Modeling and Simulation, CS302

Lab-9

Due Date: April 12, 2021 (Tuesday)

In this lab the objective is to model the heat diffusion through a thin metal bar that has a constant application of heat and cold at designated locations on the bar. The model is quite general and can be applied to other problems that involve diffusion such as pollution spread in lakes, diffusion in gases etc. *For submission see notes below*

1. Read the chapter carefully and implement all the functions in the chapter *i.e* initialization, application of hot and cold at the boundaries, neighborhood, diffusion algorithm, boundary condition, diffusion simulation and visualization.

   (a) From the projects section do projects 1-4.

   (b) **(Extra Question)** Do the stochastic diffusion problem in question 9 under projects.

Note

- The main aim of the lab is to learn how to do rule based simulation. Heat diffusion problem is simpler since it is based on physical laws.
- Observe the flexibility that is provided by such simulations. Also note the algorithmic and computational complexity that such models pose.
- Since visualization and animation is required in this lab you should post your fully documented and working code and share the link with your report. You may also share it via google drive or github.
- In addition, you should make a short video (5-10 minutes) explaining your work and highlighting your observations.
- There is no need to submit a latex report. Documentation should also include instructions on how to run the code.