# Software Requirements Specification Template

**Project- Time Series Analysis and Forecast Software**

# Lab Group: 20

**Group Members(Name and roll number)**:

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# 1. Introduction

## The aim of the project is to design a software in C++ to analyze time series data and forecast the values of the phenomenon under study(which is Gross Domestic Product, GDP).A set of ordered observations of a quantitative variable taken at successive points in time is known as ‘Time Series’. The various forces at work, affecting the values of a phenomenon in a time series can be broadly classified into four categories:

1. Secular Trend 2.Seasonal Fluctuations 3.Cyclical Fluctuations 4.Random Movements

The value of a time series at any time t is regarded as the resultant of the combined impact of the above components.

The reason for selecting this project is to integrate our knowledge of Statistics along with coding in C++ that can be used to predict future behavior of the data that the user inputs by fitting curve of the data under consideration making use of graphs. In Time Series Analysis by studying the type and nature of variations in the data relating to prices of commodities, sales and profits of stocks, agricultural and industrial production etc. with time, prediction is made about nature of variation of the data in future. Since the variations may occur either during a long of period of time or during a small period of time, we use different methods like Moving Average Method and Ratio to Moving Average Method to study these variations.

## 2. Purpose

The project is aimed at designing a software using C++ which is used to predict the variation in the data given by the user in future by analyzing the data using Statistical Methods. The user is required to give the data which will contain two variables-one of them being time and the other being the variable whose forecasting is to be done.

In this project we will get to learn how to plot graphs in C++ by which we will depict the trend of GDP (Gross Domestic Product) of a country. For separating the various components of time series we have used Curve fitting (linear, exponential and quadratic) to obtain Trend Component, Ratio to Moving Average Method to obtain Seasonal Component and rest is the Error Component containing Cyclic Component also.

**3. Assumptions**

In our analysis of time series we assume the additive model i.e. the various components of time series operate proportionately to the general level of the series. According to the additive model, a time series can be expressed as:

Yt= Tt + St +Ct +Et

The error component is assumed to act independently to follow normal distribution. In the study of trend component we are considering three types of trend : linear, quadratic and exponential.

## 4. Division of Work

1. SRS and Group Diary- Shreya
2. Code for Moving Average – Meenakshi
3. Code for Linear, Exponential and Quadratic Curve

Fitting –Soumyajeet and Jaydeep

1. Code for Error Computation-Shreya and Jaydeep
2. Code for plotting graph- Meenakshi and Soumyajeet
3. Main function- Shreya
4. User Manual-Soumyajeet and Meenakshi
5. Project Report- Soumyajeet ,Jaydeep and Shreya

## 5. References

\*Fundamentals of Applied Statistics by S.C.Gupta and V.K.Kapoor.

\*Articles on time series in Wikipedia

\* [www.stat.duke.edu/~mw/data-sets/ts\_data/gdp](http://www.stat.duke.edu/~mw/data-sets/ts_data/gdp)

\* www. cplusplus.com