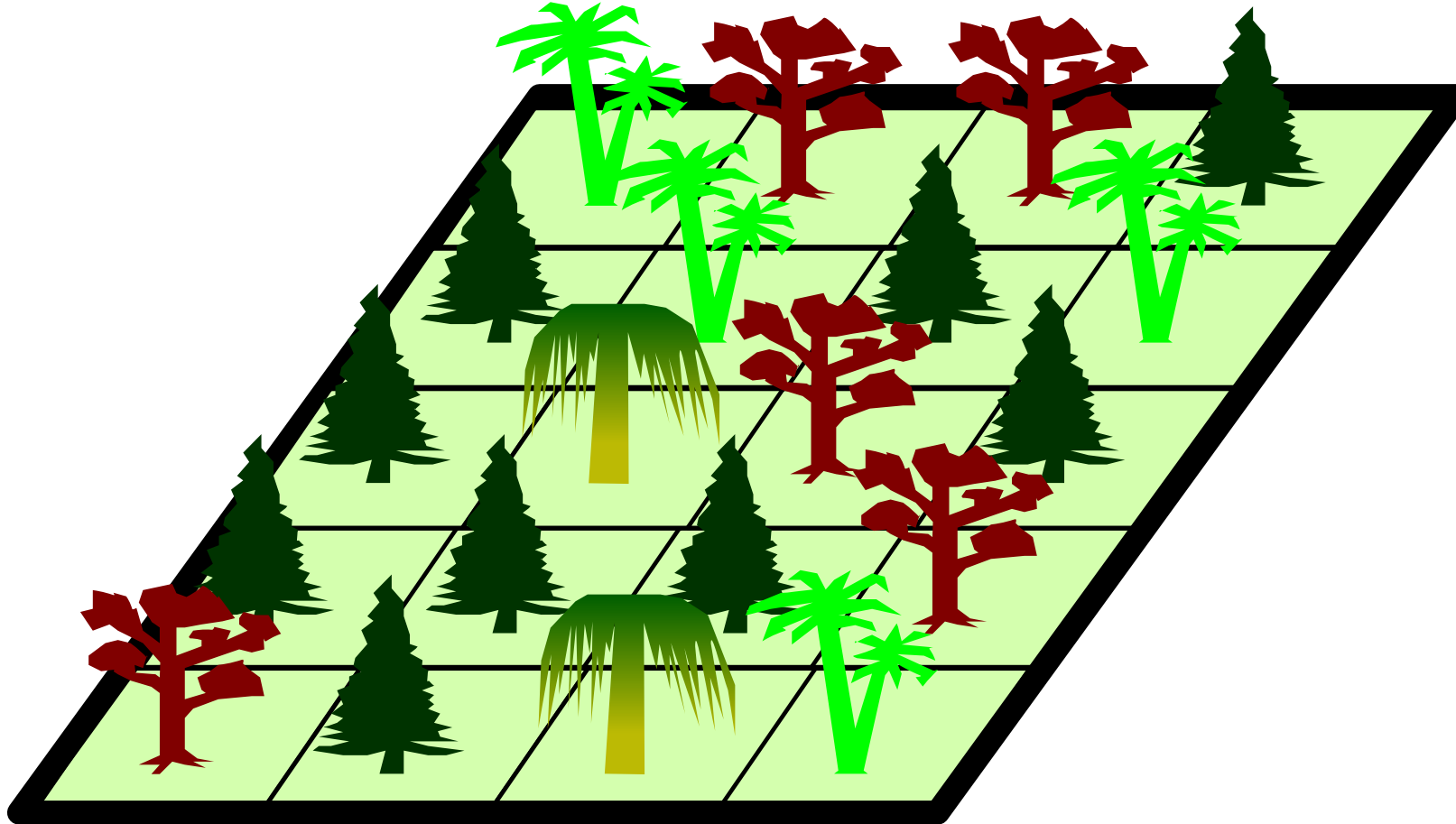
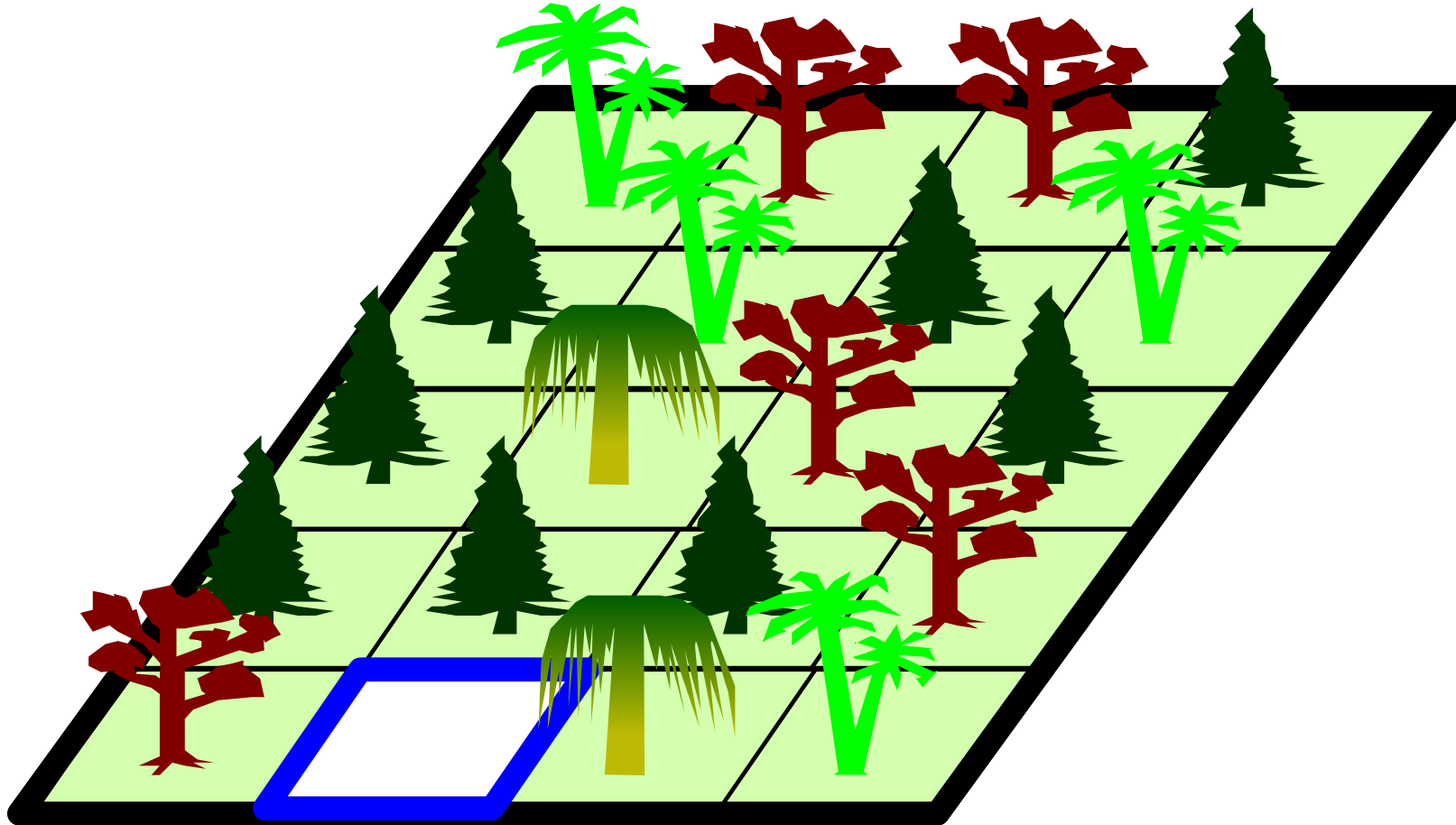


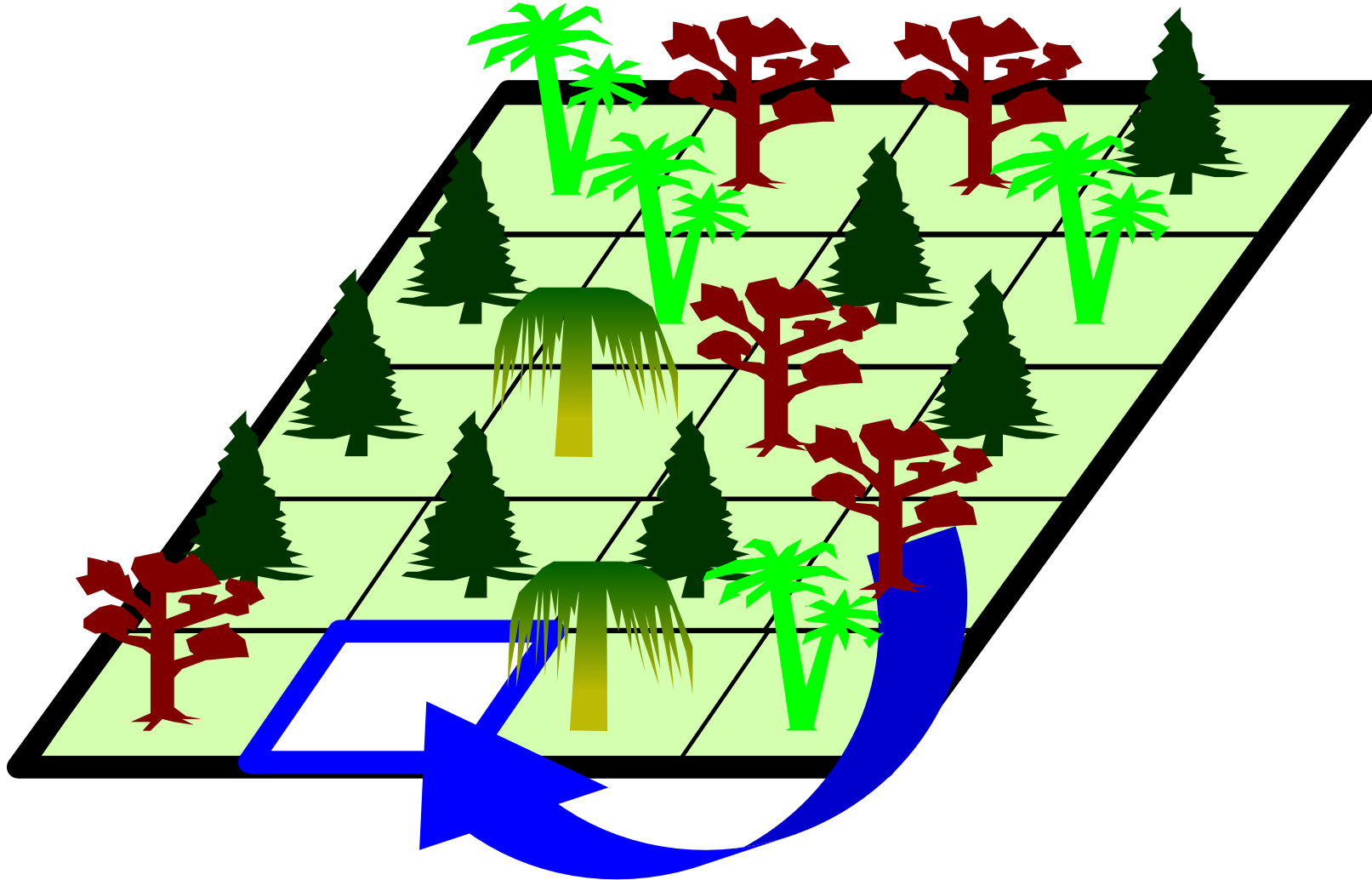
The model rules in brief



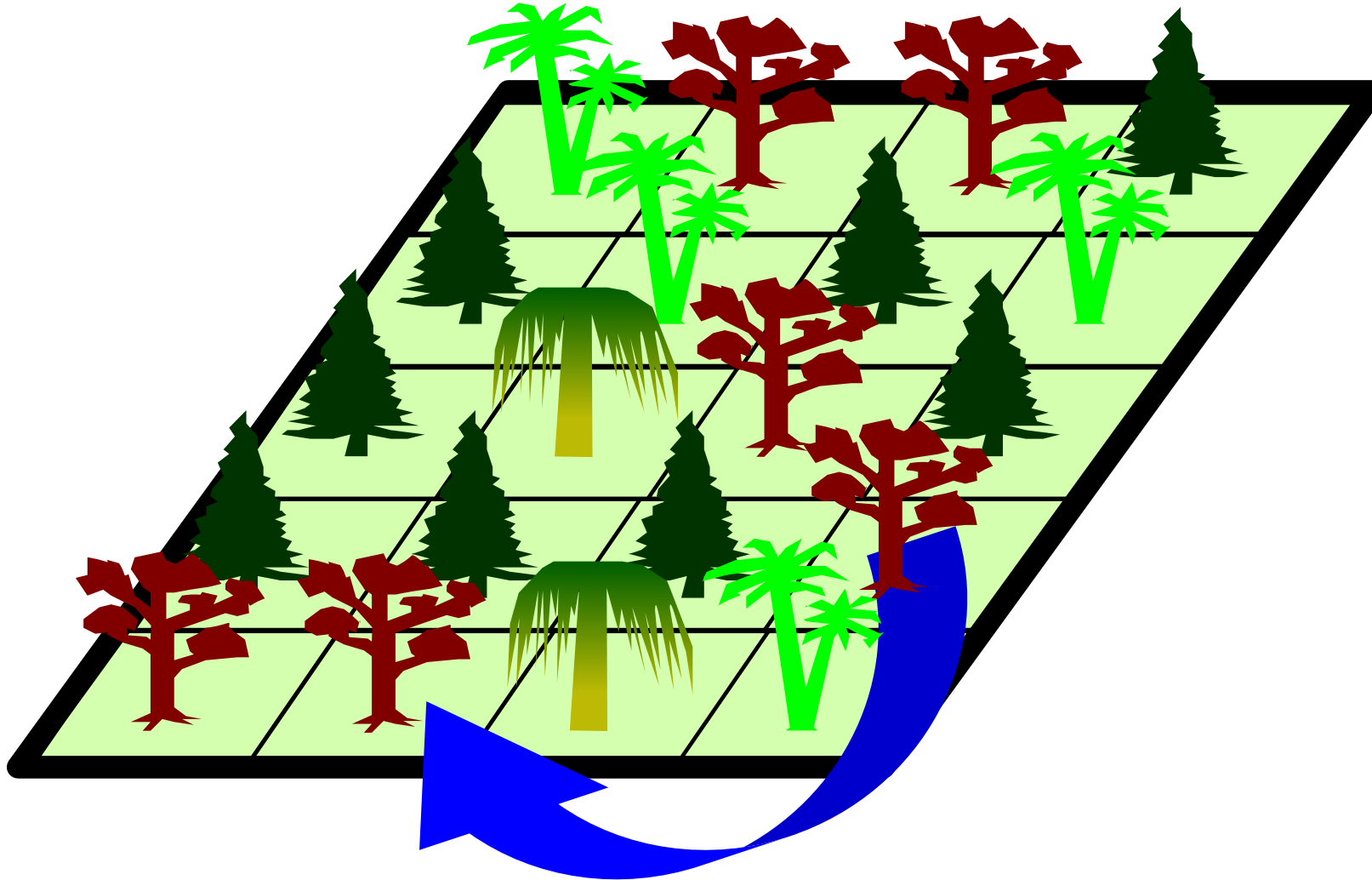
The model rules in brief



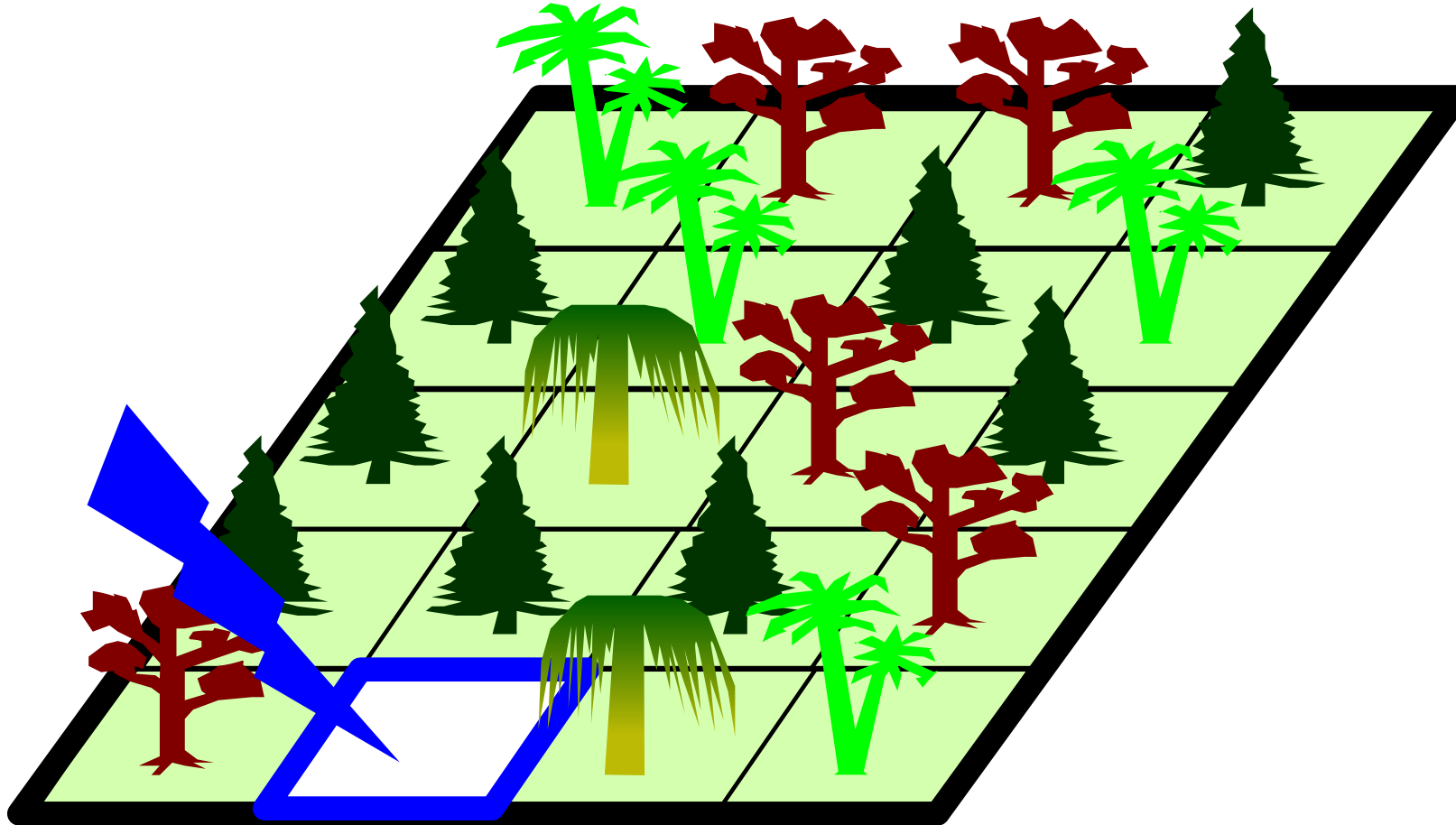
The model rules in brief



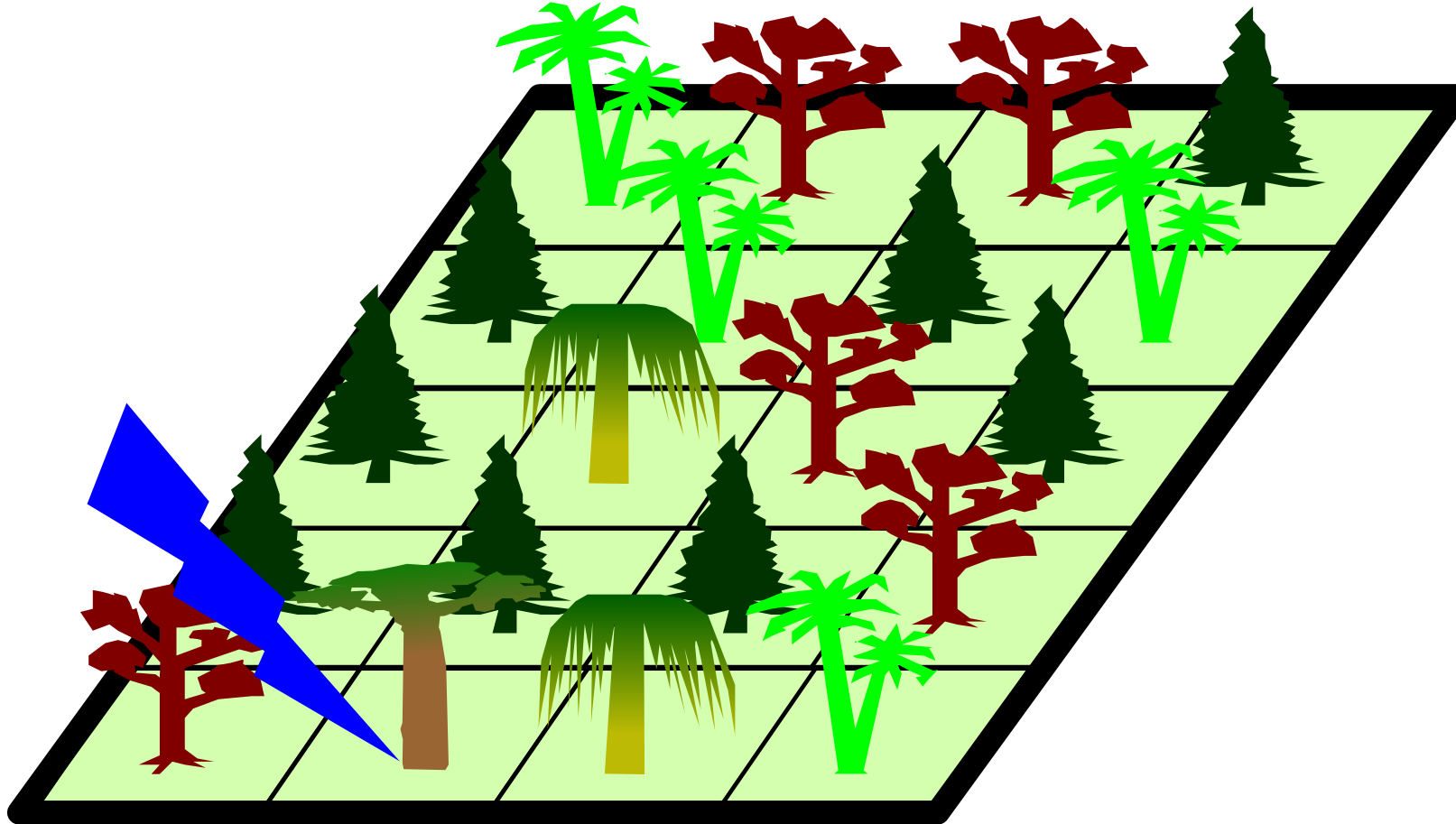
The model rules in brief



The model rules in brief



The model rules in brief



Dynamic equilibrium:

Balance between immigration and extinction
Species themselves are changing

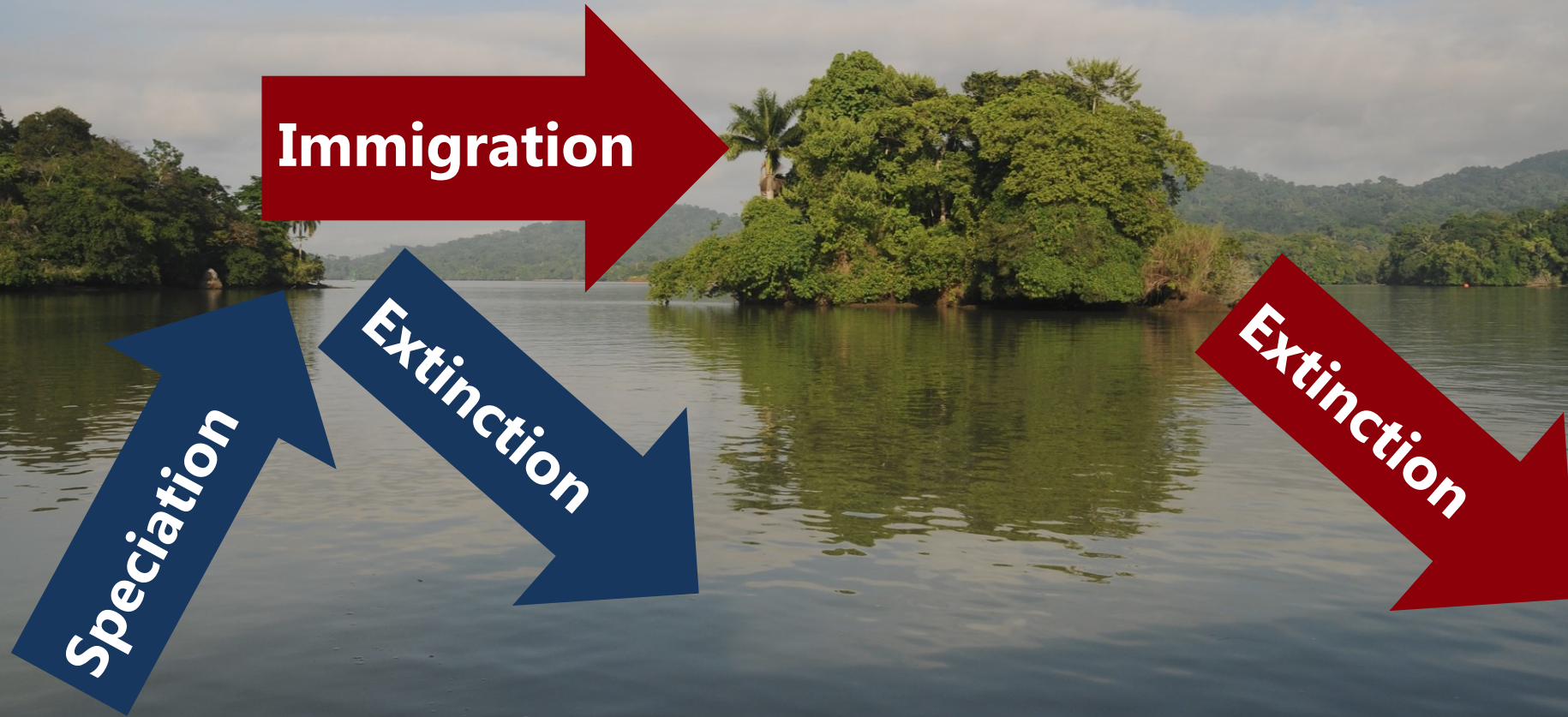
The background of the slide is a photograph of a tropical island. In the center, a large, lush green island with a prominent palm tree sits in the middle of a calm body of water. The water reflects the sky and the island. In the distance, more forested hills are visible under a blue sky with some clouds. Overlaid on this image are two large red arrows. One arrow, labeled 'Immigration', points from the left towards the central island. The other arrow, labeled 'Extinction', points from the central island towards the bottom right corner of the frame.

Immigration

Extinction

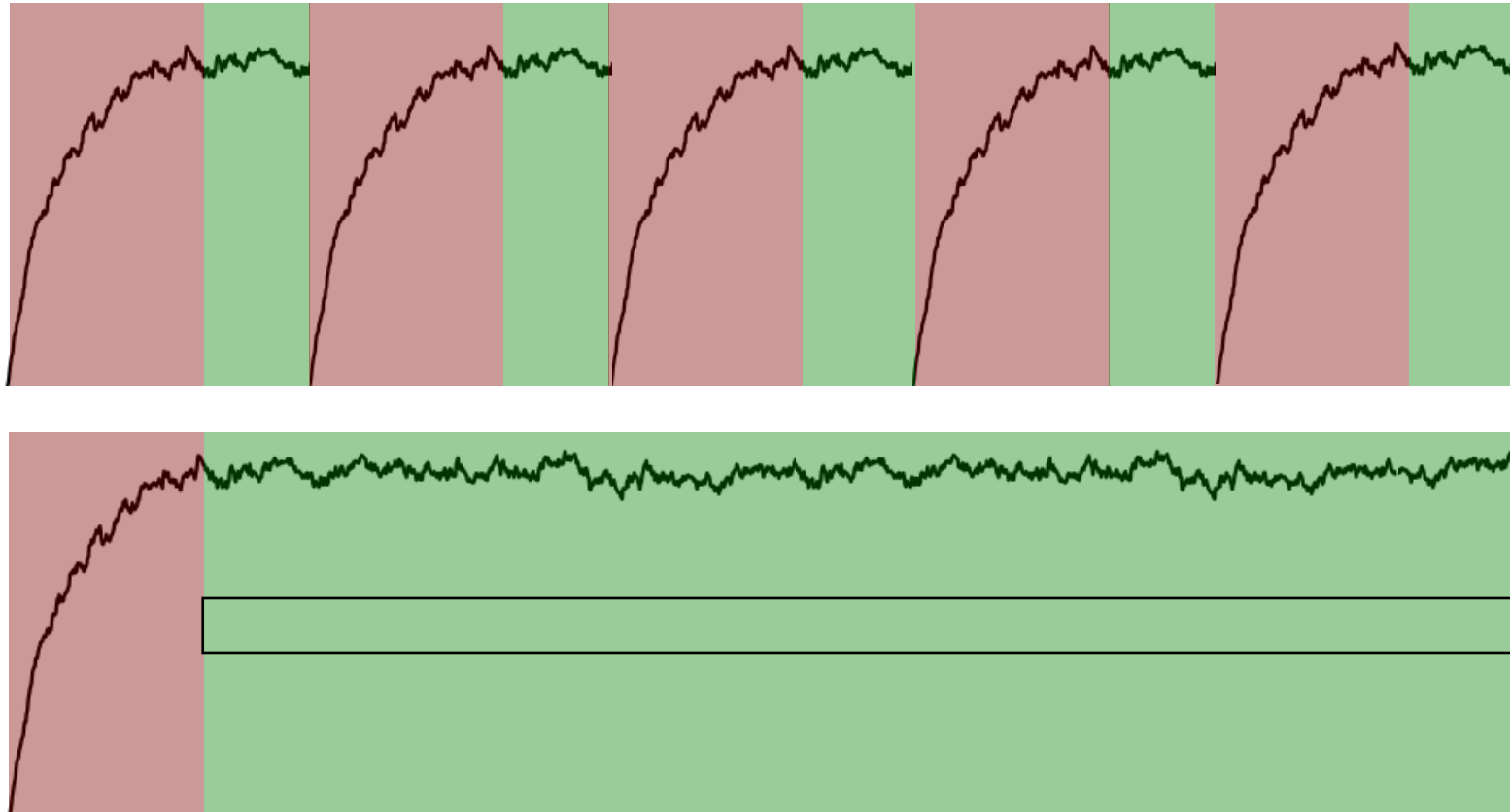
Dynamic equilibrium:

Balance between **speciation and extinction**
Species themselves are changing

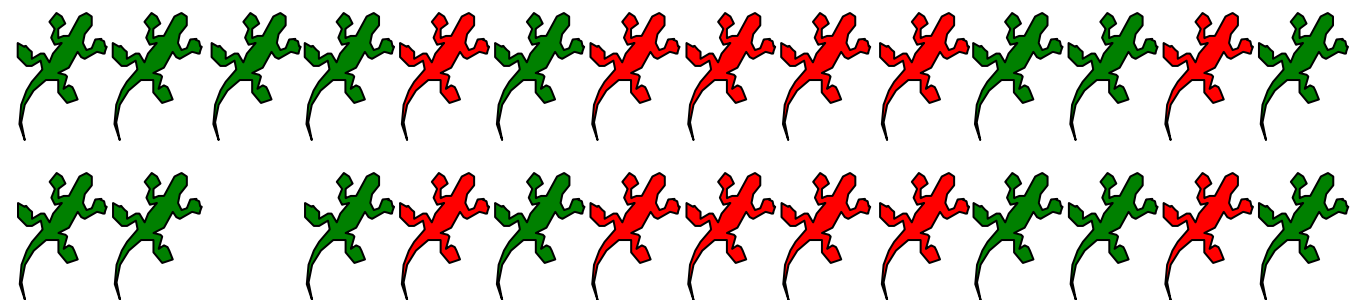


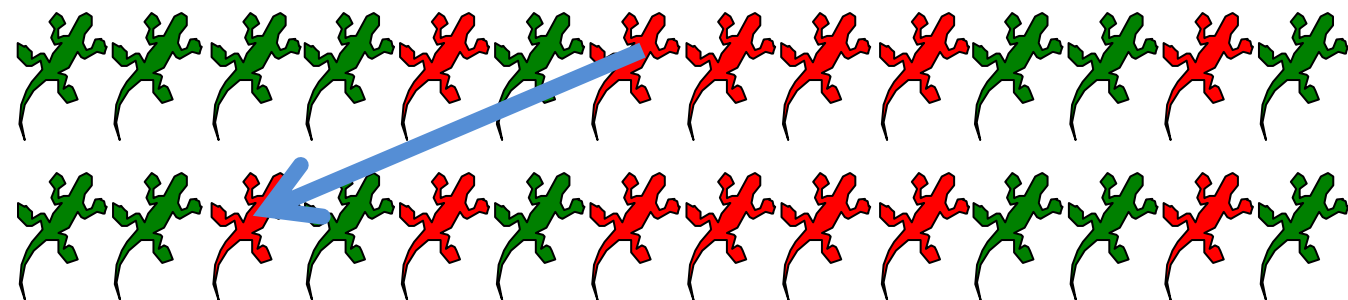
Dynamic equilibrium:

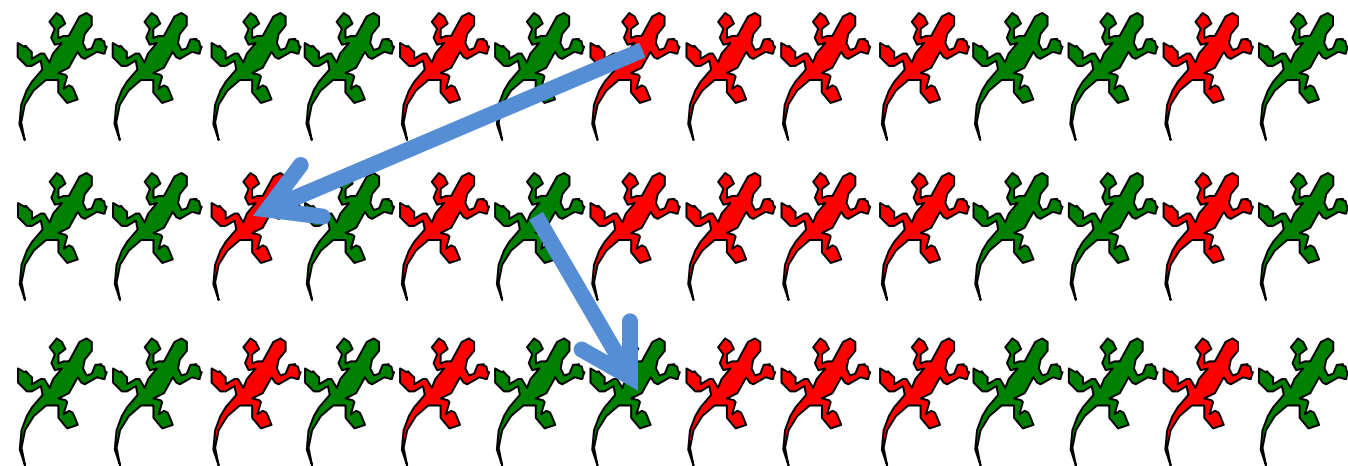
Balance between **speciation** and **extinction**
Species themselves are changing

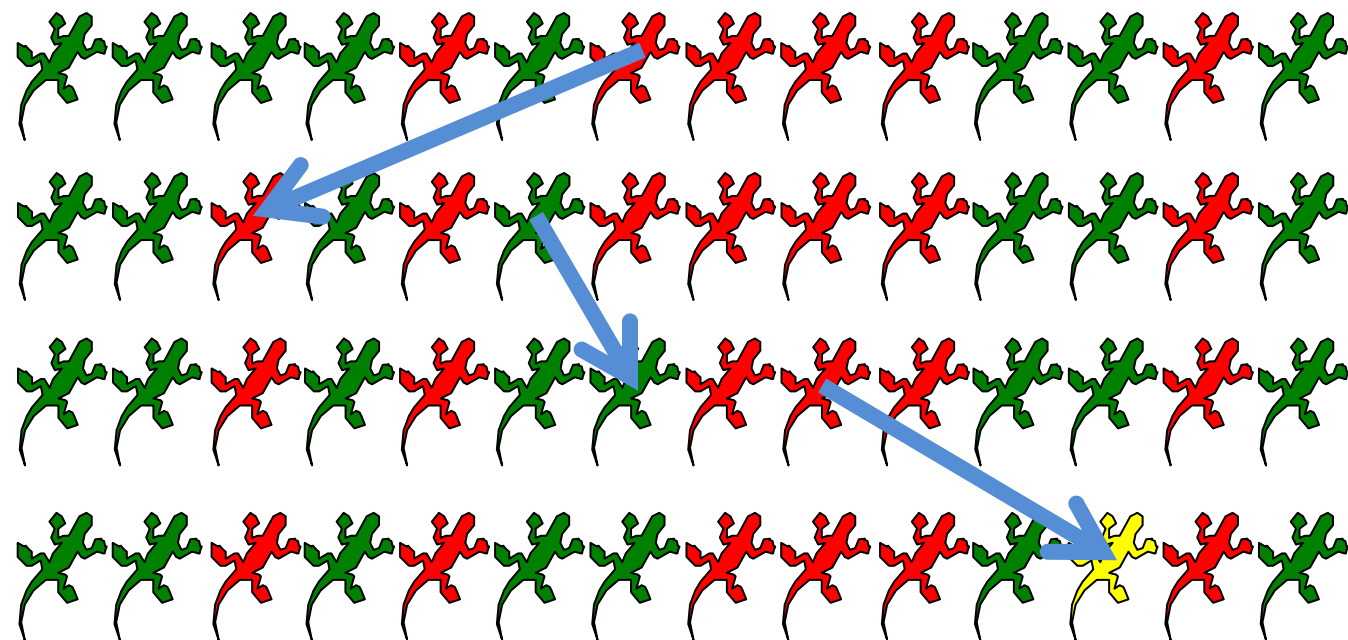


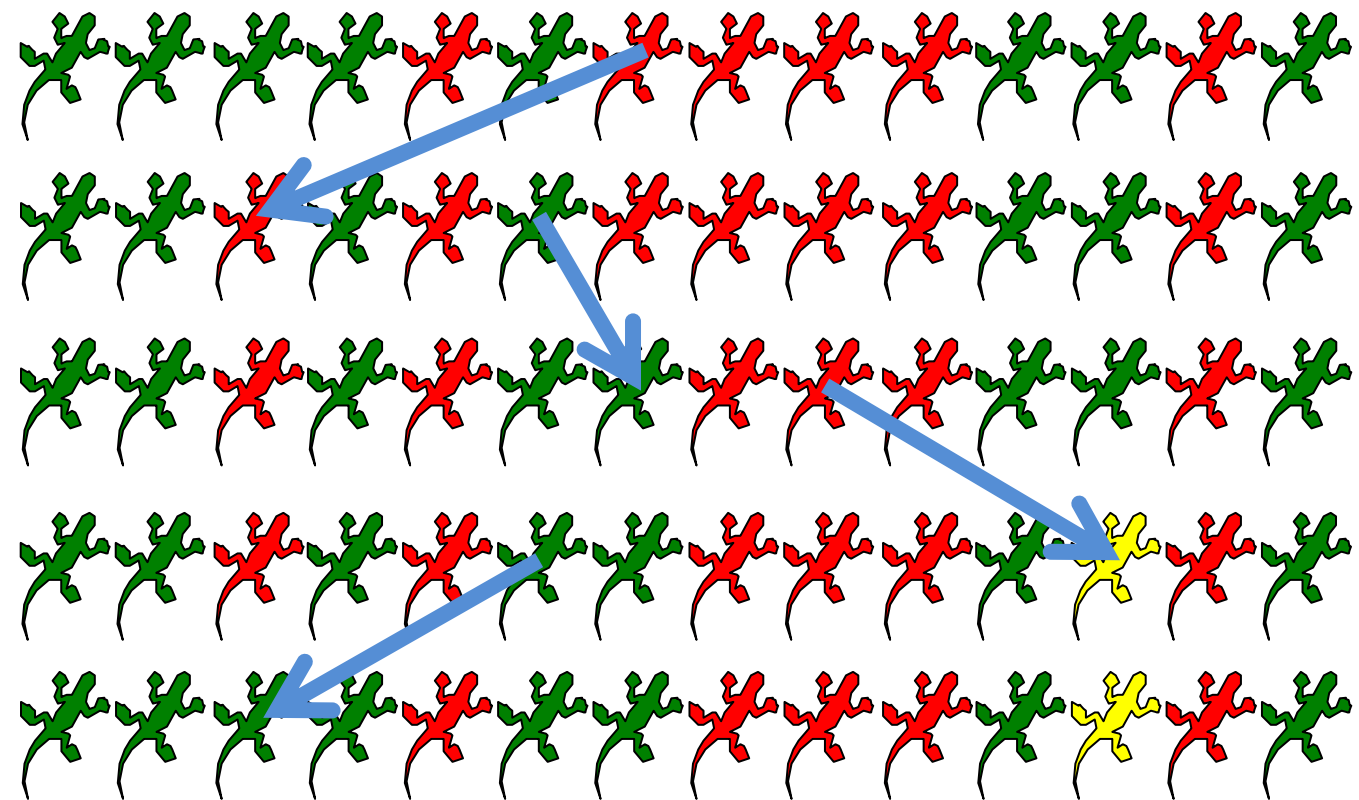


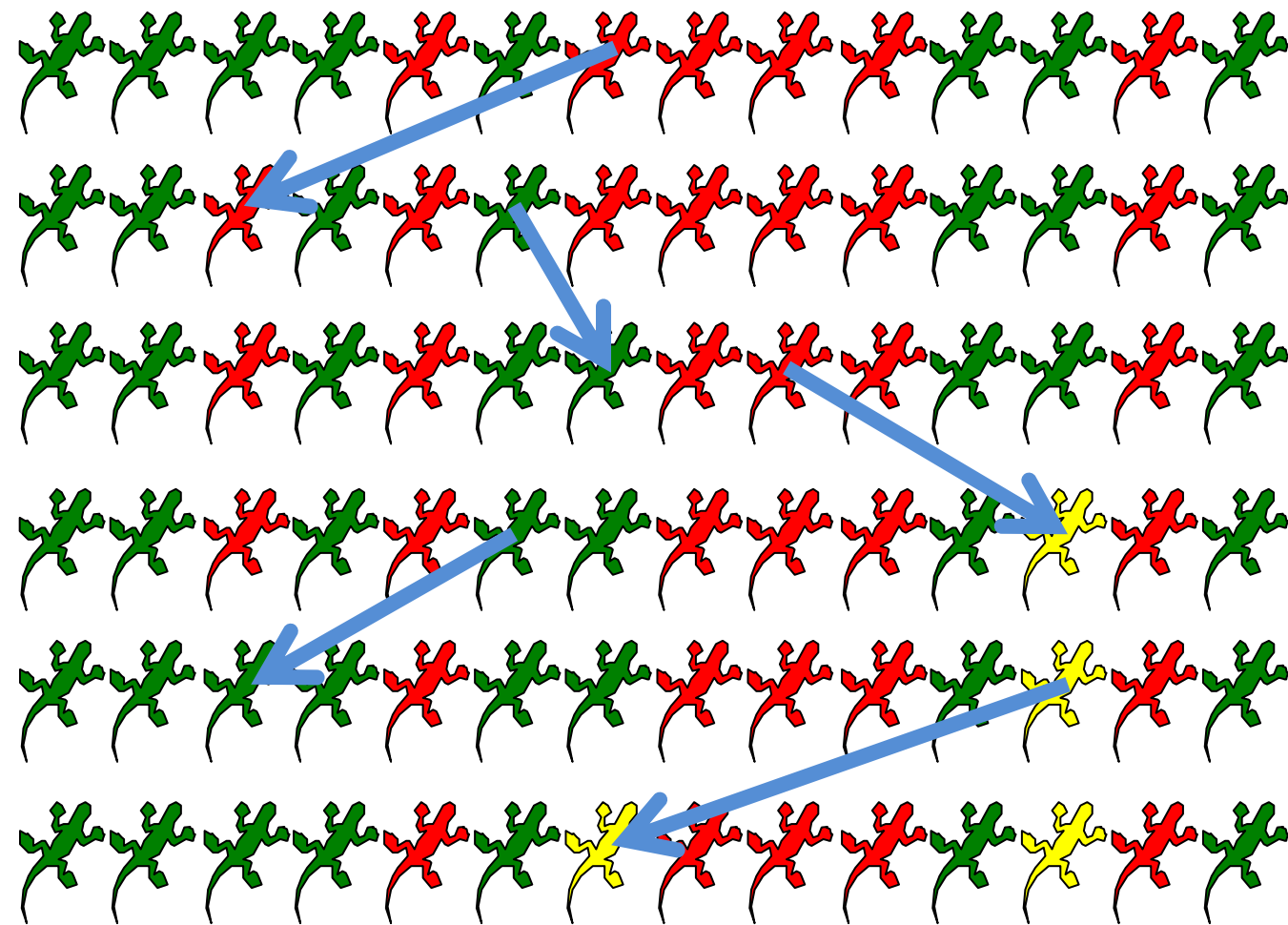


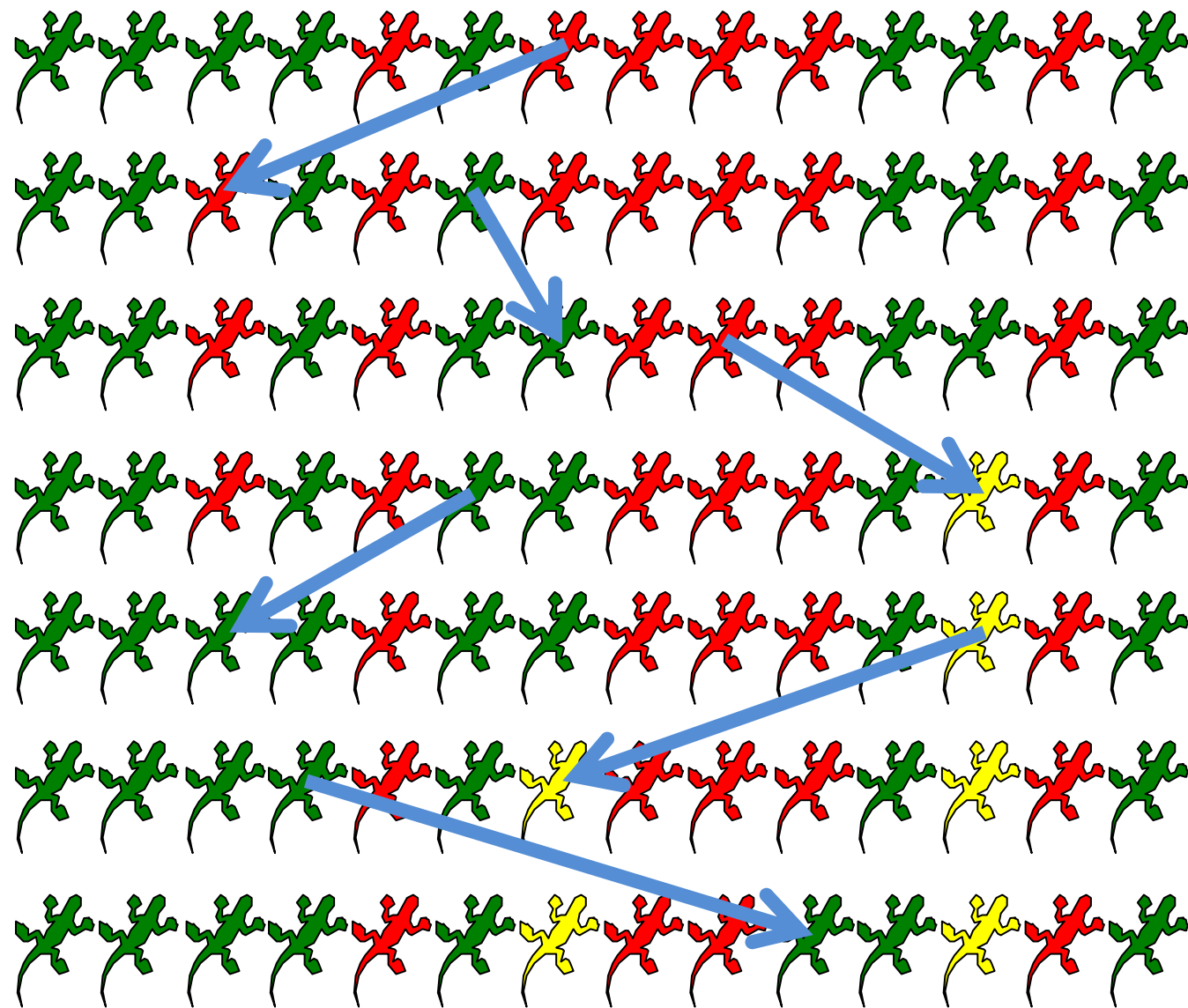


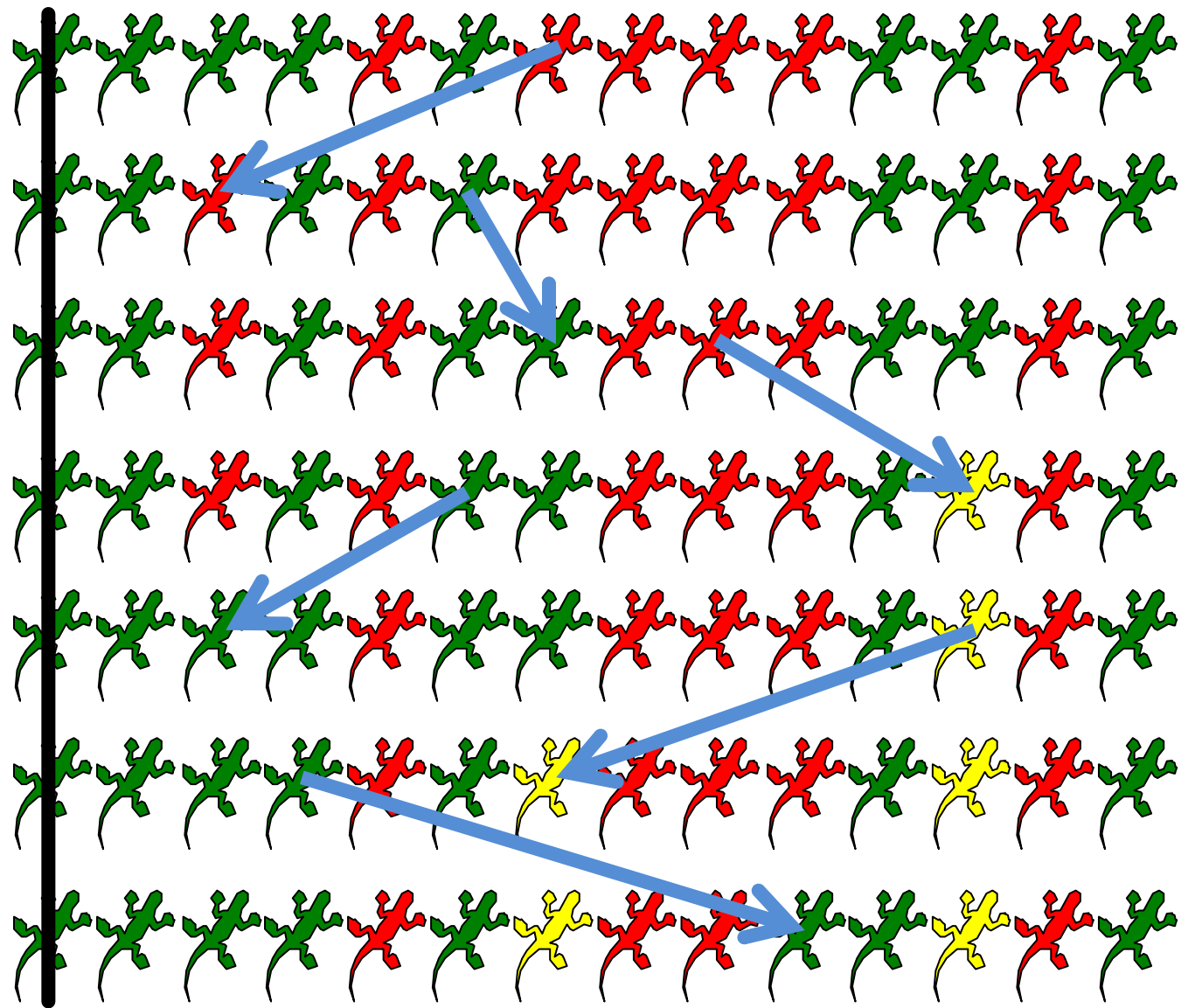


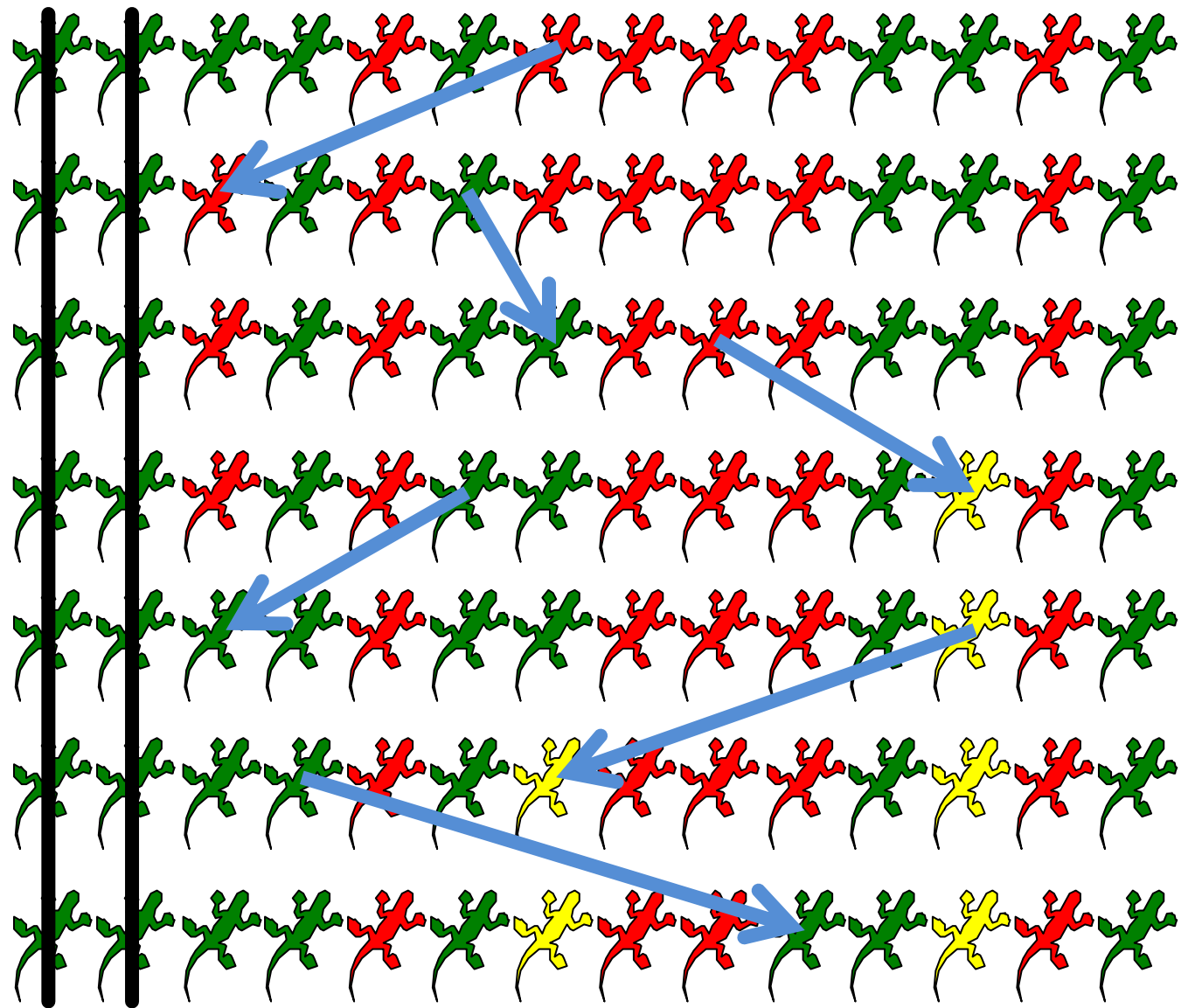


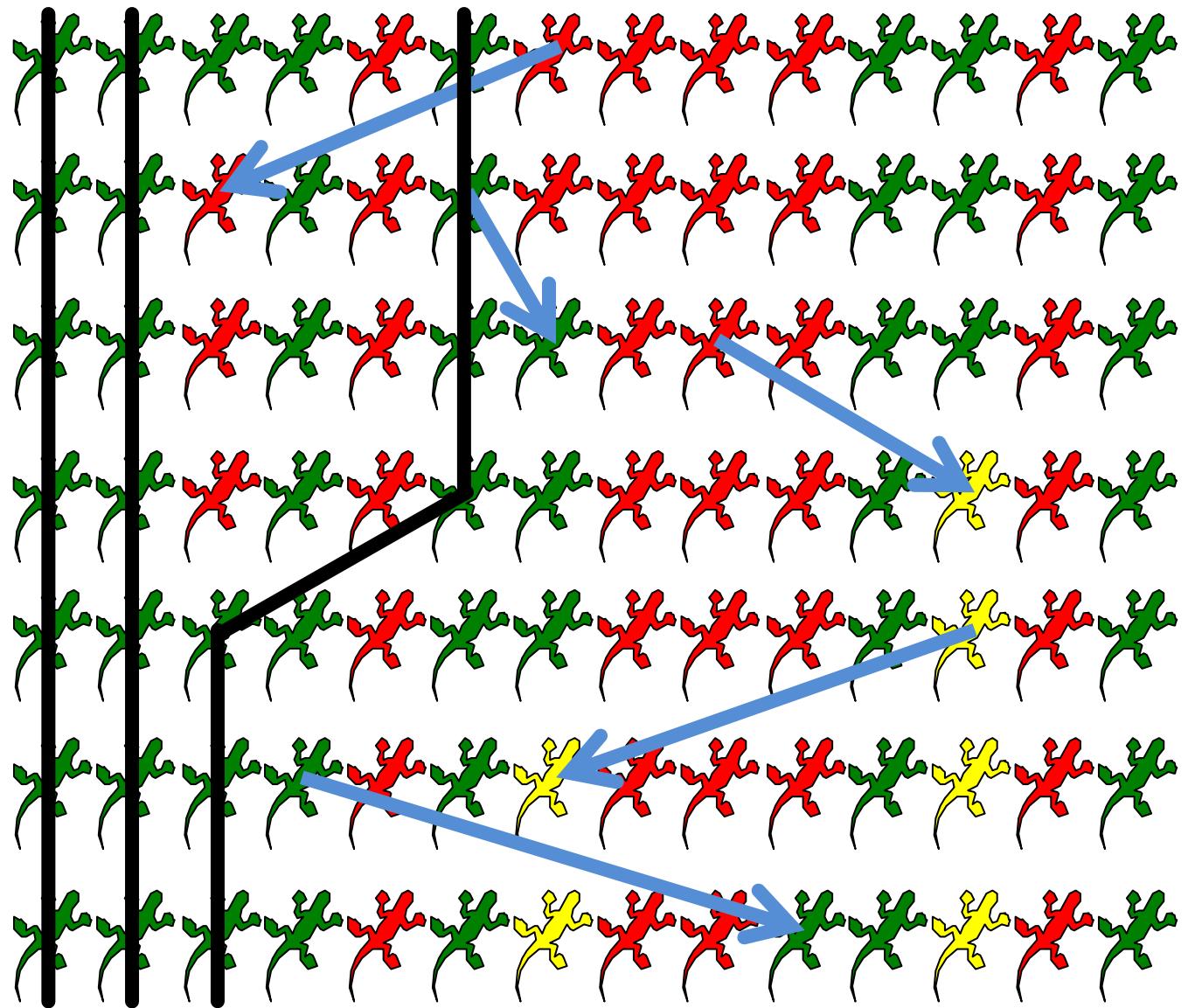


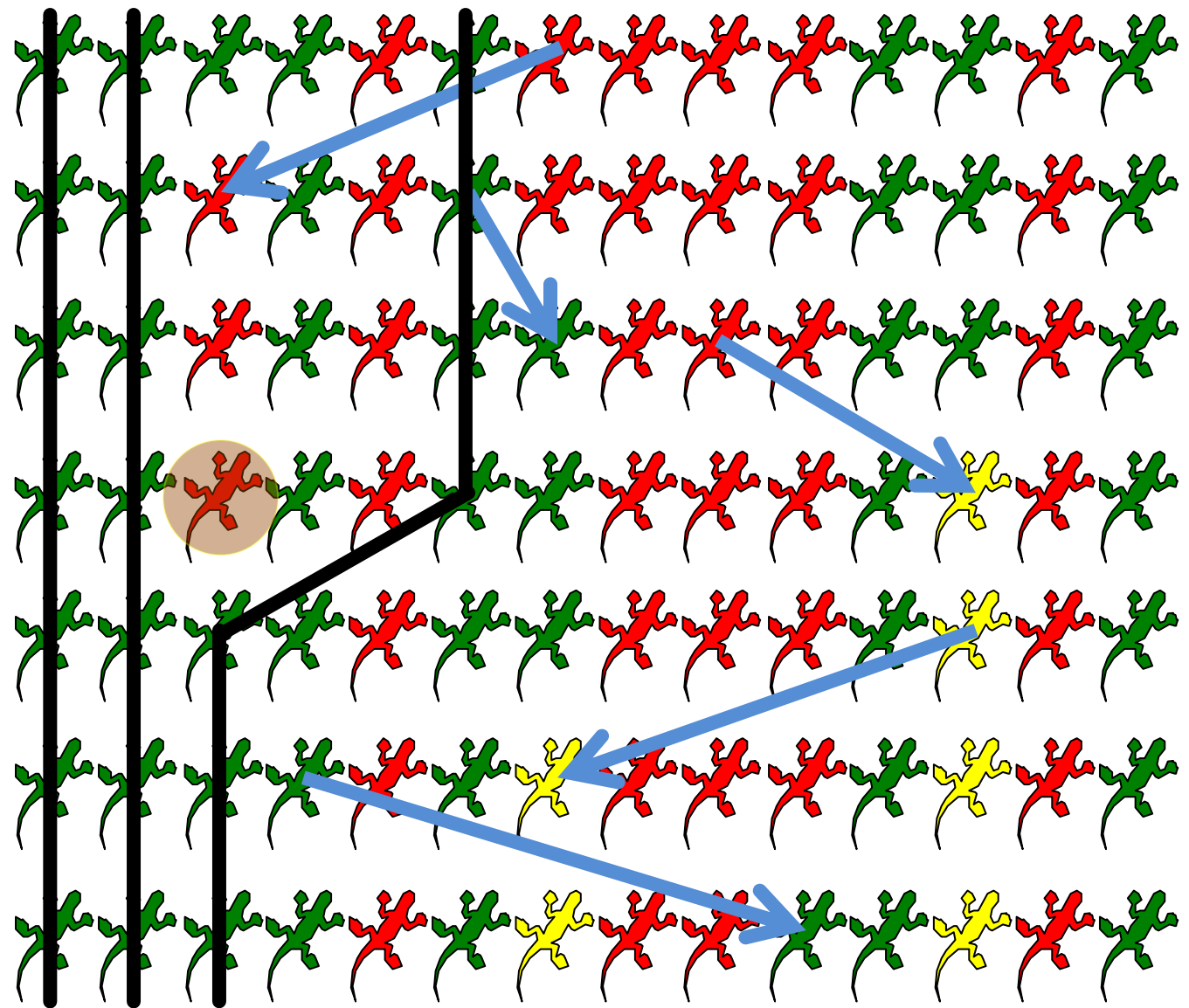


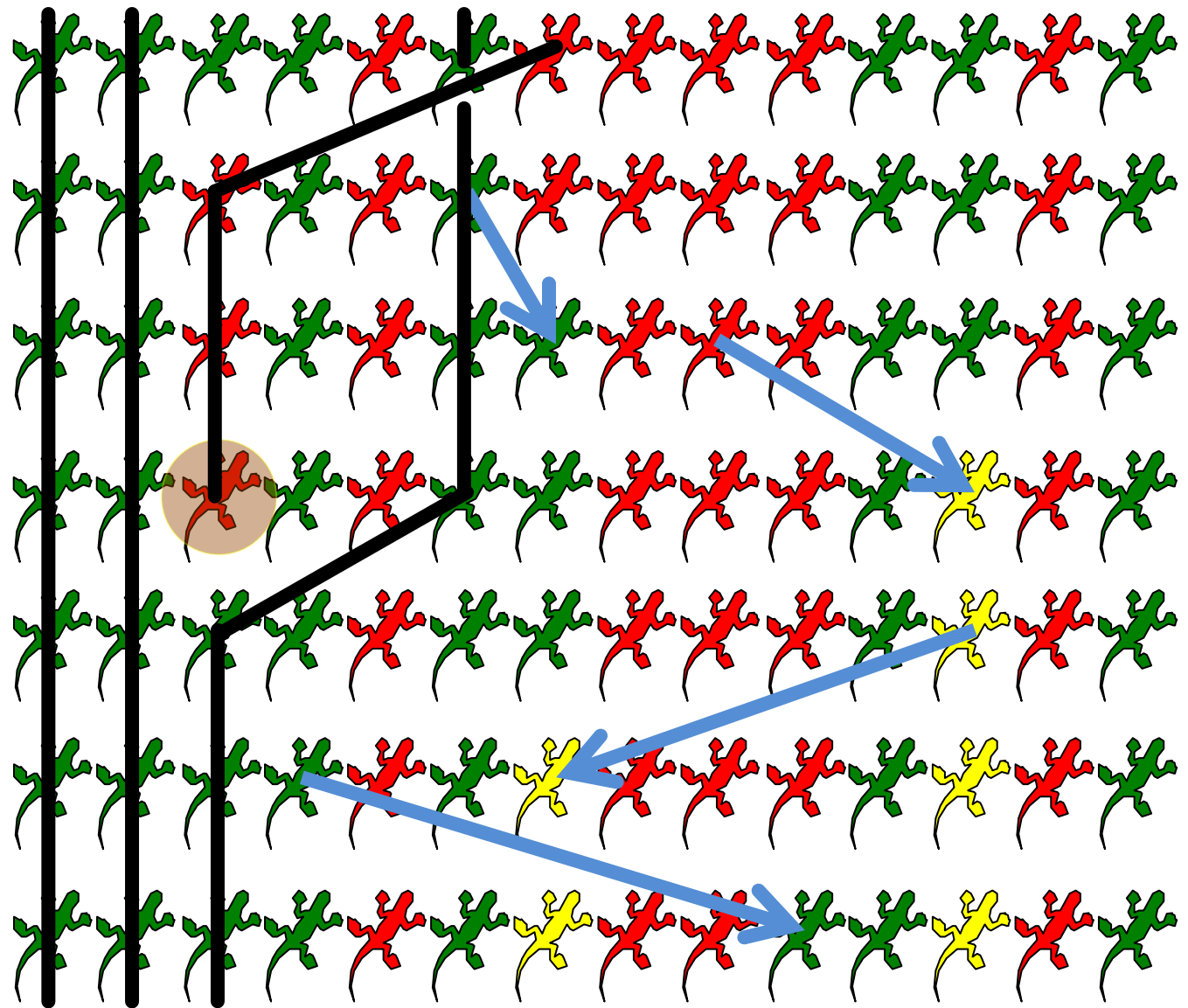


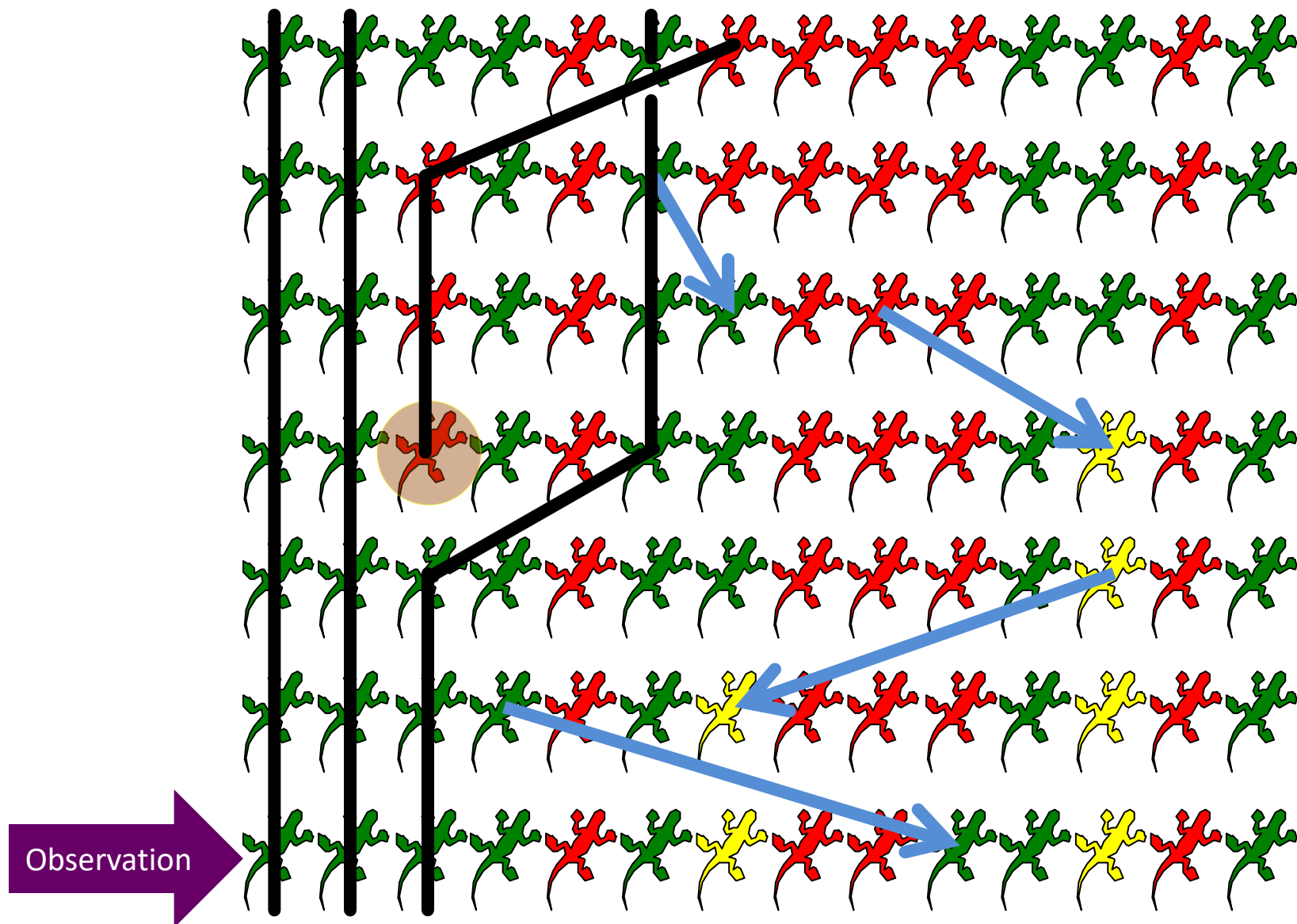


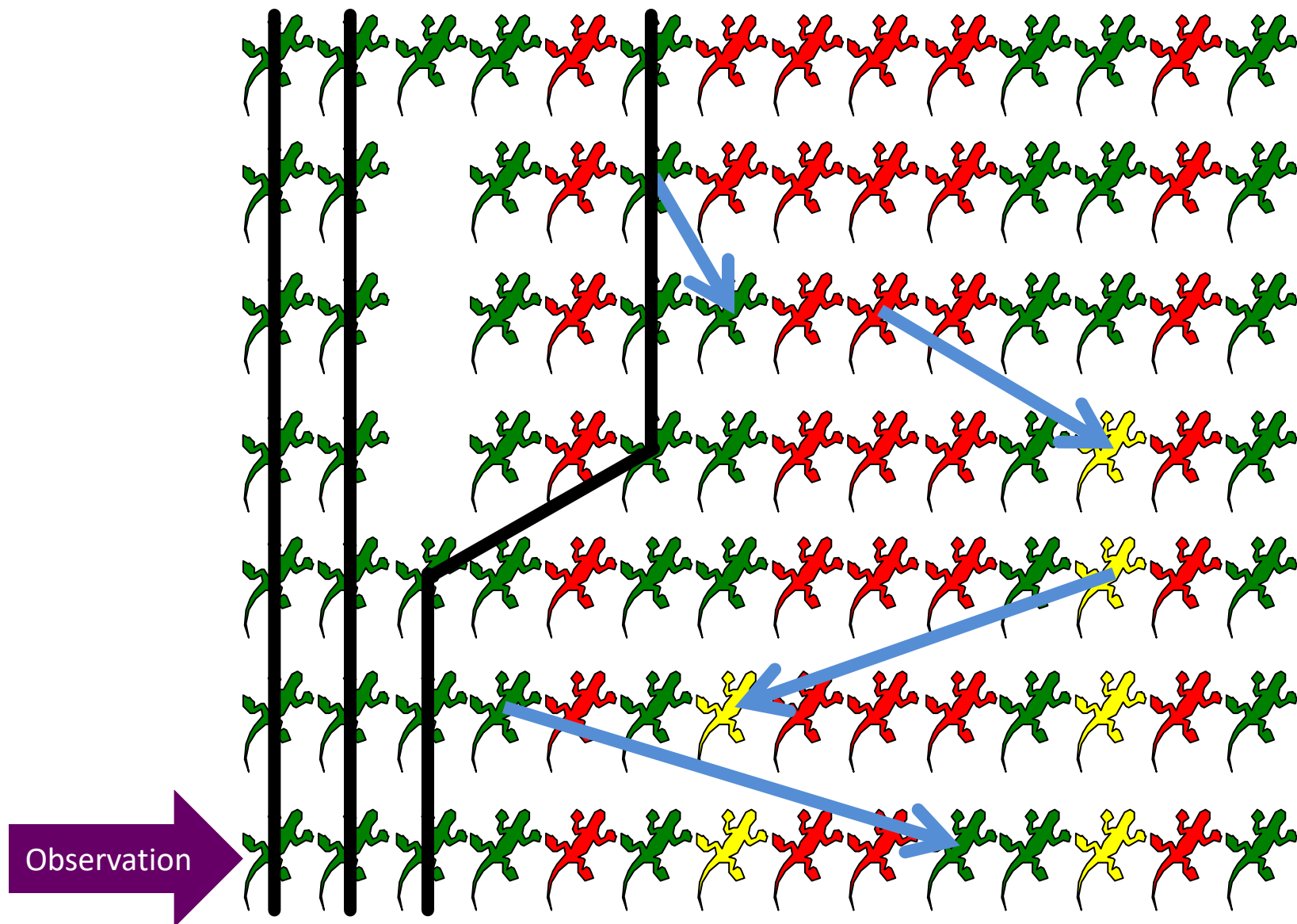


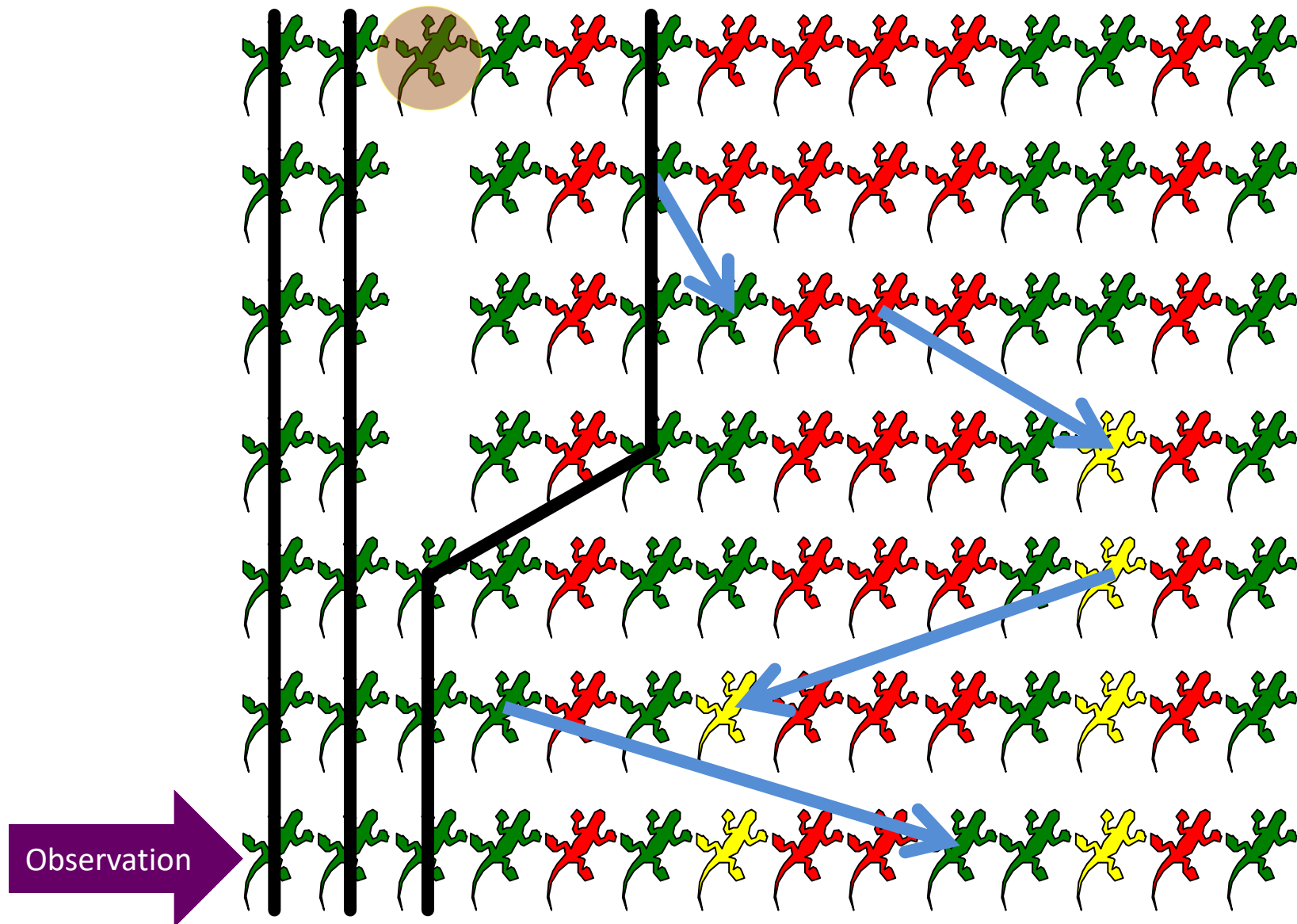


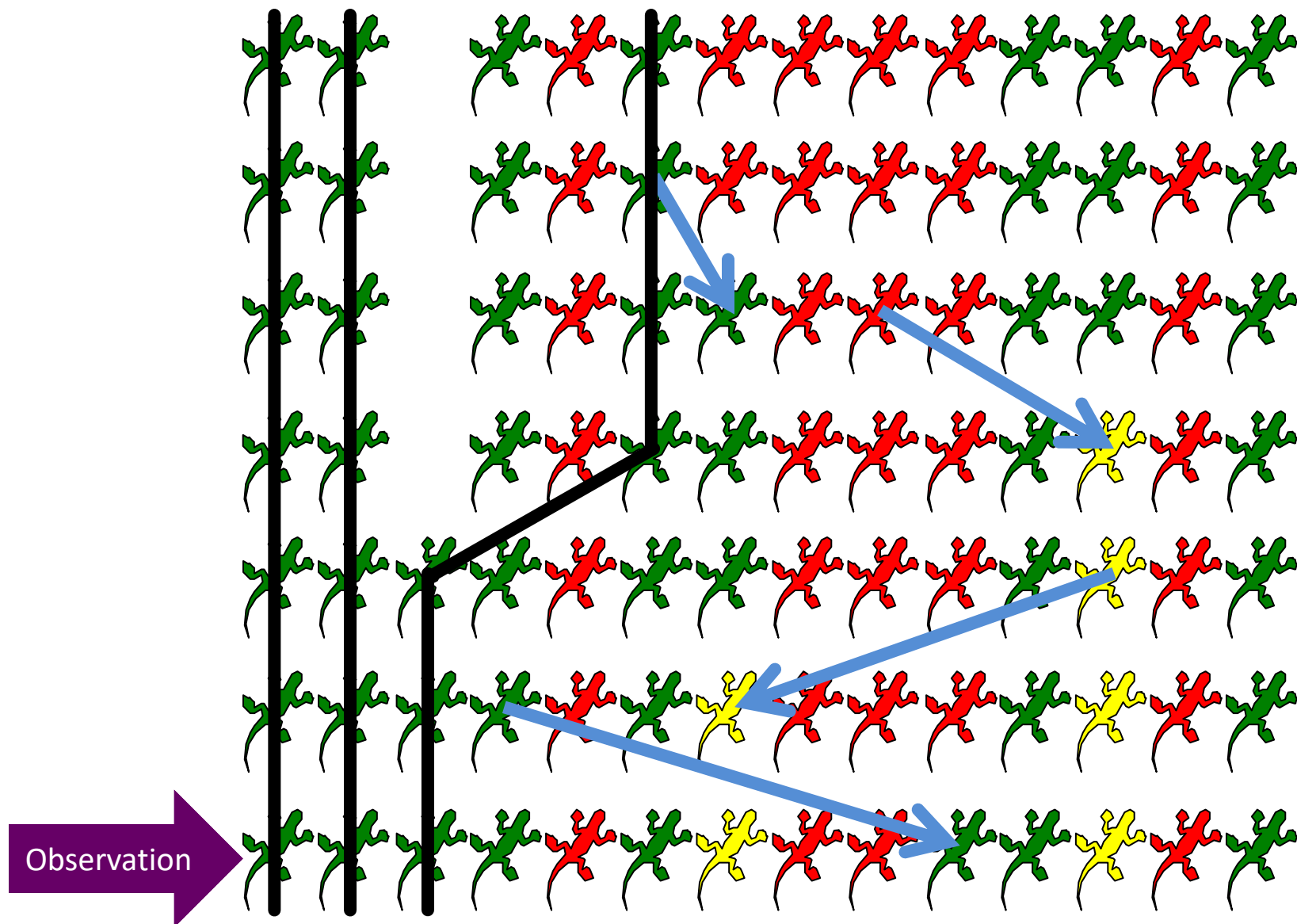


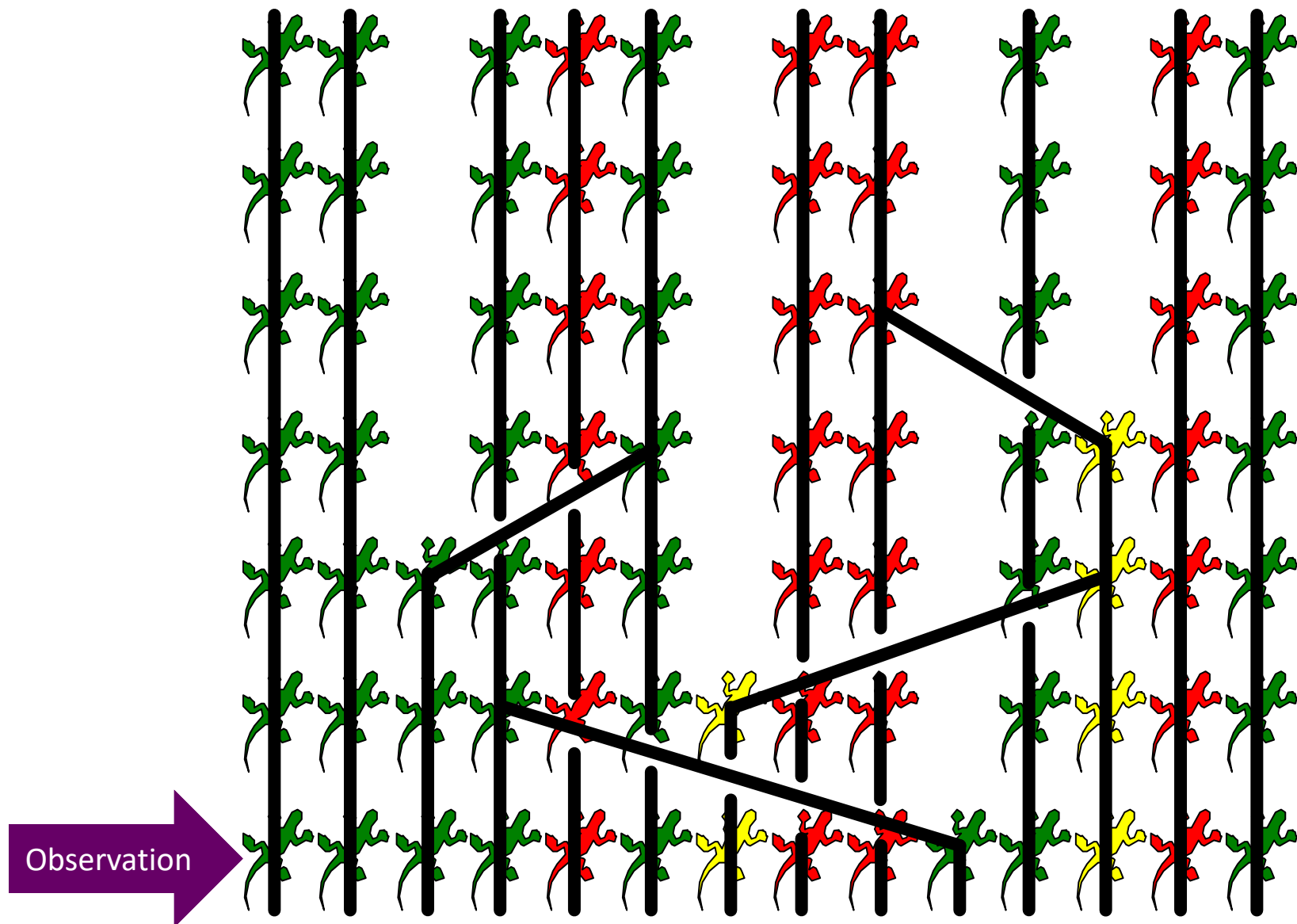


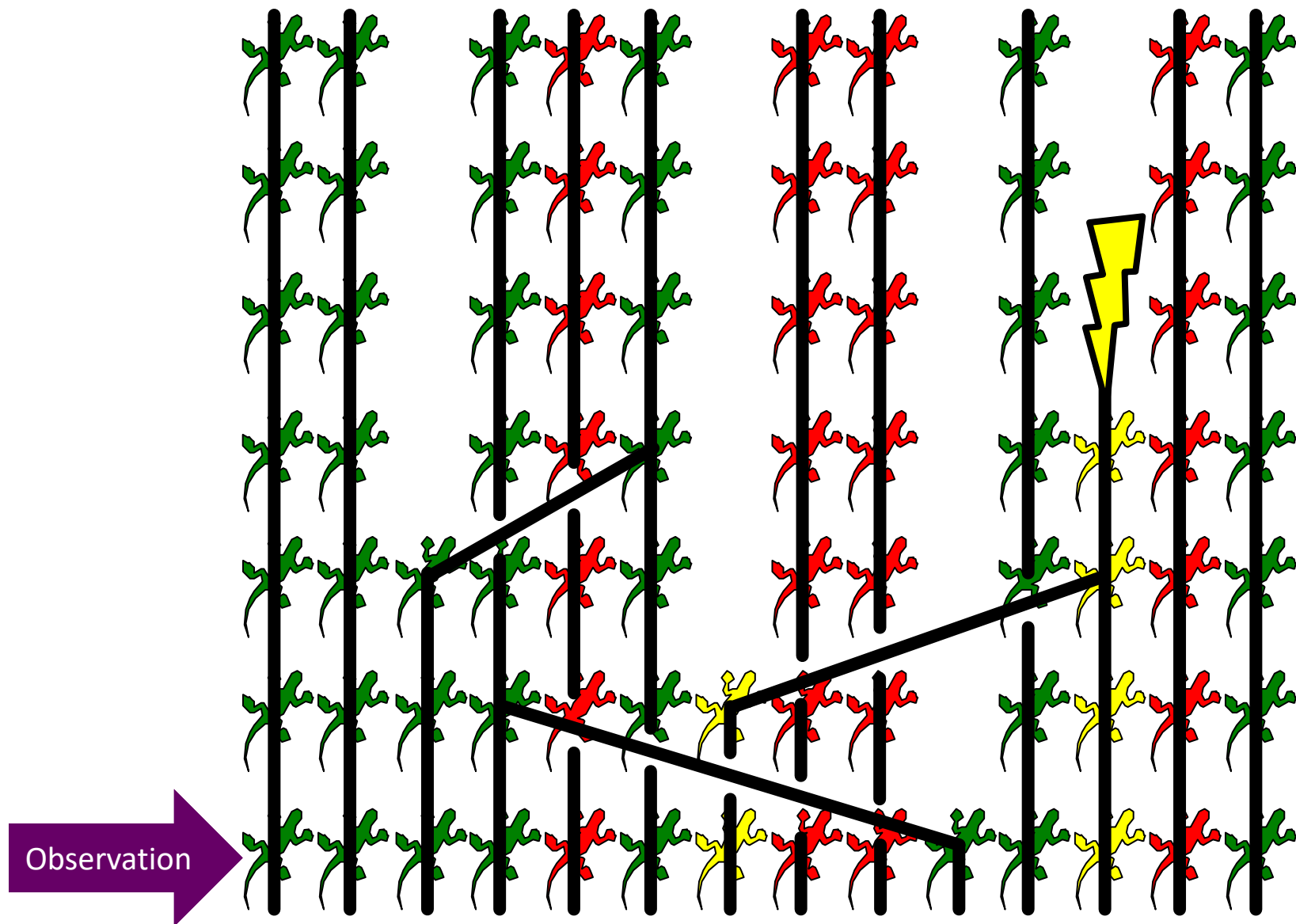


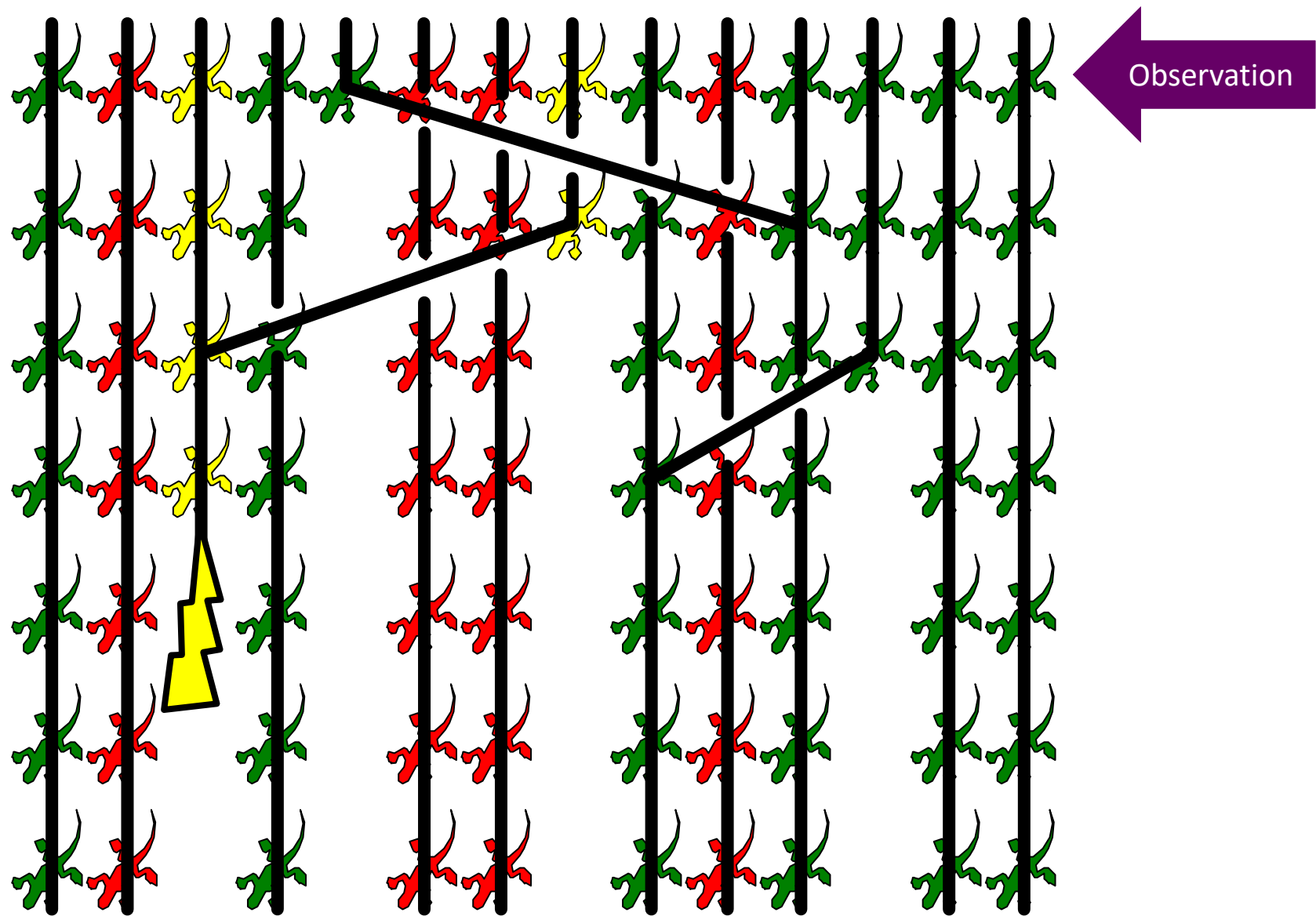


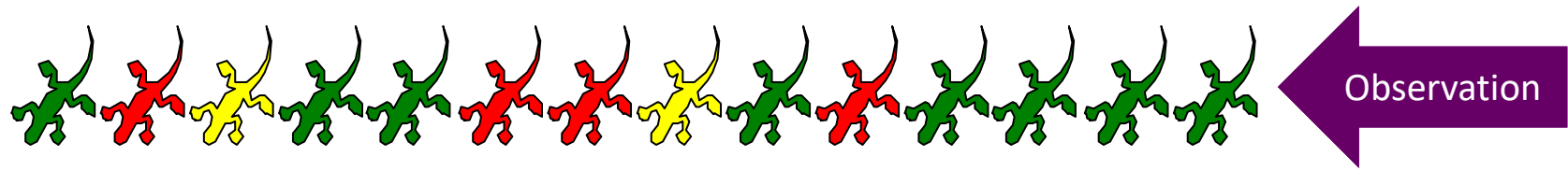


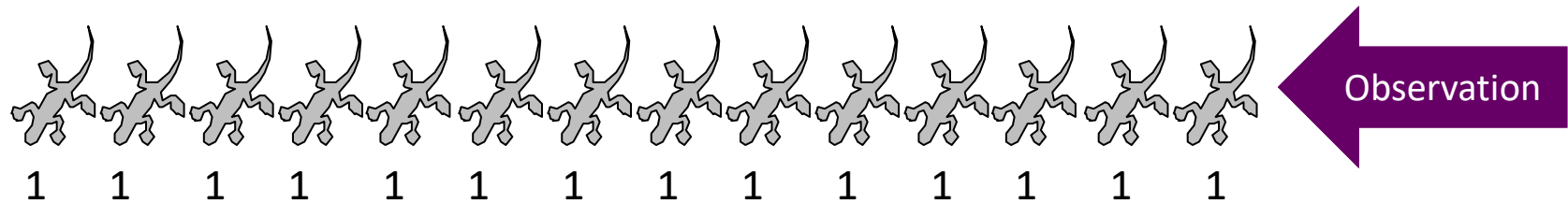


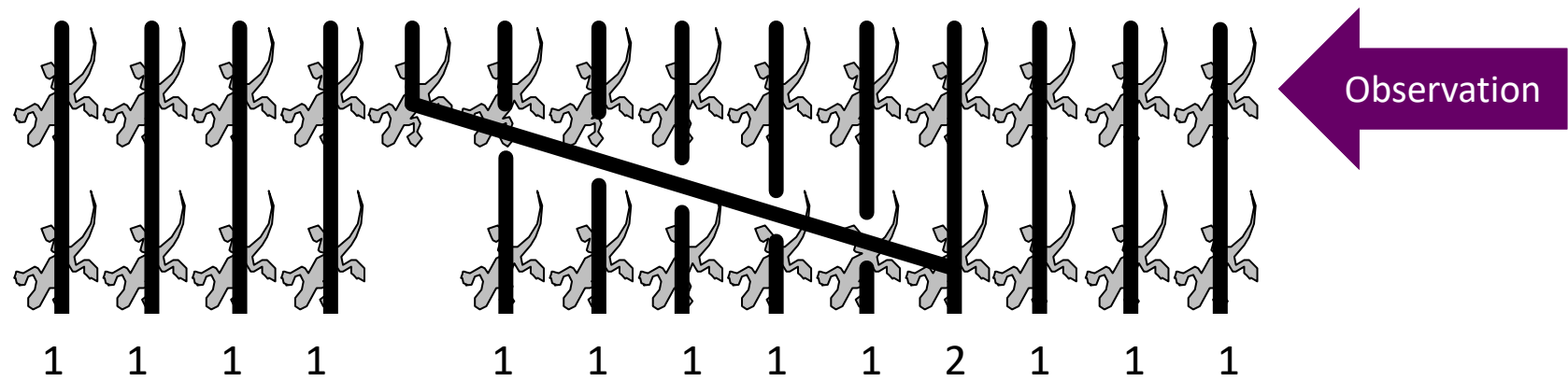


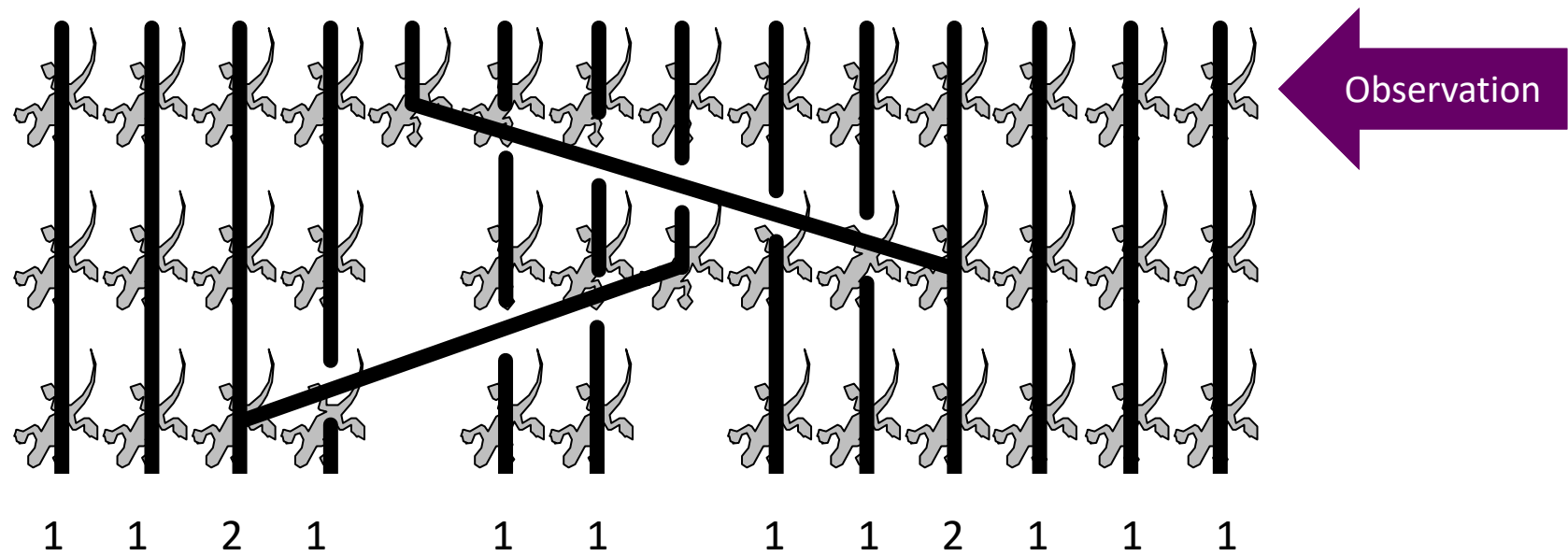


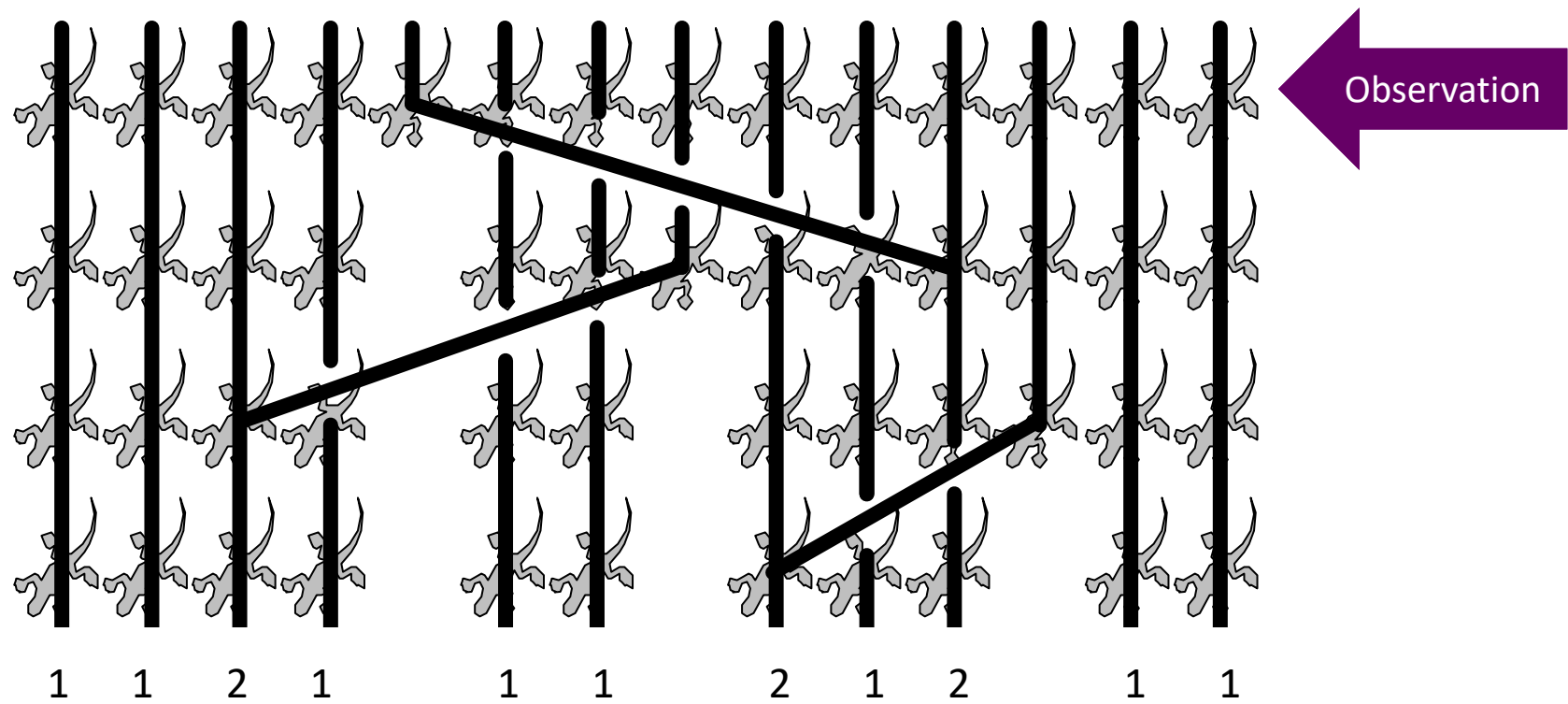


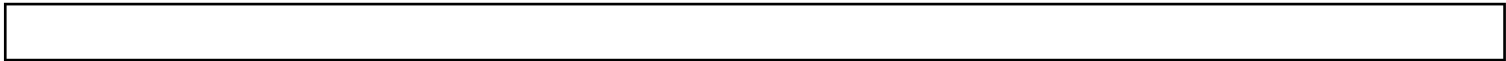
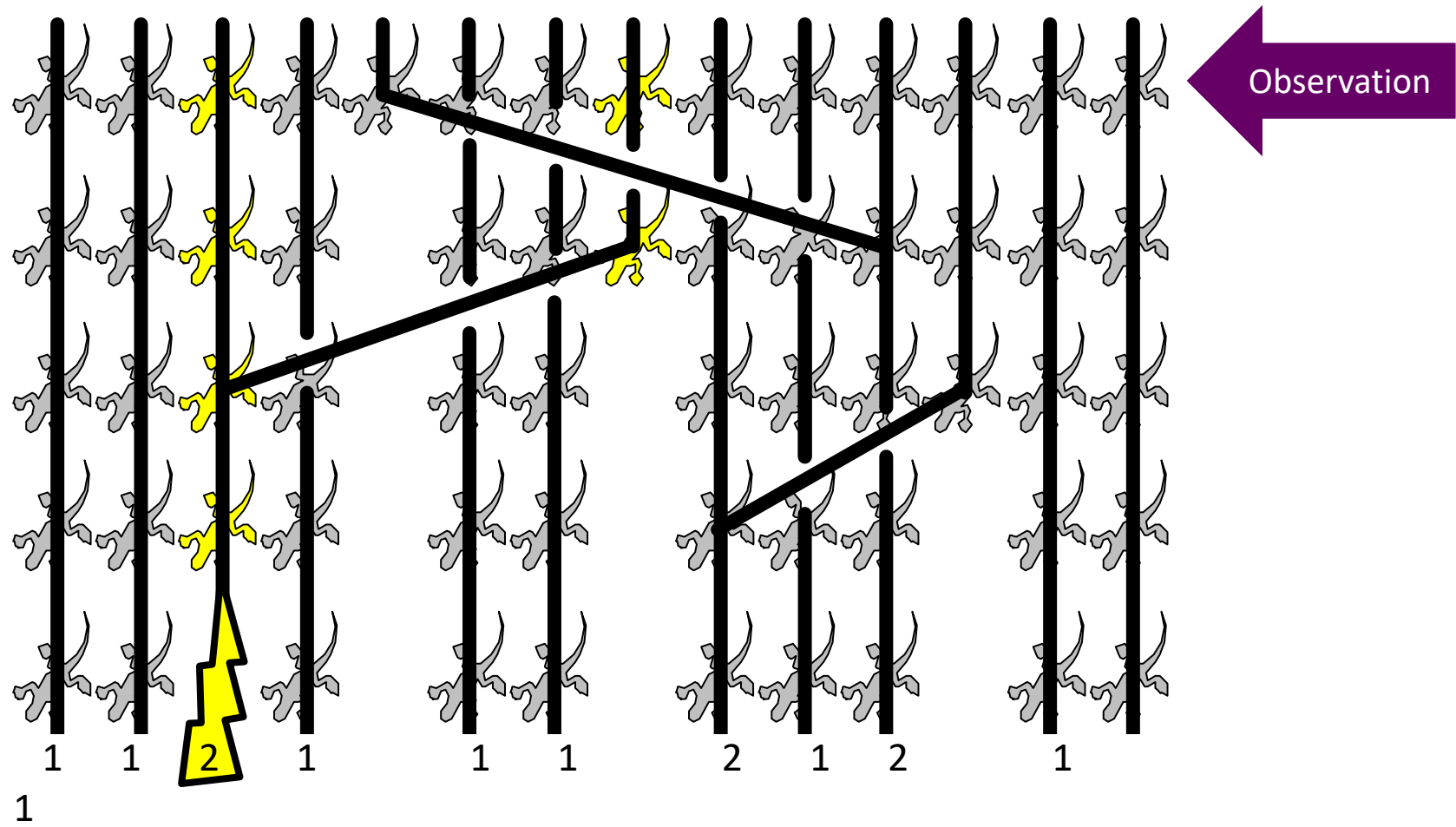


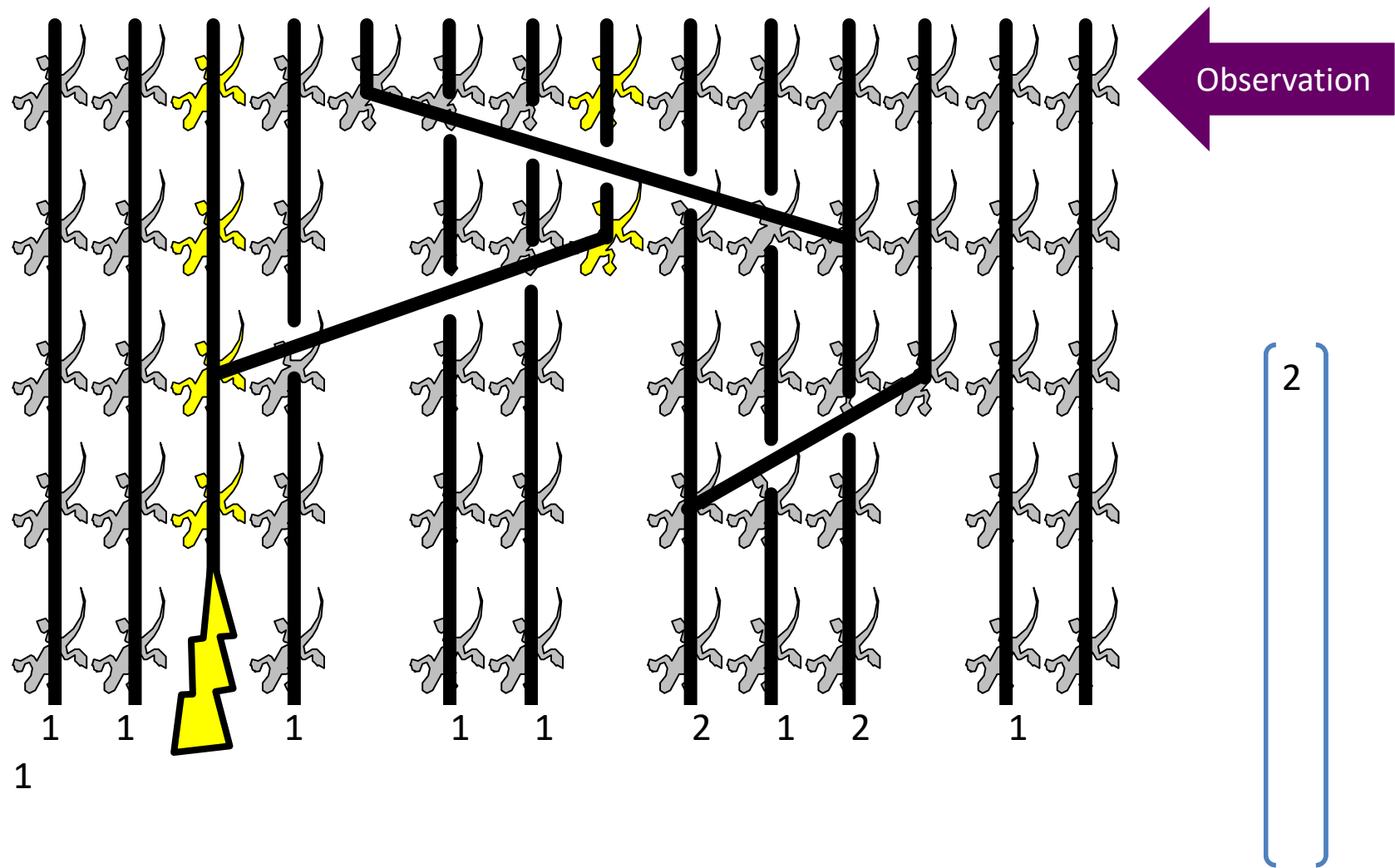


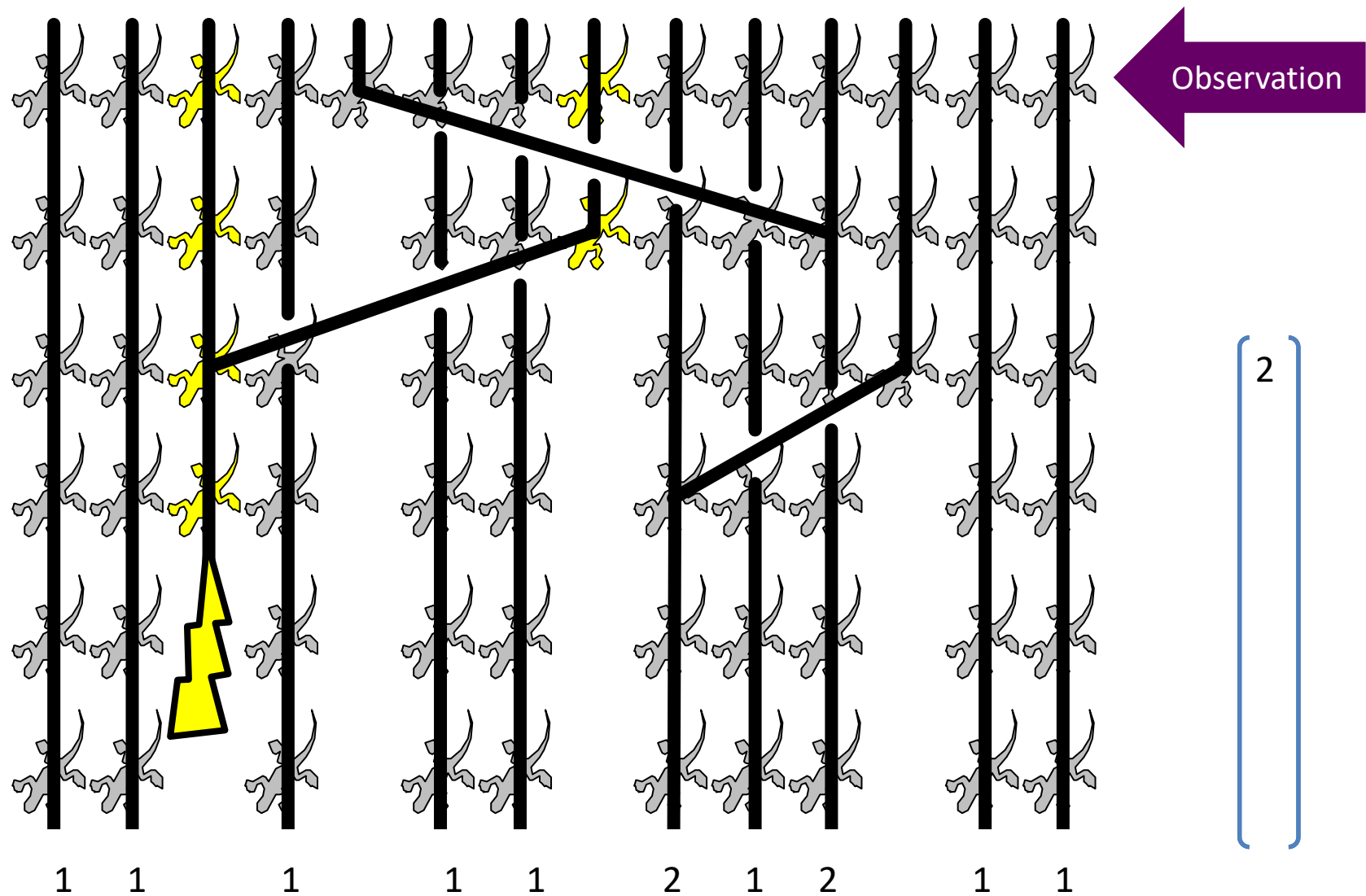


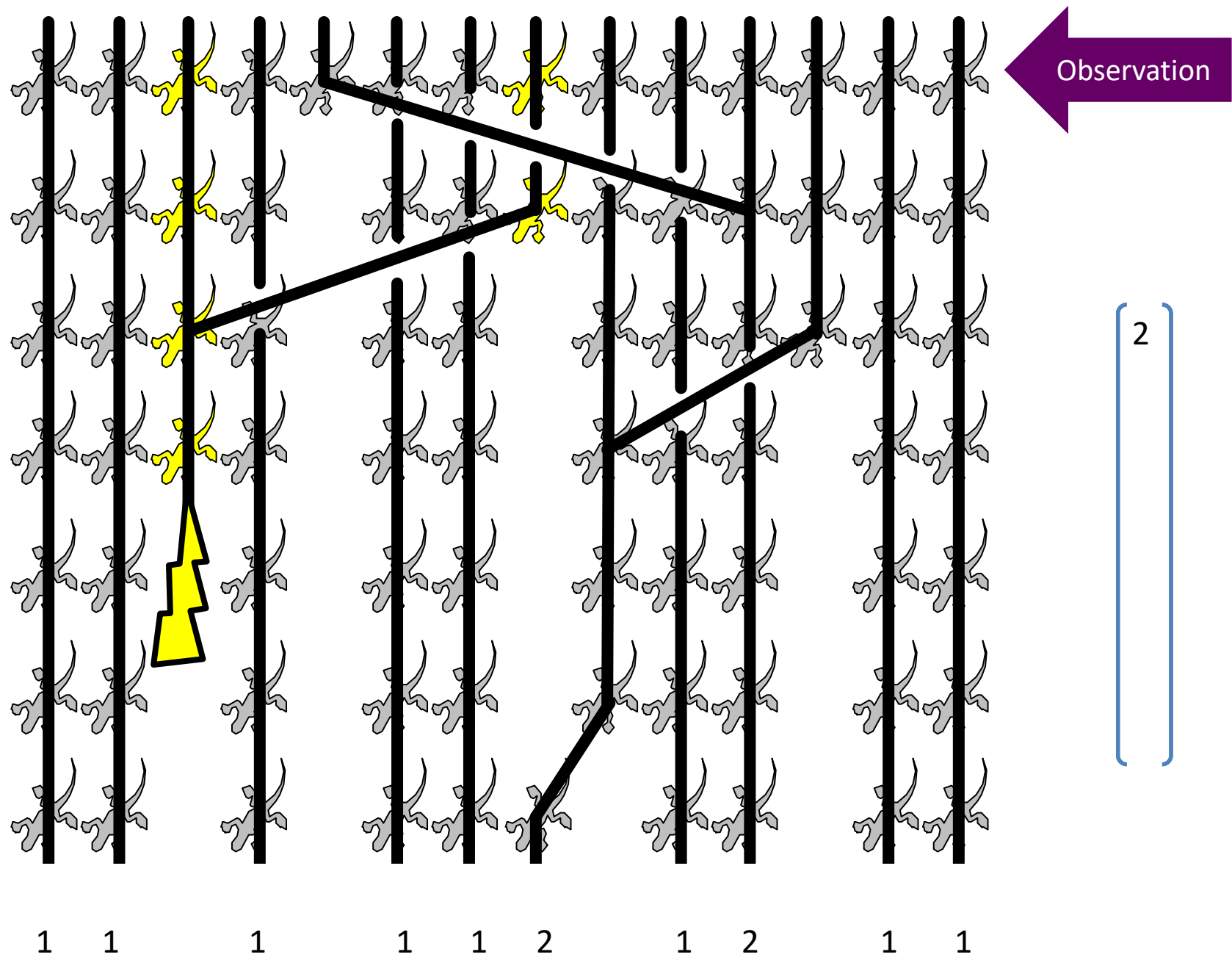


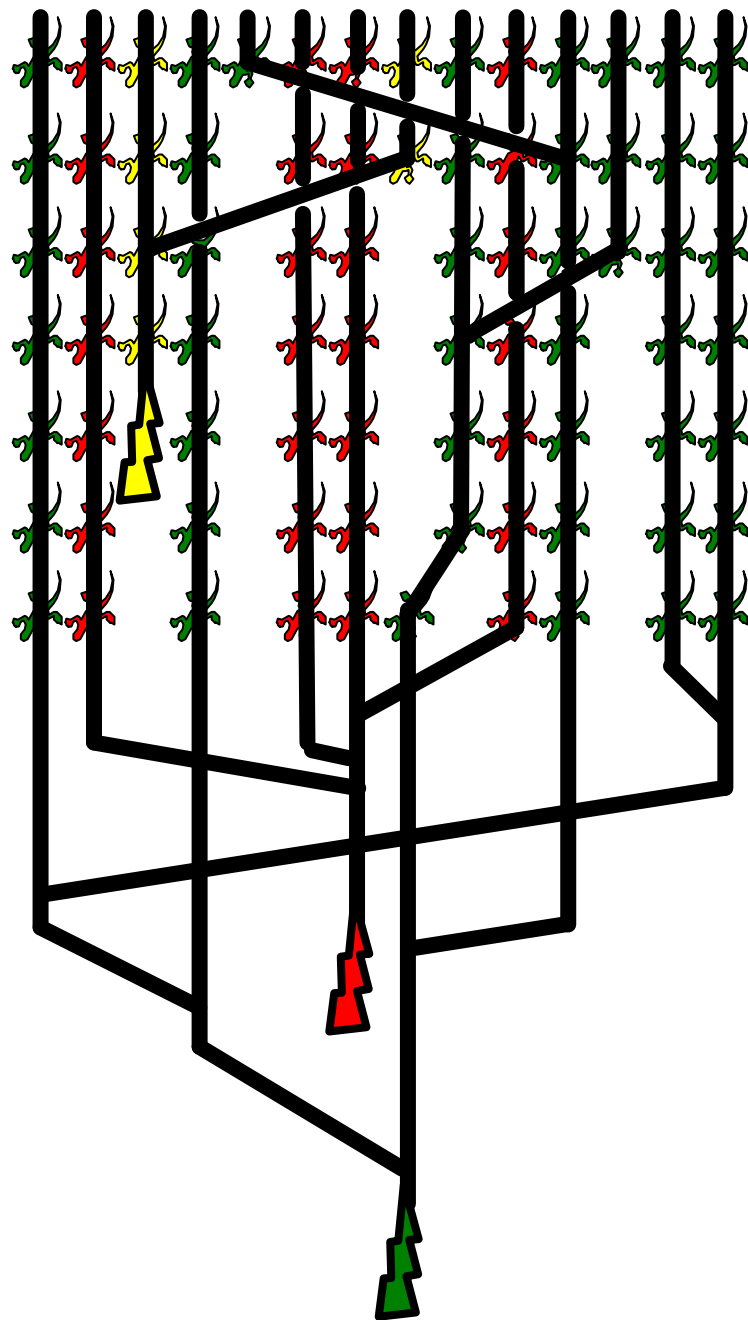




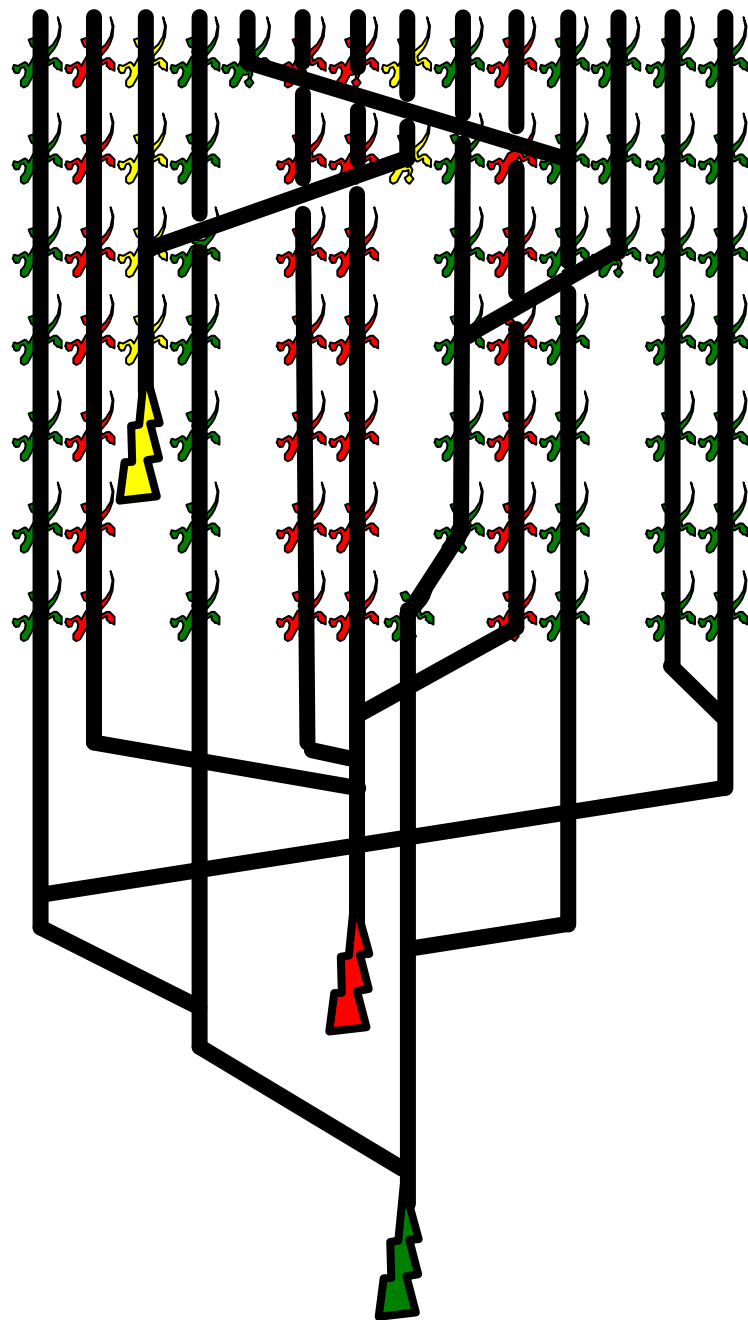






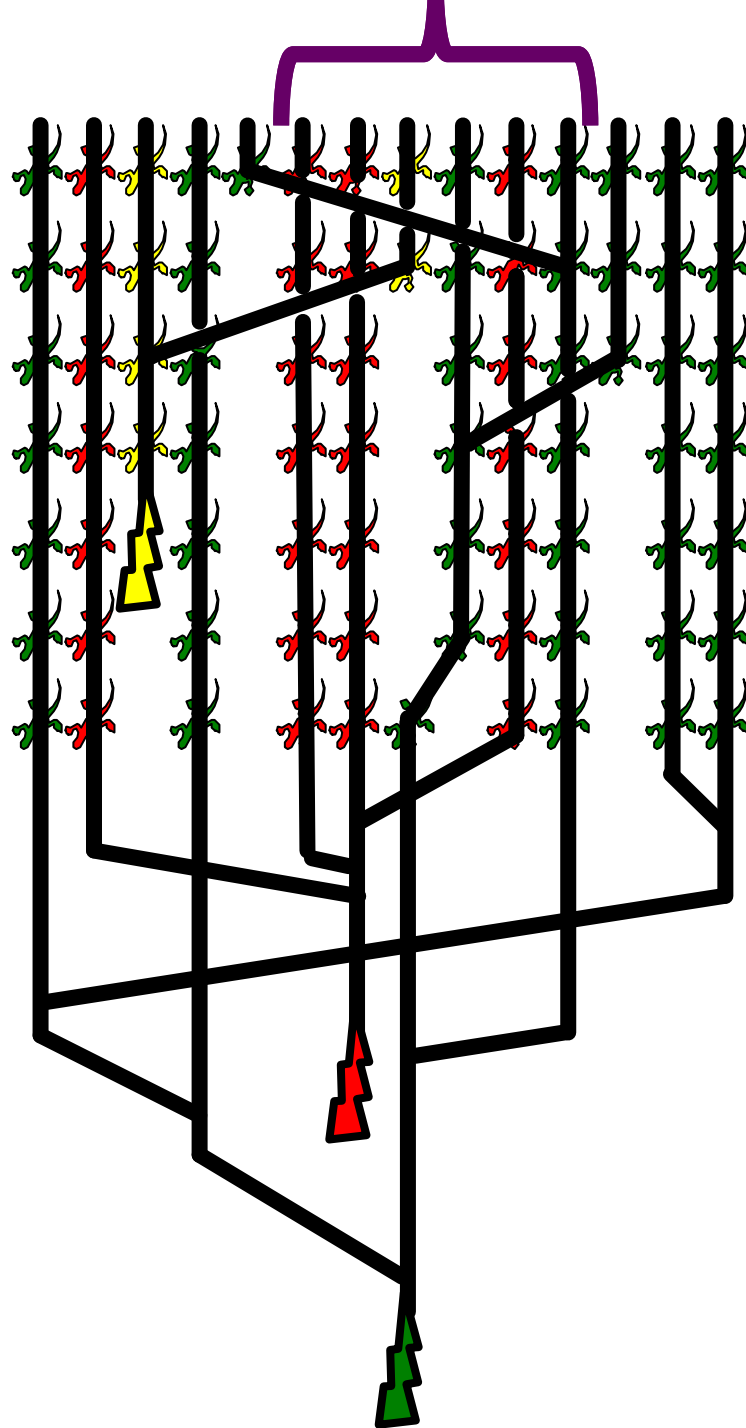


2
4
8



2
5
7

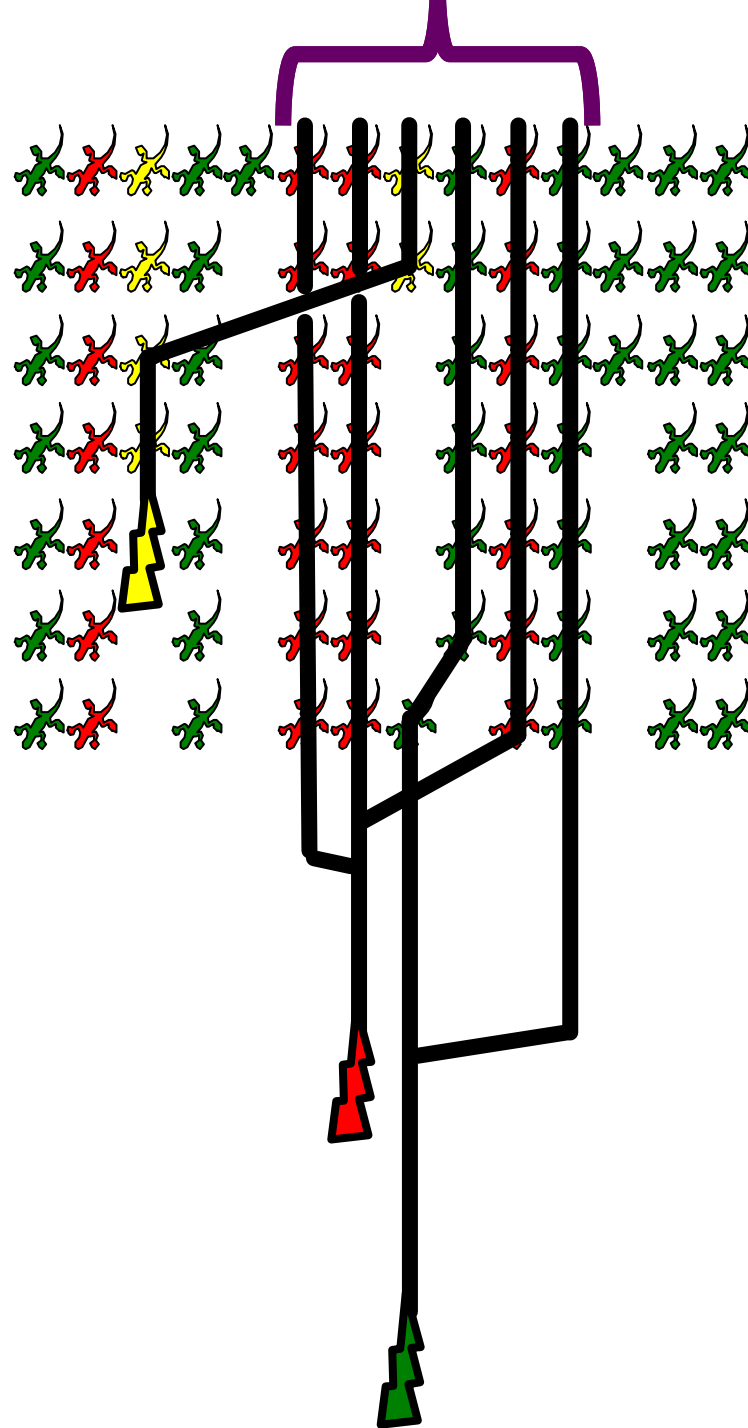
Total 14



Observation

2
5
7

Total 14

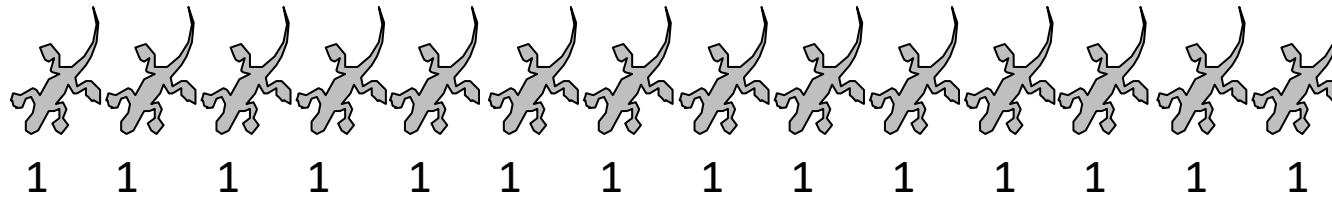


Observation

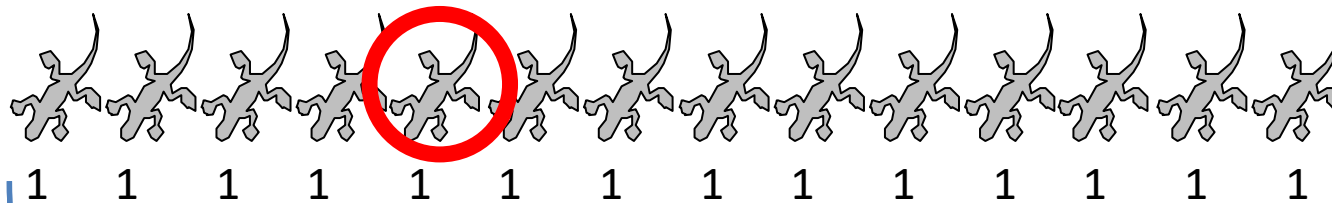
2
5
7

Total 14

J=14
N=14

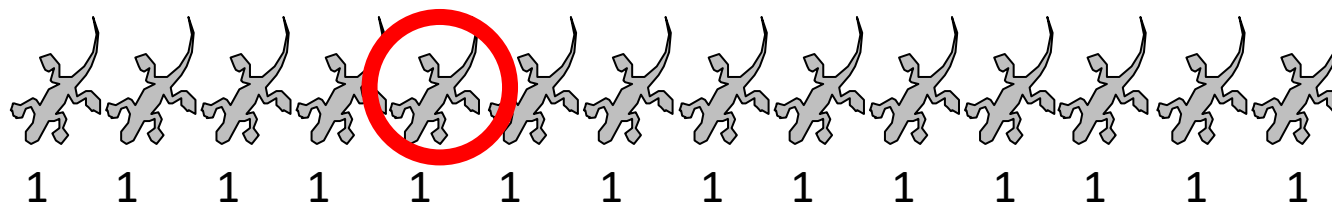


J=14
N=14



Each has $1/14$ chance

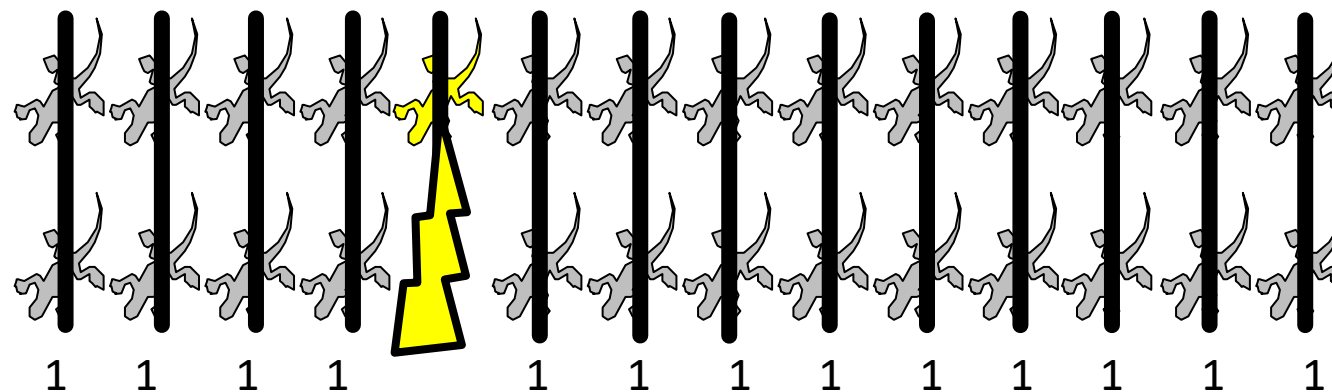
J=14
N=14



Observation

Speciation

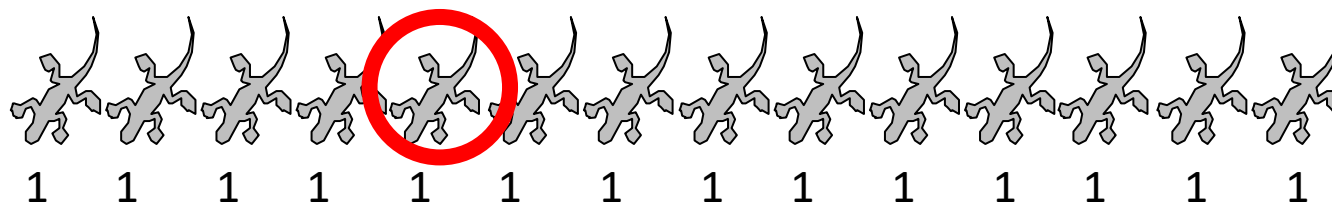
v



Observation

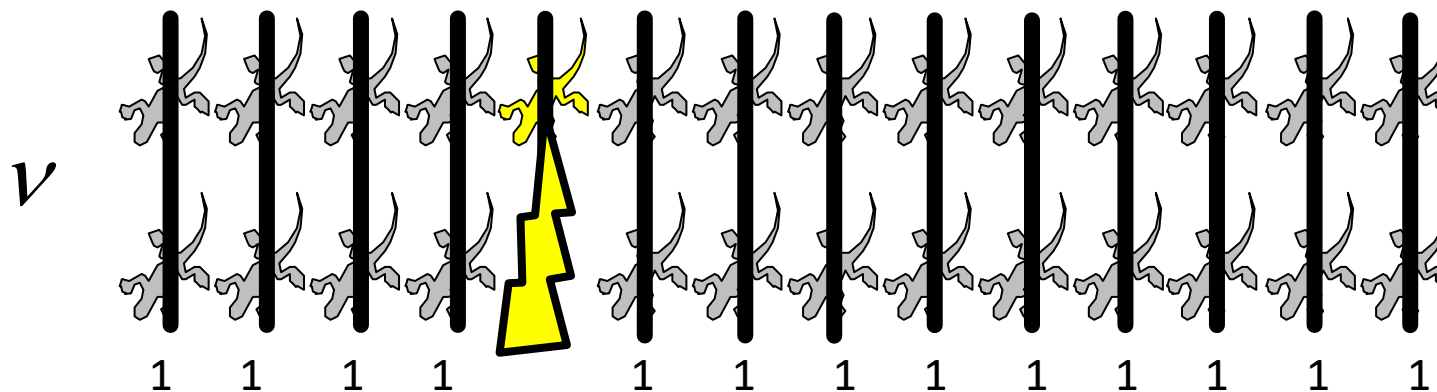
1

J=14
N=14



Observation

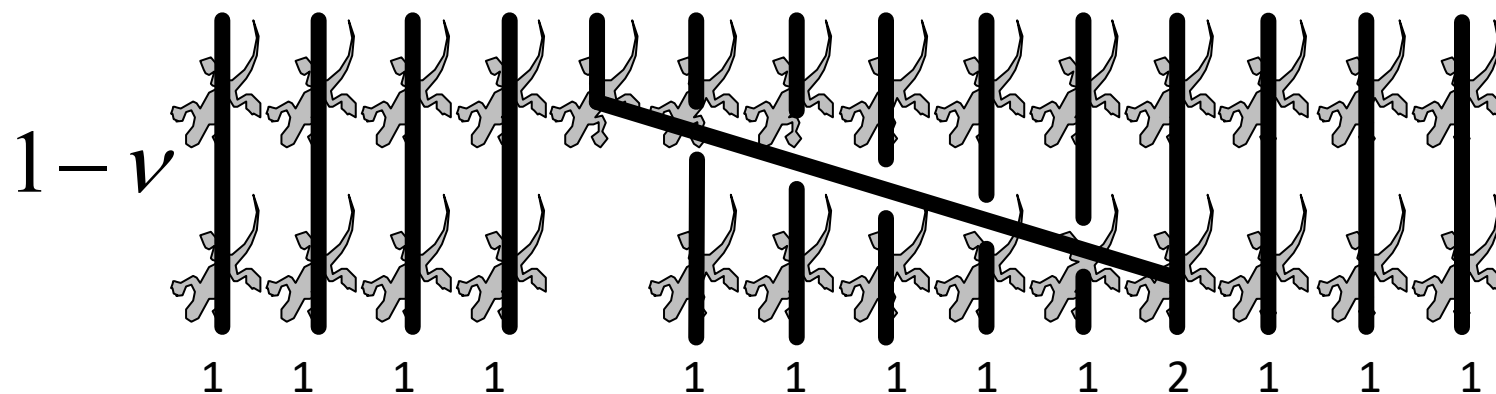
Speciation



Observation

1

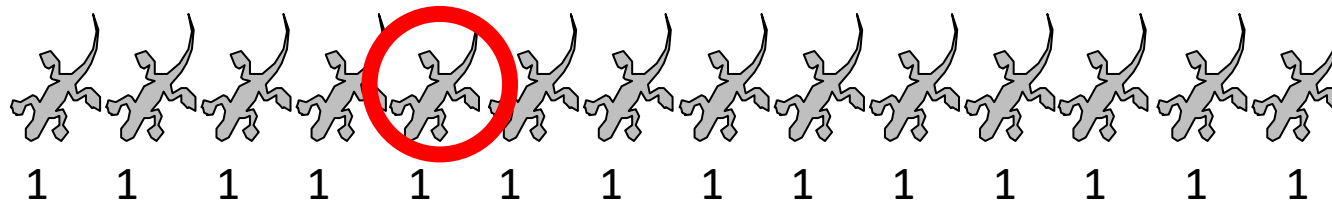
Coalescence



Observation

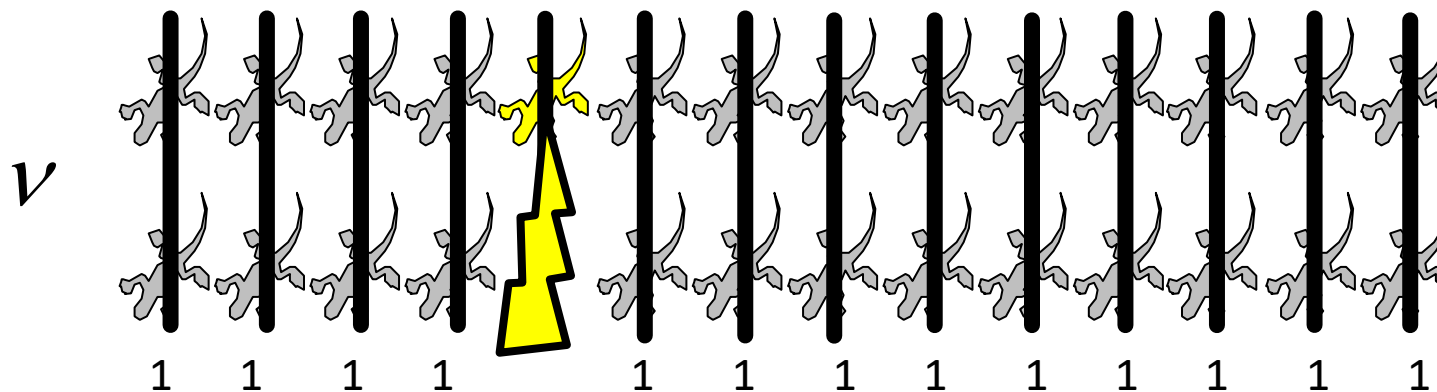
Each has 1/13 chance

J=14
N=14



Observation

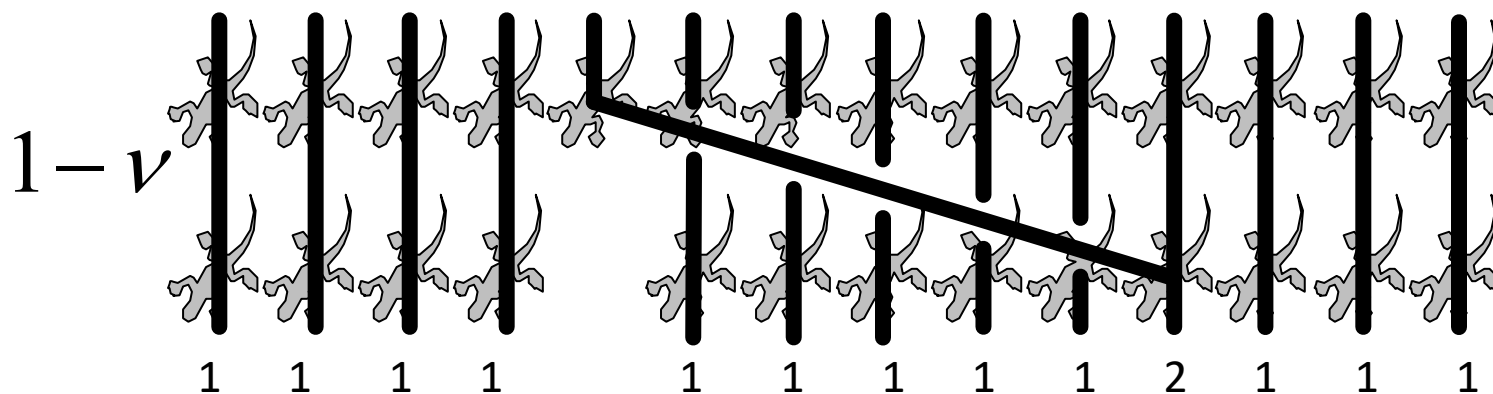
Speciation



Observation

1

Coalescence



Observation

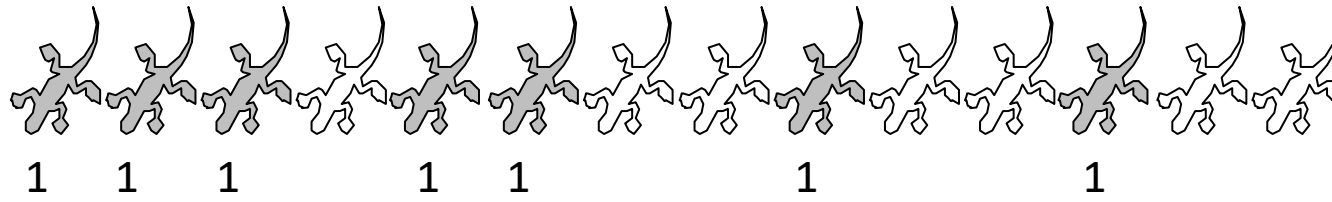
J=14
N=13

Each has 1/13 chance

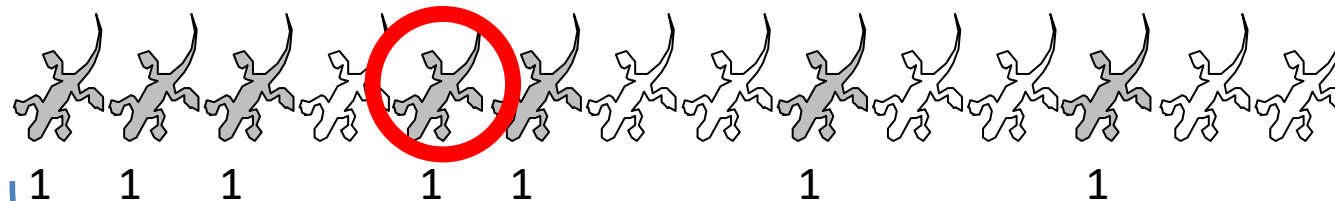
J=14
N=7



J=14
N=7

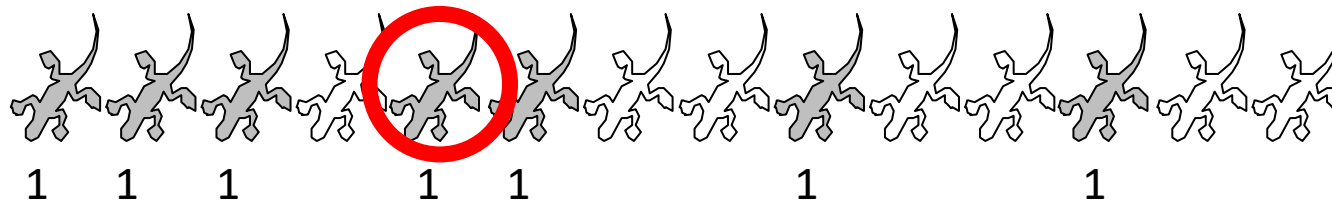


J=14
N=7



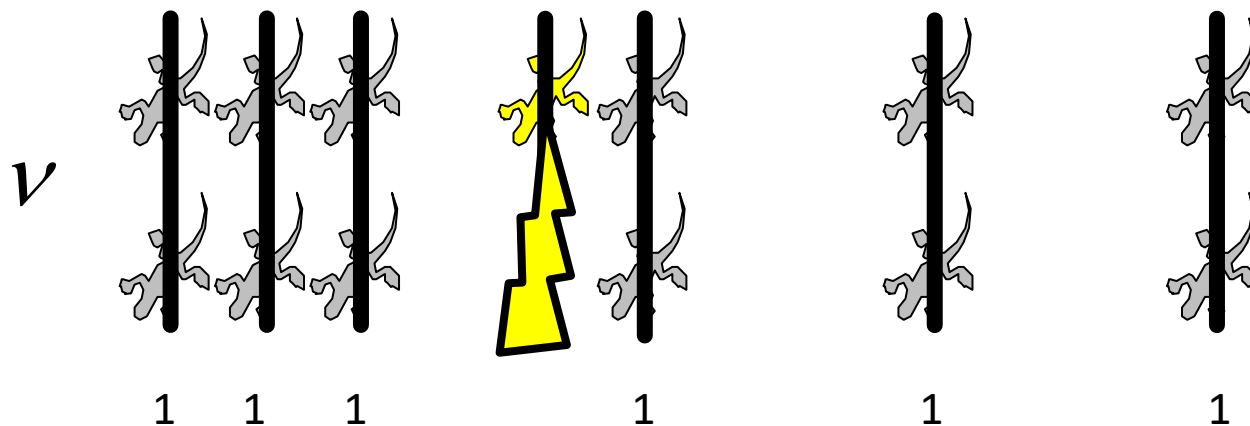
Each has $1/7$ chance

J=14
N=7



← Observation

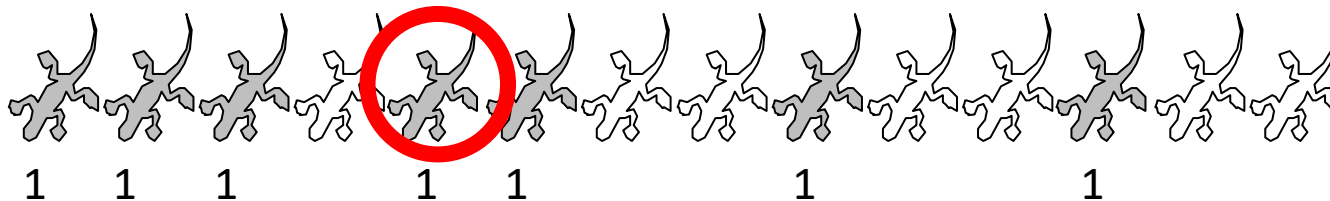
Speciation



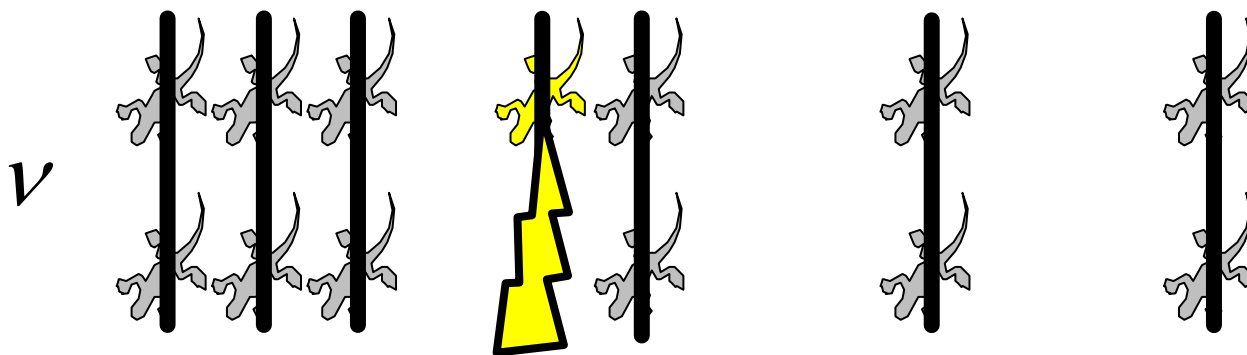
← Observation

$\begin{bmatrix} 1 \end{bmatrix}$

J=14
N=7



Speciation



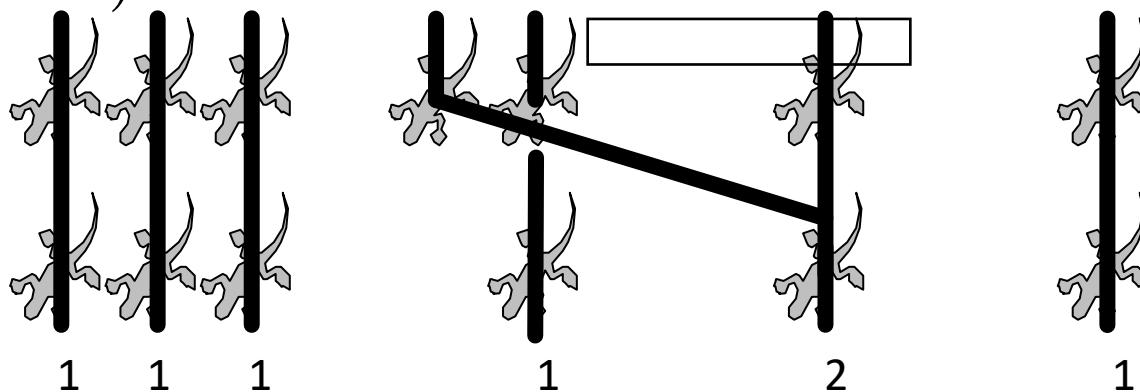
Observation

1

$$\frac{N-1}{J-1}(1-v)$$

<- probabilities

Coalescence



Observation

Each has 1/6 chance

Advantages of coalescence

- Always at equilibrium
- Much faster
- Sampling based

Disadvantages of coalescence

- Not ideal for time series
- Complex to program
- Fewer ways in which model can be changed