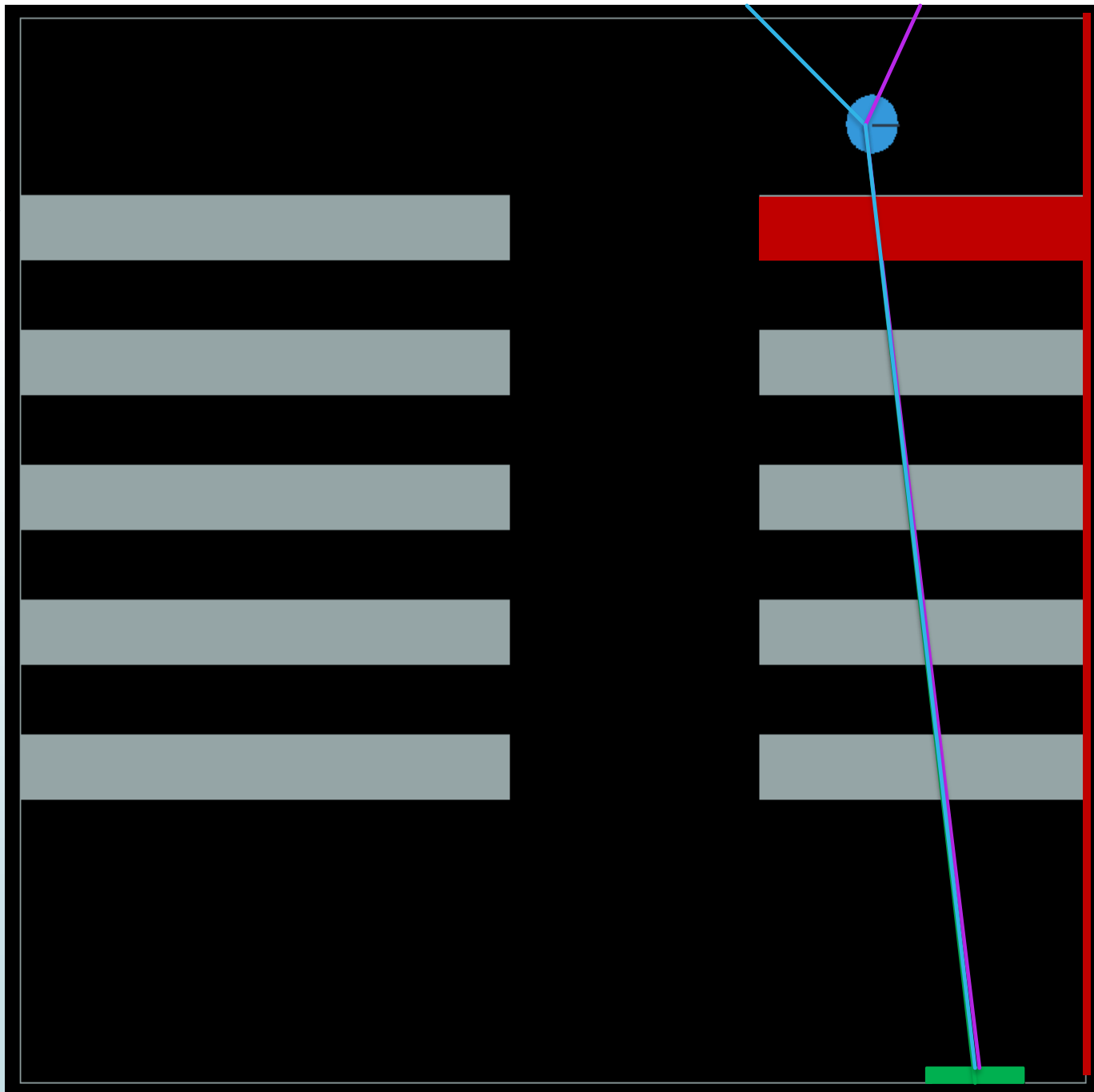
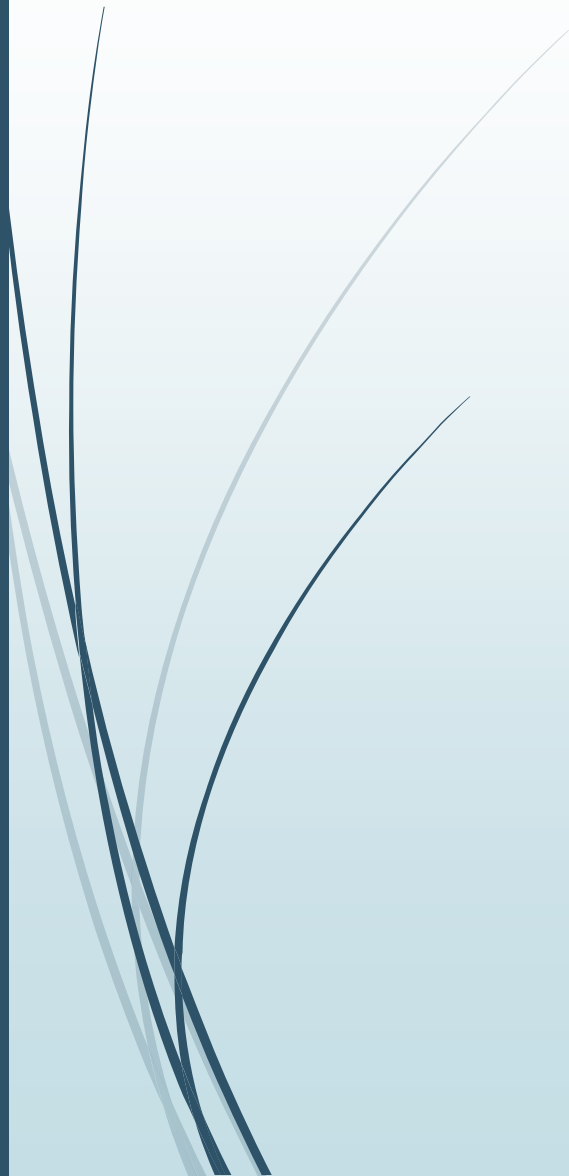


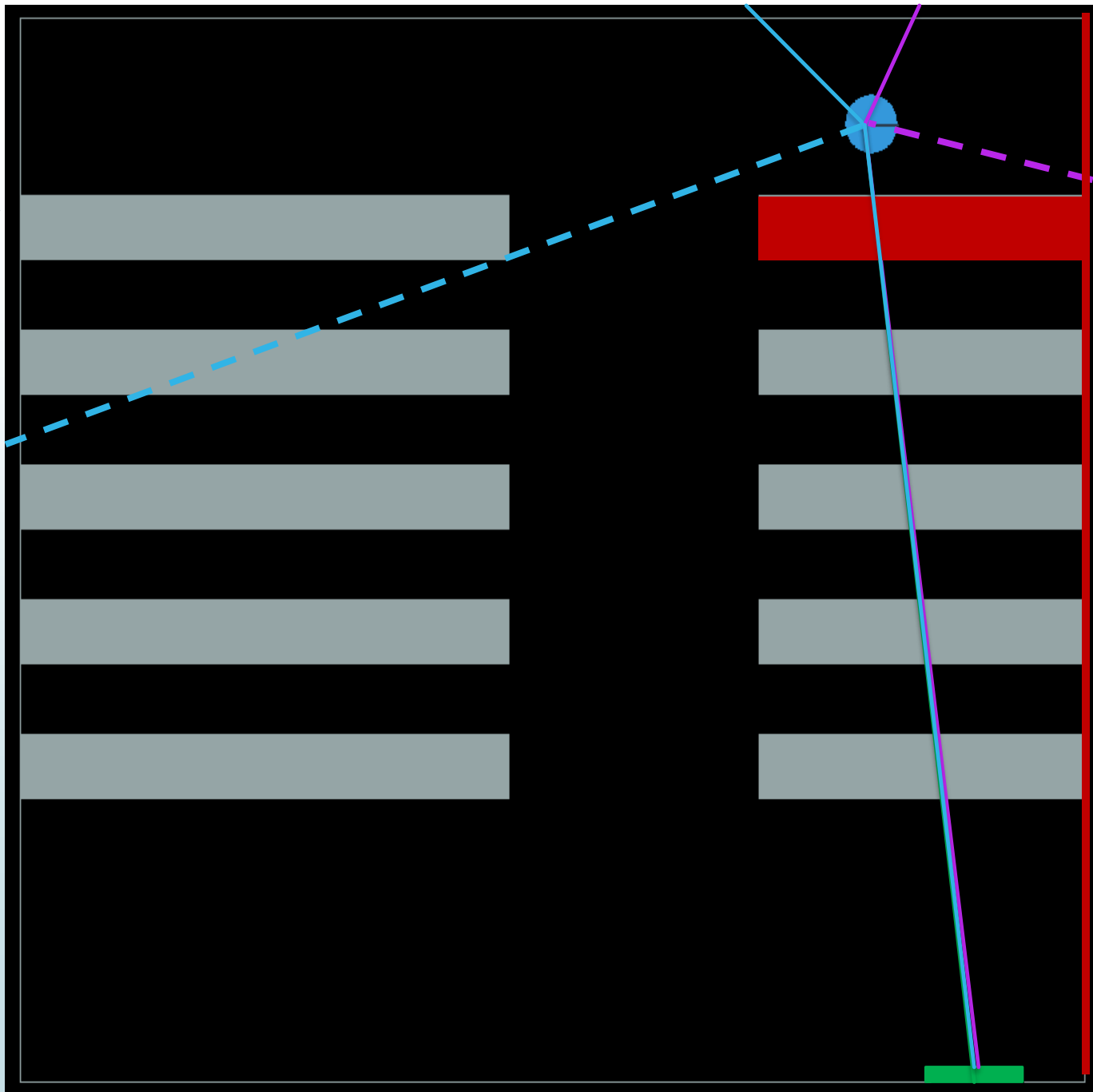
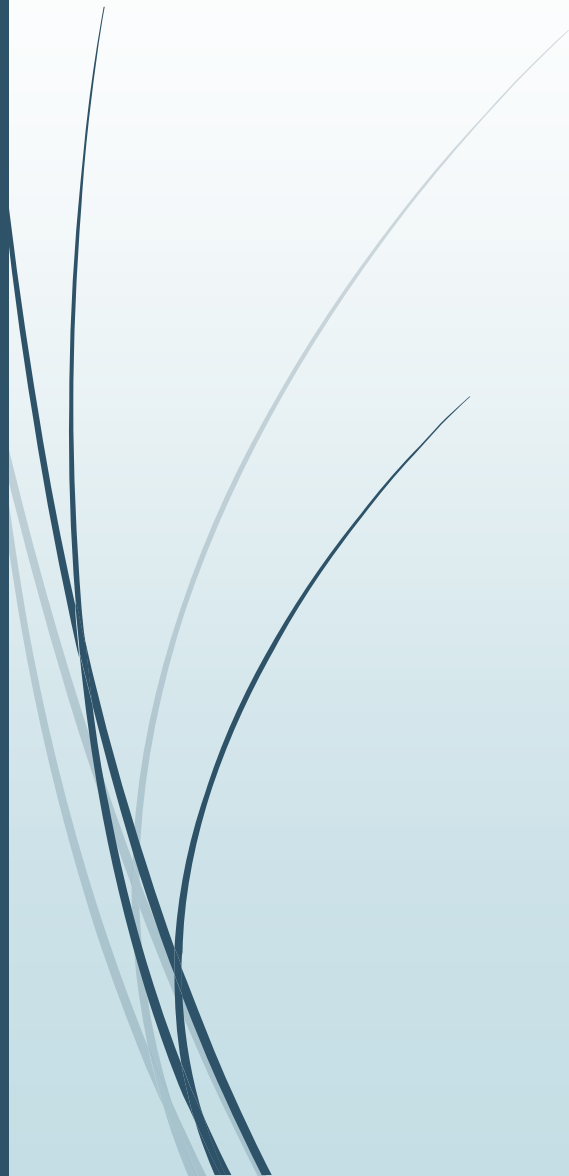


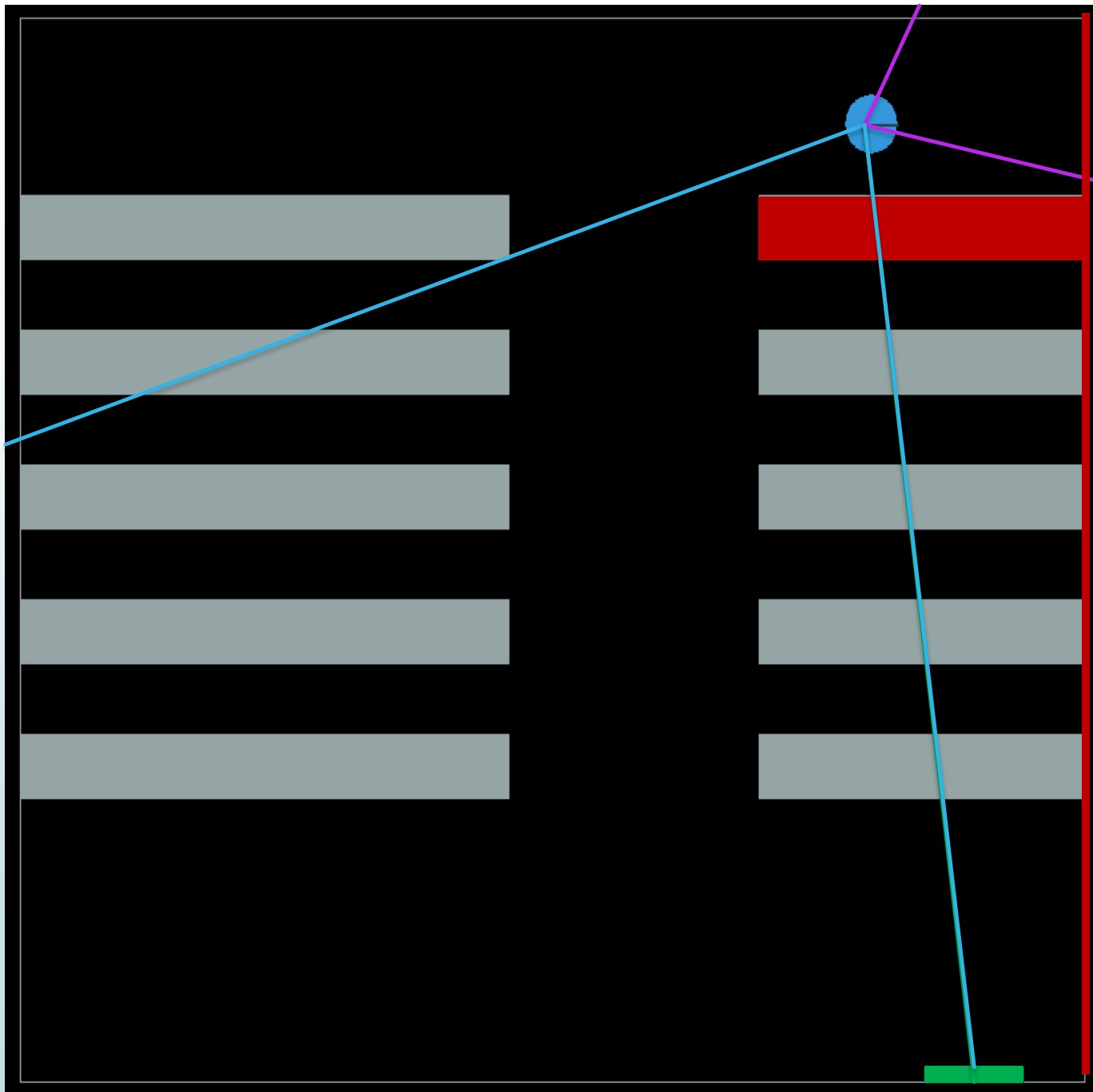
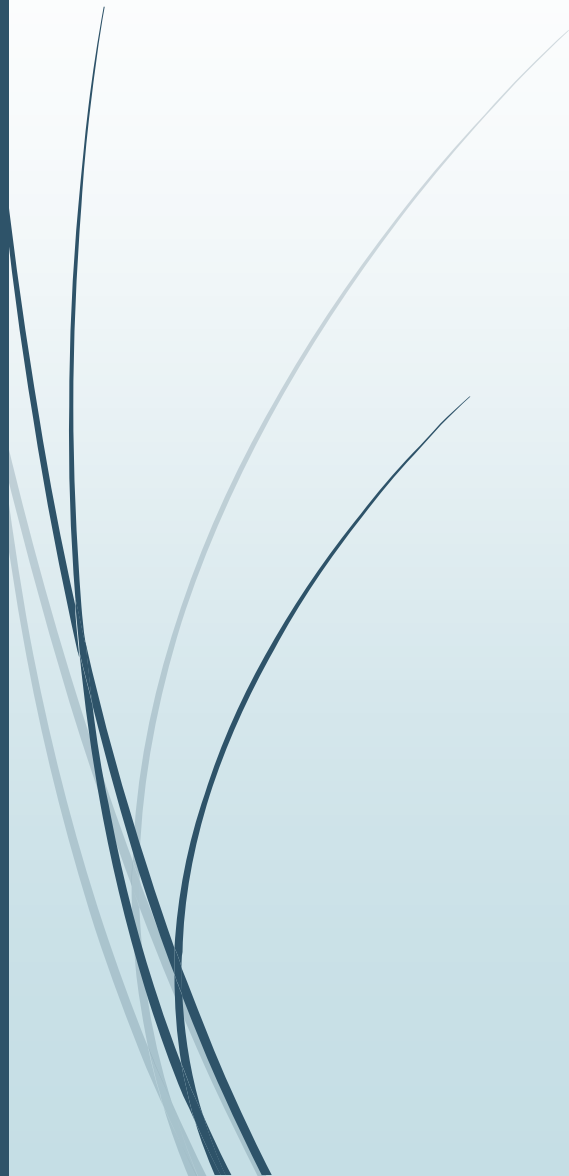


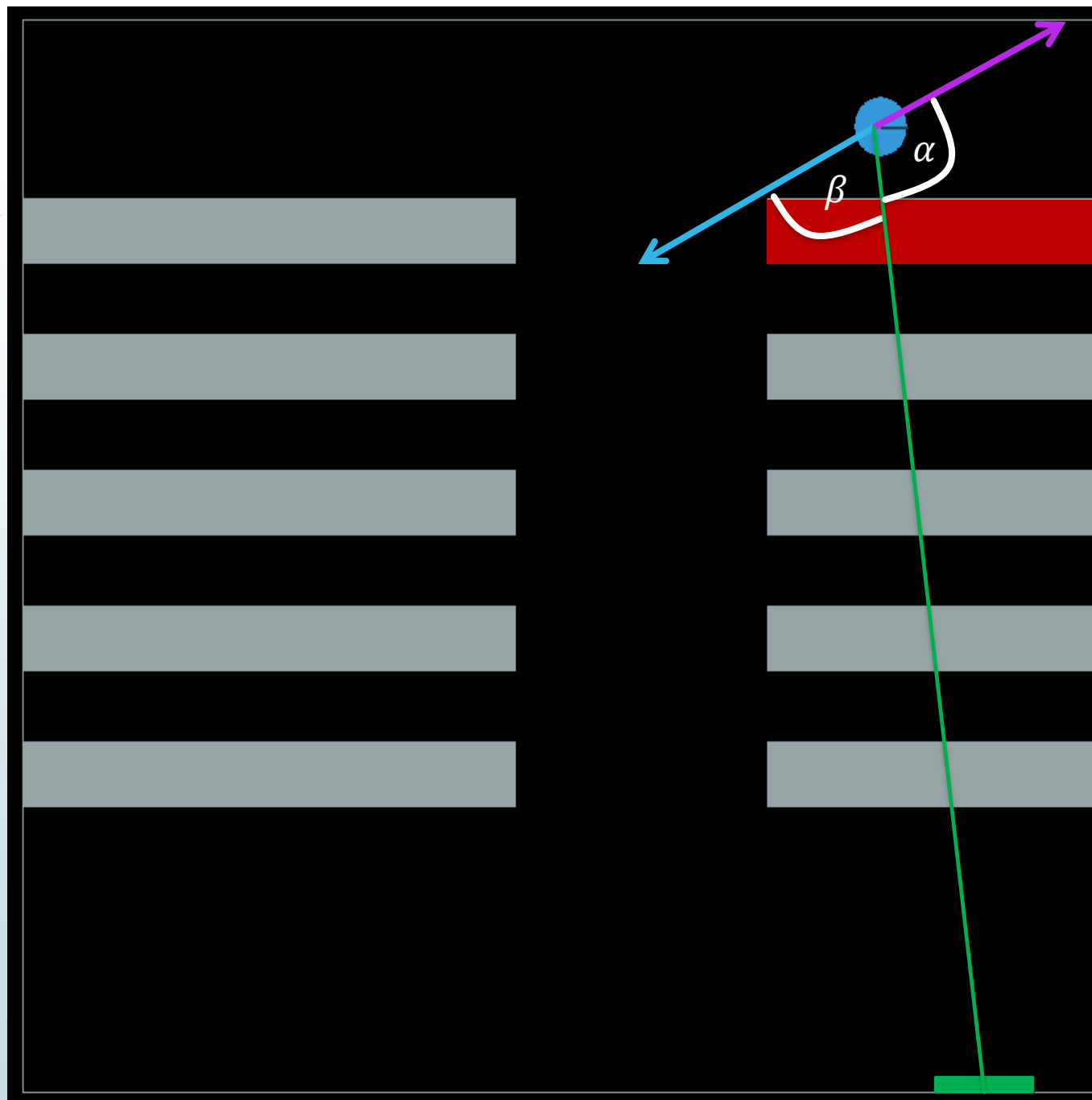
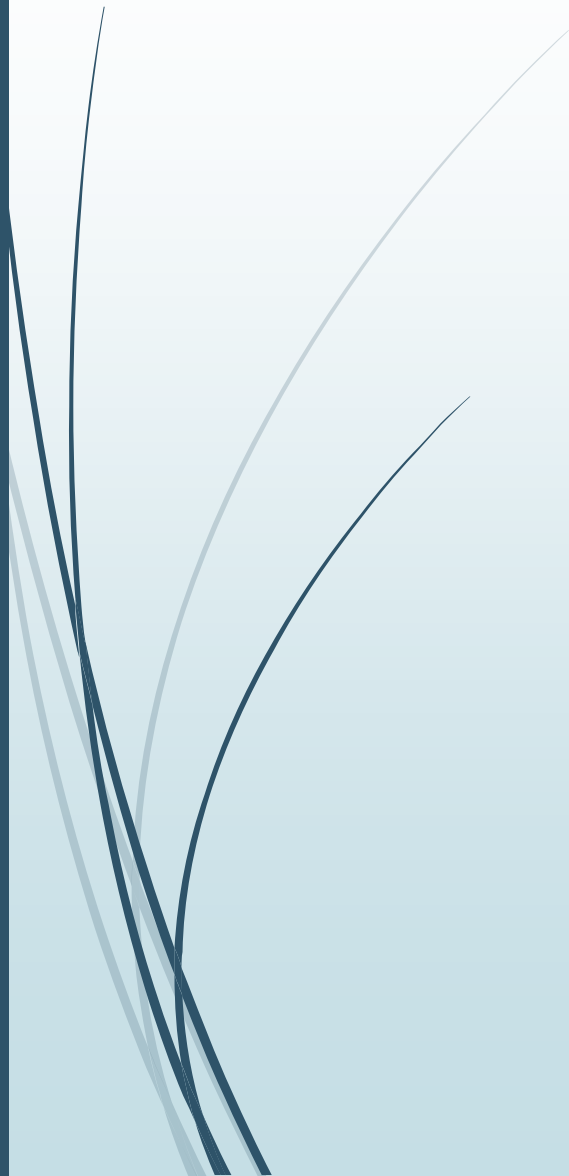
Troisième approche : la dichotomie

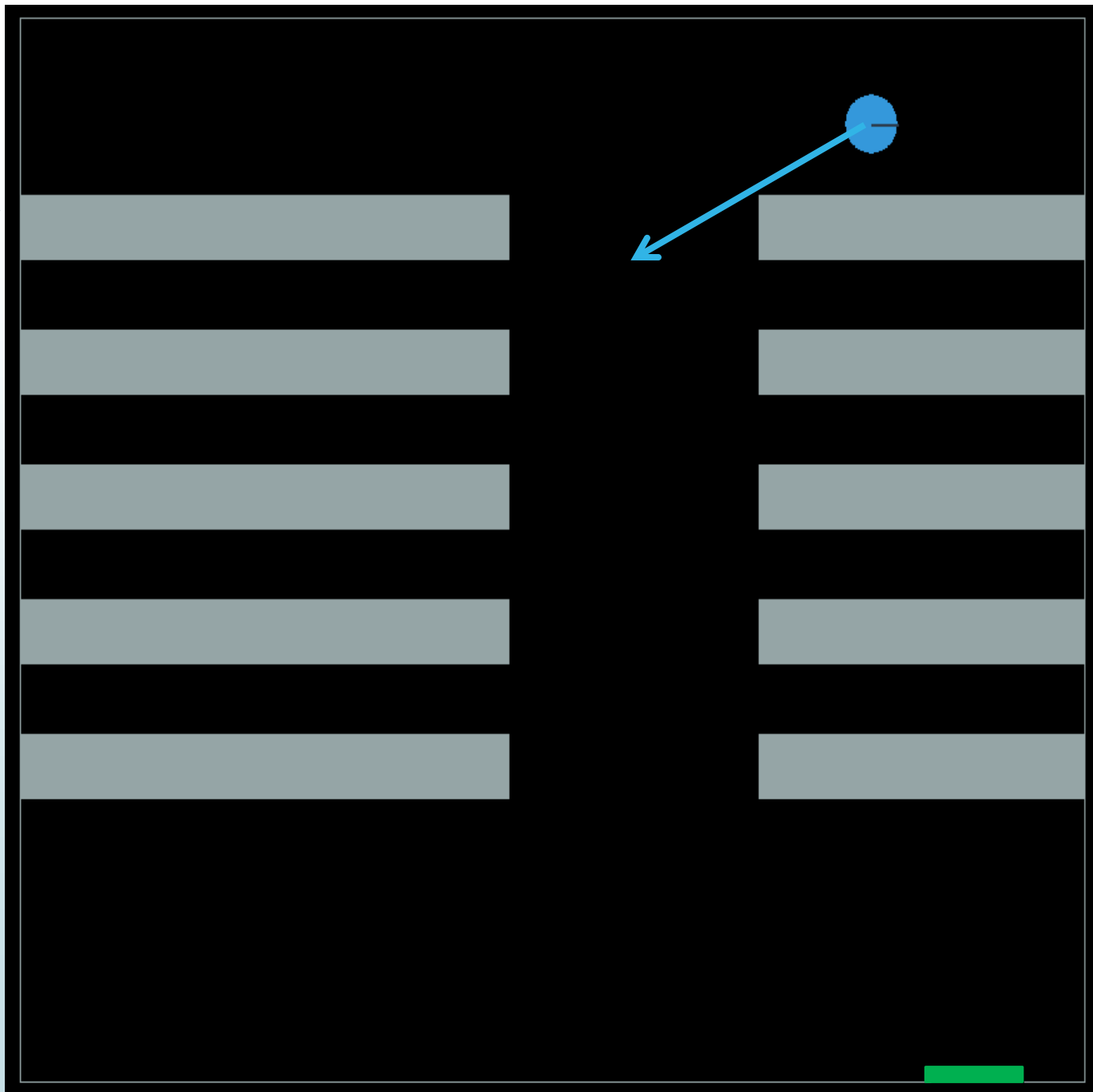
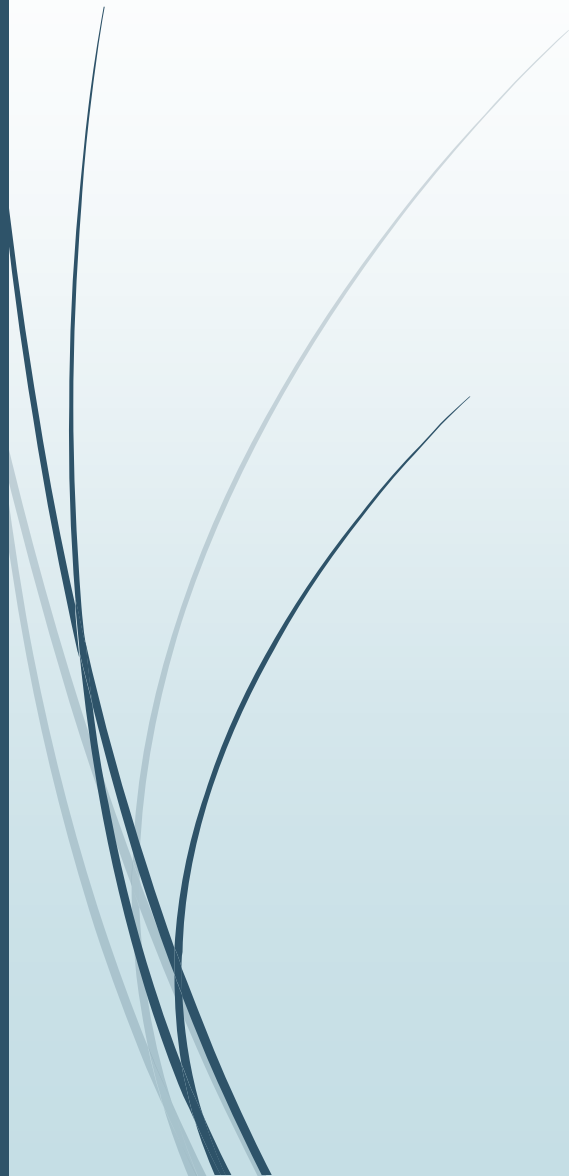




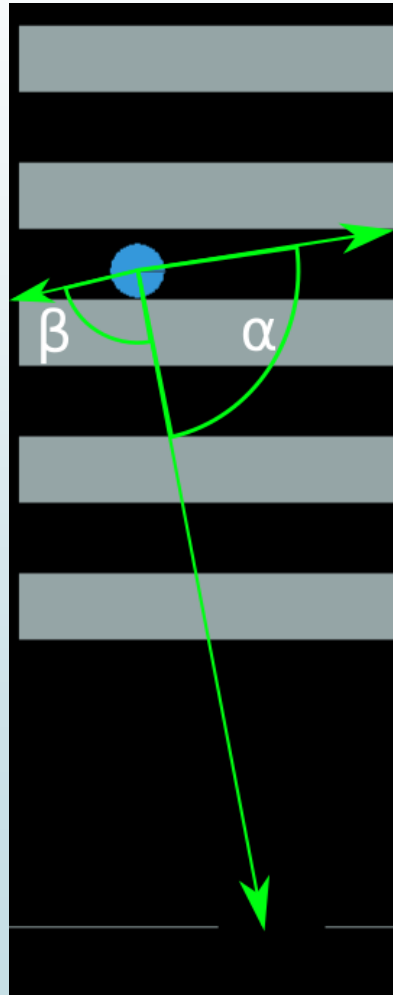








Problème : l'équilibre stable





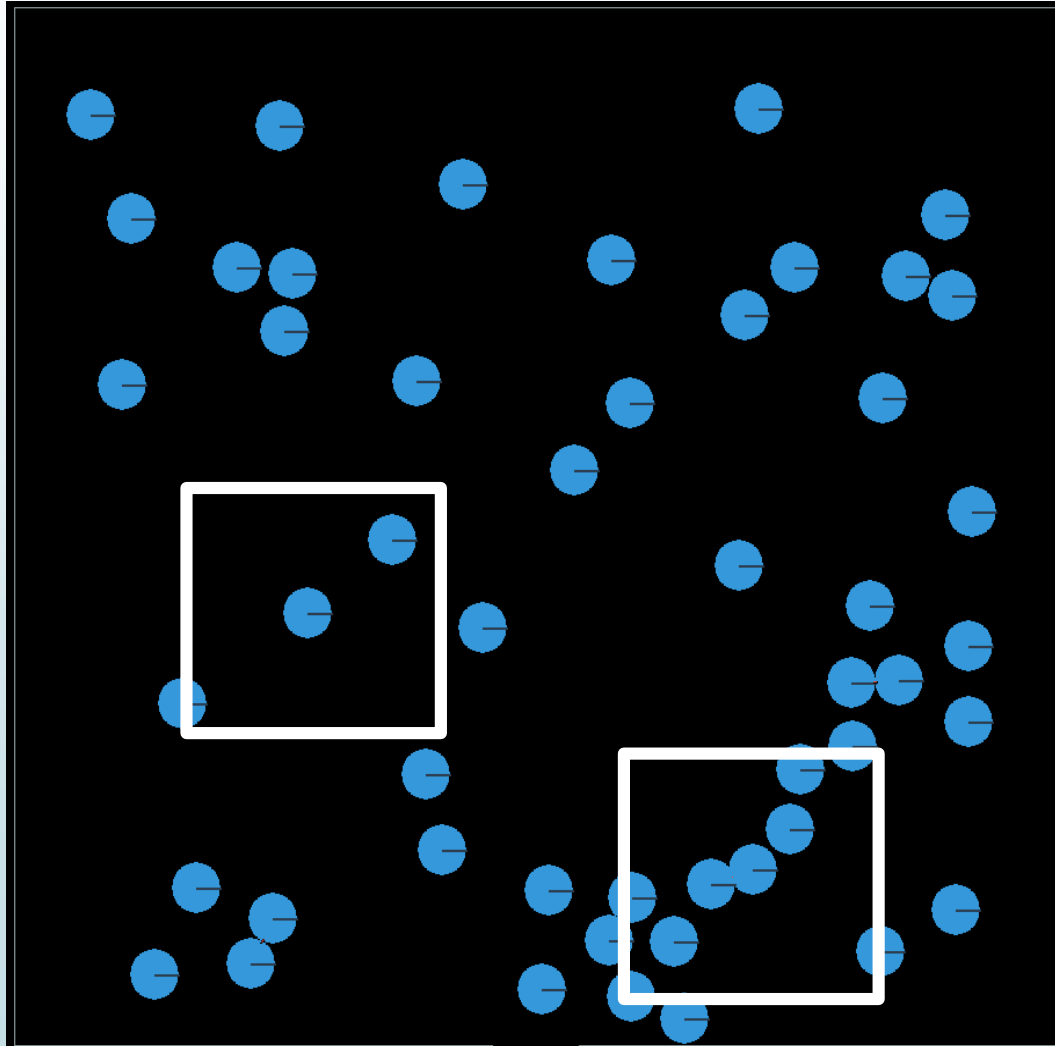
Hiérarchie des volumes englobant

Pour les recherches dans l'espace

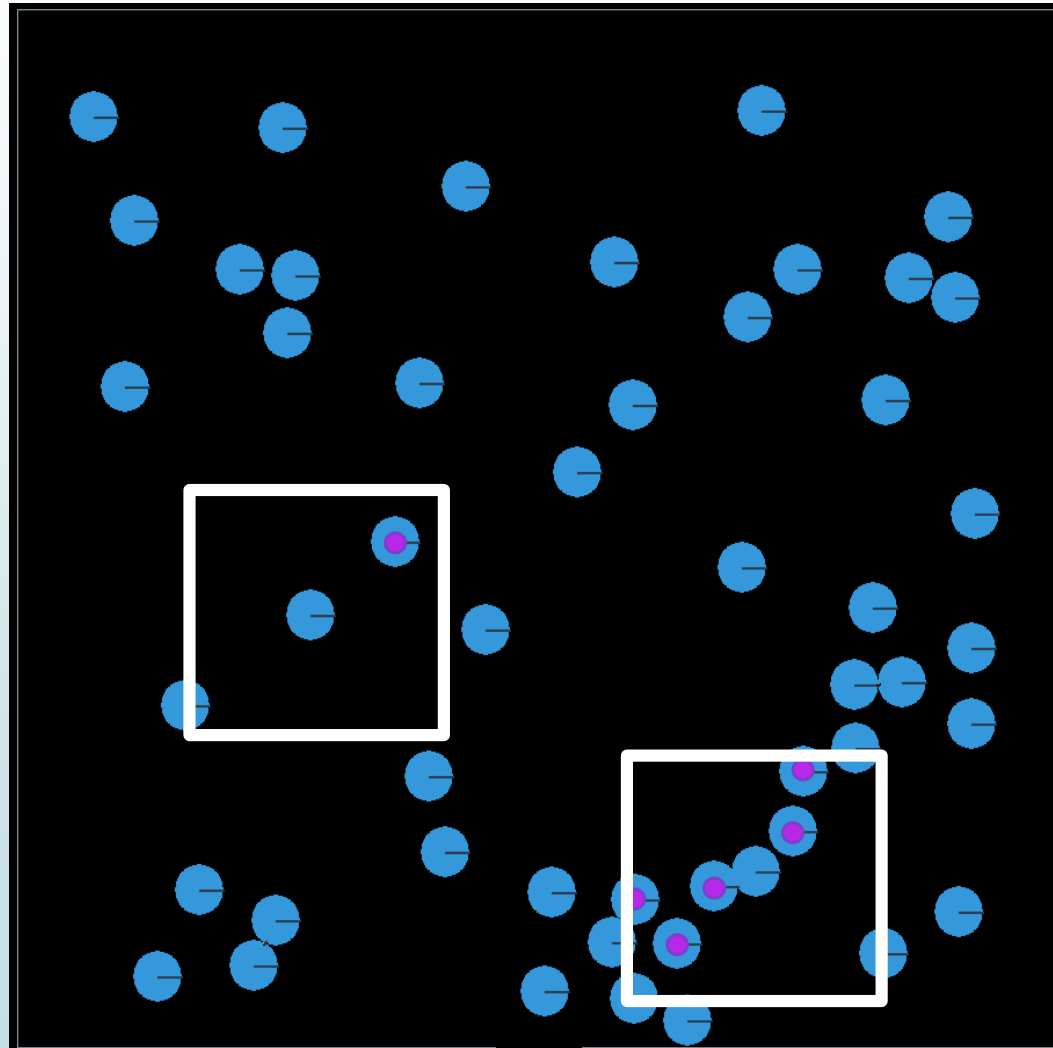


Variation de la vitesse

Influence de la densité



Influence de la densité



Formule de Togawa :

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

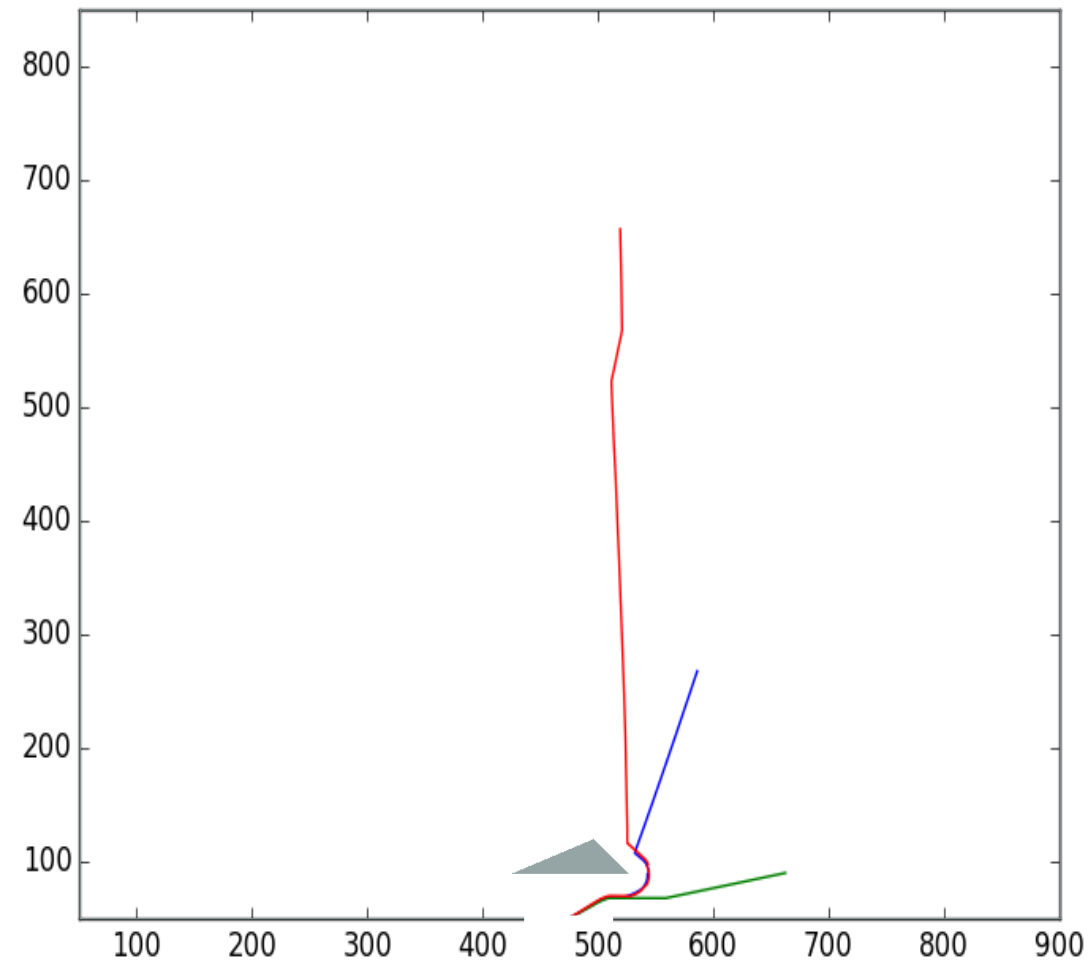


Les résultats

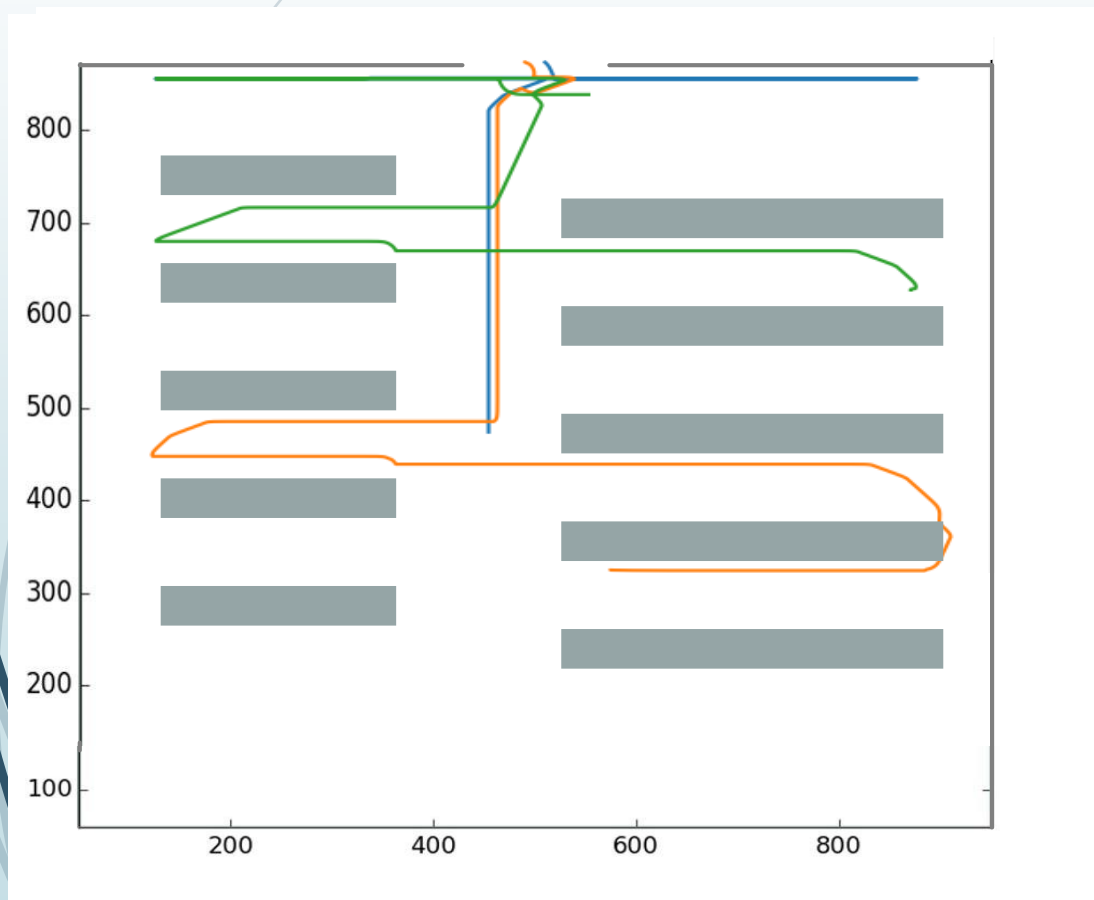


Le comportement des agents

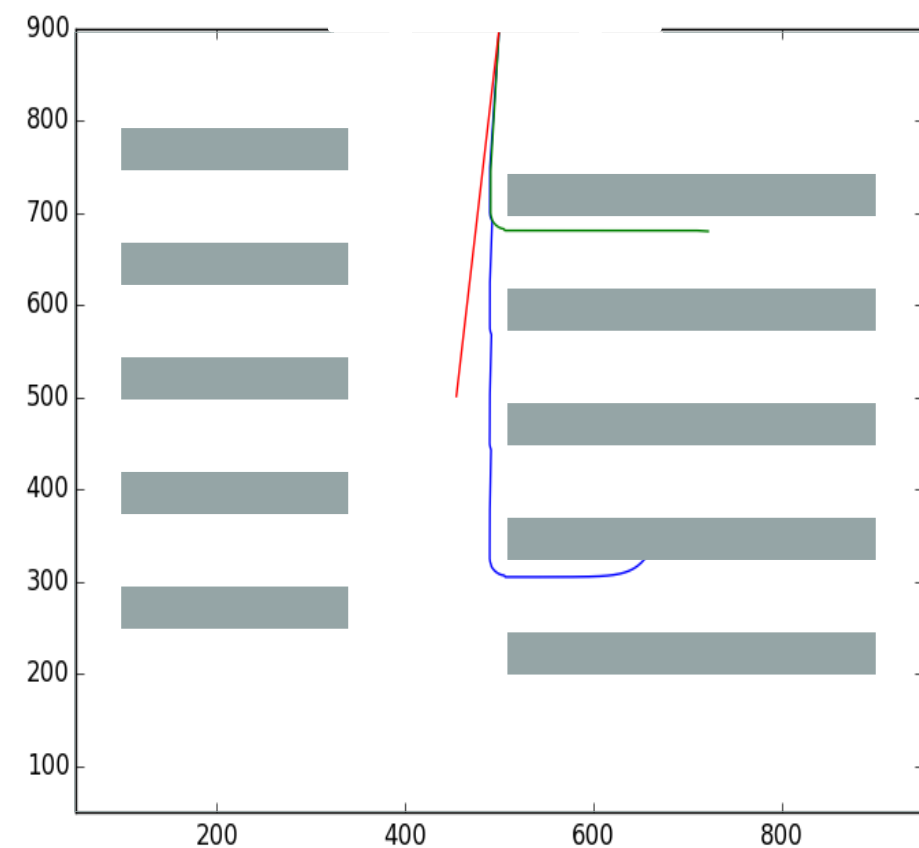
Contournement d'un obstacle



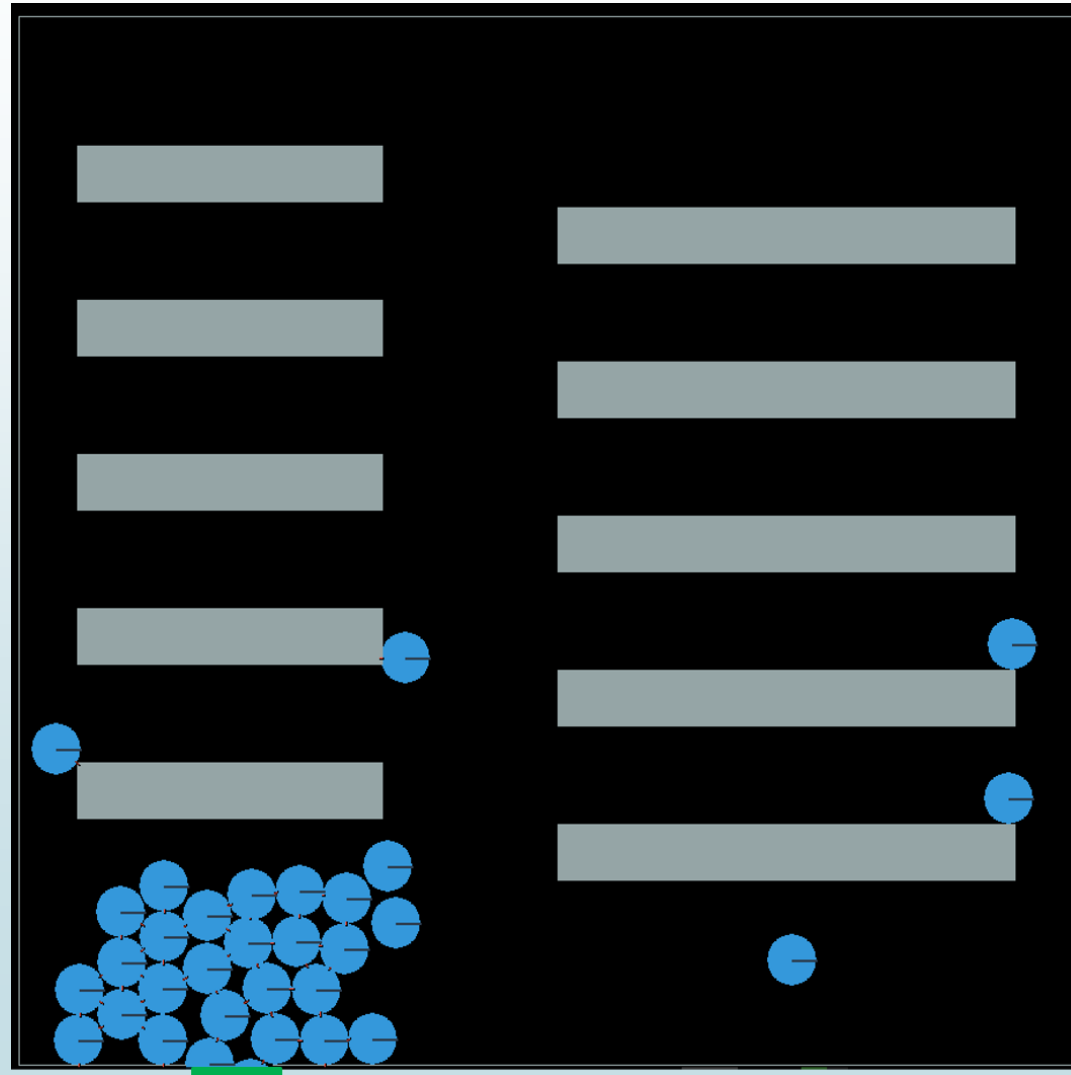
comportement avec le test de proximité



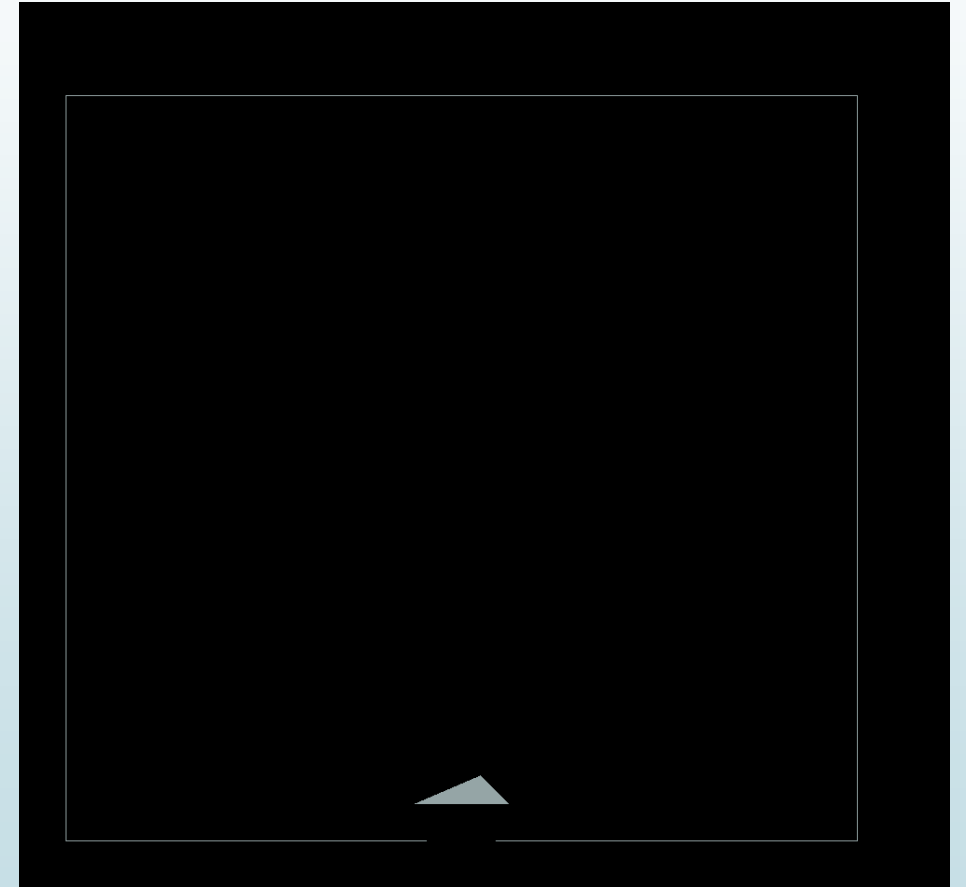
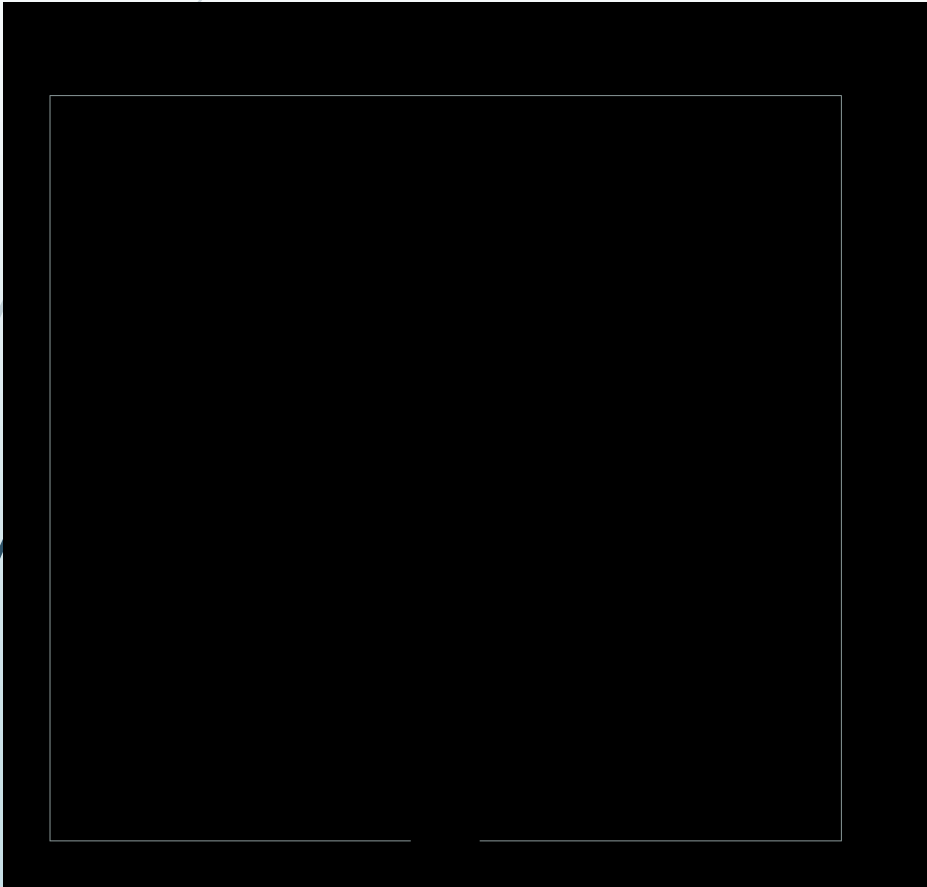
Comportement des agents avec la dichotomie



Phénomènes d'engorgement

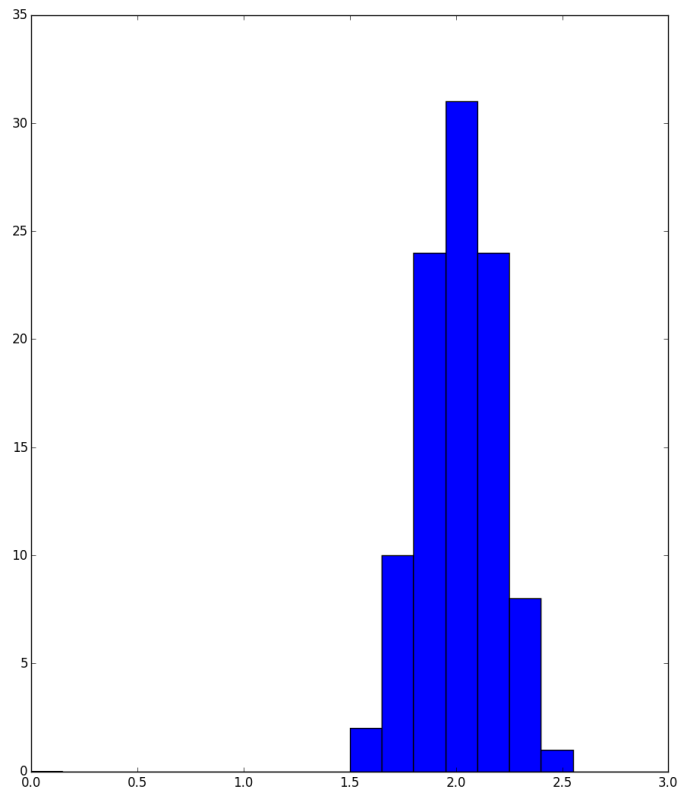


Rôle de l'obstacle devant la porte



Rôle de l'obstacle devant la porte

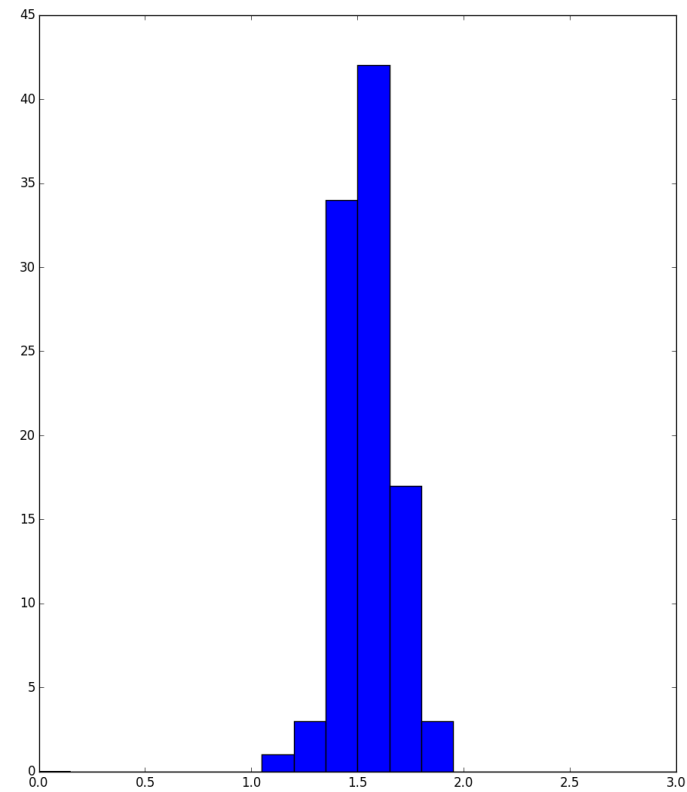
Nombre de tests



Débit (pers/sec)

Sans obstacle

Nombre de tests



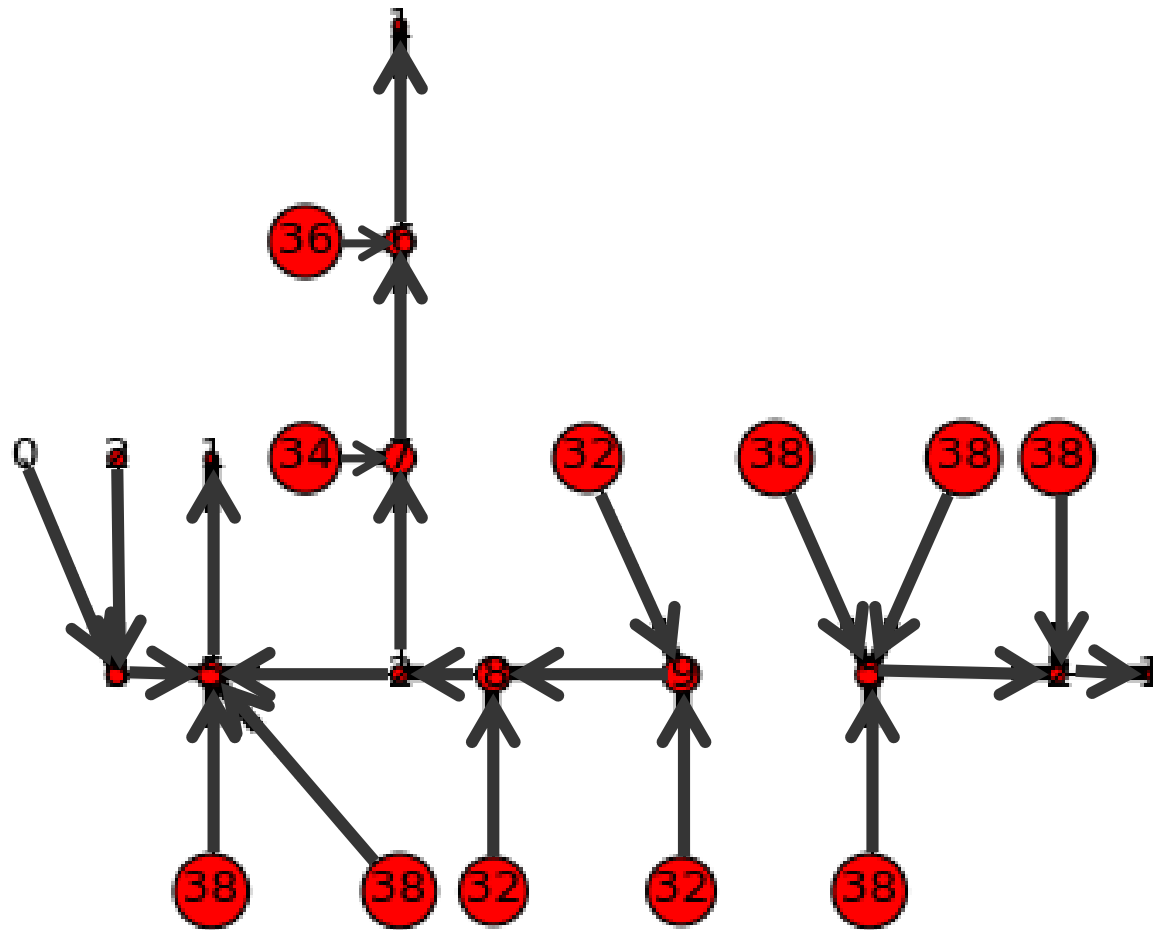
Débit (pers/sec)

avec obstacle

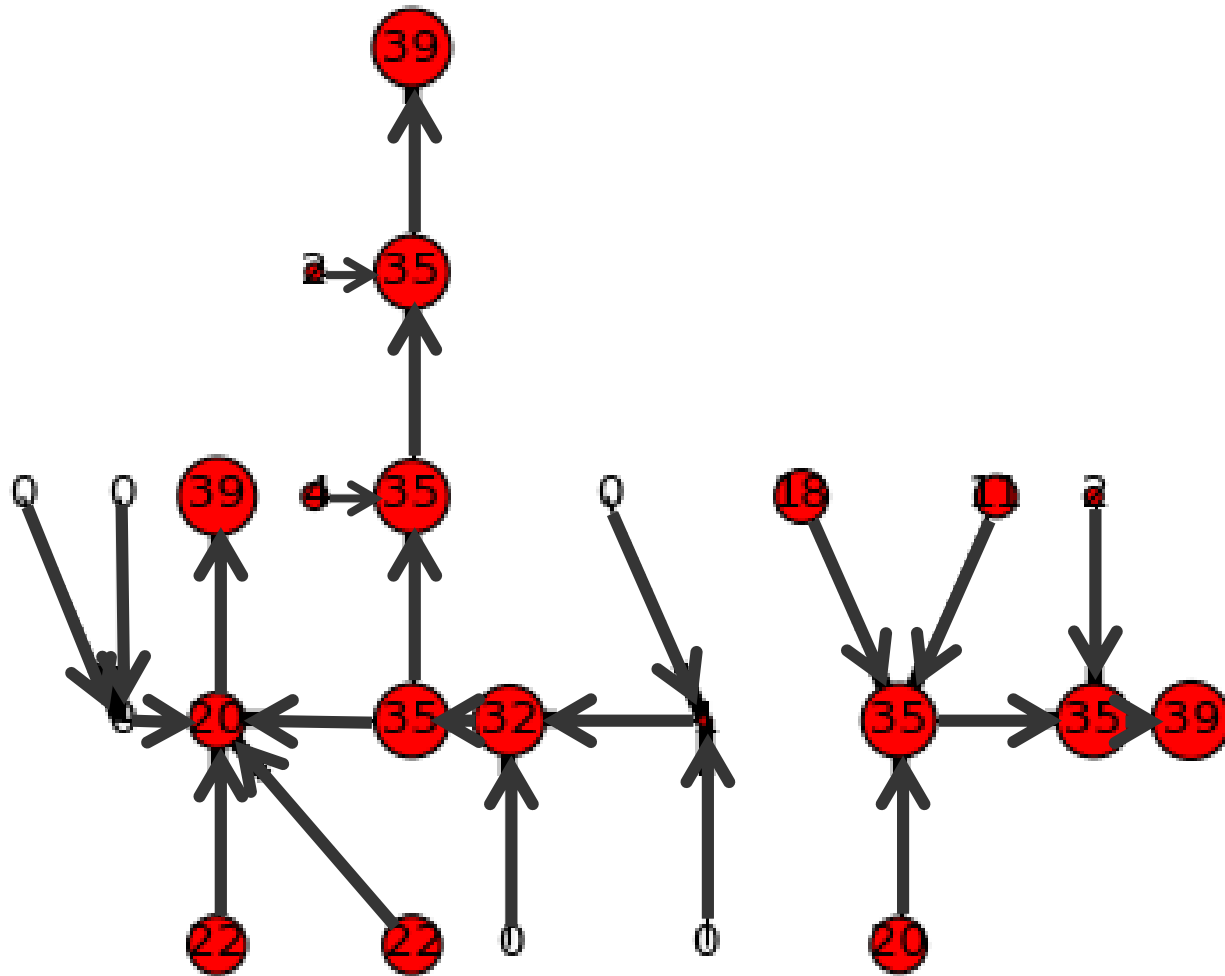
A decorative graphic on the left side of the slide. It features a dark blue vertical bar on the far left. To its right, several thin, curved lines in shades of blue and grey sweep upwards and to the right. A dark brown arrow points horizontally to the right, positioned in front of the curved lines.

Simulation globale (qq mots)

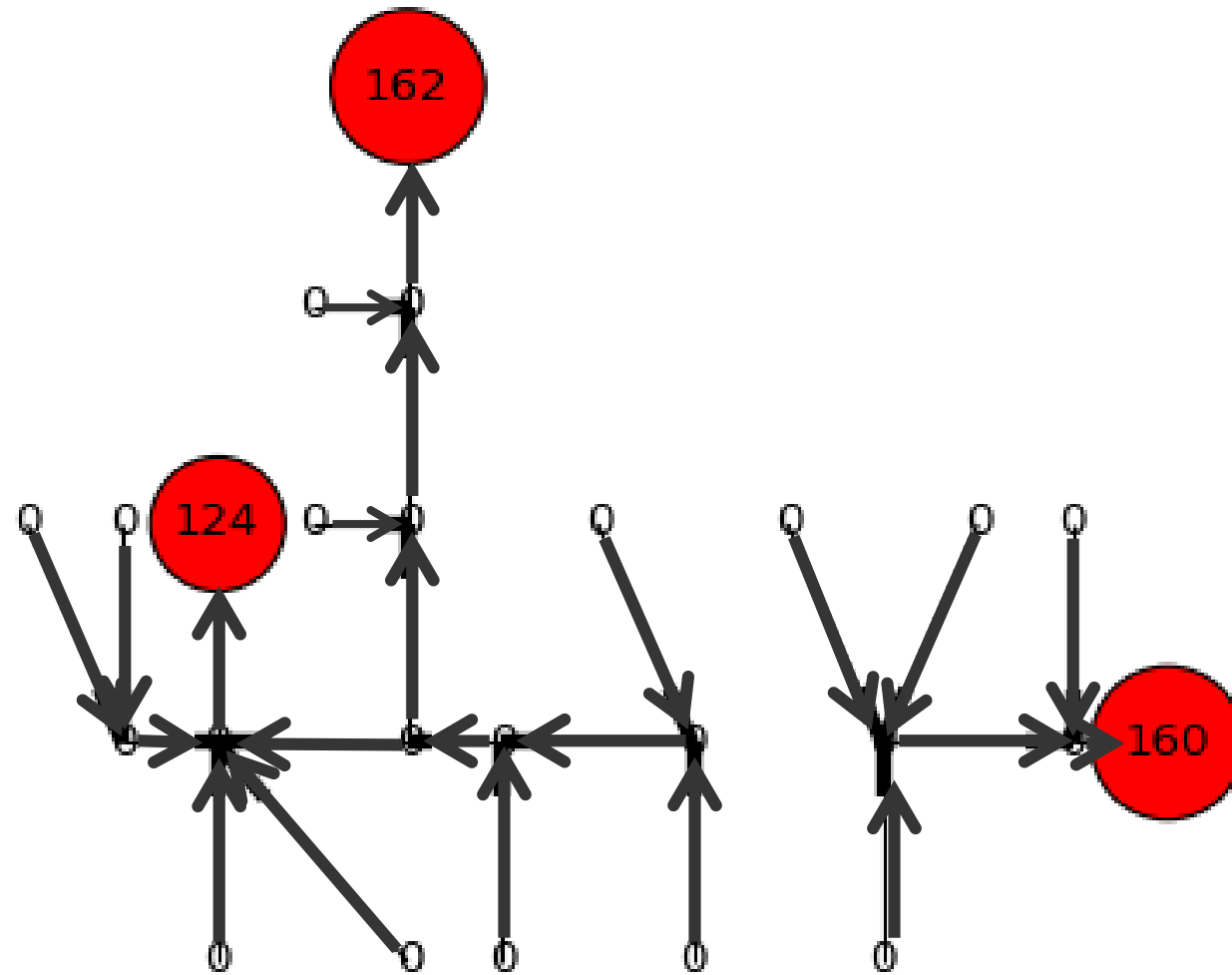
Etat initial



Etat intermédiaire



Etat final





Conclusion