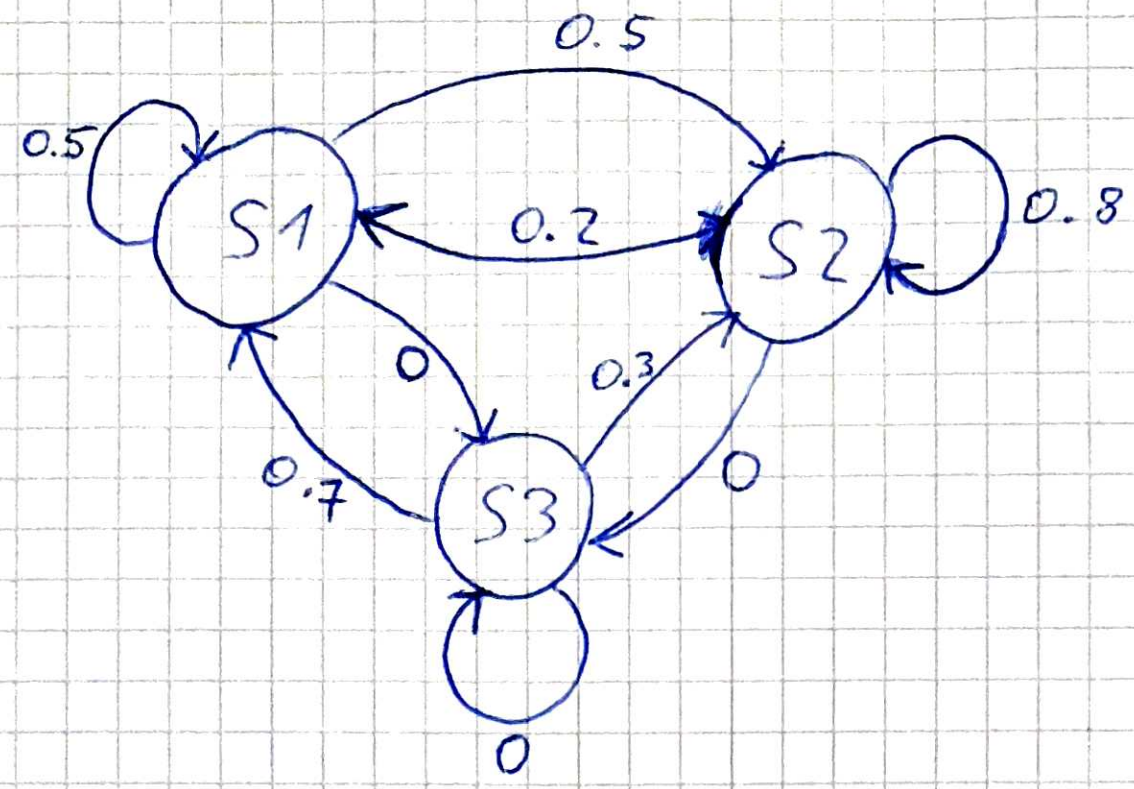
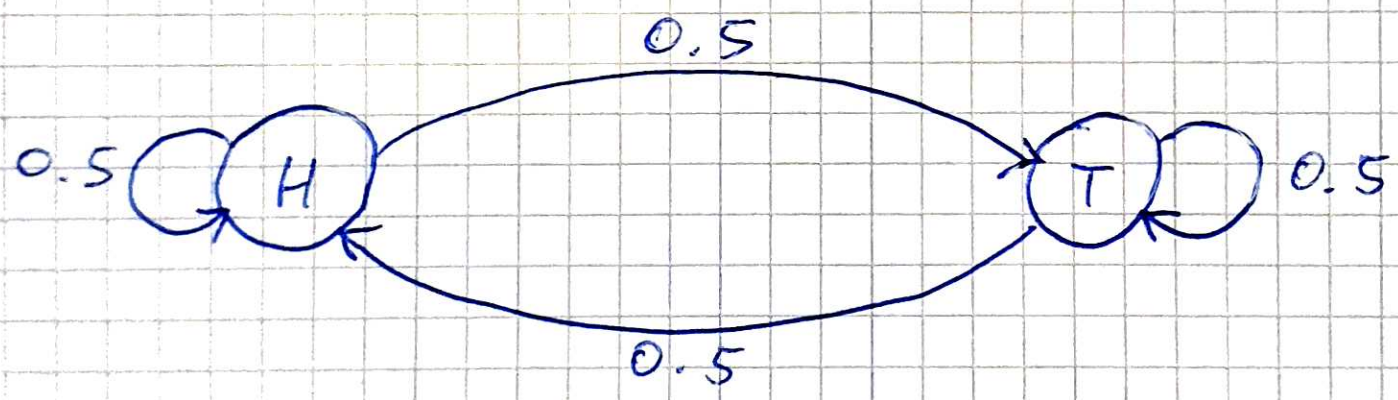
Recurrence vs. transiente of states:



S1 is recurrent, S2 is recurrent, S3 is transient

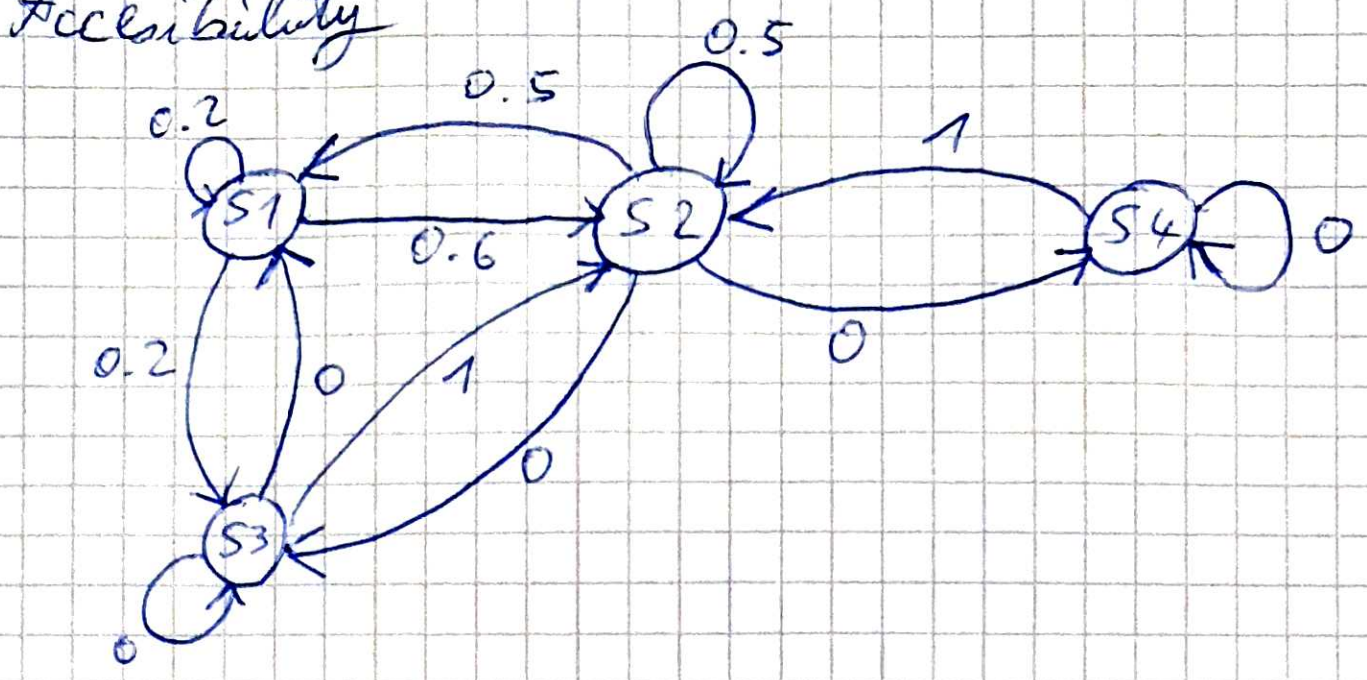
Periodicity

Example: tossing a coin



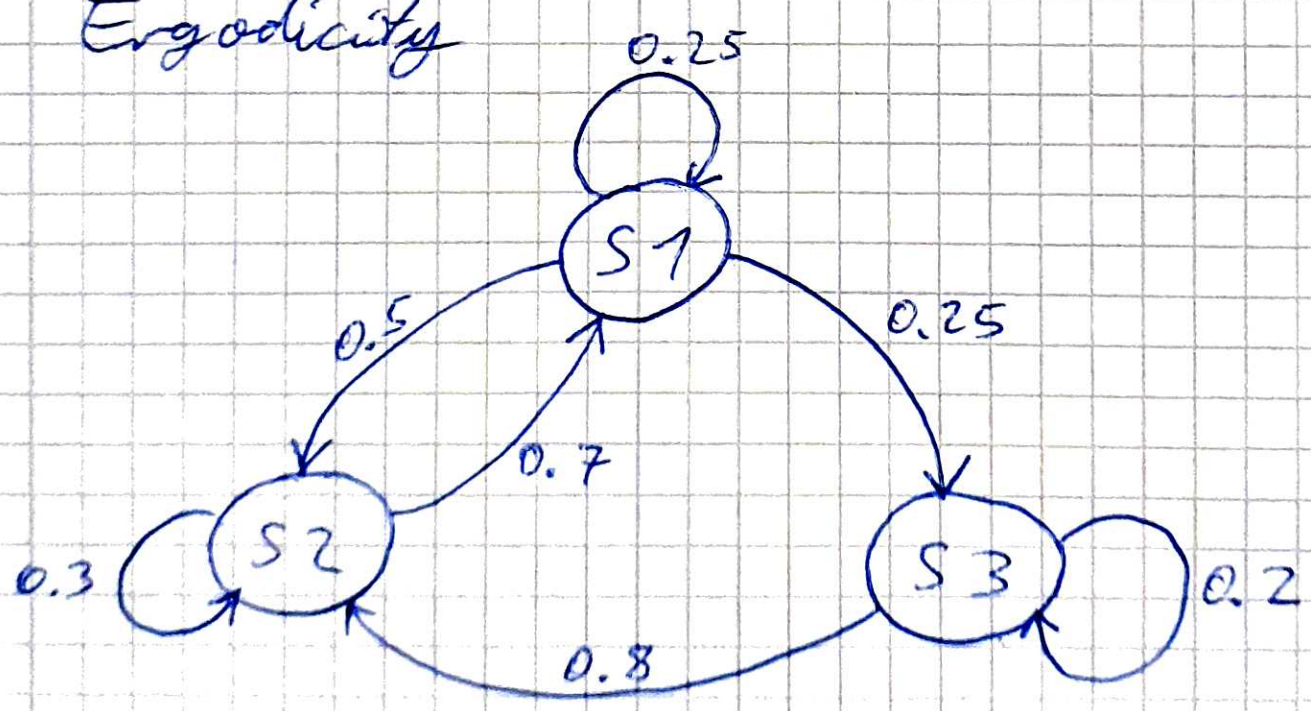
Starting in H, the next realisation of H could be 1, 2, 3 ... steps from now.
⇒ Period 1, therefore aperiodic.
Would this change when eliminating the possibility of H immediately following H?
Can a state be anything but aperiodic if self-transition is possible (has a positive probability)?

Accesibility



States S1, S2, S3 are accessible from any of the four states in the chain. S4 is however inaccessible from any state. How does this influence communication? Is the chain irreducible?

Ergodicity



1) Show that the given chain is ergodic.
2) Is it irreducible?
3) Write down the transition matrix