HW7 (due on May/22 12:30PM)

Q1. Run and understand simulate_cars.m (40 points)

The model is coded to simualte a traffic flow using Automata.

function [density, flow] = simulate_cars(moveProb, inFlow, withGraphics)

This function is simulating cars on a highway

% INPUT:

% moveProb: the probability for a car to move forwards, 0..1

% inFlowProb: The inflow volume to the road, 0..1

% withGraphics: Should the road be animated? true/false

% OUTPUT:

% density: the average vehicle density, 0..1

% flow: the average flow of cars, 0..1

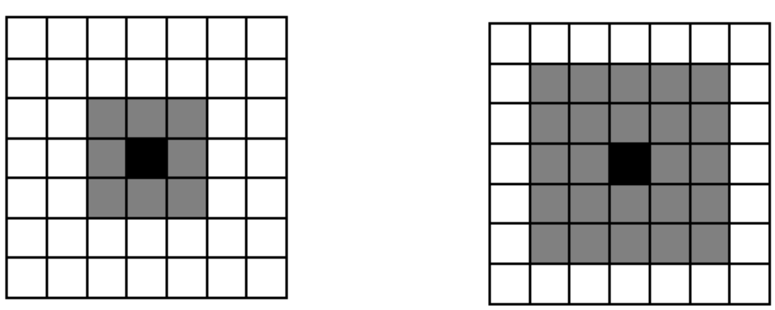
1. Use different values for parameter moveProb (from 0 to 1) (inFlow=0.5) and calculate various density and flow. Based on this set of test, build a one-order linear regression model between density and moveProb. (density=a+b*moveProb)

2. Same as 1 but build a one-order linear regression model between moveProb and output flow (flow=a+b*moveProb)

Q2. Run and understand disease.m (40 points)

1. Plot the relative fractions of the states S, I, R, as a function of time, and see if the curves look the same as for Kermack-McKendrick model last class.

2. Modify the model in the following ways: Change from the 1st order Moore neighborhood to a 2nd order Moore neighborhood and replot the relative fractions of the states S, I, R, as a function of time.



1st order Moore neighborhood   2nd order Moore neighborhood

Q3. Run dem.m and modify the model in the following ways (20 points)

Enlarge the domain by changing the code at the beginning as:

```
F = 1/9 * ones(3,3);
SRTM = filter2(F, SRTM(750:1200,750:1200));
SRTM = SRTM(2:449,2:449);
```

And run the code. Please point out the best place to build a reservoir based on DEM’s output.