Modeling and Simulation, CS302

Lab-8

This lab aims to model the forest fire spread model (Module-10.3 of the book) and systematically analyze the different scenarios. To work on this, you will first have to read Cellular Automata-1 on heat diffusion, especially the boundary condition and the neighborhood part. In addition, the class discussions on diffusion and CA.

1. Read the chapter carefully and implement all the functions in the chapter *i.e.* initialization, initial conditions, etc.

   (a) First, consider the simple model, where there is an initial density of trees with a small fraction burning. What happens to the forest as the density of trees is increased? Identify the correct observable and see if there is a tipping point (phase transition) in the model. You may include question 9 under the project section in the module for your analysis.

   (b) Include Exercise 1 and 2 in your model. How does this influence your result in (a)?

   (c) Including wind direction in your code do questions $10(a) - (d)$.

Note

- Make a short presentation of your study and share it as submission of the report (deadline April 28). There is no need to submit a lab report.