

ZOMBIE APOCALYPSE SIMULATOR

GROUP : 170

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PROBLEM STATEMENT

The project aims to provide a simulation environment in which users can simulate the fate of humans (residing in various colonies) trying to survive in a zombie infested world

GOALS:

- ★ To use Ant Colony Optimization (ACO) technique to model the behavior of humans and human-eating zombies.
- ★ To create a GUI using SDL package.

THE START WINDOW

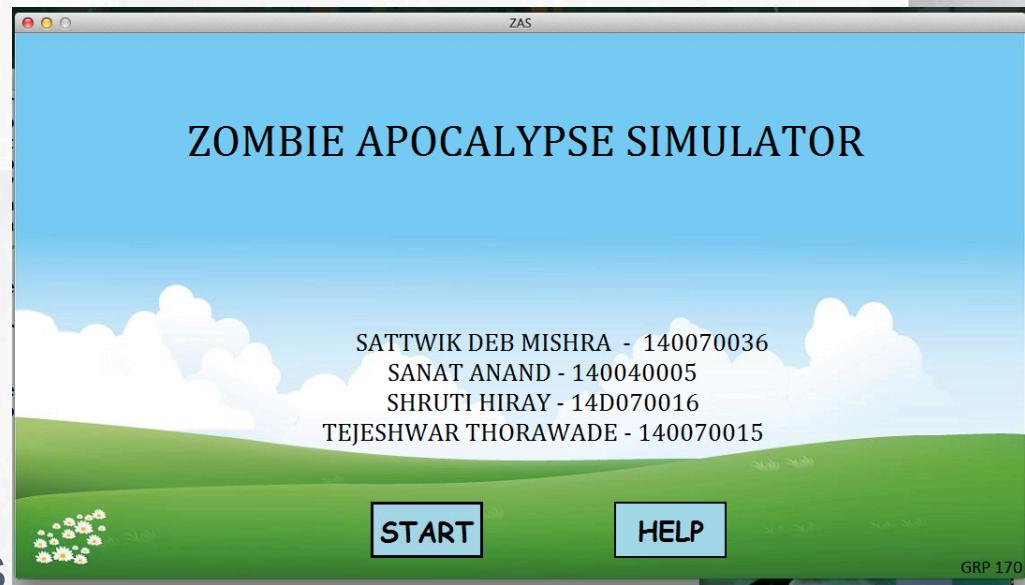
When the program starts the start window appears.

- START BUTTON:

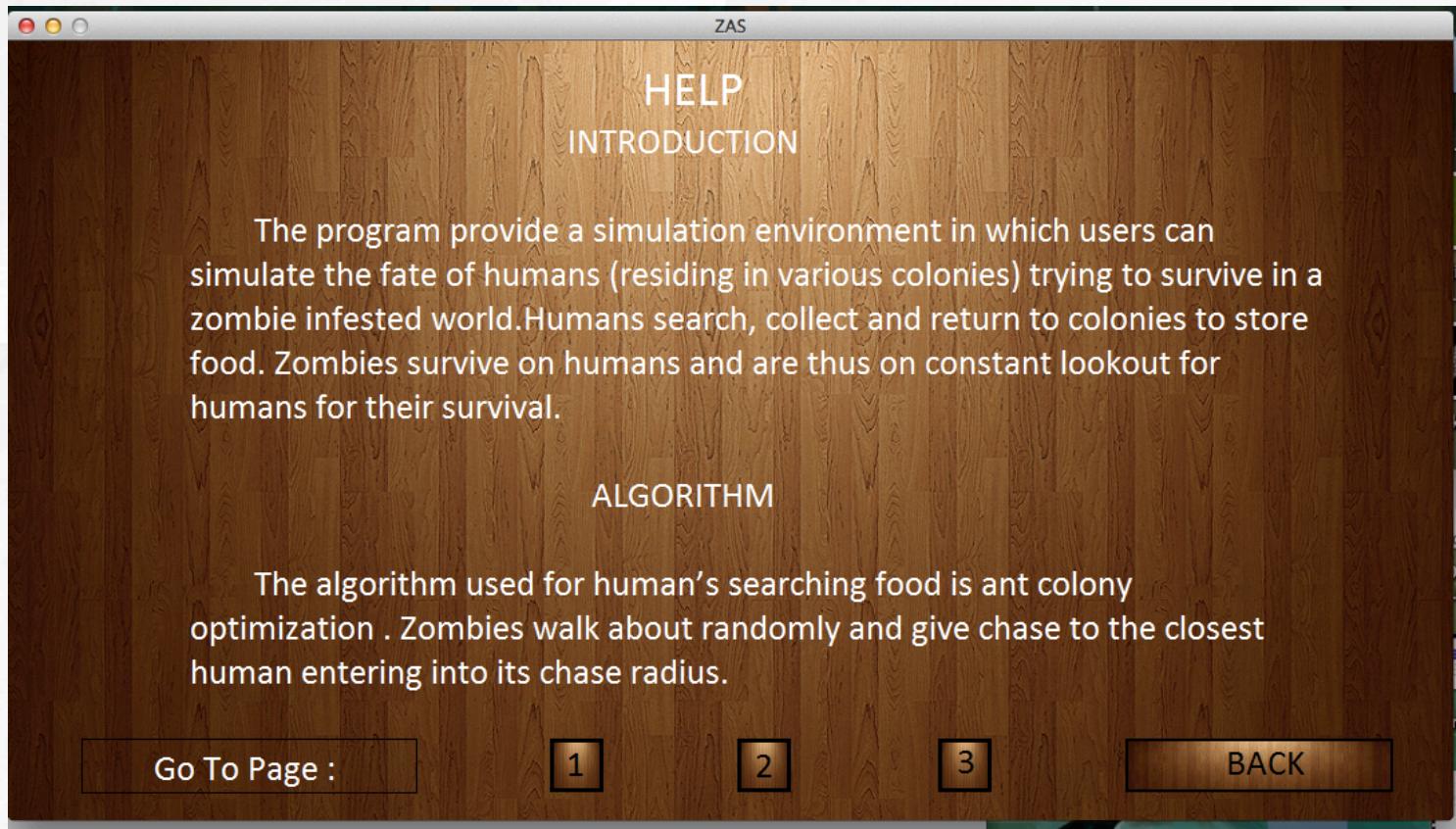
This opens the window to start simulation.

- HELP BUTTON :

This opens the window of instructions for the user.



THE HELP WINDOW



HELP WINDOW : PAGE

2

The screenshot shows a window titled "ZAS" with a wooden background. The title bar has standard Mac OS X red, yellow, and green buttons. The main area contains the following text:

PREREQUISITES

The user must have installed SDL 2 package and C++11 software in order the program to run.

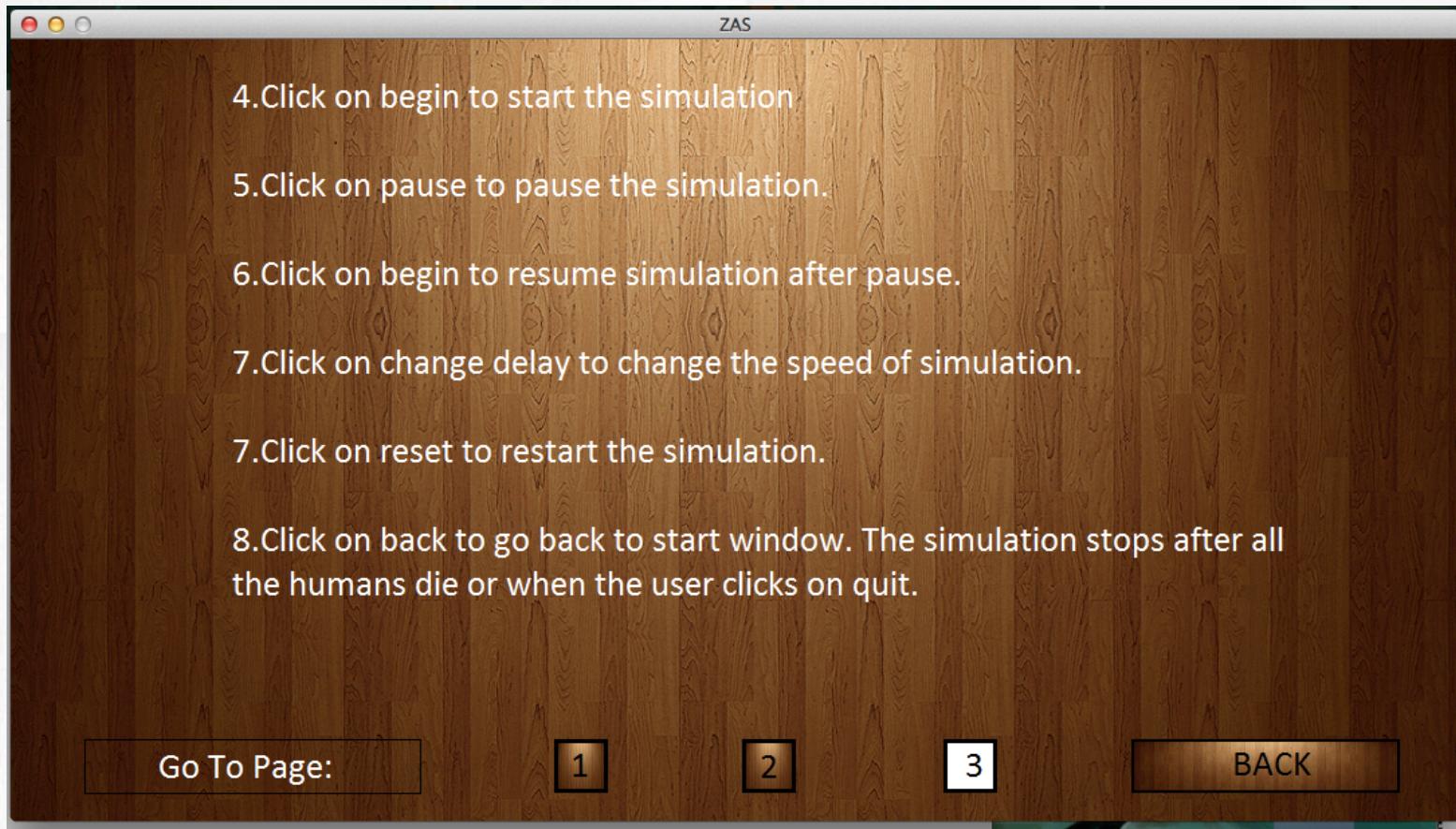
HOW TO USE

- 1.Click on Start to open the main window.
- 2.Add human colony/ zombie nest / food source by clicking on Human colony / Zombie Nest / Food Source buttons in the right side of main window.
- 3.After clicking on the button and setting parameters as required, click on Done and then on the position in the simulation area where you want to keep the human colony/zombie nest/food source.

At the bottom, there are four buttons labeled "1", "2", "3", and "BACK".

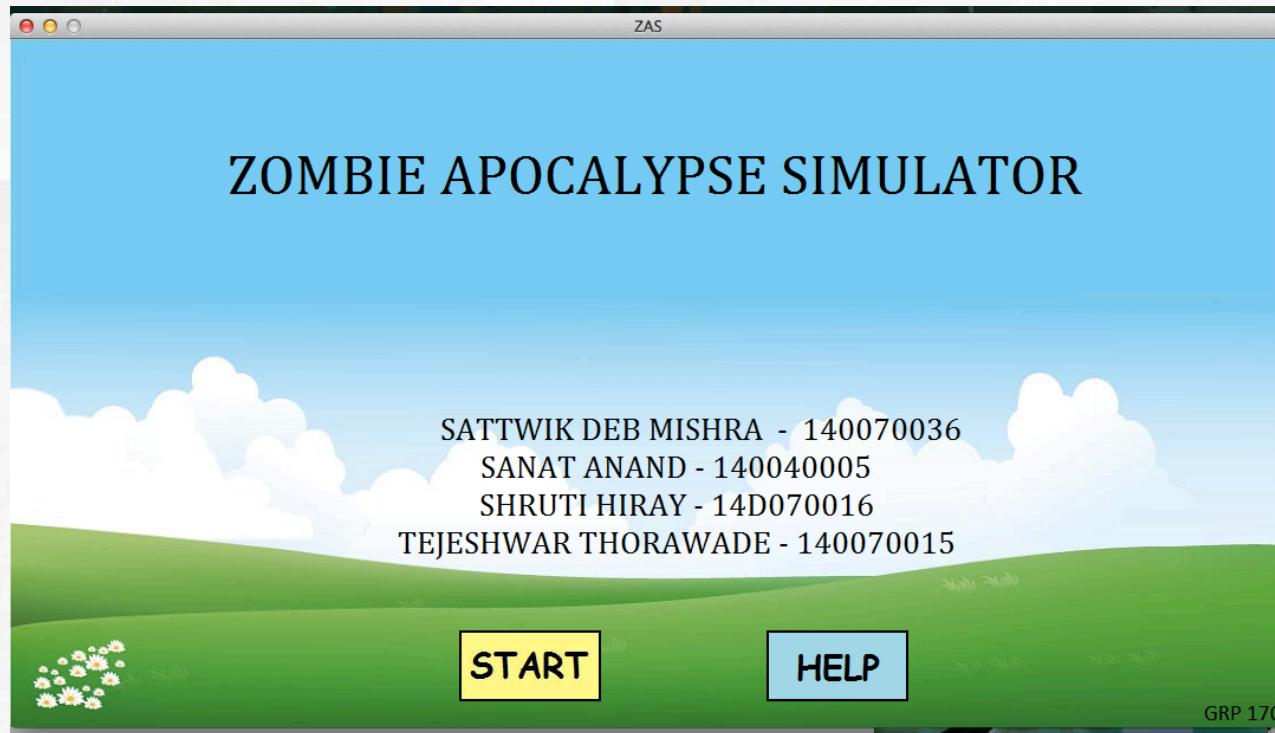
HELP WINDOW : PAGE

3



START WINDOW WHILE CLICKING ON START

A different colour is shown for the button which is being opened.



MAIN WINDOW

It consists of the green simulation area .

Besides it are buttons of Begin and Back.

There are also separate buttons to add human colony, zombie nest and food source and set their parameter values at the start of simulation.



TO END THE SIMULATION



INITIAL PARAMETERS WINDOW

ZAS

HUMAN COLONY PARAMETERS

BIRTH RATE	<input type="text"/>	 
NUMBER OF HUMANS	<input type="text"/>	 
DEATH AGE	<input type="text"/>	 
FOOD AMOUNT	<input type="text"/>	 
STRENGTH	<input type="text"/>	 
MAXIMUM FOOD CARRIED	<input type="text"/>	 
FOOD REQD FOR NEW HUMAN	<input type="text"/>	 
HOME PHEROMONE INCREASE	<input type="text"/>	 
FOOD PHEROMONE INCREASE	<input type="text"/>	 
<input type="button" value="DONE"/>		

WHILE SETTING PARAMETERS

ZAS

HUMAN COLONY PARAMETERS

BIRTH RATE	<input type="text"/>	
NUMBER OF HUMANS	<input type="text"/>	
DEATH AGE	<input type="text"/>	
FOOD AMOUNT	<input type="text"/>	
STRENGTH	<input type="text"/>	
MAXIMUM FOOD CARRIED	<input type="text"/>	
FOOD REQD FOR NEW HUMAN	<input type="text"/>	
HOME PHEROMONE INCREASE	<input type="text"/>	
FOOD PHEROMONE INCREASE	<input type="text"/>	

DONE

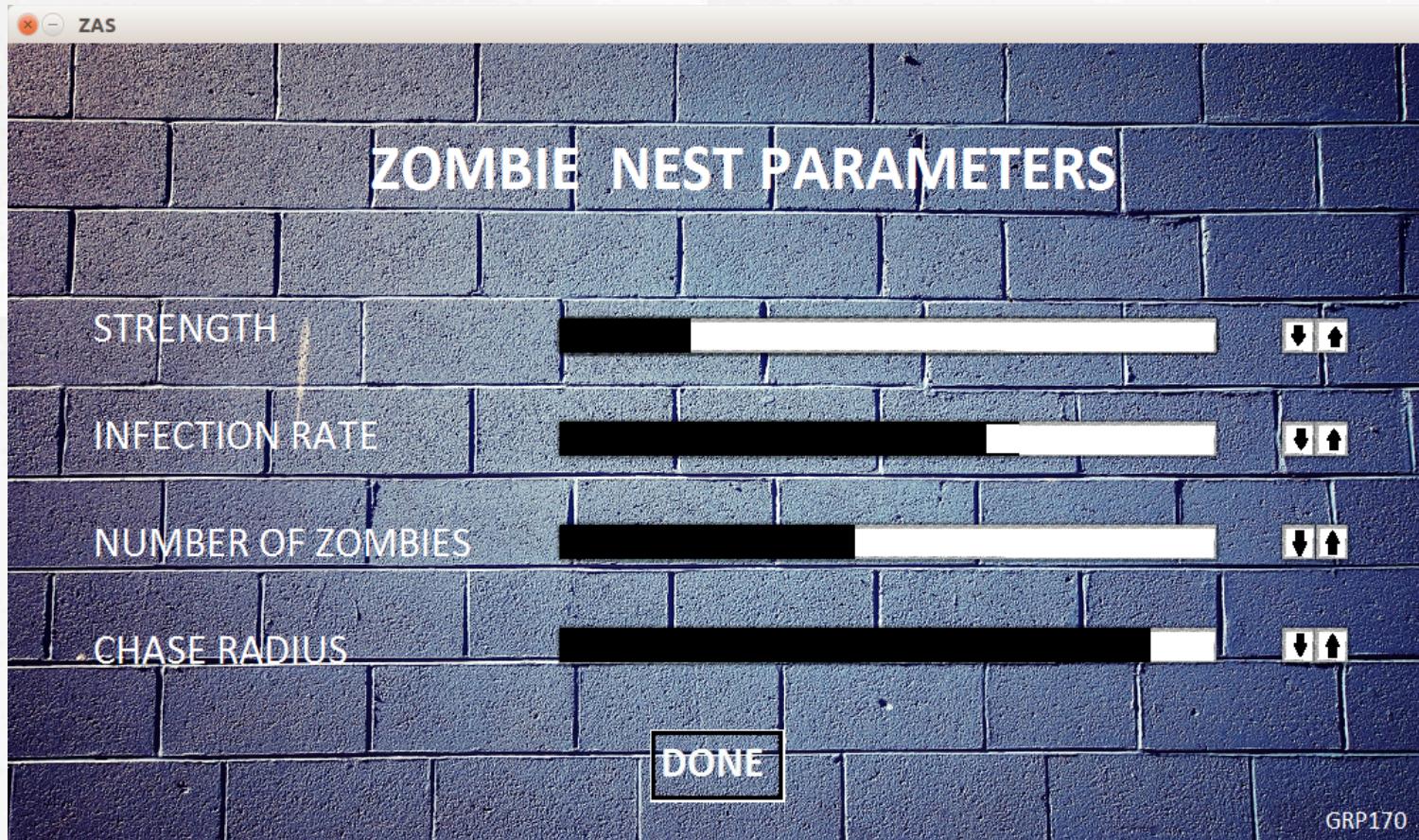
ZAS

HUMAN COLONY PARAMETERS

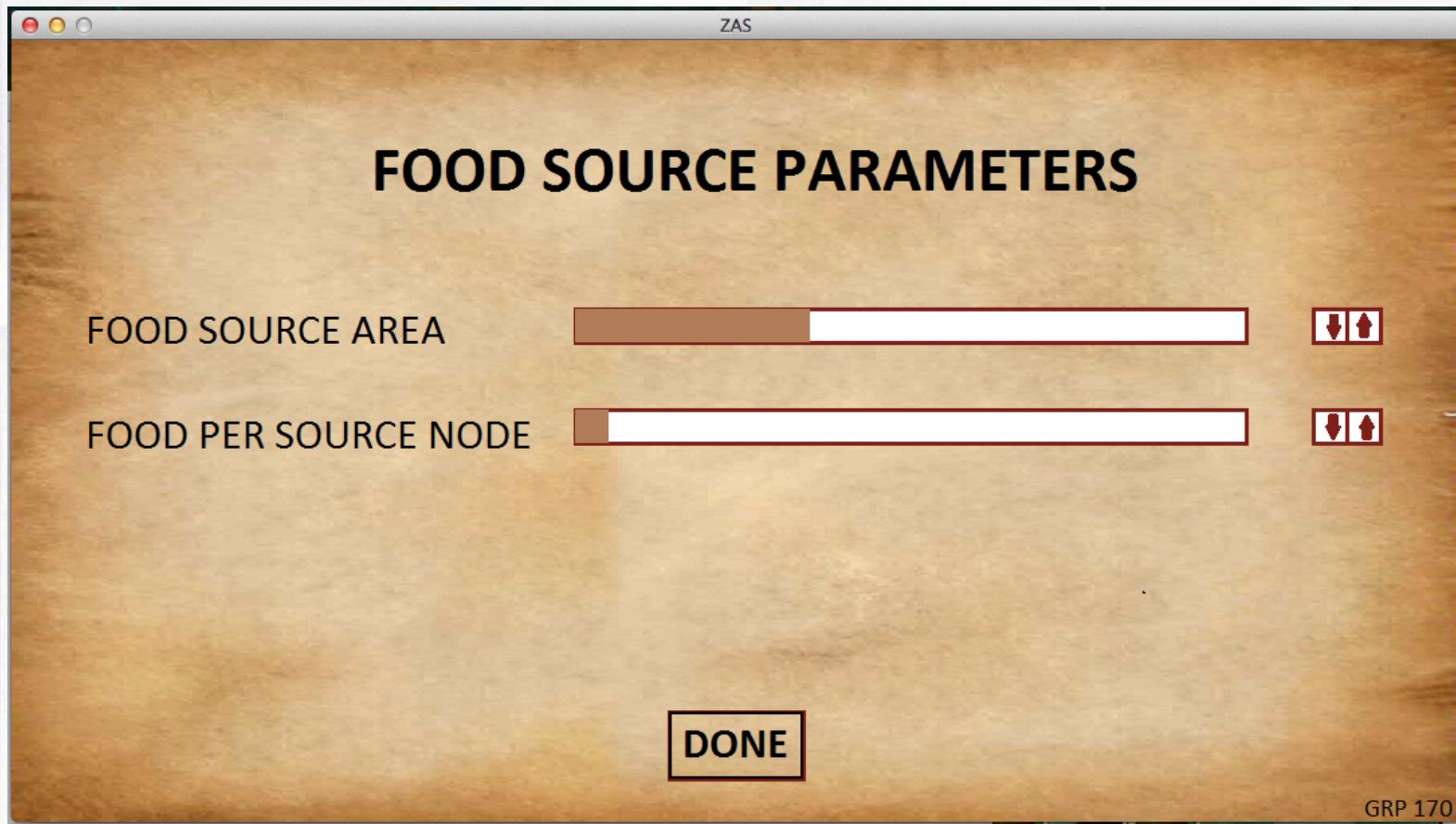
BIRTH RATE	<input type="text"/>	
NUMBER OF HUMANS	<input type="text"/>	
DEATH AGE	<input type="text"/>	
FOOD AMOUNT	<input type="text"/>	
STRENGTH	<input type="text"/>	
MAXIMUM FOOD CARRIED	<input type="text"/>	
FOOD REQD FOR NEW HUMAN	<input type="text"/>	
HOME PHEROMONE INCREASE	<input type="text"/>	
FOOD PHEROMONE INCREASE	<input type="text"/>	

DONE

SIMILARLY FOR ZOMBIE NEST PARAMETERS



AND FOOD SOURCE...



SETTING POSITION IN THE SIMULATION AREA FOR NEWLY ADDED HUMAN COLONY/ZOMBIE NEST / FOOD SOURCE



CLICKING BEGIN TO START SIMULATION



ONE ZOMBIE NEST- ONE HUMAN COLONY- ONE FOOD SOURCE - SIMULATION AT START



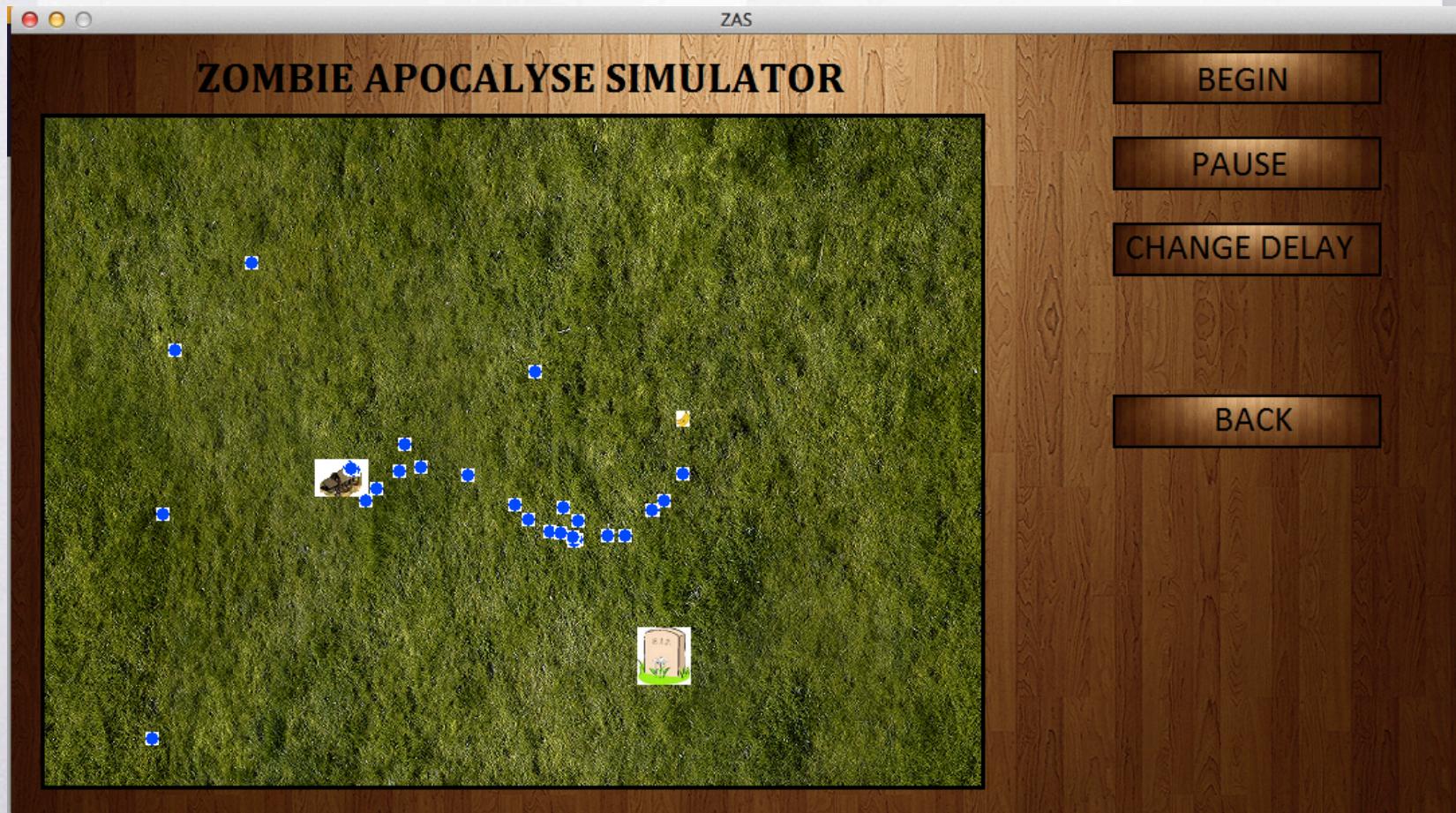
PAUSING THE SIMULATION



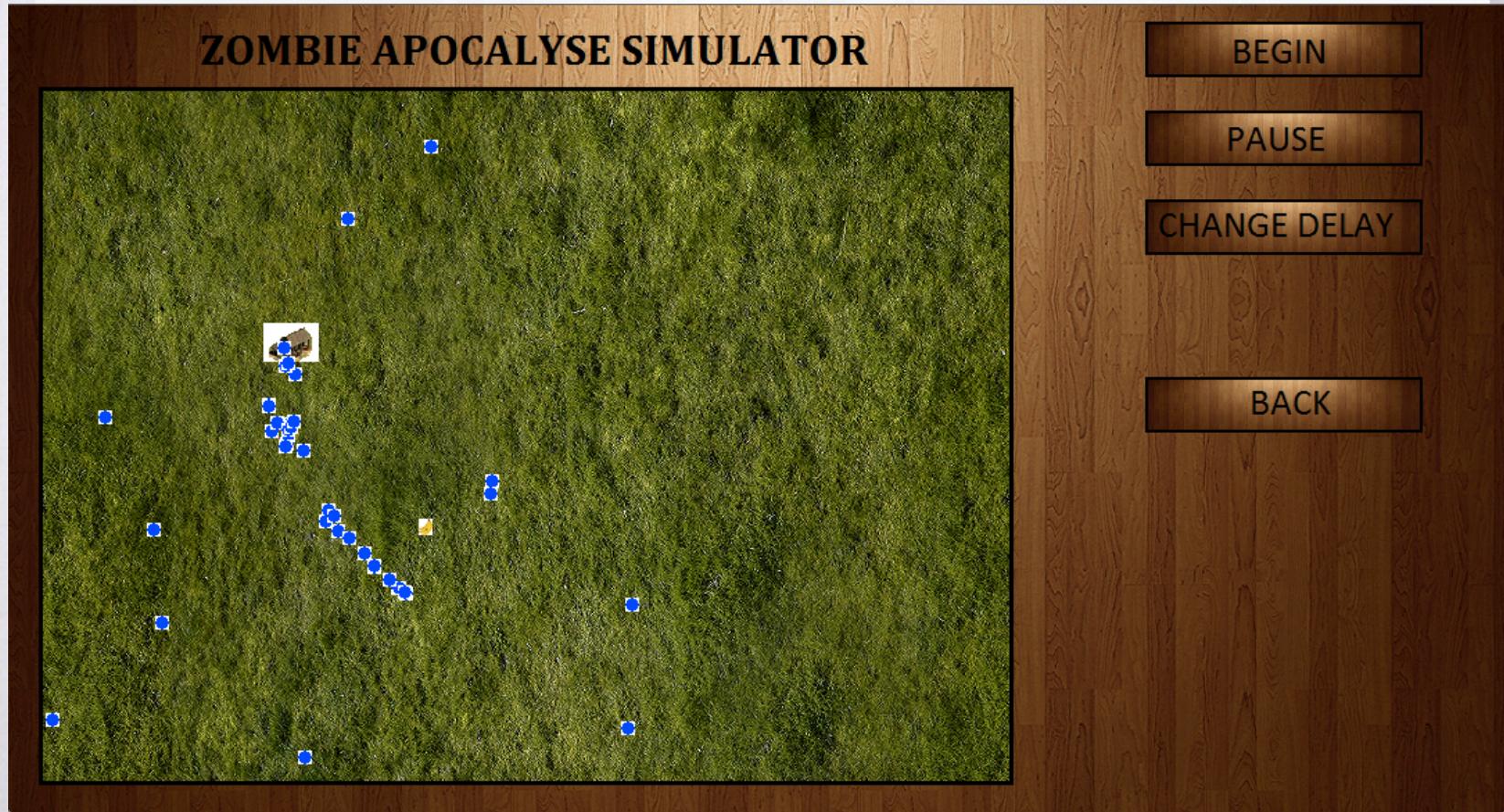
TO RESUME SIMULATION AFTER PAUSE



AFTER SOME TIME HUMANS FORM
THE TRAIL
AND ALL ZOMBIES HAVE DIED.



ONE HUMAN COLONY- ONE FOOD SOURCE SIMULATION



2 HUMAN COLONIES - ONE ZOMBIE NEST - ONE FOOD SOURCE- SIMULATION AT START



IN BETWEEN SIMULATION - TRAILS START FORMING - ZOMBIES HAVE ALL DIED.



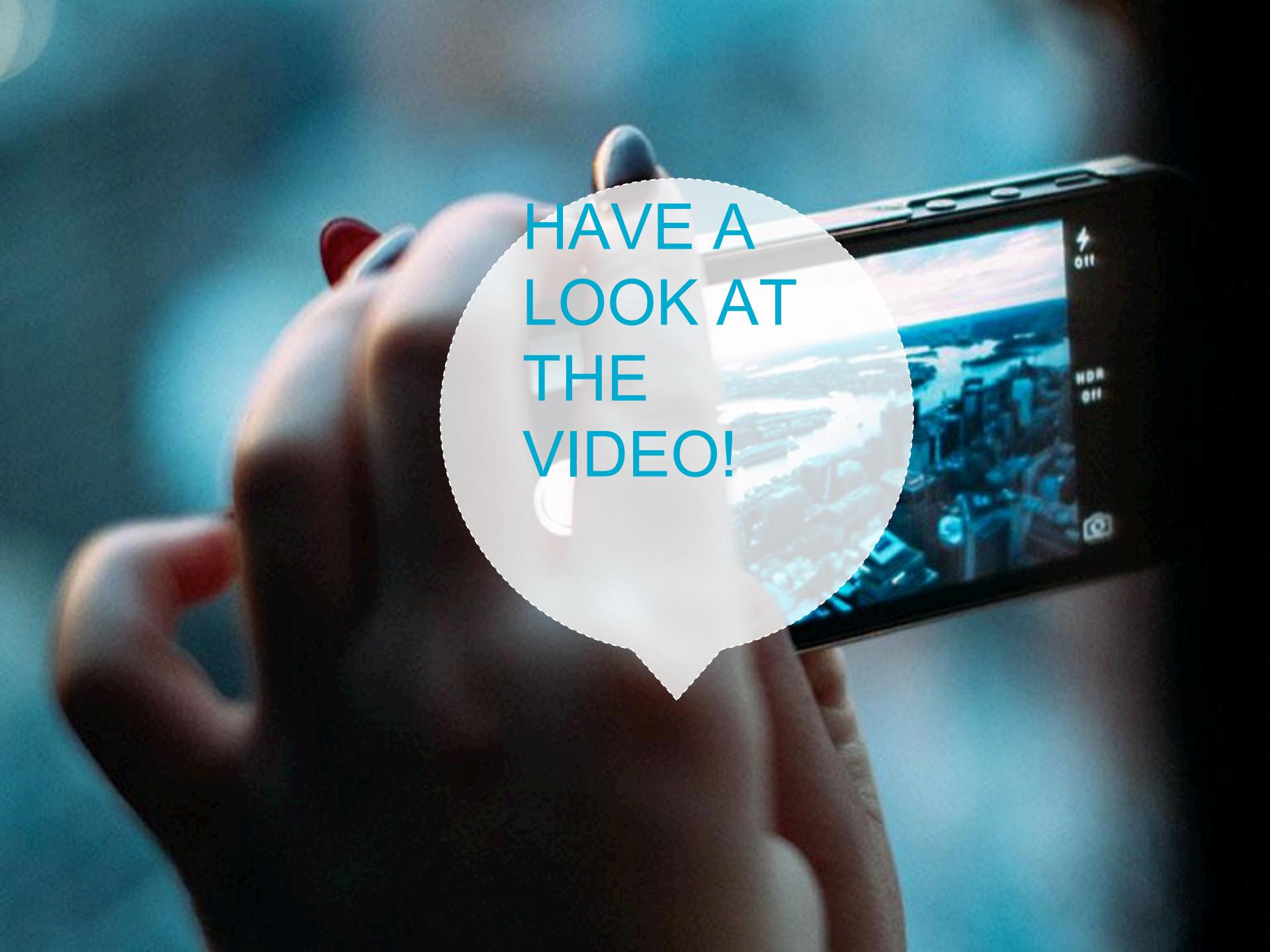
FULL FLEDGED TRAILS HAVE NOW BEEN FORMED.



ALGORITHM USED.

Humans live in colonies and Zombies live in nests. Humans search for food following ACO algorithm (suitably modified), collect food and return to colonies to store food. Humans can carry a limited amount of food (up to its maximum carrying limit).

Zombies survive on humans. Zombies walk about randomly and give chase to the closest human entering into its chase radius

A close-up photograph of a person's hands holding a smartphone. The screen of the phone displays a video of a city skyline at night, with lights reflecting off the water. A white speech bubble is overlaid on the image, containing the text "HAVE A LOOK AT THE VIDEO!".

HAVE A
LOOK AT
THE
VIDEO!

CHALLENGES

- Implementing the ACO algorithm

SOLUTION:

Algorithm appears simple, but hard to implement. Used 2 types of pheromone(food pheromone and home pheromone)to solve the problem.

- Simulation involves handling a lot of objects in proper manner.

SOLUTION:

Learnt and used vector library for the same.

- Designing GUI and using images in SDL

SOLUTION:

Edited images in Paint for them to be used in
SDL 2.0

- Finding out how to generate uniformly distributed random numbers.

SOLUTION:

_____ Included random file and thus got uniformly distributed random numbers.

- Choosing parameters for the algorithm and for the GUI from scratch.

SOLUTION:

_____ Updated the list of parameters as and when required for the proper working of program.

INNOVATIONS

- We have revolutionized ant colony scenario by adding multiple colonies, food sources and made a “prey-predator” system.
- The prey-predator system is a novel idea in the field of such simulations.
- The user has full freedom to set whatever system he wishes to and appropriate simulation is carried out.

FUTURE WORK

- Implement the concept of day/night, seasons.
- Humans/zombies calling for help during a fight, multiple creatures fighting and types of humans along with different types of terrain
- Trade of food among human colonies and also provide the user dynamic control during simulation over single/multiple characters.

Thanks!

Any questions?

