

Prairie Dogs

New Mexico
Supercomputing Challenge
Final Report
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Executive Summary:

Gathered Information

There are different kinds of prairie dogs. In our area we have two of the species. Black-tip prairie dogs which are named for the black color on the tip of their tails. The other type of prairie dog looks exactly the same without the black tip on their tails. Prairie dogs do not hibernate even though they are mammals. In the winter, they stay in the ground as long as possible, but come out when they get hungry.

Plan Of Action

We plan to learn the easiest way of getting rid of the prairie dogs or how to relocate the ones that are damaging farmer's crops and other people's yards. We also plan to make a StarLogo presentation representing how quick they spread.

We Have Learned...

As an argument that all life is valued, prairie dogs contribute to other animals also. As in burrowing owls, white-tailed rabbits, badgers, weasels, snakes, and even foxes.

Problem

We want to know how to control the existence of the prairie dogs. We will do this by creating an environment with predators already existing. Then we will put prairie dogs in it and make them reproduce, eat, and make new holes. In this part of the country prairie dogs take over many acres of land, and cause problems for many people. In our project we are trying to figure out how to help control the prairie dogs.

Method

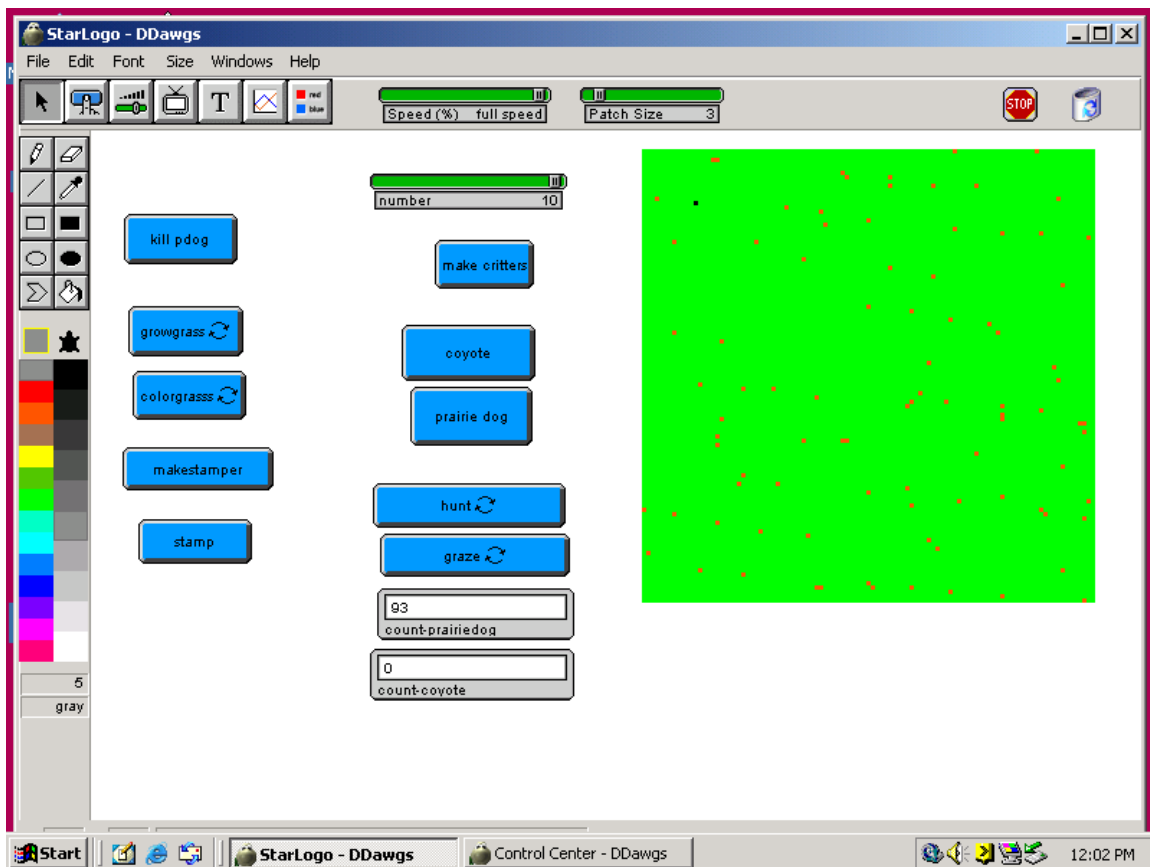
Our method of demonstrating this problem and how we are planning to solve it is by using a model on StarLogo. Also, we used power point, and Microsoft word. Our model has prairie dogs that eat, reproduce, and make new holes. We also have

Results

We made a model on StarLogo to demonstrate how the prairie dogs reproduce, and how they die off caused by the amount of food in their environment and the number of predators. We found the results to be similar to how we expected. Some of the problems we have encountered are that when our coyotes reproduce they create prairie dog pups. Also another problem we encountered was that we couldn't get the prairie dogs to stamp random holes, instead they stamped a sequence of holes.

Screen Shot

Here is an example of our screen on StarLogo.



Project Code

```
breeds [coyote prairiedog stamper]
turtles-own [health xvalue yvalue]
```

```
to makecoyote
```

```
  if xcor = 0 [setc brown setshape coyoteshape setbreed coyote rt random 355 jump
random 25]
```

```
end
```

```
to makeprairiedog
```

```
  if xcor = 0 [setcolor orange setshape prairiedogshape setbreed prairiedog]
```

```
end
```

```
to hunt
```

```
  if breed = coyote
```

```
    [
```

```
      rt random 30
```

```
      lt random 30
```

```
      ;repeat 8
```

```
        ;[
```

```
          fd 1
```

```
          pounce
```

```
          ;wait .2
```

```
        ;]
```

```
      sethealth health - .05
```

```
      if health < 0 [die]
```

```
      reproduce_coyote
```

```
    ]
```

```
end
```

```
to pounce
```

```
  if breed = coyote
```

```
    [
```

```
      grab one-of-turtles-here
```

```
        [
```

```
          sethealth-of partner -10
```

```
          sethealth health + 1
```

```
        ]
```

```
    ]
```

```
end
```

```
to graze
```

```
  if breed = prairiedog
```

```

[
  repeat 4
    [
      rt random 360
      fd 1
      eat
      ;wait .2
    ]
    setxy (-40 + who * 10) 40 - who
    sethealth health - .5
    if health <= 0 [die]
  ]
end

to eat
if breed = prairiedog
[
  if feed > 0
    [
      sethealth health + 1
      reproduce_dog
      setfeed feed - 1
      ifelse feed >= 7
        [
          stamp green
        ]
        [
          ifelse feed < 4
            [stamp brown]
            [stamp yellow]
          ]
        ]
    ]
]
end

to reproduce_dog
if breed = prairiedog
[
  if health > 20
    [
      sethealth 2
      hatch
        [
          setbreed prairiedog
          setcolor orange
          sethealth 2
        ]
    ]
]
end

```

```

    ]
  ]
end

to reproduce_coyote
  if breed = coyote
  [
    if health > 5
    [
      sethealth 2
      hatch
      [
        setbreed coyote
        setcolor brown
        sethealth 2
      ]
    ]
  ]
end

to stamps
  if breed = stamper
  [
    setxy -52 -52
    setheading 0
    repeat 105
    [
      repeat 106
      [
        stamp lime
        setfeed 7
        fd 1
      ]
      rt 90
      fd 1
      lt 90
    ]
    setxy -40 40
    stamp black
    die
  ]
end

```

Conclusion

In conclusion, some of the changes we needed to make are making the coyotes reproduce correctly, and also figuring out how to make the prairie dogs stamp holes randomly.

Bibliography

In our project we used the following sites to look for research and information on prairie dogs:

<http://www.scsc.k12.ar.us/2002Outwest/NaturalHistory/Projects/RoarkJ/default.html>

<http://www.nationalgeographic.com/burrow/pdog.html>

http://www.desertusa.com/dec96/du_pdogs.html

<http://mountain/prairie.fws.gov/species/mammals/btprairiedog/>

<http://cahe.nmsu.edu/pups/1/L-201.pdf>

Also for more information we talked to some people in the community about their knowledge on prairie dogs. Many of them live out of town and have dealt with prairie dogs before.

Software

The software we used is the following:

Microsoft PowerPoint. For all presentations on our project.

Microsoft Word. For all documents on our project.

StarLogo. For the modeling of our project.