Tetris

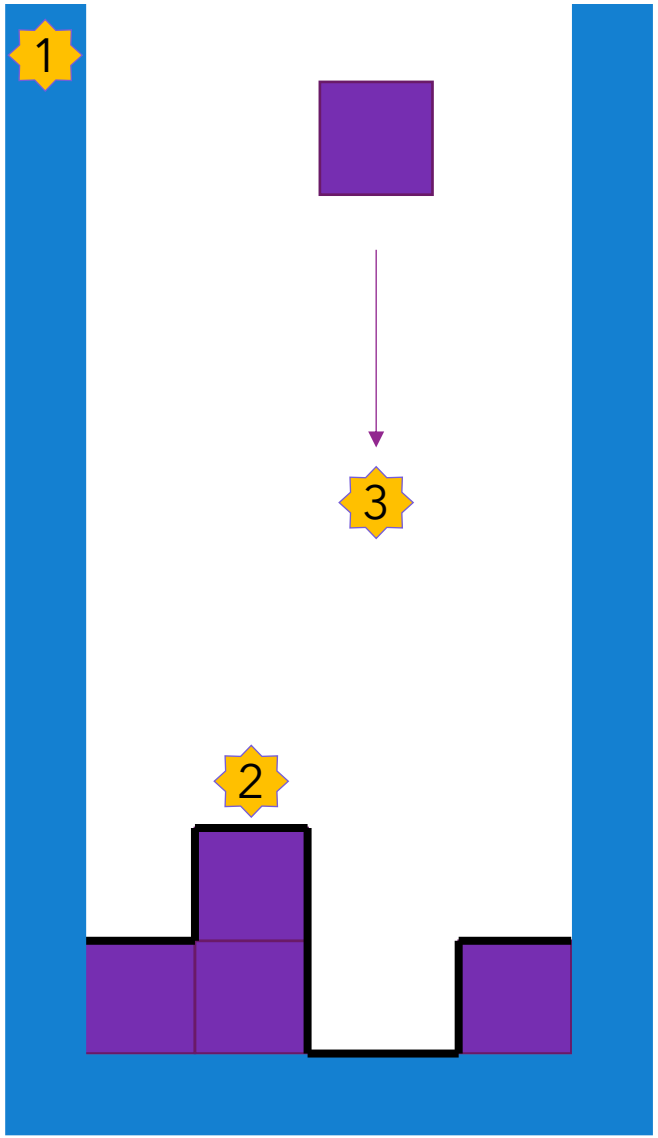
The AI game

Goal based agent

- We have decided, to use this kind of agent to play our Tetris game.
- The main reasons for this was:
  - It has the knowlagde about current state of enviroment
  - It is goal based oriented
  - It can choose apropiate actions based on the goal
- Our agent was design to observe the board enviroment, especially the currenlty falling piece and the pieces that were placed on the board by now. Based on the current piece knowlagde, it could go trough all the X axis and decide which place is the most profitable. Decision about the profit for current place was made based on the points. Those were collected conditionally based on the black line, blue line and well suited place. For each place, the sum of points was calculated four times – each one for every rotation. The best of those four, were choosen and remebered for future comprasion. Process was completed once, each x of X axis were assign to the best sum of points, on it's place. Next part of the process, was to move the piece that many times – that piece position, could reflect the one with the best/ heighest points value. The last thing for the agent, left to do, was to rotate a piece based on the previous calculations. At the end, when the block touches the others, it is moved to the state["game"], as a result – new piece appears and be handled by the the agent.

Points calculation

1. **Blue line –** identified by the frame of the board.
2. **Black line –** identified by the blocks, which are laid down on top of others or empty board at the beginning. Black line can contains part of the blue line or can be equal to it whenever, there are no blocks placed yet, or first x line is not covered by blocks.
3. **Well-suited place –** identified as a location, where as soon as the falling block will fit in the x line will be fulfilled, means we will score a point



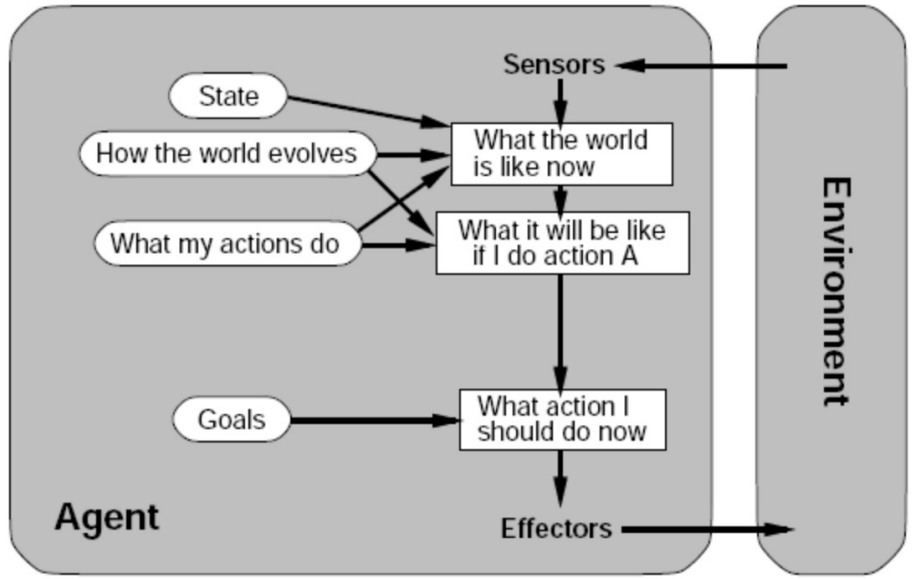
Structure of our agent

State – it reflects the knowlagde of all the pieces that are laid down already.

How the world evolves – agent knows the piece that will appear next.

What my actions to do – agent knows how the action is going to affect the enviroemnt (ex. It knows what will happen when the piece will be placed).

Goals – is the most profitable place and position for the current piece.



Properties of enviroment

1. **Accesible** - agent's sensory apparatus gives it access to the complete state of the environment.

2. **Deterministic** - next state of the environment is completely determined by the current state and the actions selected by the agents.

3. **Episodic** - In an episodic environment, the agent's experience is divided into "episodes." Each episode consists of the agent perceiving and then acting.

4. **Dynamic** – The enviroment changes with the passage of time.

5. **Discrete** – when we think about two different games, becouse one does not affect the other.
Continuous – when we think about moving current piece, becouse it affects the possible moves/positions of next piece.

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