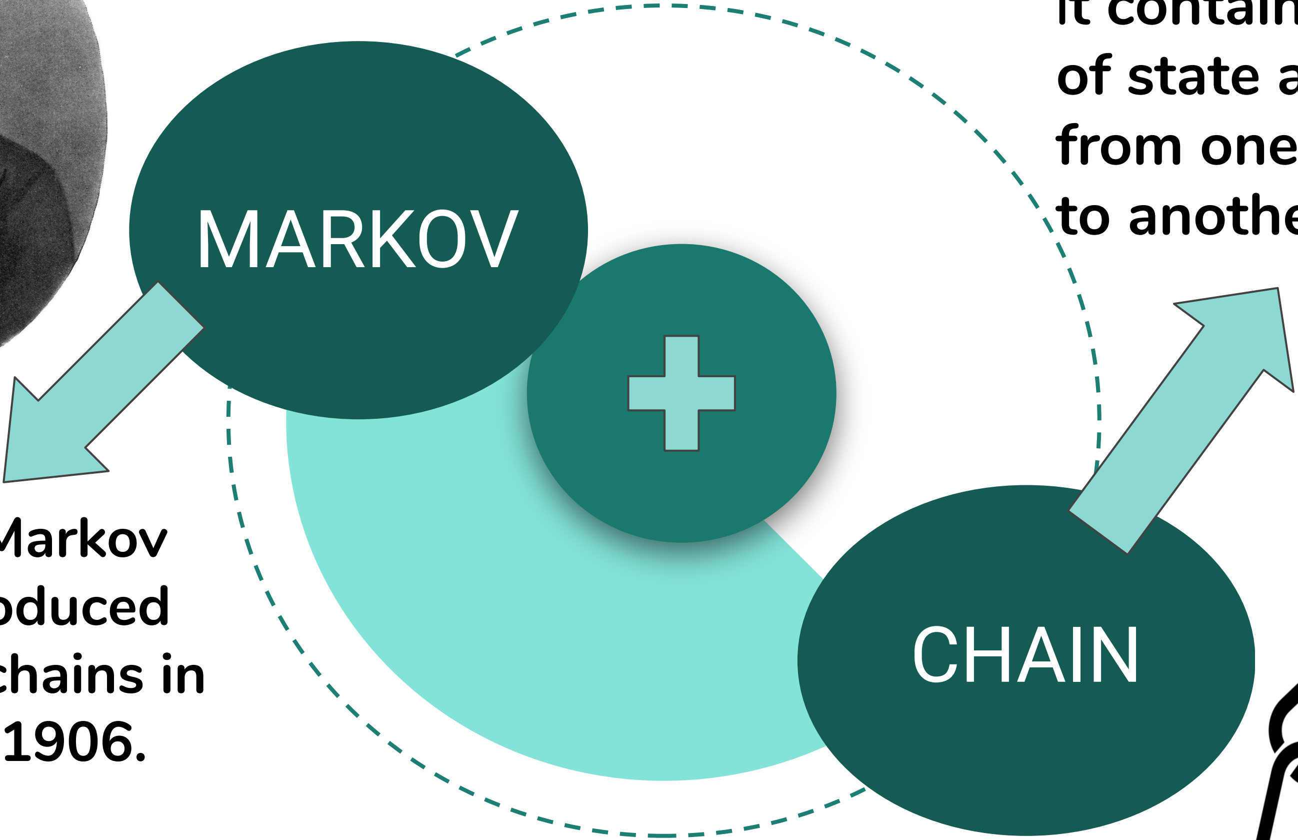
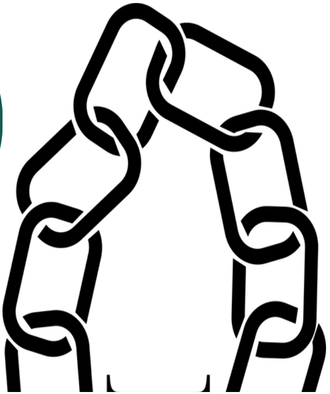
MARKOV CHAIN



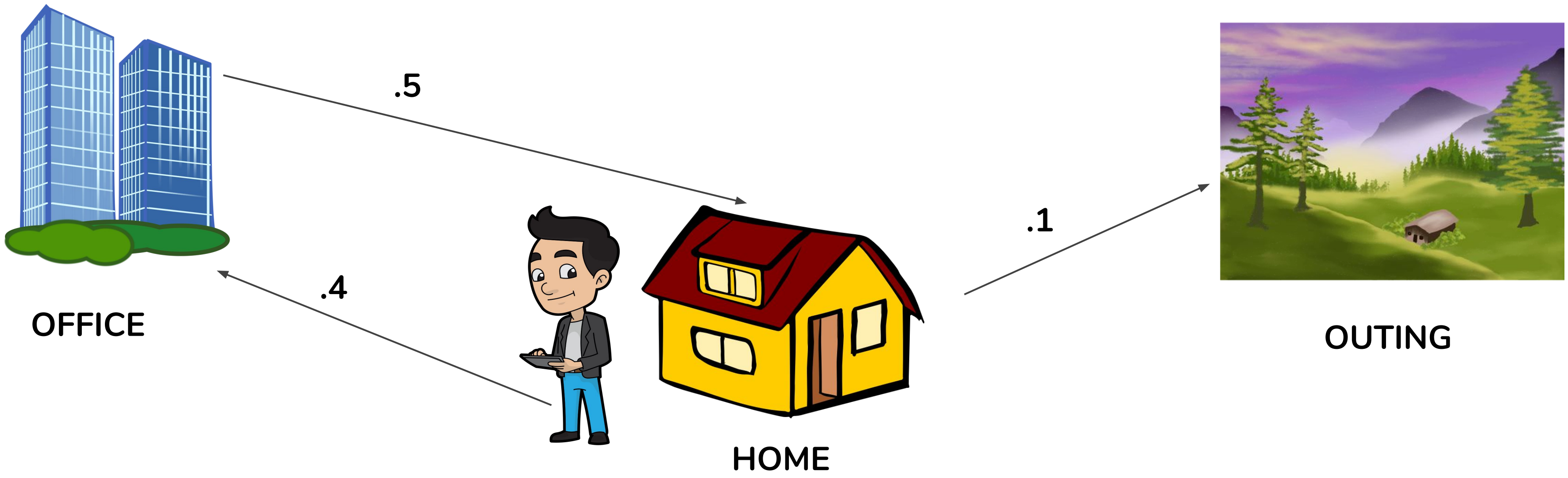
It contain finite no of state and we go from one process to another.

Andrey Markov first introduced Markov chains in the year 1906.



Markov Chains

A stochastic process containing random variables, transitioning from one state to another depending on certain assumptions and definite probabilistic rules.



Markov Property

- A Markov chain is a *stochastic process*, but it differs from a general stochastic process in that a Markov chain must be "memory-less
- *Markov Property states that the calculated probability of a random process transitioning to the next possible state is only dependent on the current state and time and it is independent of the series of states that preceded it.*

UNDERSTANDING MARKOV MODEL WITH EXAMPLE

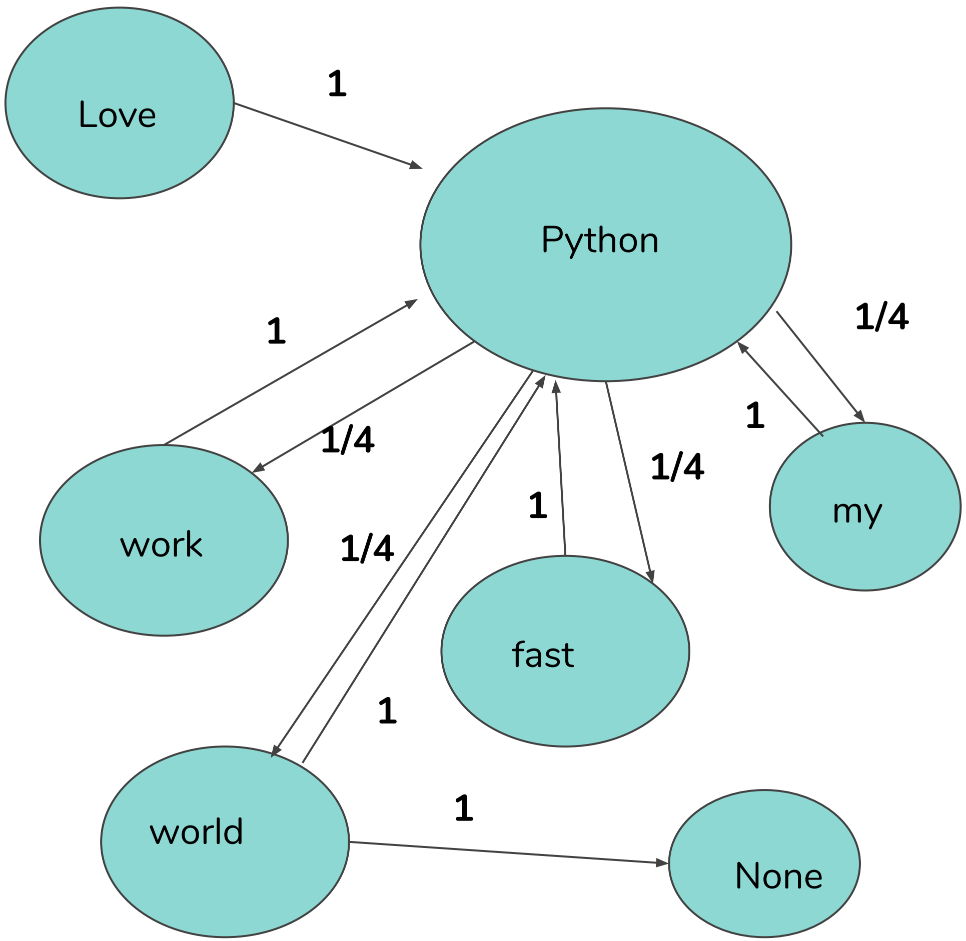
Love Python Work Python Fast Python My Python World

Key : Unique words {love , python , work , fast ,my , world}

Token : Total no of words {Love Python Work Python Fast Python My Python World}

Keys	Frequency
Love	1
Python	4
Work	1
Fast	1
My	1
World	1

CURRENT STATE	NEXT STATE
Love	Python
Python	Fast, Work ,My ,World
Work	Python
Fast	Python
My	Python
World	None



Transition Matrix

Square matrix used to describe the transitions of a Markov chain. Each of its entries is a nonnegative real number representing a probability.

It is also called a **probability matrix, substitution matrix, Markov matrix** or **stochastic matrix**

$$P = \begin{bmatrix} P_{1,1} & P_{1,2} & \dots & P_{1,j} & \dots & P_{1,S} \\ P_{2,1} & P_{2,2} & \dots & P_{2,j} & \dots & P_{2,S} \\ \vdots & \vdots & \ddots & \vdots & \ddots & \vdots \\ P_{i,1} & P_{i,2} & \dots & P_{i,j} & \dots & P_{i,S} \\ \vdots & \vdots & \ddots & \vdots & \ddots & \vdots \\ P_{S,1} & P_{S,2} & \dots & P_{S,j} & \dots & P_{S,S} \end{bmatrix}.$$