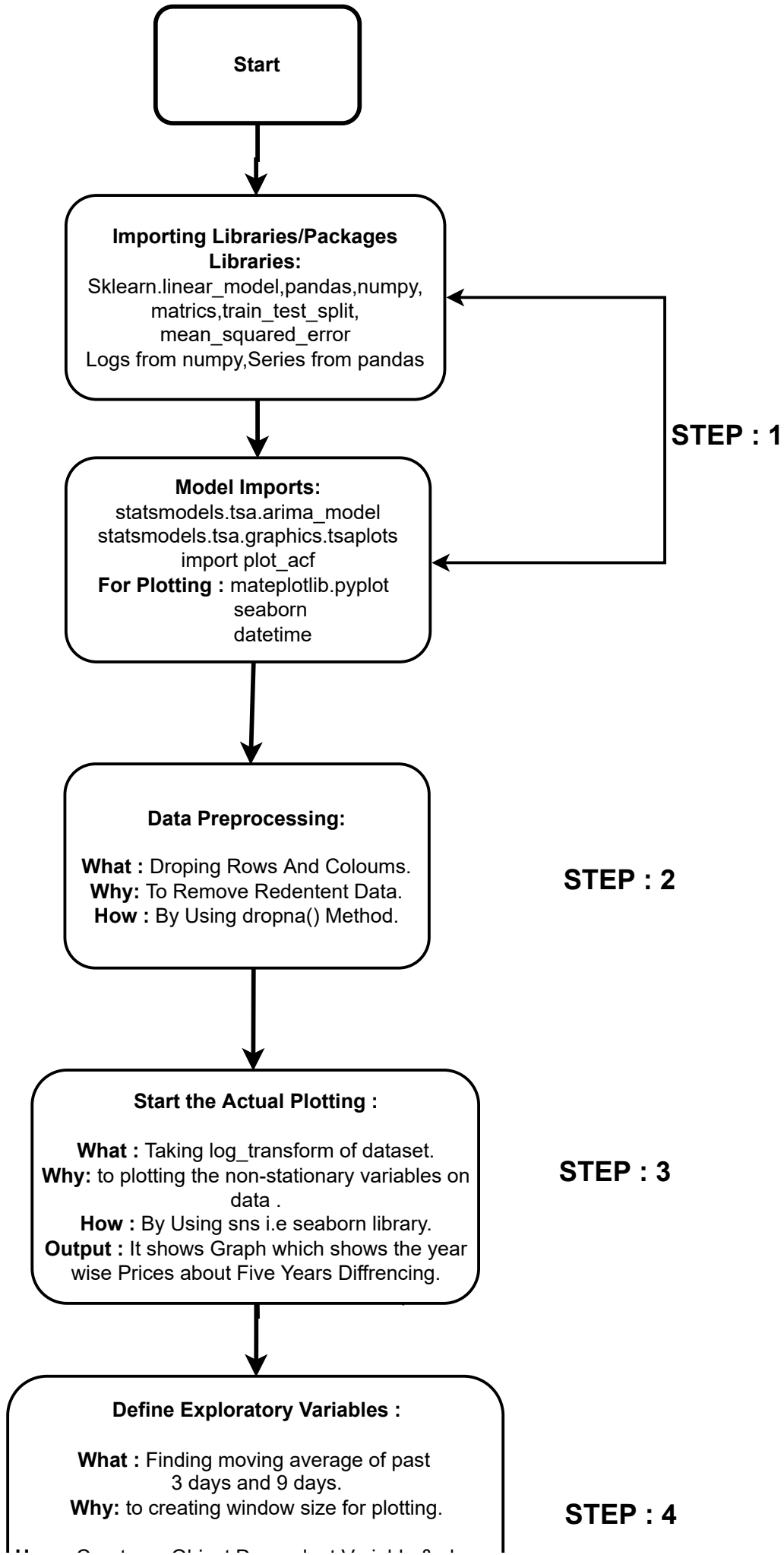

Start
Importing Libraries/Packages
Libraries:
Sklearn.linear_model,pandas,numpy,
matrics,train_test_split,
mean_squared_error
Logs from numpy,Series from pandas
STEP : 1
Model Imports:
statsmodels.tsa.arima_model
statsmodels.tsa.graphics.tsaplots
import plot_acf
For Plotting : mateplotlib.pyplot
seaborn
datetime
Data Preprocessing:
What : Droping Rows And Coloums.
Why: To Remove Redentent Data.
How : By Using dropna() Method.
STEP : 2
Start the Actual Plotting :
What : Taking log_transform of dataset.
Why: to plotting the non-stationary variables on data .
How : By Using sns i.e seaborn library.
Output : It shows Graph which shows the year wise Prices about Five Years Diffrencing.
STEP : 3
Define Exploratory Variables :
What : Finding moving average of past 3 days and 9 days.
Why: to creating window size for plotting.
STEP : 4

How : Create an Object Dependent Variable & showa the charts
Output : It shows line graph of Years..

Split Dataset Into train & test :

What : training and testing of dataset
Why: to creating the model.
How : Define the test size using train_test_split() Method.

STEP : 5

Model Implementation :

What : Performing Linear Regression
Why: to Predict the actual & predicted prices.

How : Create X_test object and plot the graph.

STEP : 6

Model Implementation :

What : Performing R square and rmse (Root Mean Square Error)

Why: to Cheking the goodness of fitted model.

How : By using sqrt(mean_squared_error() Method.
Output : Showing Regression Flot Value.

Checking Stationary:

What : Calculation & Conclude the dependent Structure,

Why: to Finding Mean,Varience AND Cheking the goodness of model.
How : By using Following Methods.
1] ADF_statistics()=Augmented Dickey-Fuller test
2] p_value()=below threshold for suggests we reject the null hypothesis **(p>0.05 => fail to reject null hypo)**
3] Critical_Value(): Checking upper and lower bounds confidence.

STEP : 7

Taking the Log Transform :

1st Order Diffrencing

What : Performing 1st Order Diffrencing log transform.

Why:
1] To checking the Confidence Level and convert it into Stationary.
2] To Remove trends & diffrencing order.
How : By Using **dropna()** Droping Some Rows & Checking Stationary .
Output : An **p_Value is become Changed** (**0.984 to 0.00**) after taking the log transform.

STEP : 8

Model Implementation :

What : Performing Again Linear Regression
Why: to Predict the actual & predicted prices.

How : Create X_test object and plot the graph.

STEP : 9

Model Implementation :

What : Performing R square and rmse (Root Mean Square Error)

Why: to Cheking the goodness of fitted model.

How : By using sqrt(mean_squared_error() Method.
Output : Here the chart **Shows the Negative Prediction** i.e Fails the Whole Model .
R squared value=(-0.5)

Solution: Performing 2nd Order Diffrencing.

Model Implementation (2nd Order)

What : Performing 2nd Order Diffrencing.
Why: To checking stationary.

How : By using diff() Method twice.

Output : It will make again filtering the train model so,we will get p_value hypothesis. (p_value=0.00)

STEP : 10

Model Implementation :

What : Performing 2nd Order Diffrencing.

Why: To checking stationary.

How : By using diff() Method twice.

Output : It will make again filtering the train model so,we will get p_value hypothesis. (p_value=0.00)

STEP : 11

Model Implementation :

Performing Again Linear Regression for 2nd Order

What :
Finding Moving Average > > Finfing Dependent Variable(Y) >> Split train & test >> sret size (t:0.2) >> linear Regression >> Predict Price with actual and predicted value through plotting >> Calculate R square and rmse to check goodness of fitted model .
Why: to Predict the actual & predicted prices.

Output : 1] Showing Next 4 Year vPrediction i.e
Prev = from 2015-2020.
Next = 2021,2022,2023,2024.
2] Display the R square Regression : 30(Positive)

STEP : 12

Model Implementation

What : ARMA & ARIMA Model on Non-Stationary data.

Why : After 2nd Oder Diffrencing the result make sense , but still unacceptable inaccuracy is there.
How : Plotting ACF And PACF Graph .By Using series we treat the dataset and finding Autocorrelation & Partial Autocorrelation.

STEP : 13

Graph Showa some Unacceptable Events so, we will Going to Implement subprocess of ARIMA Model i.e **SARIMAX Model**

STEP : 14

Model Implementation : SARIMAX Model

What : SARIMAX (Seasonal Auto-Regressive

Integrated Moving Average Xogenous Factors).

Why : Graph Showa some Unacceptable Events.
How : Plotting and finding Autocorrelation & Partial Autocorrelation Factors.

STEP : 15

Importing the Libraries & Pakages

What : statsmodels.api , statamodel.tsa.SARIMAX

Why : To used the properties of SARIMAX Model

STEP : 16

Model Implementation : Setting Orders

What : Define the Dataset.
Why : To displaySARIMAX Model result.
By Using summary() method.

How : Defing the Datset ny shifting and rolling the window.

Output : COVARIANCE TABLE
1] Variable are following :
Model Name , Date , Time , Sample .
2] Observations :
Log , AIC , BIC , HQIC

STEP : 17

Model Implementation : RMSE Model

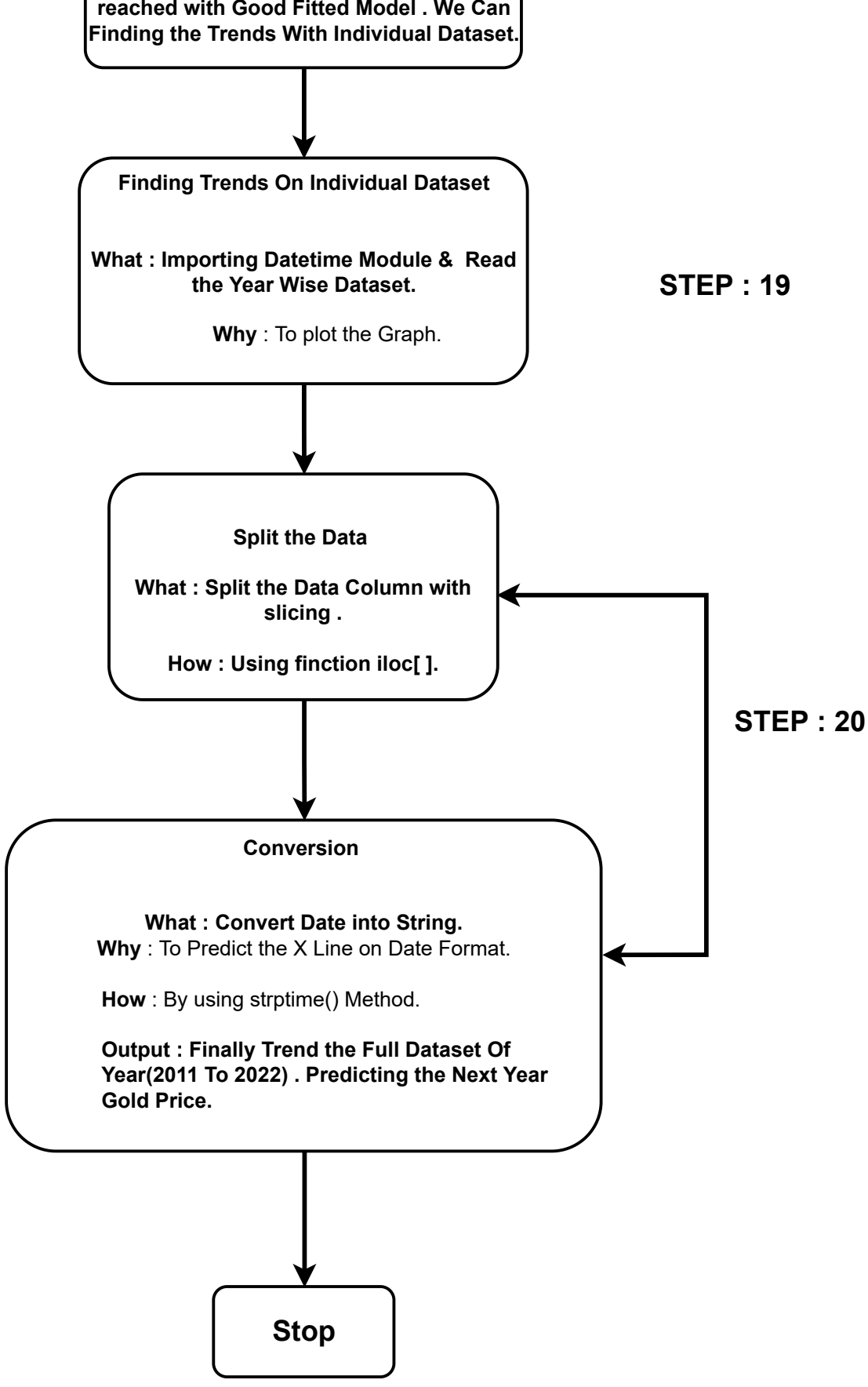
What : RMSE (ROOT MEAN SQUARE ERROR).

Why : 1] Thus, Covariance gets to much complicated as it predicts the valus in float format.
2] For calculating the Perfect Sarimax Summary.

How : We can calculate the R2 Score by using the matrics
Output : SCORE : 0.7379
RMSE : 1701.1

STEP : 18

Thus, Result is Satisfied so we will finally



MODEL 1
IMPLEMENTATION