7.2.1 Interactive: Markov Chain Simulation

This interactive lets you create and run a Markov chain.

Markov Chain - Directions for Use

1. Use the "Matrix dimension" slider to choose the size of the transition matrix (which also corresponds to the number of states in the chain).
2. Enter the values for the transition matrix (making sure each row sums to 1), or click "Randomize" to get a random transition matrix.
3. Click on "Run" to start running the chain, and "Stop" to stop the chain. You can adjust the "Step time" slider to control how fast the simulation runs, and click the "Sonify" button if you want to add sound. The "Results" box shows the fraction of time that the chain has spent in each state.

You should try:

- Create a transition matrix where the Markov chain will, with probability 1, get "stuck" in some state (reaching that state and then never leaving).
- For a couple simple examples, get a sense of how long it takes for the results to get very close to the stationary distribution.
- See whether the stationary distribution appears to be uniform over the states in an example where both the row sums and the column sums of the transition matrix are all 1.
- Replicate the results of the Markov chain animation, by trying out the transition matrix for Ana's process of randomly flying from city to city.

Controls

Matrix dimension: 3

Step time:

250 milliseconds

Sonify: ☑
(Adjust your speakers.)

	1	2	3	Total
1	0.4	0.3	0.3	1.00
2	0.3	0.4	0.3	1.00
3	0.3	0.3	0.4	1.00

Randomize | Run

Results

Step count: 0

1:

2:

3: