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Final Project – Progress Report 2

Introduction:

Since the last progress report, I believe my setup code is complete – the code that captures the setup for each of the three sizes of cities (large, medium, and small/rural). I've been researching tornado movement and randomness patterns to understand what rules to give the tornado for its movement as well as a reference point for how to assess damage done to buildings/homes when tornadoes are ravaging the cities. I've also updated my project proposal, once to initially answer questions that Uri and David had for me regarding my initial proposal, and again to further clarify some of my intentions for my model. I realized that I will have to make quite a few assumptions for my model as well that I will outline in the final report and I believe I have stated in my updated proposal as well which can all be found on the modeling commons website.

Agent behavior:

In the big city setup, I've set up a shore line from patches on the right side of the world outlined by some trees (breed of turtle) to give a Chicago lakefront or Manhattan's Battery Park sort of feel – as big cities don't generally have a lot of houses or trees around. I've also created 50 “larger size” buildings (breed of turtle) that are being setup such that there are no agent overlaps. Lastly, there is a single tornado (breed of turtle) created in an isolated region initialized to a strength defined by the user. In the medium city setup, I've created 40 trees in the middle of the world that separates the 30 suburban houses (breed of turtle) and the downtown area's 25 buildings. Again, there is a single tornado being created in an isolated region initialized the same way. Lastly, for the small-town setup, I'm creating 80 trees with 20 houses and 6 large buildings scattered about the world, along with a single tornado initialized the same way. The exact setup is never the same as the y-coordinates of the turtles are randomized, though the x-coordinates are static.

System behavior:

Currently, there is no “go” code, so the only system behavior is the setup of the type of city that the user chooses in the beginning of each model run. Again, the exact setup of each city is different since the y-coordinates of the turtles are randomized.

Rationale for agent rules:

The number of buildings/homes is arbitrary in each case, I chose a number such that the visual perception of the world in each case was good and clean. I don't want to allow the user to setup the number of buildings/houses because it could mess up the spatial aspect and density of the cities if turtles overlap. I also made the exact setup of the cities different in each case just for a visual flair – there is no real other reason for it since the real randomness comes from the tornado – its movement and strength that will determine the damage done to the city.

Model output:

There is currently no output generated from this model other than the city setup currently. However, I feel that the setup accurately reflects the vision I had for how the cities would show up.

Questions:

I'm still researching exact tornado movement patterns to determine with what probability it is fair to say the tornado will move and how it will traverse the world. I'm also figuring out how to model the damage done – whether or not to set the worth of each building or home in the cities to the average price of property for such city setups (based on real data) and then have the damage done be the difference between the initial worth and final worth of buildings summed throughout the entire city. I think it would be difficult to keep track of all the variables so I'm still figuring out how I can model the damage correctly. As I mentioned before, my model for the tornado will really only incorporate the

movement and randomness patterns of the tornado rather than the real physics of its formation and wind swirls. However, I'm wondering how I should take into account all the factors when determining damage done. I'm considering making a mathematical model with weights depending on the strength of tornado, cost of buildings/home, time tornado spends in an area, trees thrown at buildings versus homes (homes affected more than large buildings), etc – but I'm still wondering how exactly to go about incorporating all of the components.

Next steps:

I will be adding some tornado movement and trying to finalize how the randomness of it's movement pattern will be and with what probability a tornado may move or reproduce into multiple tornadoes. I'm also going to try and finalize the damage model and see how I will incorporate all the components into determining final damage done. I must also see, using real data collected, if assigning a "value" to each building/home in the city is a viable option towards assessing damage done.