TIME SERIES

AR MODEL:

1. Y is dependent on X and the previous values of Y.
2. Stochastic prediction i.e. the future values always have a bit of randomness which cannot be predicted and the prediction is always close to actual values.
3. AR(p)- pth order AR model: The current Y is dependent on X and previous Y of p period window only.

MA MODEL:

1. Y is dependent on the residuals of the previous prediction.

ARMA MODEL:

1. Combination of AR and MA models.
2. Y is dependent on X and the past values of Y as well as the past residuals.

ARIMA [AR(p) I(d) MA(q)] MODEL:

1. I is for integrated which provides differencing (d) of the time series.
2. Differencing is done to convert non-stationary series to stationary (removing seasonality) for better predictions.
3. Stationary series: Mean and variance are constant over time.
4. First differencing is difference between current and previous values in time. If mean and variance isn’t constant, then we take 2nd differencing i.e. over 1st difference.
5. In ARIMA, we use AR term or MA term, but rarely both. To check which one to choose, we use autocorrelation function plot.
6. +ve autocorrelation at lag 1 -> use AR  
   -ve autocorrelation at lag 1 -> use MA
7. p: window period  
   d: degree of differencing  
   q: degree of dependence on residuals  
   m: periods in each season  
   P,D,Q: p,d,q for seasonal part of time series.