ID 2209 - Distributed Artificial Intelligence and Intelligent Agents

Assignment 3 - Coordination and Utility

Group 3
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Introduction

This assignment had two main tasks. The first one was a practical implementation of the N queens problem. The N queens problem requires to position N number of queens on a chess board such that no queen is in the attack range of any other queen. The solution must work for up to 20 queens.

The second task was to implement a concert simulation where each stage has different properties, and agents choose a stage based on their preference by calculating the total utility from each individual property of the stages.

How to run

Run GAMA 1.8 and open *Main.gaml* file. Press the green button 'my_experiment' to run the simulation.

Species

Agent Queen

Queen is an agent that goes to it's rows on the board and contact the predecessor to check whether it can stand there. Each queen only knows it's column and its predecessor. We simply run a loop and each queen moves one cell at a time and checks whether it is okay or not. If not - predecessor has to find a new cell.

Agent People

This agent has the following behaviour patterns: go_wander (wander around if no group is present after a concert has finished), receive_inform (the agent gets contacted by the stage and then compares the stages and which one it wants to go to). It has 6 different aspects that determines its choice of the stage it wants to go to. It is shown visually by giving it a color from white to black.

Agent Stage

This agent is responsible for informing people about the concerts that are happening and has six different king of aspects to it that lets the people choose accordingly. Also changes colors based on the aspects.

Implementation

Queens

First of all, we googles about the N queens problem, and spent a couple hours thinking about how we should go about implementing this solution. Then, after finding a solution we checked out the documents about how to implement our solution and began writing the code.

Festival

We began this task by using the core of the previous homework's implementation in order to build a skeleton for this homework. We have then proceeded by implementing a basic FIPA communication, starting with inform and cfp as performatives. After that, we have implemented the people agents' responses to choosing a stage.

Results

For the Queens we show the solution with animation of the queens movements.

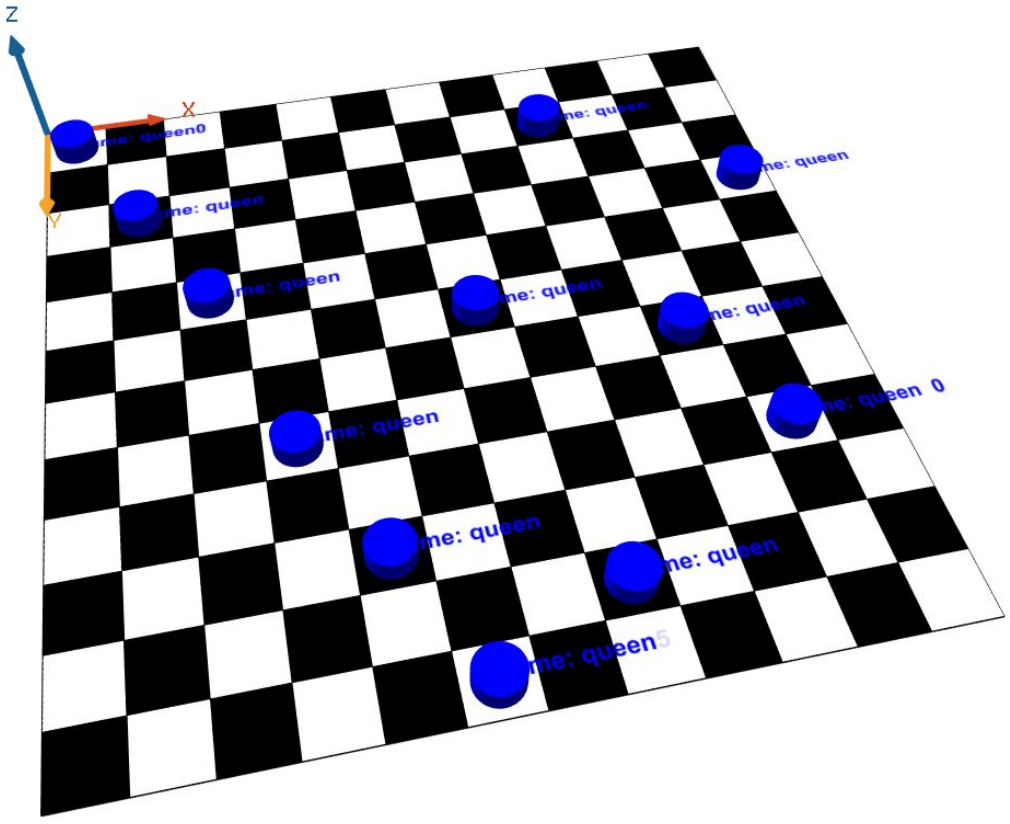

Figure 1: A screenshot of the final solution.

For the festival we demonstrate everything by people choosing a stage according to if it is as similar of color as possible.

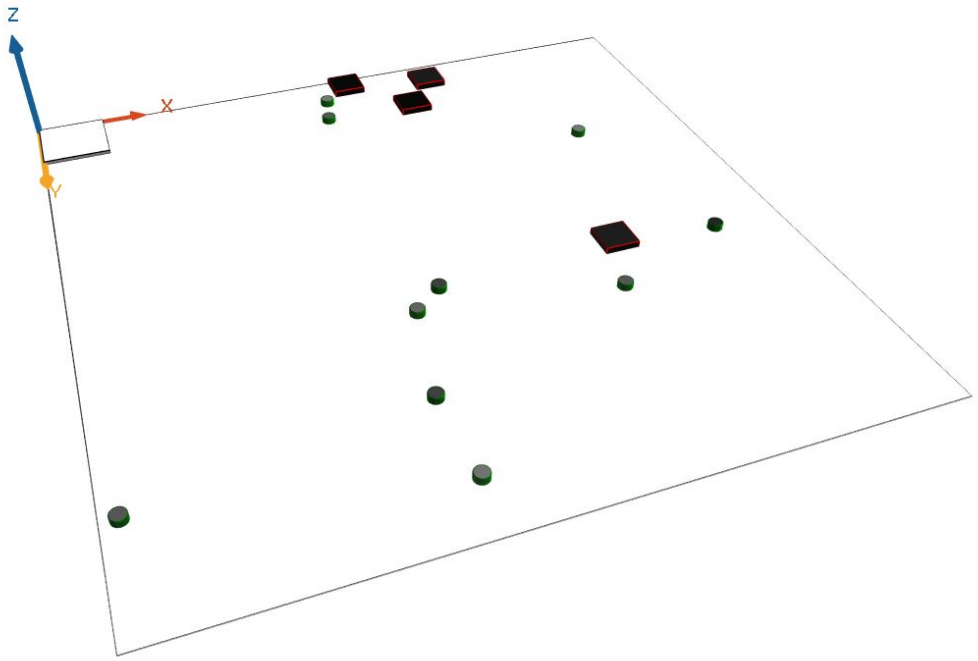

Figure 2: A screenshot of the final solution + creative part.

Creative implementation

Our creative solution is an improved version of the Task 2. If for the Task 2 all of the agents had to associate with a stage, no matter how far the utility score was, our creative part introduces a certain boundary of what the agents are willing to put up with. If all of the stages are of no interest to the agent, then the agent goes to the resting area, where it waits until the stage changes the utility and checks again, whether it has become more interesting since.

Moreover, if the agent can not find a new concert for too long, it becomes displeased and decides to leave the festival.

We argue that we should receive a bonus point for creativity in this assignment because not only did we include functionality other than what was asked in the assignment (3d gui, GUI improvements), but it is also an interesting visually presentable feature.

Qualitative/Quantitative questions	*Answer*
Time spent on finding and developing the creative part	1 hour
In what area is your idea mostly related to...	3D GUI, GUI improvements, math functions
On the scale of 1-5, how much did the extra feature add to the assignment?	5

On the scale of 1-5, how much did you learn from implementing your feature?	4

Discussion / Conclusion

The main learning outcome of this assignment was the understanding of how to solve the N queen problem with use of intelligent agents. It may be simple if you have a global entity, but in an environment like ours it becomes a tricky task to complete.