Virtual Ant Colony User Manual:

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Version 1.0

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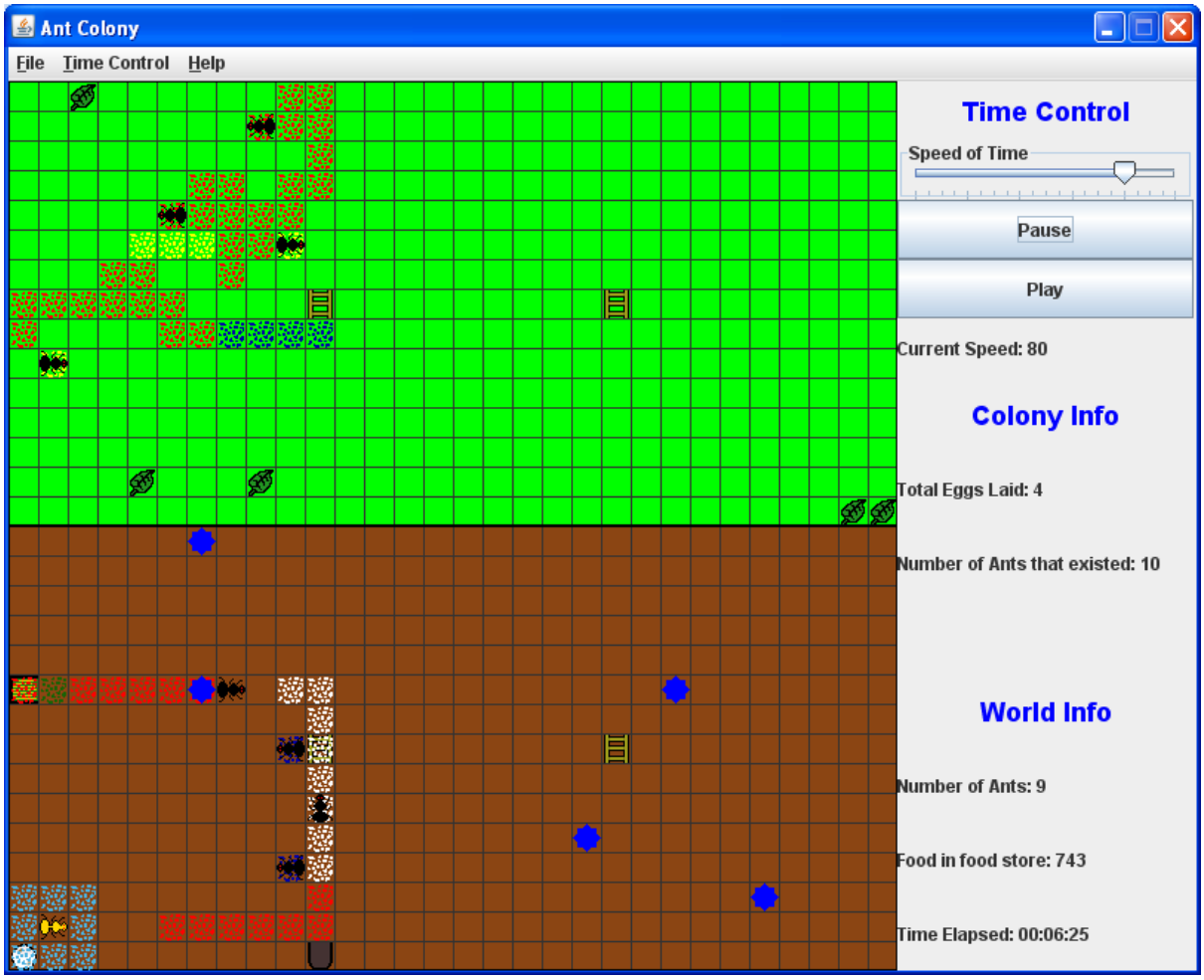
Introduction:

When the program is first run, it will place five normal ants and one Queen Ant in the colony by default. Four ladders, two on each level, will also appear in fixed locations on the map. There will also be five leafs and five water locations added to map at random locations when the program begins.



Decision Making:
The behaviour of the ant will depend on what its priorities are, for example, if it's food and water levels are reasonably high, and it knows that food is needed in the food store, it will gather food. Or if its food level is low, it will go to the food store to get something to eat, and the same thing goes for water, if it's water level is low, it go to a location on the map where it can drink.

Life and Death:
In their life, the ants will carry out various tasks, they will gather, clean, eat, drink, sleep and mate. And like real ants, they have a limited lifespan, so after a certain amount of time the ants will die. They will also die if their water level or food level reaches 0. So the ants will need to eat and drink to stay alive for as long as possible.

What Each Icon Means:

Ant:
-The basic ant, they have a health level out of 100, which reduces by 1 after a certain amount of time. To only way which an ant can regain their health is but either eating or drinking.
-Once the ant reaches a certain age or its food or water level reaches 0, the ant dies.
-The ant mates with the Queen Ant to produce an egg.

Egg:
-The egg is the result of an ant mating with the Queen Ant, the egg will hatch and become an ant after a certain amount of time after it's produced.

Ladder:
-The ladder is the only position on the grid where an ant can change from one level to the next.

Leaf:
-The leaf is where the ants get their food to restore their health and food level, it has a level out of 100 which reduces as an ant eats it. Once the level reaches 0, the leaf disappears.
-The leaf will only appear on the upper level.
-Leafs will be generated at random as the colony lives.

Rubbish:
-The rubbish is produced by the ants a certain amount of time after they have either eaten or drank.
-The rubbish is disposed with by other ants.

Queen Ant:
-The Queen Ant is unlike a normal ant, in that she never needs to eat, drink and doesn't age.
-The Queen Ant is the only ant which can produce an egg, and she only does so after she has been mated with by another ant.

Water:
-The water is where the ants go to restore their health and water level.
-Water can only be found in the lower level.

Den:
-The den is where the ants go to sleep, when they have no other tasks to do.

Food Store:

-The food store is where the ants bring leafs that the find on the upper level.

Pheromones Explained:

Pheromones will allow, not just anyone looking at the program to know what the ants are doing, but they also allow one ant to know what the other ants in the colony may be doing, below is a list of all the pheromones which the ants will produce, and what they mean.

Pink Pheromones:
-The pink pheromones appear around the Queen Ant when she is available for mating.

Blue Pheromones:
-The blue pheromones appear around the Queen Ant when she is unavailable for mating.

Purple Pheromones:
-The purple pheromones appear when a normal ant intends to mate with the Queen Ant.

Red Pheromones:
-The red pheromones appear when the ant is looking for food to put in the food store.

Yellow Pheromones:
-The yellow pheromones appear when the ant has found food and is going to put it in the food store.

White Pheromones:
-The white pheromones appear when the ant is going to the den to sleep.

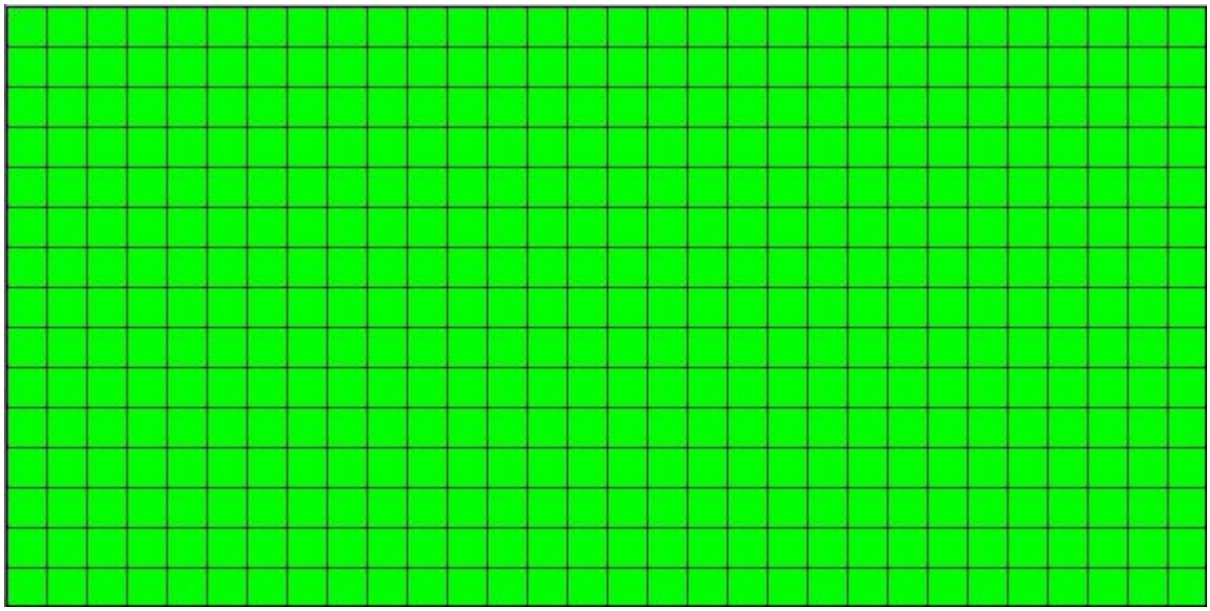
Brown Pheromones:
-The brown pheromones appear when the ant is going to remove some rubbish

Green Pheromones:
-The green pheromones appear when the ant is going to the food store to get something to eat.

Blue Pheromones:
-The blue pheromones appear when the ant is going to find water so it can drink.

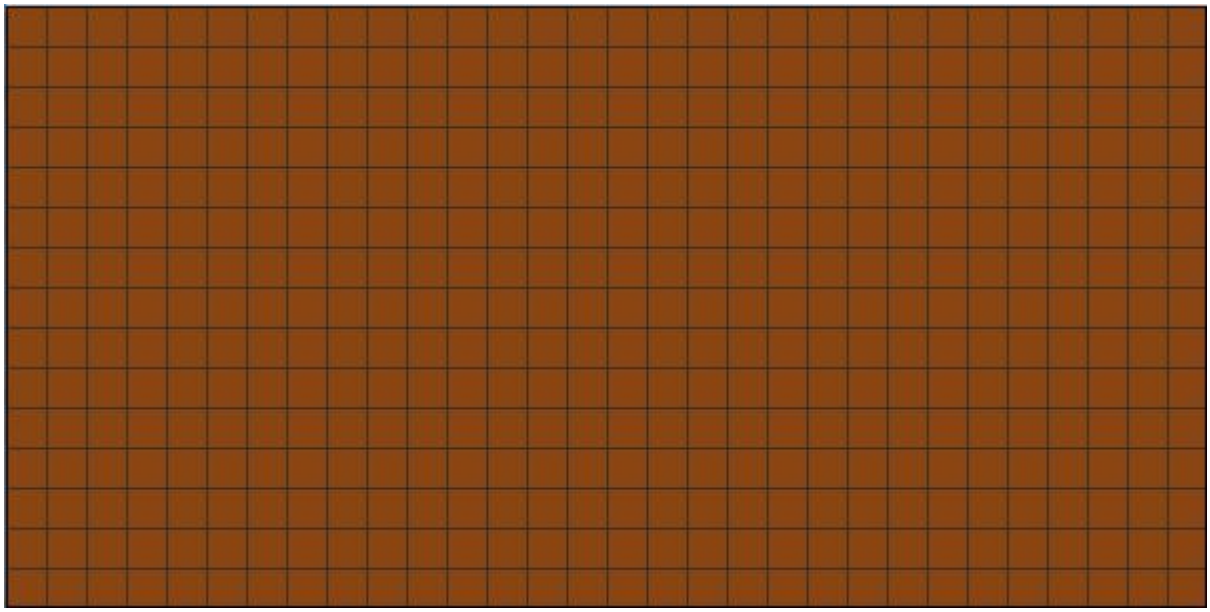
The Five Main Panels:

Upper Level:



-The upper level represents above ground, there are a total of 450 spaces in the upper level.
-There will be 2 places on the upper level for two ladder icons by default.
-The upper level is the only place where leafs will appear.

Lower Level:



-The lower level represents the under-ground, there are a total of 450 spaces in the lower level.
-There will be 2 places on the lower level for two ladder icons by default.
-The Queen Ant will have a default location in the lower level, and will never move from that position.
-The lower level is the only place where water will appear.

Time Control:

The Time Control Window has a slider which can be used to control how fast the ants move on the screen.

Slower:
To make the ants move slower, move the slider to the left.

Faster:
To make the ant move faster, move the slider to the right.

The Time Control Window also has two buttons which the user can use to pause the colony and make them go again.

Colony Info:

The Colony Info Window shows some overall statistics regarding the overall life of the colony.

It shows how many times the Queen Ant has produced an egg, and shows the total number of ants that have ever lived in the colony since its creation.

World Info:

The World Info Window shows information about the colony at the present time.

The number of ants which are currently in the colony is displayed at the top of the window, it increases as new ants are born and decreases as other ants die.

The total number of food which is in the food store is displayed in the middle, this will increase as the ants put food in the food store and will decrease as the ant eat the food that's there.

And at the bottom of the window, the time which has elapsed since the colony was created is displayed, in the format of hh:mm:ss.

About the Virtual Ant Colony:

The Virtual Ant colony was developed using the Java programming language by Ross Andreucetti and Oisín Colm Kelly, students of the School of Computing in Dublin City University in 2011. Work on the project began in February 2011 and was completed in late March of 2011.

The original idea was created by Alistair Sutherland, a lecturer of the school of computing.

The tools used in the development of the program were Eclipse, GIMP and Adobe Photoshop, and the programs were constructed on machines running Windows Vista and Windows XP on both home computers and computers in the DCU School of Computing Laboratories.

Resources used for the project were acquired on the internet, at websites such as:

-The Oracle website: www.oracle.com
-Java Beginner: www.javabeginner.com
-About.com www.java.about.com