ID2209 – Distributed Artificial Intelligence and Intelligent Agents

Assignment 3 – GAMA and Agents

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How to run

Run Gama.exe and import the .gaml files.Press the green button to execute the experiment called myExperiment (each .gaml file has a separate experiment).

Species

Queen:

The Queens are the agents that have to be placed at the chess board at an acceptable position. The table is stable when all queens have been placed at an acceptable position at the table. Each queen has a successor and a predecessor. The position of a queen is acceptable if it follows the following rules: No two queens can share the same row, No two queens can share the same column, No two queens can share the same diagonal line

MyGrid

The MyGrid is the chess table.

Stage

The Stage are agents that are placed at a specific location at the festival. Each stage has one event/concert at a time and when it starts the Stage shares the attributes of this event with the Guests so the guests can rate this stage according to their preferences. At the extra challenge the first stage will be the squid game place and its behavior will be different than the other ones. All guests will play games and die with a high probability. Maybe one of them will stay alive and win the game.

Guest

The Guests are agents that wander around and choose concerts to visit according to their preferences. They visit the concert they prefer and party there until it finishes or a better one comes up.

Leader

The Leader is an agent used at Challenge 1. All guests send the stage they prefer to the leader and if they prefer crowded places or not. The Leader will share the number of guests per stage and the number of antisocial guests per stage. Based on this information the guest will choose at which stage to go because he may change his mind if for example he is social but understands that not so many people will go to the event .

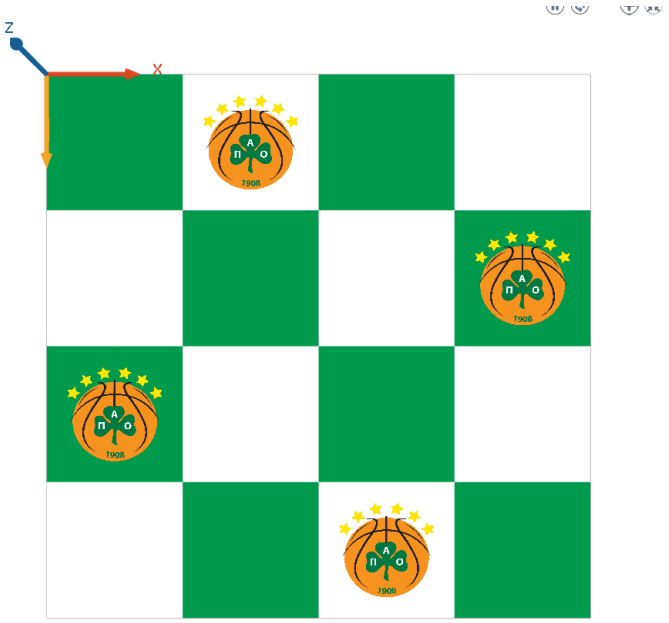
Base concept 1: Chess

The first base concept was positioning an amount of queens (chess pawns) in such a way as they could not be threatened by another queen. The amount of queen can be N, equal to the NxN dimensions of the chess board.

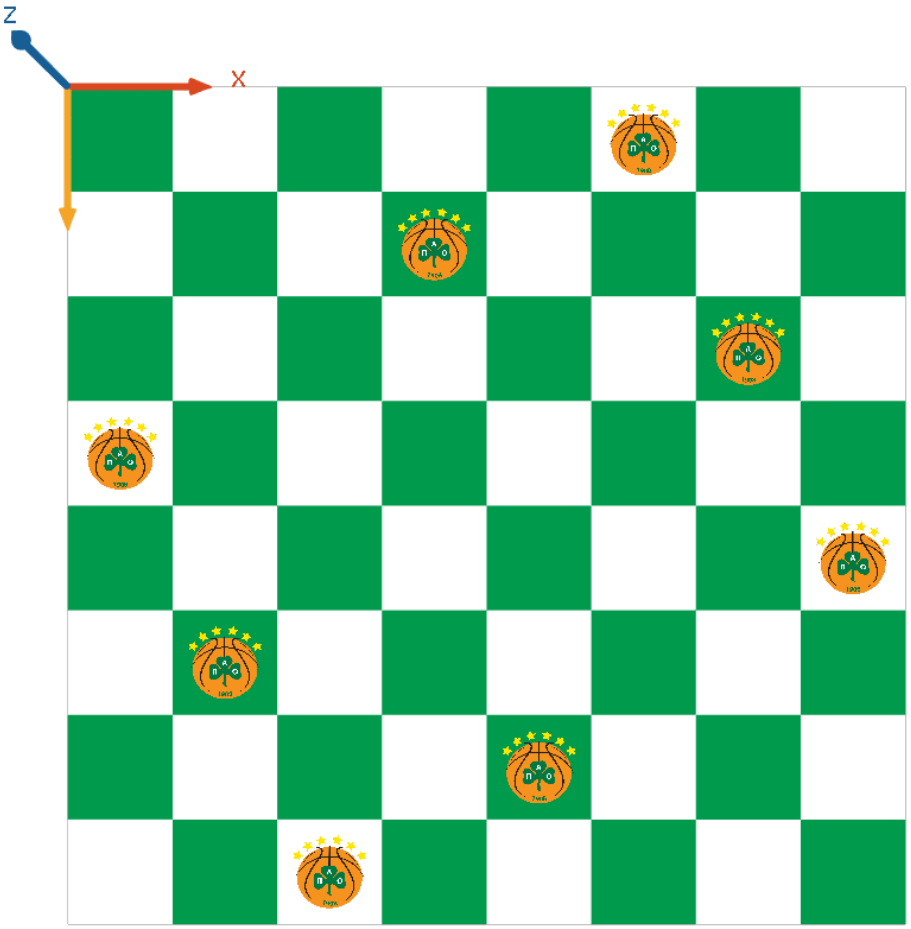
As requested, each queen can only communicate with its predecessor and successor (via fipa). To solve this problem we are using recursion. A queen will first select a random position on the board, and then check with its predecessor to see if it is threatened. In order to do that we do not only need the permission of our direct predecessor, but also our grandfathers. Therefore all our distant predecessors will be recursively asked, and if all cannot reach us then we can keep our position. So, if we get a total green light we can inform our successor that it can start positioning itself too. If the location it picked is not safe, the queen will have to select another position. To make things faster, each queen keeps track of which positions it has picked in order not to pick one again. If it has no remaining positions then it considers itself blocked and it informs its predecessor that it needs to move and start the algorithm again. At this stage obviously the queen forgets the positions that it has been since it can test them again.

When a queen that has no successor has successfully positioned itself the problem is solved and the algorithm is terminated.

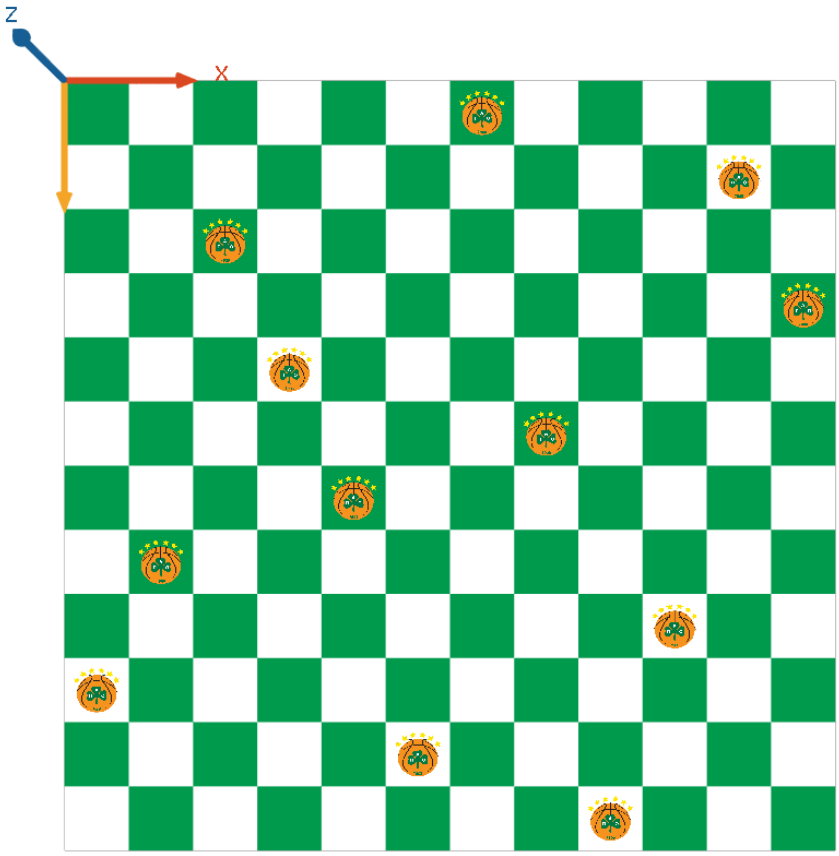
Queens = 4



Queens = 8



Queens = 12



Base concept 2: Basic Festival

In this task the participants of the festival will pick an importance (ie weight) for some 6 attributes that are offered in each event in the festival. Events can start and finish after some point, therefore for each stage that can accommodate an event, those values for the event get reinitialized. However, the guests will always have the same values for their preferences.

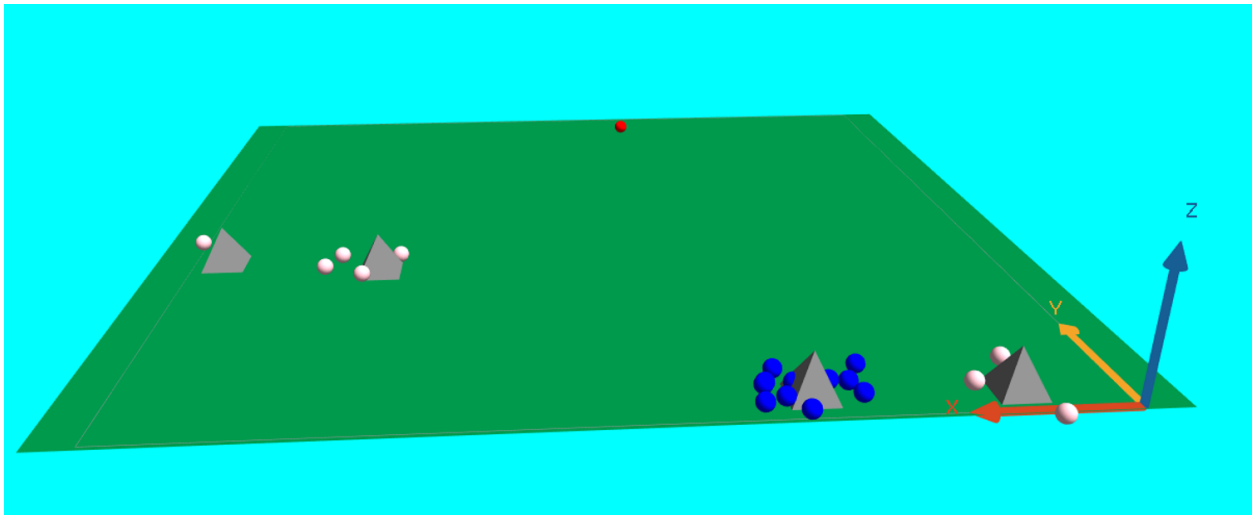
After a guest has checked the attribute values of each stage and has calculated the score for each stage (using the formula provided in the presentation), it selects the best stage for him and goes there to have fun until the event is over.

Challenge 1: Introverts and Extroverts

In this challenge, a guest can randomly be social or antisocial. Social guests prefer bigger crowds, when antisocial ones generally prefer smaller ones. That being said, the size of the crowd is not the only factor at play when a guest is picking an event, but it does play a relatively larger role in his selection. Running the experiment one will see that blue (ie social) actors either stick together (since they all like popular stages) or go to an event that has happened to be attended by antisocial people that can still sometimes appear in numbers.

However, the spread of white agents (antisocial people) is way more thin than the blue (social) people.

In order to do that a new agent, the leader, has been created that gathers the initial votes of the guests (ie where they would have gone if there was no crowd factor to think of) and adjusts their preferences according to how many people will attend the event that they have picked.



Extra challenge: Squid Game

As an extra challenge we have implemented a special event that can take place only once in the festival, as it includes slightly breaking the law by killing all but 1 participant (if he is lucky enough to survive too). They are lured in the game with the promise of money. Dead participants turn red (sorry) and don't move, but the stage is immediately shut down by the festival authorities. Guests are not allowed to enter again, and if one was lucky enough to survive he is not allowed to leave (possibly until the police arrive).

Not to ruin the mood, the other guests keep partying in the remaining stages.