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| Name of The Student | Kanak Sahu |
| Internship Project Topic | **“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 |
| 26/03/21 | Friday(Day-23) | 4 |
| Activities done during the day:  Today I learnt about ARIMA model and also, I used this method for time series forecasting model fitting.  From all the materials I learnt given by you, here is the short explanation of it.  **ARIMA (Auto-Regressive Integrated Moving Average) Model**  Image for post  We know that in order to apply the various models we must in the beginning convert the series into Stationary Time Series. In order to achieve the same, we apply the differencing or Integrated method where we subtract the t-1 value from t values of time series. After applying the first differencing if we are still unable to get the Stationary time series then we again apply the second-order differencing.  The ARIMA model is quite similar to the ARMA model other than the fact that it includes one more factor known as Integrated( I ) i.e. differencing which stands for I in the ARIMA model. So in short ARIMA model is a combination of a number of differences already applied on the model in order to make it stationary, the number of previous lags along with residuals errors in order to forecast future values.  Consider the above graphs where the MA and AR values are plotted with their respective significant values. Let's assume that we consider only 1 significant value from the AR model and likewise 1 significant value from the MA model. Also, the graph was initially non-stationary and we had to perform differencing operation once in order to convert into a stationary set. Hence the ARIMA model which will be obtained from the combined values of the other two models along with the Integral operator can be displayed as ARIMA(1,1,1).  Python Code   |  |  | | --- | --- | | 1  2  3  4  5  6  7  8  9  10  11 | # ARIMA example  from statsmodels.tsa.arima.model import ARIMA  from random import random  # contrived dataset  data = [x + random() for x in range(1, 100)]  # fit model  model = ARIMA(data, order=(1, 1, 1))  model\_fit = model.fit()  # make prediction  yhat = model\_fit.predict(len(data), len(data), typ='levels')  print(yhat) |   **Time series forecasting with ARIMA**  We are going to apply one of the most commonly used method for time-series forecasting, known as ARIMA, which stands for Autoregressive Integrated Moving Average.  ARIMA models are denoted with the notation ARIMA(p, d, q). These three parameters account for seasonality, trend, and noise in data. | | |