

# Quiz

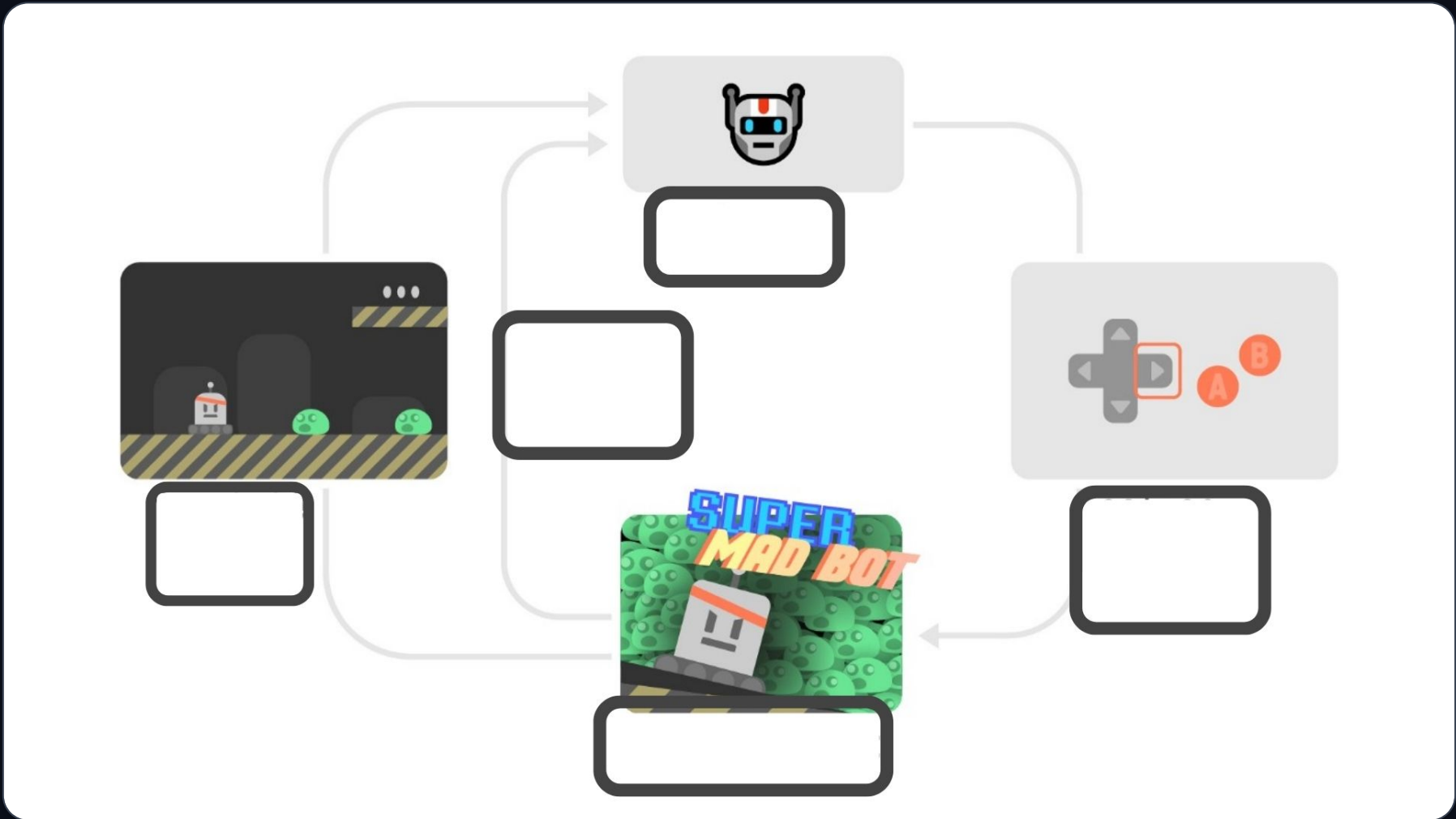
The best way to learn and to avoid the illusion of competence is to **test yourself**. This will help you to find **where you need to reinforce your knowledge**.

## Q1: What is Reinforcement Learning?

▼ Solution

Reinforcement learning is a **framework for solving control tasks (also called decision problems)** by building agents that learn from the environment by interacting with it through trial and error and **receiving rewards (positive or negative) as unique feedback**.

## Q2: Define the RL Loop



At every step:

- Our Agent receives    from the environment
  - Based on that    the Agent takes an
  - Our Agent will move to the right
  - The Environment goes to a
  - The Environment gives a    to the Agent
- ☐ an action a0, action a0, state s0, state s1, reward r1
- ☒ state s0, state s0, action a0, new state s1, reward r1

Correct!

☐ a state s0, state s0, action a0, state s1, action a1

Submit

You got all the answers!

### Q3: What's the difference between a state and an observation?

☒ The state is a complete description of the state of the world (there is no hidden information)

Correct!

☐ The state is a partial description of the state

☐ The observation is a complete description of the state of the world (there is no hidden information)

☒ The observation is a partial description of the state

Correct!

☒ We receive a state when we play with chess environment

Correct! Since we have access to the whole checkboard information.

☐ We receive an observation when we play with chess environment

☐ We receive a state when we play with Super Mario Bros

☒ We receive an observation when we play with Super Mario Bros

Correct! We only see a part of the level close to the player.

Submit

You got all the answers!

### Q4: A task is an instance of a Reinforcement Learning problem. What are the two types of tasks?

☒ Episodic

Correct! In Episodic task, we have a starting point and an ending point (a terminal state). This creates an episode: a list of States, Actions, Rewards, and new States. For instance, think about Super Mario Bros: an episode begin at the launch of a new Mario Level and ending when you're killed or you reached the end of the level.

☐ Recursive

☐ Adversarial

☒ Continuing

Correct! Continuing tasks are tasks that continue forever (no terminal state). In this case, the agent must learn how to choose the best actions and simultaneously interact with the environment.

Submit

You got all the answers!

### Q5: What is the exploration/exploitation tradeoff?

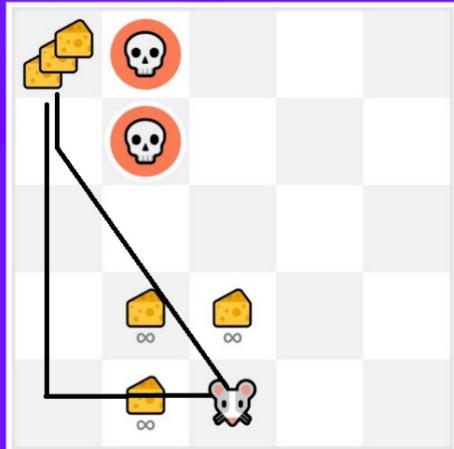
#### ▼ Solution

In Reinforcement Learning, we need to **balance how much we explore the environment and how much we exploit what we know about the environment.**

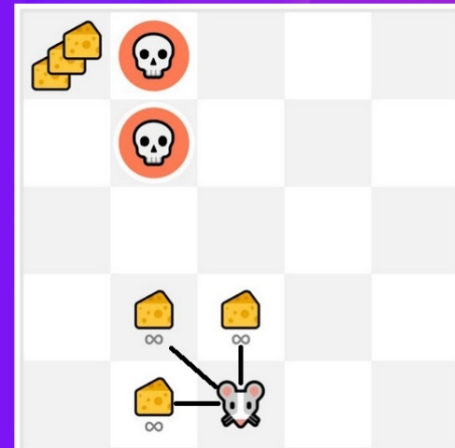
- *Exploration* is exploring the environment by **trying random actions in order to find more information about the environment.**
- *Exploitation* is **exploiting known information to maximize the reward.**

# Exploration/ Exploitation tradeoff

**Exploration:** trying random actions in order to find more information about the environment.



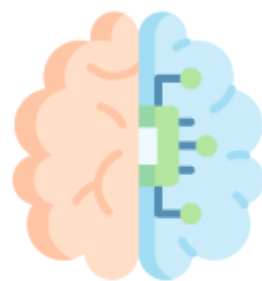
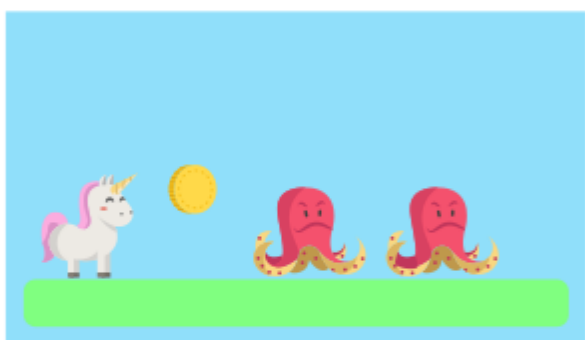
**Exploitation:** using known information to maximize the reward.



Q6: What is a policy?

▼ Solution

- The Policy  $\pi$  is the **brain of our Agent**. It's the function that tells us what action to take given the state we are in. So it defines the agent's behavior at a given time.



State



$\pi(\text{State}) \rightarrow \text{Action}$

Q7: What are value-based methods?

▼ Solution

- Value-based methods is one of the main approaches for solving RL problems.
- In Value-based methods, instead of training a policy function, we train a **value function** that maps a state to the expected value of being at that state.

Q8: What are policy-based methods?

▼ Solution

- In *Policy-Based Methods*, we learn a **policy function** directly.

- This policy function will **map from each state to the best corresponding action at that state**. Or a **probability distribution over the set of possible actions at that state**.

Congrats on finishing this Quiz 🎉, if you missed some elements, take time to read again the chapter to reinforce (😊) your knowledge, but **do not worry**: during the course we'll go over again of these concepts, and you'll **reinforce your theoretical knowledge with hands-on**.

← Hands-on

Conclusion →