Bug Infestation in Carson National Forest

New Mexico

Supercomputing Challenge

April 4, 2018

Team Number

McCurdy Charter School

Team Members

Isaiah Marquez

Ramses Martinez

Christopher Maestas

Jesus "Chuy" Gonzales

Michael Trujillo

Sponsoring Teachers

Melissa Berryhill (Former Sponsor)

Roger Duroux (Current Sponsor)

We have been studying the effects of bug infestations in forests, the recent tent caterpillar infestation in Carson National Forest is what inspired us to investigate the problem of bug infestations in forests. We have yet to succeed in finding a way to solve this problem, but we are attempting to solve the problem by creating Net-Logo program that can predict the spread of various creatures under certain conditions such as weather, the season, predators, and much more. Currently our program is in its third major revision, this version allows the random creation of a forest with a variable density along with optional sources of water with variable sizes. In order to simulate the movement of bugs and infection of trees we used a cellular automata model, for the predator(s) we used a patch hunting "turtle" to hunt down an infected patch and turn it back to green. In order for our program to be as accurate as possible we have been conducting research on the movement patterns of bugs and their predators as well as the effect that weather has on the lifestyle of the creatures we want to implement in our program with the hopes that our program can be validated by actual ecologists. So far we have had little success in having good accurate results, but we believe that with further revisions to the program and further research we believe that we can get good results in the future. We as a group believe that our biggest achievement was the major revision three of our program, mostly because it took the longest of the three revisions to complete, also because it added the predator portion of our program which is arguably the most important part of preventing or containing a bug infestation. We would like to acknowledge our former sponsor Melissa Berryhill who introduced us to the Supercomputing Challenge our freshman year and helped us through most of this year's challenge. We would also like to acknowledge Nick Bennett who taught us most of what we know about Net-Logo.