Tricking your cerebellum

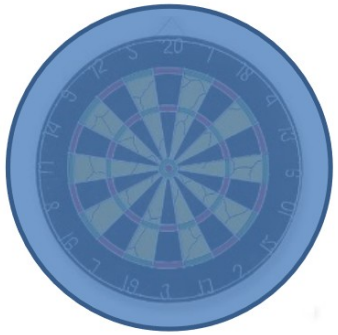
Exercise 3 – Feedback

Motivation feedback

Motor Learning

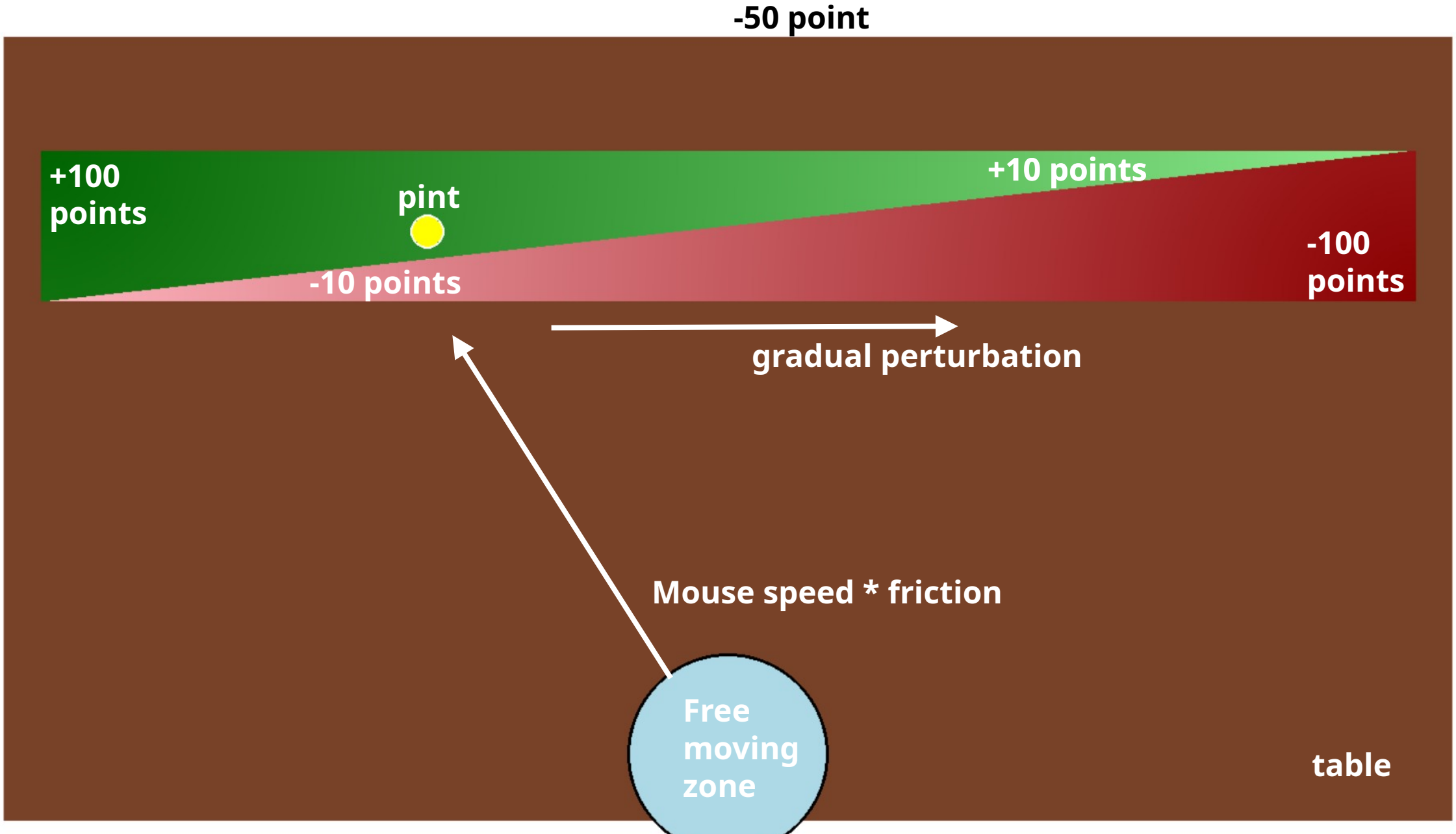
- Internal Models → error-based learning
  - task-specific prediction error (e.g. direction & amplitude) is used to update an internal model of how this result came about
- Reinforcement Learning
  - an external or internal reward signal is used to improve

amplitude and direction of error available



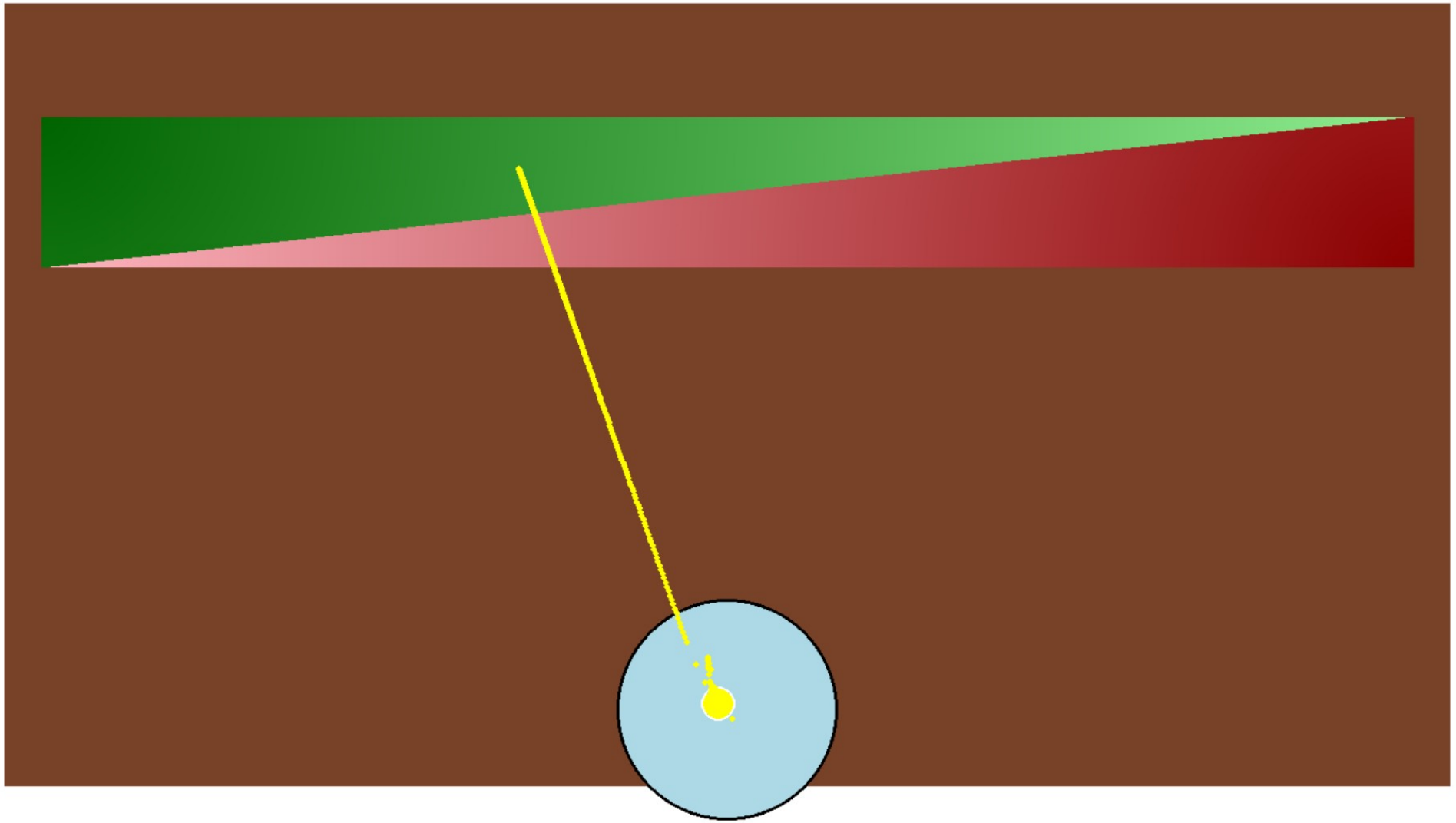
Bulls eye: Yes or No

The Bavarian Game



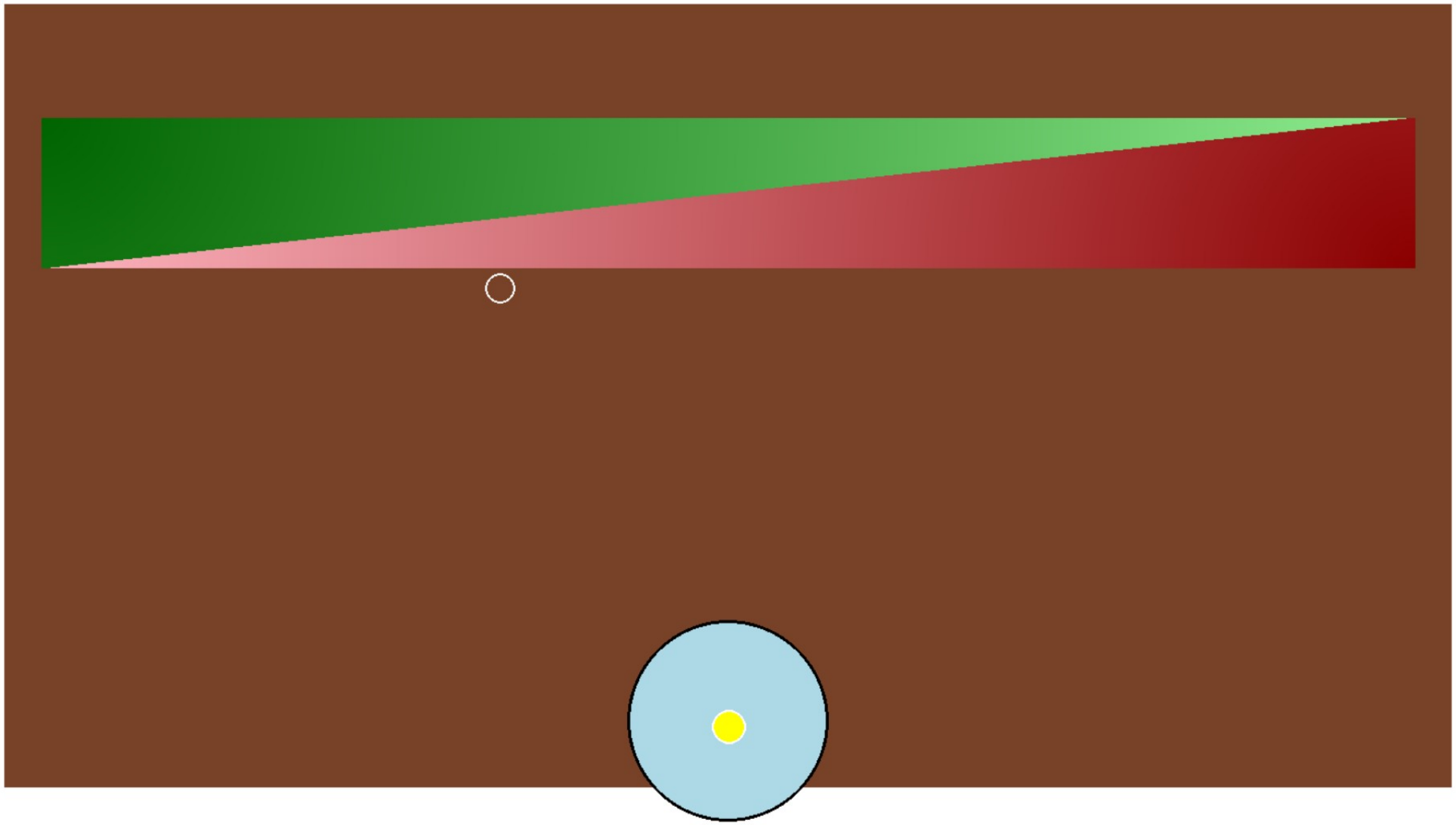
feedback_type=‘trajectory‘

Draw trajectory of the **last** attempt



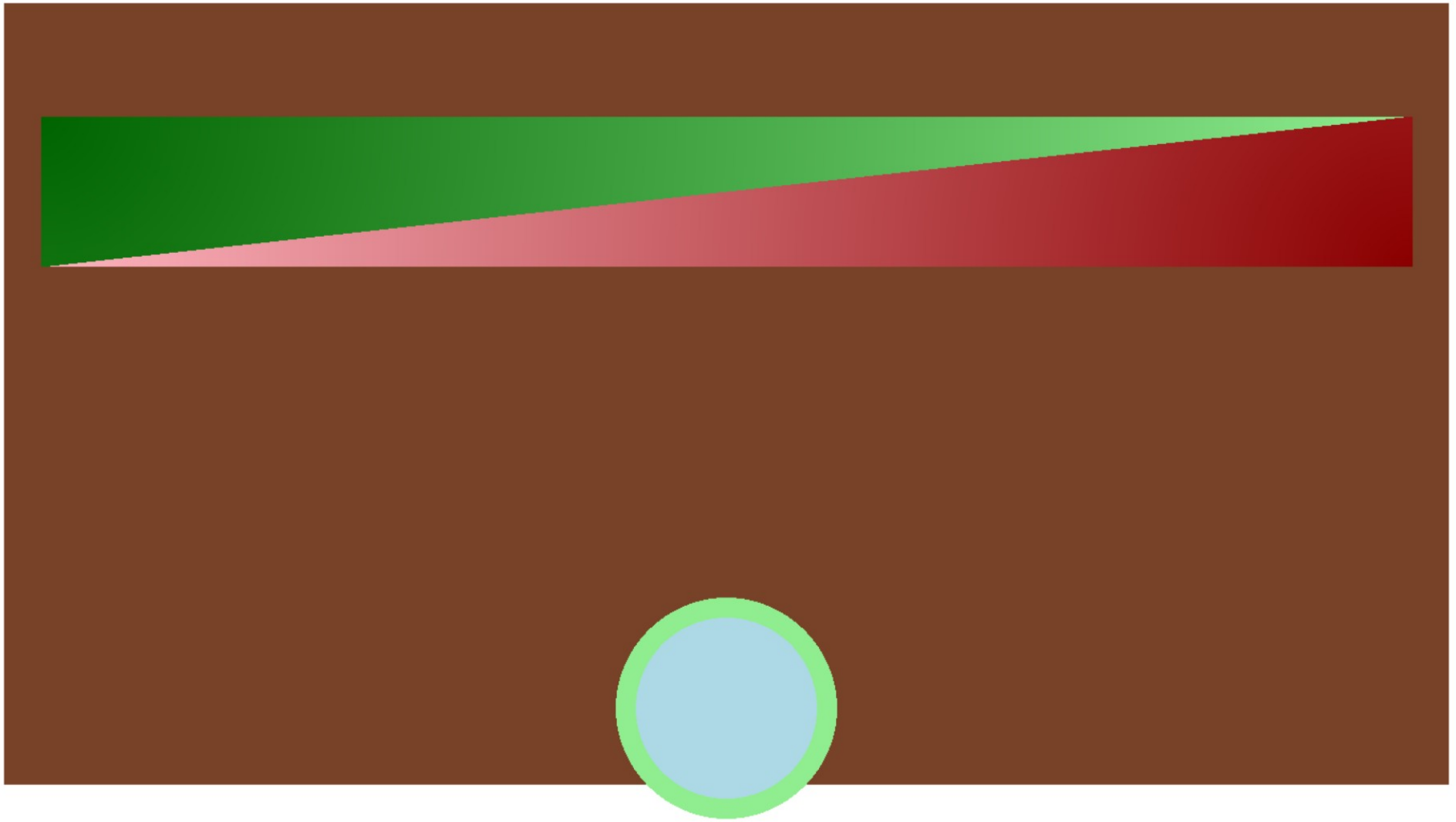
feedback_type=‘endpos‘

Draw pint_end_position of the **last** attempt



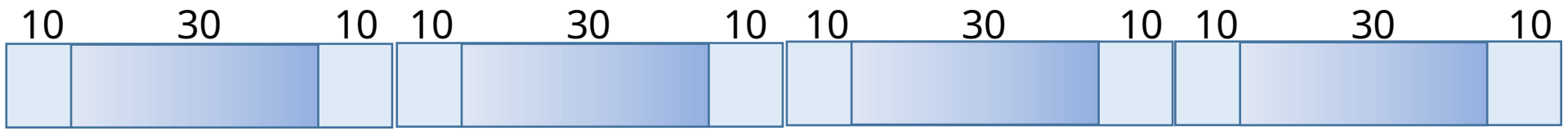
feedback_type=‘rl‘

Change color of starting_postion edge:
RED for miss
GREEN for hit



Design your experiment!

No perturbation
gradual perturbation .2 in 10 steps, increase after 3 attempts



feedback_type= ‘None‘

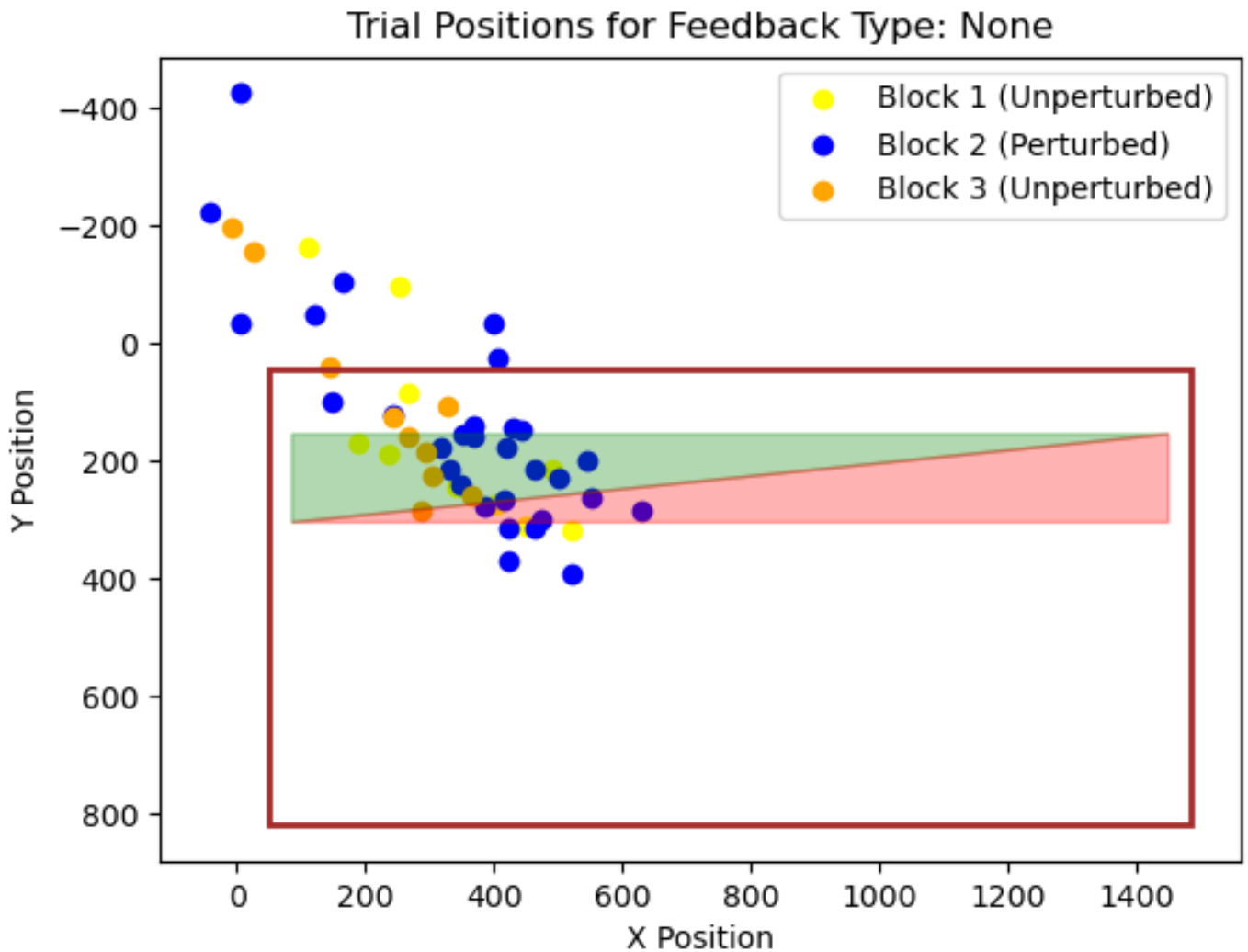
feedback_type= ‘trajectory‘

feedback_type= ‘endpos‘

feedback_type= ‘rl‘

Exercise 3

- TASK 1: Implementation of feedback_types
  - Implement the **3 different feedback_types**: ‘trajectory‘, ‘endpos‘, ‘rl‘
  - **Design** your own experiment to test feedback_types
- TASK 2: Analysis of feedback on unbiased subjects
  - **Record** the subject performing your own experiment
  - **Visualize** the effect of different feedback on subject‘s performance
- TASK 3: Discussion of your results
  - What’s the effect on subject’s performance of each feedback_type
  - Under which feedback_type was your subject able to adapt the best?


Trial Positions for Feedback Type: None
Block 1 (Unperturbed)
Block 2 (Perturbed)
Block 3 (Unperturbed)
−400
−200
0
200
400
600
800
Y Position
0
200
400
600
800
1000
1200
1400
X Position