Markov Chain (again)

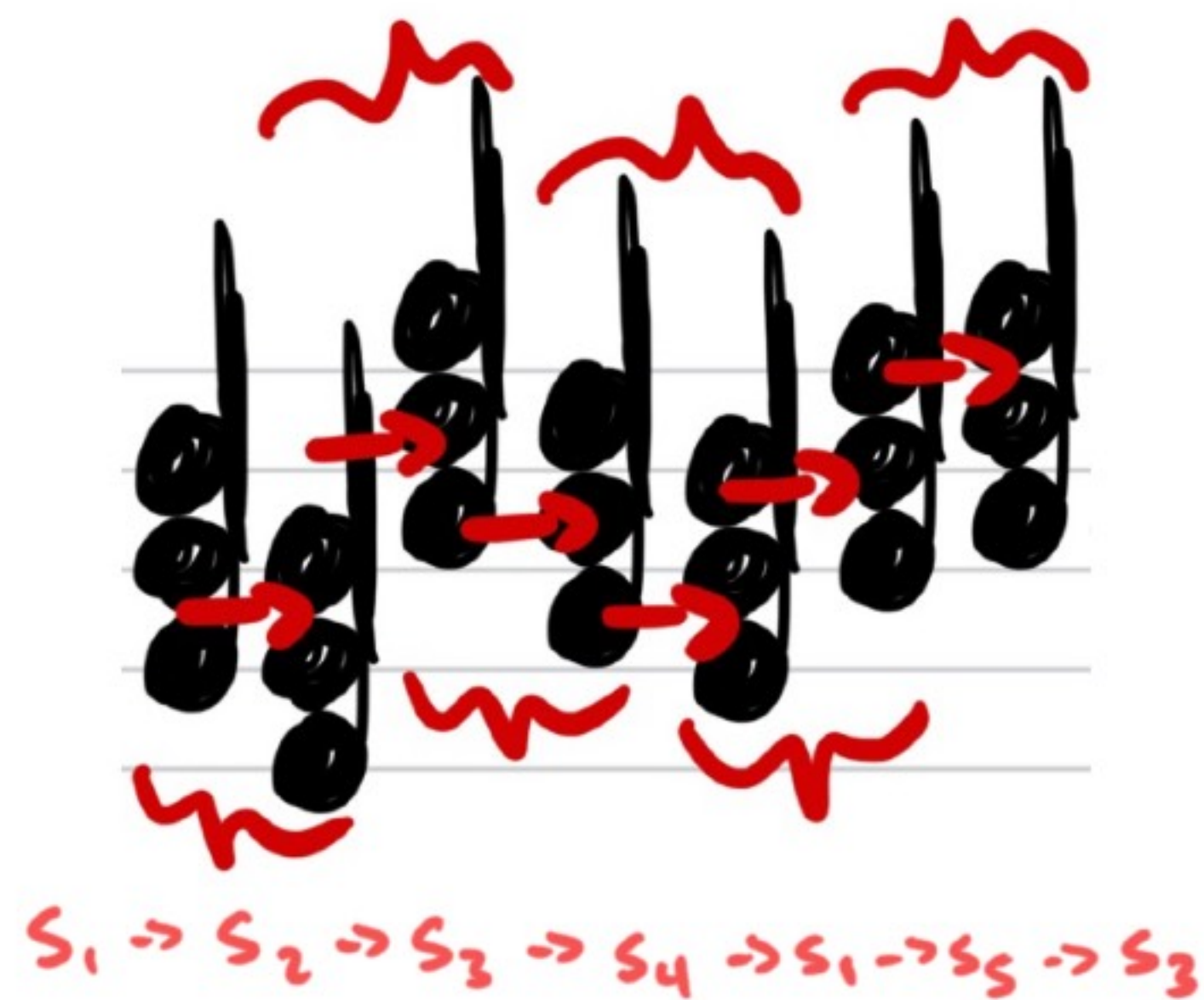$$S_1 \to S_2 \to S_3 \to S_4 \to S_1 \to S_5 \to S_3$$

$$
\begin{array}{c c}
 & \begin{matrix} S_1 & S_2 & S_3 & S_4 & S_5 \end{matrix} \\
\begin{matrix} S_1 \\ S_2 \\ S_3 \\ S_4 \\ S_5 \end{matrix} &
\begin{bmatrix}
0 & 1 & 0 & 0 & 1 \\
0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 \\
1 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0
\end{bmatrix}
\end{array}
\quad \to \quad
\begin{array}{c c}
 & \begin{matrix} S_1 & S_2 & S_3 & S_4 & S_5 \end{matrix} \\
\begin{matrix} S_1 \\ S_2 \\ S_3 \\ S_4 \\ S_5 \end{matrix} &
\begin{bmatrix}
0 & 1/2 & 0 & 0 & 1/2 \\
0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 \\
1 & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0
\end{bmatrix}
\end{array}
$$

make this matrix row-stochastic

$$
\begin{array}{c c}
 & \begin{matrix} S_1 & S_2 & S_3 & \cdots & S_{n-1} & S_n \end{matrix} \\
\begin{matrix} S_1 \\ S_2 \\ S_3 \\ \vdots \\ S_{n-1} \\ S_n \end{matrix} &
\begin{bmatrix}
 & & & & & \\
 & & on \ a & & & \\
 & & large & & & \\
 & & scale & & &
\end{bmatrix}
\end{array}
$$

Generating the Markov Chain

The useful stuff.

make this matrix row-stochastic

1. Tracks all of the unique sequences of notes in each 64th note unit of time

2. Tracks the amount of times you transition from one sequence to another

3. Creates a square matrix that shows how many times you transition from one state to the next

4. Then make it row stochastic by dividing each row by the row sum

Markov Chain Code