
Disease Modeling

An Environmentally Based Approach
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Abstract

- Considering the increasing virulence of diseases and their resistance to contemporary medicines, it is of utmost importance to consider and explore non medicinal avenues to control and halt the spread of disease. By providing ways to stop epidemics before they become epidemics, we provide a great service to humanity. This project utilizes environmental based modeling to attempt to define the optimal behavior for an individual in a population in which an epidemic is released. This project takes a real step towards predictive modeling and explores how disease is transmitted
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Purpose/Scope

- This project's purpose is to make a modeling tool for predicting the spread of disease.
 - The project will attempt to produce an easily modifiable, robust program that fulfills the requirements of the modeling tool.
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Results

- The model was successfully created
 - Anticipated results are:
 - More people get infected over time, smaller classrooms leads to greater infection, more time leads to greater infection
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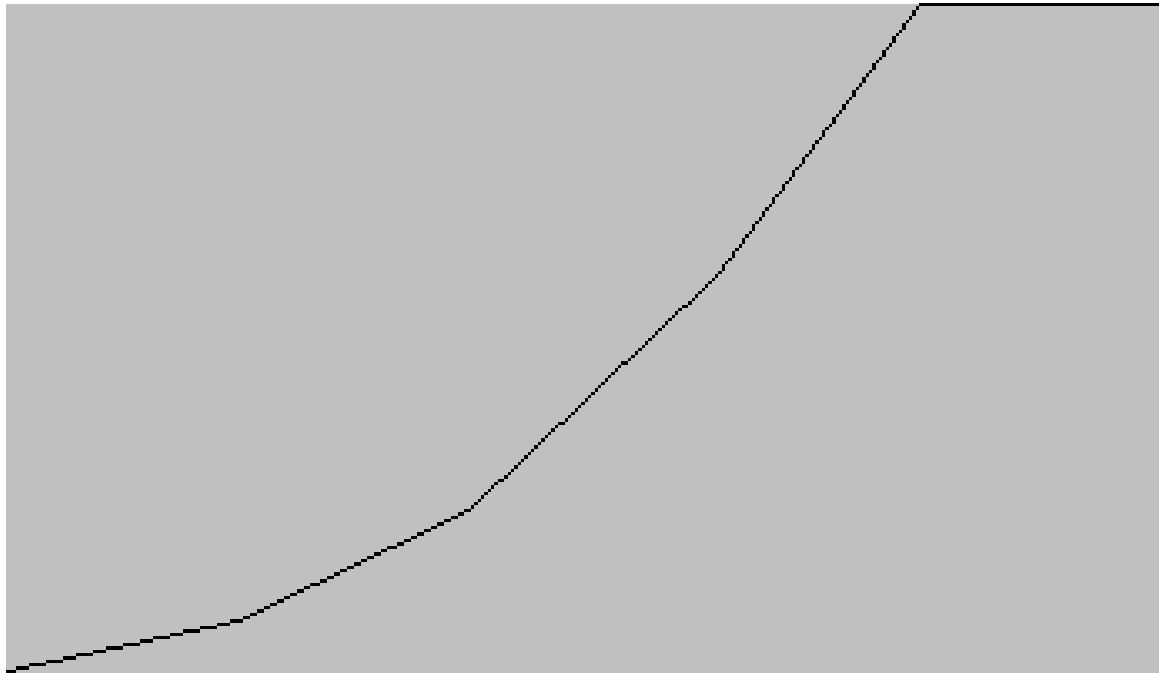
Current Work

- Non computer based standpoint
 - Based results off scientific study; the model holds up to scientific scrutiny
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Methods

- Simple, top down model to show how a disease would be spread in such a population
 - The program can take simple inputs and do some math to simulate how many students have become infected
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Example Graph



Explanation

- Percentage Graph
 - Will eventually have labels
 - Produced by the actual program
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Testing

- Many forms of testing:
 - Random, Structural, Functional, Engineering, Adaptability

 - Results:
 - So far, program deals well with errors from an experienced user but needs work from a non-experienced user's standpoint
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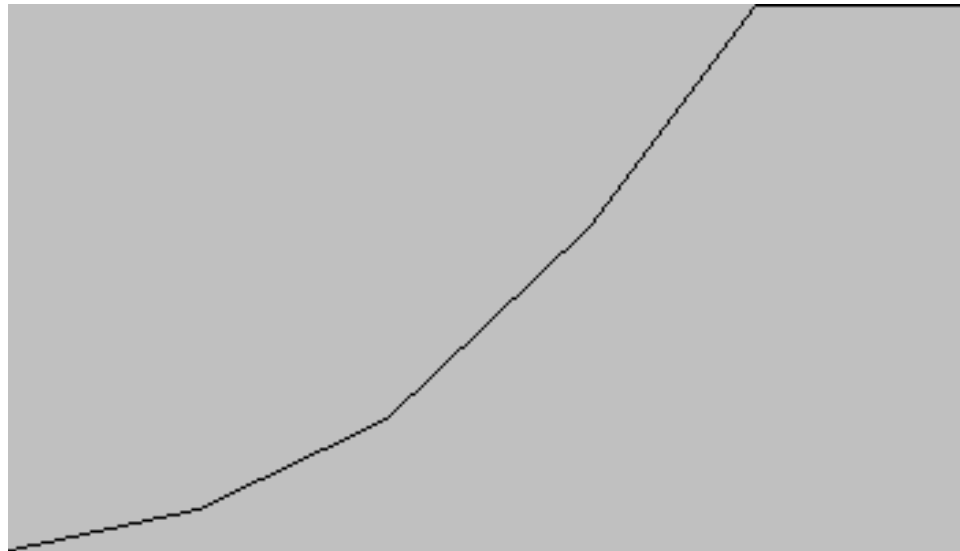
Programming Language

- Self Developed, in Java
 - Originally using the MASON modeling environment; scrapped due to bulkiness
 - Object Oriented Structure
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Results

- The model was successfully created
- Anticipated results from running it were obtained.

- Typical result graph shown here:



Evolution

- Agent Based versus Environment Based
 - MASON versus not
 - The scope/purpose of the project; modeling or finding new conclusions

 - This project could be expanded upon to discover unknown things about epidemics
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What I learned

- A bit about programming, good code structure
 - How epidemics spread and how diseases do
 - Work ethic and time management
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