**Course: Advance Bio Informatics**

**Module Title: Markov Chain**

**Module No: 102**

**Markov Chain**

* Finite discrete set S of possible states, a Markov chain process occupies one of these states at each unit of time.
* Process either stays in same state or moves to some other state in S.
* Stochastic / deterministic
* Memory less and time homogeneous

**Markov Chain**

Triplet (Q, {p(x1 = s)}, A)

**Q** is a finite set of states.

**p** is initial state probabilities.

**A** is the state transition probabilities, denoted by

**ast** for each **s, t ε Q.**

For each **s, t ε Q** the transition probability is:

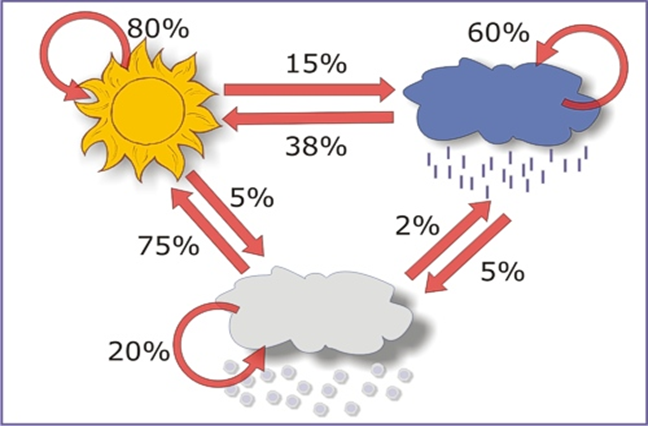
**ast ≡ P(xi = t|xi-1 = s)**

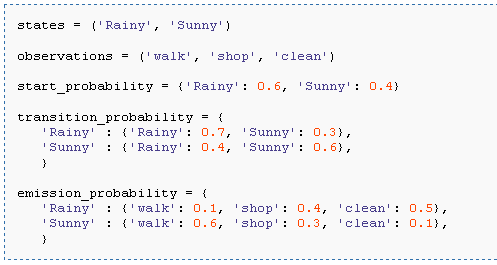
**Output:** The output of the model is the set of states at each instant time => the set of states are observable

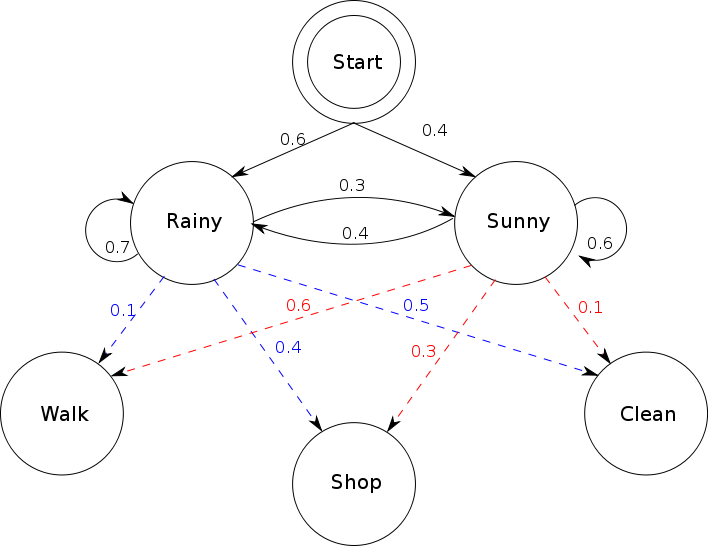
**Property**: The probability of each symbol ***xi*** depends only on the value of the preceding symbol ***xi-1***:

**P(xi | xi-1,…,x1)=P(xi | xi-1)**

**Example of Markov Chain**

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