Mobeen's Myrmecology Madness High Level Design (HLD) Document

Introduction

Mobeen has tasked you to build a model demonstrating how ants forage for food. He wants you to build an overhead view of the ant's world. The world will start out with a nest which contains 200 ants. 10 of those ants will be scout ants that will leave the nest and randomly walk around looking for food (the strongest pheromone trails to food). As the ant randomly walks around looking for food or strong pheromone trails, it will leave behind a broken trail of pheromone. The more ants that pass over a spot the stronger the pheromone trail will be come. Over time the pheromone trail will fade as no ants travel over an area.

In this world, the user will be able to place a pile of sugar that contains 1000–5000 grains of sugar. When an ant finds the sugar it will pick up 3 sugar grains and start to follow the broken trail back to the nest leaving a solid pheromone trail on its return. Once the ant returns home, it will recruit 3 other ants to follow the strongest pheromone trail. When the food is depleted, the last ant returns to the nest and signals (with a pheromone) that the food is gone, so the 10 scout ants will return to randomly foraging.

Subject Matter Experts Agreement List

Name	Title/Role	Mandatory Reviewer (Y/N)	Approved
Apprentice name	Developer	Y	
Phil List	Supervisor	Y	
Eric Horton	Intern-apprentice wrangler	Y	
Mentor	Mentor	Y	

Requirements

    a. A Javascript or Agentsheets model showing the interactions of agents which exhibit the following behaviors:
        i. Ant Agent (Scout depiction)
            1. Moves randomly around world, releasing pheromones

2. If it finds sugar, returns to nest with 3 sugar grains and sends 3 other ants to retrieve sugar

ii. Ant Agent (Waiting depiction)
1. When scouts return, it will follow the strongest pheromones to retrieve 3 grains of sugar.
2. When number of sugar grains reaches zero, it will return to the nest and signal with pheromones that there is no more sugar.

iii. Sugar Agent (Waiting depiction)
1. Contains 1000–5000 grains of sugar
2. Collected by the ants until the number of grains = 0

Timeline

Due one week from the time of starting.

Desired Behavior / Components

The Ground – size 30 x 30
a. The area that the ants walk on
b. Becomes increasingly filled with pheromones as ants walk on it.
c. When the ants are not walking over it, the pheromones will slowly dissapear.

The Nest – size 2 x 2
a. Generates 200 ants at start of model
b. Releases 10 scout ants
c. Releases 3 more ants if scout ant returns

The Sugar Pile – size 4 x 4
a. Placed by the user in any location on the ground (not obstructed by the nest)
b. Number of sugar grains is chosen between 1000 and 5000

The Ants
a. Wait in the nest for scout ants to find sugar
b. When released from nest, follow strongest path of pheromones
c. After finding sugar, bring back 3 grains of sugar to the nest
d. If there is no more sugar, return to the nest and signal to stop the ants send the scouts back out to walk randomly

The Scout Ants

a. Randomly walk over the ground, releasing a little bit of pheromones
b. When they find sugar, return to nest with 3 grains, releasing a solid line of pheromones
c. Signal for the nest to release 3 more ants, then follow the pheromones back to the sugar to collect more

Conclusion

The goal is this activity is to practice building models and improve your understanding of using Javascript or Agentsheets to create models.