Time Series

Definition:— Arrangement of statistical data in chronological order i.e in accordance with occurance of time is known as 'Time Series'. In other words, it is series of values taken by a variable at different points of time. It depicts the relationship between two variables, one of them being time e.g. the population of a country in different years (t), the Sales (U_t) of a departmental store in different months (t) and temperature (U_t) of a place on different days (t) of week.

Thus if the values of a variable at time $t_1, t_2 \cdots t_n$ are $U(t_1), U(t_2) \cdots U(t_n)$ respectively, then serial

$$t: \quad t_1 \quad t_2 \cdots \quad t_n$$
$$U(t): \quad U(t_1) \quad U(t_2) \cdots \quad U(t_n)$$

constitute a time series. The values of t may be yearly, monthly, weekly, daily or even hourly etc.

Components of a Time Series

If the values of a variable are observed at different periods of time, the values of the variable under consideration change from time to time. These fluctuations (variation) are affected not by a single force but are due to the net effect of multiplicity of forces pulling it up and down and if these forces are in a state of equilibrium the series would remain constant. For example, the retail prices of a particular commodity are influenced by a number of factors viz the crop yield which further depends on weather conditions, irrigation facilities and fertilizer used etc.

The various forces affecting the value of a time series are called components of time series. There are four components of time series which are given below

(I) Secular Trend

(II) Seasonal Variations

(III) Cyclic Variations

(IV) Random or Irregular Variations.