

# Assignment 1 – Gama & agent

*Group 27*

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13/11/2019

## *Festival*

In this assignment, we were tasked to create 3 types of agents: 10 guests, an information center and 4 stores in GAMA, and implement that the users randomly get hungry or thirsty, whenever these happened the users go to the information center and then the information center gives them randomly one of the stores food or drinks, given the need.

## *How to run*

Run GAMA 1.7 and open the file Project1, there will be 4 scripts project.gaml, challenge1.gaml, challenge2.gaml and idea.galm. Open the file which wants to be checked and press main (left top of script window) to run the simulation. Note that changing parameters of number of guests can be done without any repercussions, also the variable numStores can be changed without any problem.

## Species

### Guest

This agent is wondering around in a random place at the festival, until it randomly feels hungry or thirsty. The Agent is responsible of choosing randomly its state (hungry or thirsty) and getting to a target point. The important variables are Boolean thirsty, hungry and as point targetPoint. The reflex used was to check when entering a store if it was in the information center or store, if it is in the information center it asks randomly for the in need store, and if it is at the target store it goes to a random place to wander and do nothing.

### InfoCenter

This agent is responsible of giving the position of the store to the guest requesting it and since there are two stores of food and two of drinking, the InfoCenter has two lists with the location of all the stores of each type.

### Store

This agent has two default aspects food and drink.

## Implementation

First, we created all the needed agents in this case InfoCenter, Guests and Stores. Then we started designing the Store since they are statics and have no reflexes. Then, we went on with Info center, that has only the task to ask the stores their location and add them to the lists. Finally, the agents which were the most complicated regarding their behavior, we started creating the necessary reflexes and then filling them with the logic.

## Results

As you can see in the following log, the guest go to the information center if they feel hungry or thirsty, then they go to the respective store and when they finish they are done.

Guest7 going to Info Center and I am hungry

Guest13 going to Info Center and I am thirsty

Guest4 going to Info Center and I am thirsty

Guest14 going to Info Center and I am hungry

Guest9 going to Info Center and I am thirsty

Guest7 on the way to food store

Guest9 on the way to drinking store

Guest13 on the way to drinking store

Guest18 going to Info Center and I am hungry

Guest7 found food store

Guest4 on the way to drinking store

Guest18 on the way to food store

Guest18 found food store

Guest14 on the way to food store

Guest9 found drinking store

Guest13 found drinking store

Guest14 found food store

Guest4 found drinking store

This can also be demonstrated from the Figure 1, that the agents are red color when hungry and blue when thirsty.

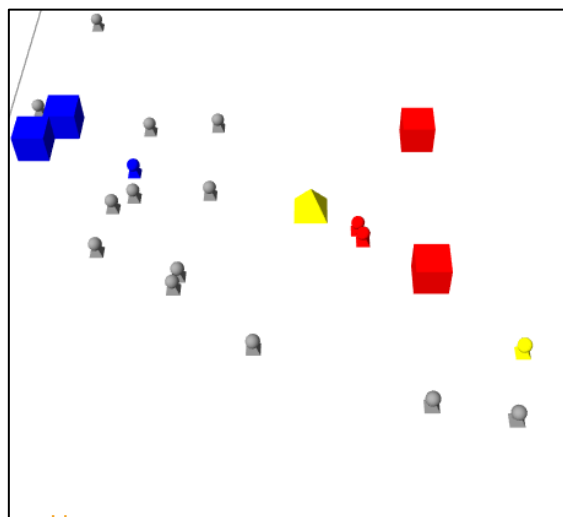


Figure 1: A screenshot of the final solution.

## Challenge 1

To complete the first challenge, we added in the Guest agent a reflex named agentClose and some extra conditions in the reflex state. The agentClose will check if any of the agents that are around him are going to the information center, if so, it would recommend him a place of its desire. The new conditions on the reflex state are to decide if the agent should go to a known place or to get to know a new one. Finally, the travel distance with help and without help can be observed in Figure 2.

```

Thanks for the drink-tip
Distance without help: 21001.646657281304
Distance with help:    20994.854869855826
Thanks for the drink-tip
Distance without help: 26025.45902189253
Distance with help:    26015.557262958886
Thanks for the drink-tip
Distance without help: 29373.321911458315
Distance with help:    29350.61348487221

```

*Figure 2: A screenshot of distance travel by all agents.*

## Challenge 2

To complete the second challenge, we added multiple boolean variables to Guests, this in order to the accomplish a sequential behavior of the agent. Additionally, a new agent was introduced Security. The agents Guest now where constantly responsive to the presence of any bad guests, and in any case one is found they would go to the Information center and ask for the guard's location and then go to report the bad behaved agent to the Security guard. Finally, the agent and the guard went to the bad guy and the security agent instruct the bad guy to die, and the bad agent died.

## Creative implementation

For our creative solutions, we started by creating different guests in a simple manner female(white)/male(gray), and creating bathrooms for Female (pink sphere)/male(darkblue sphere). And you will wonder, why? Well the guests seem to drink and eat indefinitely without needing to go to the bathroom. And then thinking on events, parties... We came up with the idea that Bathrooms were missing. From that basis, we created two variables, nDrinks and nFood, when a Guest drinks 2 times it needs to go to pee to the bathroom (orange color), whereas when a Guest eats 3 times it needs to go to longer needs(brown color).

However, we wanted to go one step further and we decided to implement a queuing system. So if someone is in the bathroom, the guest needs to wait until the bathroom is empty. To do so lists and communication with the species Bath had to be created. Furthermore timers, 50 times for Pee, 150 times for Poo, had been created in order to be able to form queues.

Moreover, to create realistic queues the function `index_to` has been used to create a visual image of an expected queue. The values of the timer of the number of drinks or meals, can be modified in order to be able to have longer queues, we set up a high number of the timer to show an extended queue.

To sum up, many creative solutions had to be created in order to be able to obtain a creative implementation that would not only be good in terms of direct results but also visual ones to have a clear picture of what happens. Many Boolean variables and strings had to be created in order to be able to trigger one reflex or the other, which also made it difficult to program it. In Figure 3 you can see a clear picture of the bathroom queues.

We believe that the bonus point should be conceded to us in this assignment, we create a new implementation which also fits perfectly the situation. From there we used features that we didn't used before, such as the queue system or the use of timers to stimulate that. WE had to do a lot of research by our own regarding terminology and options that Gama offers in order to produce the desired result.

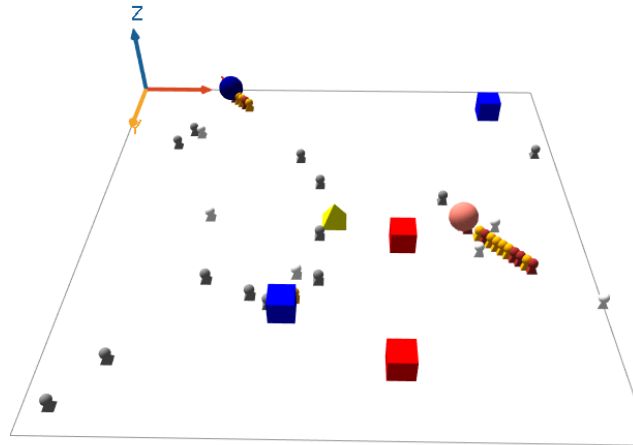


Figure 3: Creative Idea showing the queues formed in Bathrooms

Answer	Qualitative/Quantitative questions
Time spent on finding and developing the creative part	10 hours
In what area is your idea mostly related to	Queues, Working with lists, Timers...
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?	5

## Discussion / Conclusion

Creating the project was fun and not so complicated. The complication came with the challenges and the creative idea, when the behavior of an Agent extends and more variables and situations have to be taking in consideration, since the environment is bigger the possibility to miss a situation increments. In general, the assignment was interesting and fun, we learned many things and hope to learn more.