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| Name Of The Student | Kanak Sahu |
| Internship Project Topic | TCS iON RIO-125: Forecasting System - Project Demand of Products at a Retail Outlet Based on Historical Data. |
| Name of the Organization | TCS iON |
| Name of the Industry Mentor | Himalaya Ashish |
| Name of the Institute | Symbiosis University of Applied Sciences |

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| Date | Day # | Hours Spent |
| 5/03/21 | Friday(Day-4) | 4 |
| Activities done during the day:  **TCS iON RIO-125: Forecasting System - Project Demand of Products at a Retail Outlet Based on Historical Data.**  Today I took deeper dive into time series forecasting and ARIMA model and how to use as it as model. Time Series Forecasting A time series is a sequence where a metric is recorded over regular time intervals.  Depending on the frequency, a time series can be of yearly (ex: annual budget), quarterly (ex: expenses), monthly (ex: air traffic), weekly (ex: sales qty), daily (ex: weather), hourly (ex: stocks price), minutes (ex: inbound calls in a call canter) and even seconds wise (ex: web traffic).  We have already seen the steps involved in a previous post on [~~Time Series Analysis~~](https://www.machinelearningplus.com/time-series/arima-model-time-series-forecasting-python/www.machinelearningplus.com/time-series-analysis-python). If you haven’t read it, I highly encourage you to do so.  Forecasting is the next step where you want to predict the future values the series is going to take.  But why forecast?  Because, forecasting a time series (like demand and sales) is often of tremendous commercial value.  In most manufacturing companies, it drives the fundamental business planning, procurement and production activities. Any errors in the forecasts will ripple down throughout the supply chain or any business context for that matter. So it’s important to get the forecasts accurate in order to save on costs and is critical to success.  Not just in manufacturing, the techniques and concepts behind time series forecasting are applicable in any business.  Now forecasting a time series can be broadly divided into two types.  If you use only the previous values of the time series to predict its future values, it is called **Univariate Time Series Forecasting**.  And if you use predictors other than the series (a.k.a exogenous variables) to forecast it is called **Multi Variate Time Series Forecasting**.  This post focuses on a particular type of forecasting method called **ARIMA** modeling.  ARIMA, short for ‘AutoRegressive Integrated Moving Average’, is a forecasting algorithm based on the idea that the information in the past values of the time series can alone be used to predict the future values. 2. Introduction to ARIMA Models So what exactly is an ARIMA model?  ARIMA, short for ‘Auto Regressive Integrated Moving Average’ is actually a class of models that ‘explains’ a given time series based on its own past values, that is, its own lags and the lagged forecast errors, so that equation can be used to forecast future values.  Any ‘non-seasonal’ time series that exhibits patterns and is not a random white noise can be modeled with ARIMA models.  An ARIMA model is characterized by 3 terms: p, d, q  where,  p is the order of the AR term  q is the order of the MA term  d is the number of differencing required to make the time series stationary  If a time series, has seasonal patterns, then you need to add seasonal terms and it becomes SARIMA, short for ‘Seasonal ARIMA’. More on that once we finish ARIMA.  So, what does the ‘order of AR term’ even mean? Before we go there, let’s first look at the ‘d’ term. | | |