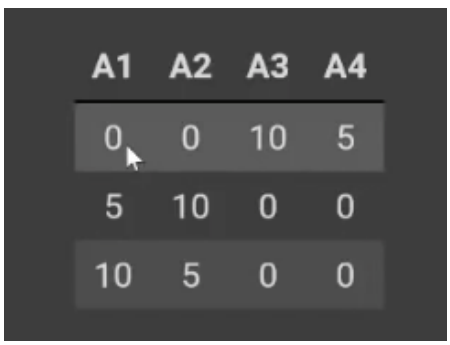
- ***-> reinforcement learning***
  - -> this is a machine learning technique
  - -> we let the model (agent) decide what the clusters / categories are
  - -> the model makes mistakes and learns from them
  - -> there are many different types
    - -> this is Q learning
  - -> this is an introduction
- ***-> terminology***
  - ***-> environment*** <- what we are trying to solve, it's the landscape we are exploring
    - and the landscape is made of data
  - ***-> agent <- what explores the environment***
    - -> something exploring an environment
    - -> e.g training AIs to play games
  - ***-> the state***
    - -> where you are in the environment
    - -> the agent is in a specific state
      - the state of the agent
  - ***-> the action***
    - -> actions are e.g moving to the left or the right in an environment
    - -> or taking no action at all
    - -> something like jumping
    - -> you can be in the same state after performing an action
  - ***-> reward***
    - -> this is what the agent is trying to maximise
    - -> you need to give the agent a reward when it performs the action correctly
      - e.g it's like a loss function in recurrence neural networks
      - -> it's an optimisation problem where you're trying to maximise the reward
      - -> you can give it negative rewards to stop it from doing something
  - -> having the agent take navigate the environment, going through the states and determining which actions maximise the rewards in each specific state
- ***-> Q-learning***
  - -> a method to do re-enforcement learning
  - -> creating a matrix - each row containing each state and action which could be taken



A1	A2	A3	A4
0	0	10	5
5	10	0	0
10	5	0	0

    - -> A's are the actions
    - -> the rows are the different states
    - -> the values are the different rewards to expect if that action was taken while in that state
    - -> **there are optimal actions to take, depending on the state**
    - -> what the predicted reward is for an action which is taken
  - -> it learns what the table is
  - -> the key components of reinforcement learning are environment, agent, state, action, and reward