# Retail Sales Forcasting CASE STUDY

# SUBMISSION


Group Name:

1. Ishita Aggarwal
2. Sundaresan V
3. Dhruti Contractor
4. Dhanilan M S

# Abstract

## Business objective:

- Forecast the sales and demand for the next 6 months in order to manage inventory and revenue accordingly.

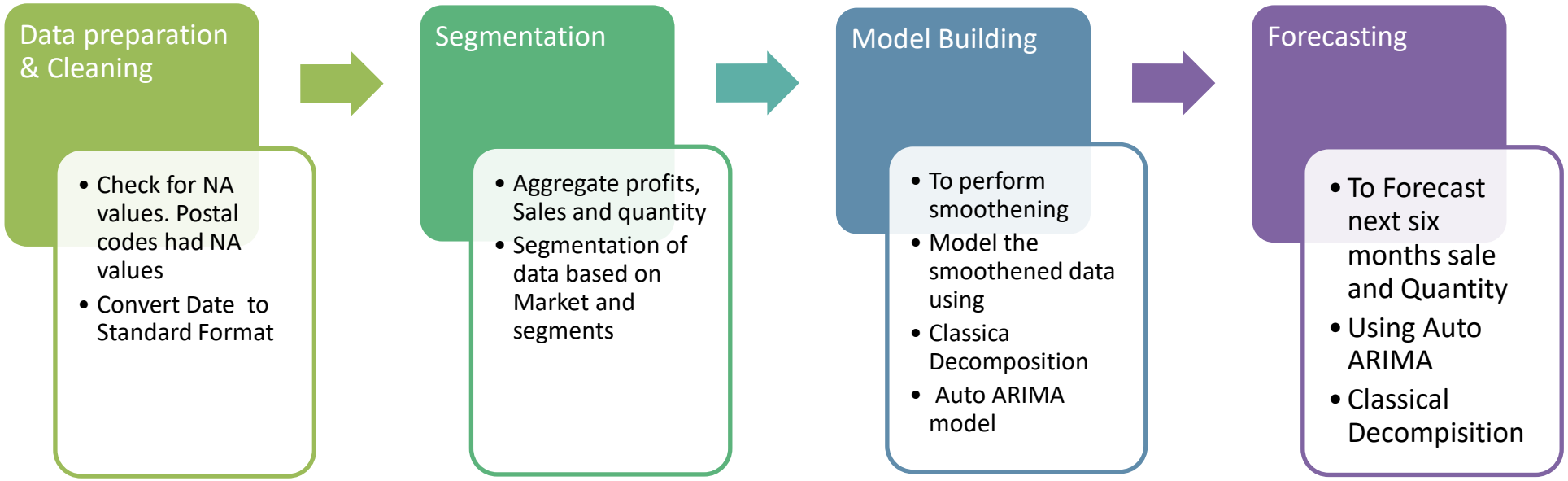
## Data Source:

- Data set of 51290 observations/orders(Transactions) which includes transaction data of 7 different market segments in three major segment categories.
- Each observation has 24 variables/attributes.

## Strategy:

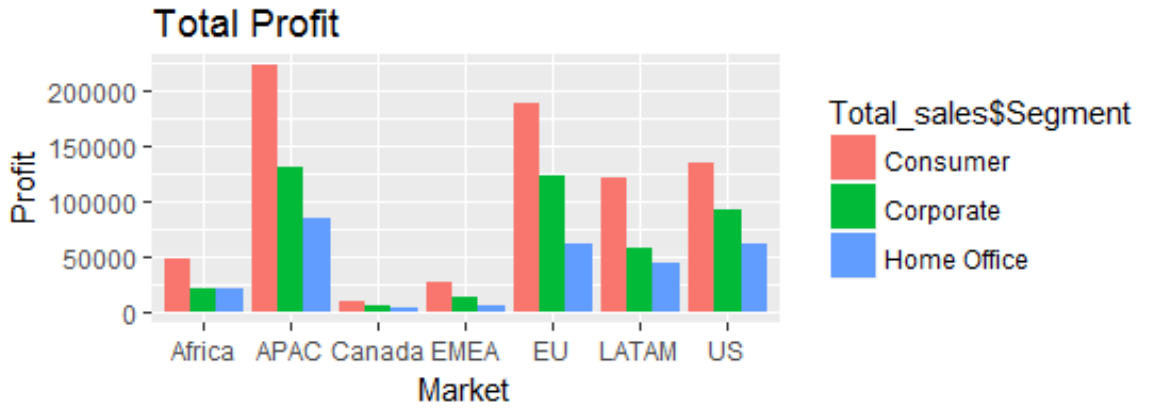
- To identify the most profitable segments in the seven market area
- To forecast the sale and quantity for next six months using classical decomposition and ARIMA forecasting.

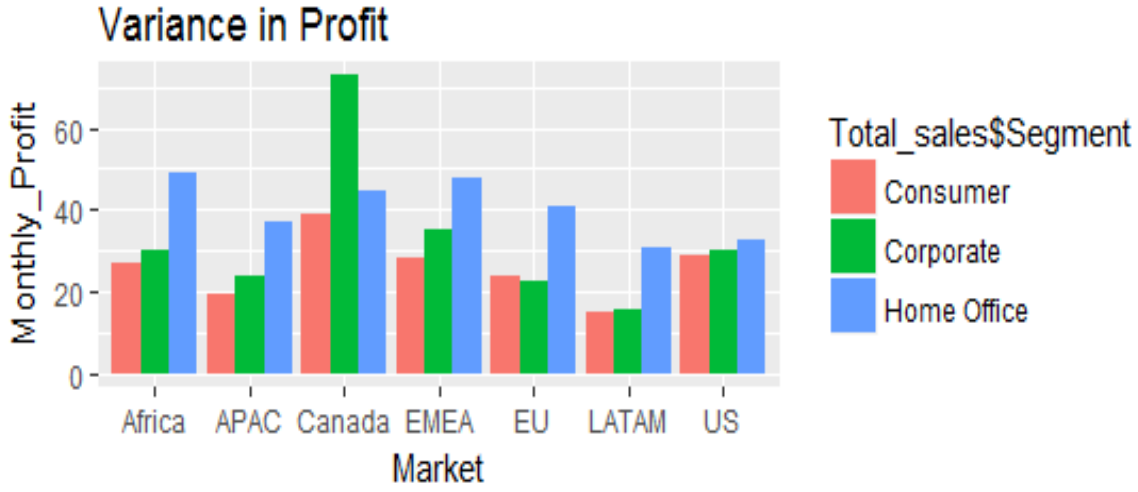
# Problem solving methodology



# Market Segment Identification

- The data consist of 7 regions and 3 segments. In order to analyse the profits, the dataset was divided into 21 Market Segments.
- One of the business requirement was to forecast the profits and sales for top 2 market segments with high Profits and consistent sales.
- As seen from the graphs, the segment ‘Consumers’ earns the highest profit in ‘APAC’ and ‘EU’ region. Further, these Market Segment comparatively deviates less from its average profits every month.



# Model Building and Forecast Approach

**Problem Statement**

- To Forecast the sales/qunatity for next six months

**Approach**

- To use smoothening before performing any model forecasting
- To use classical decomposition mode to forecast sale & quantity
- To use Auto Arima mode for forecasting

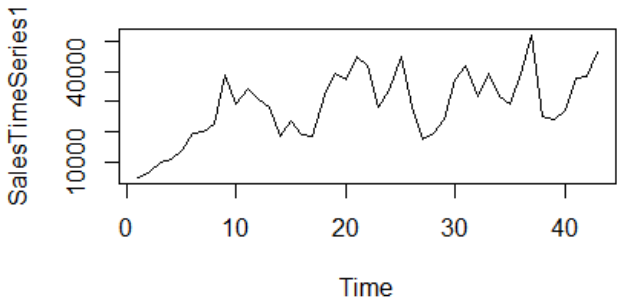
**Final Result**

- Demand and Forecast models EU and APAC consumer segment

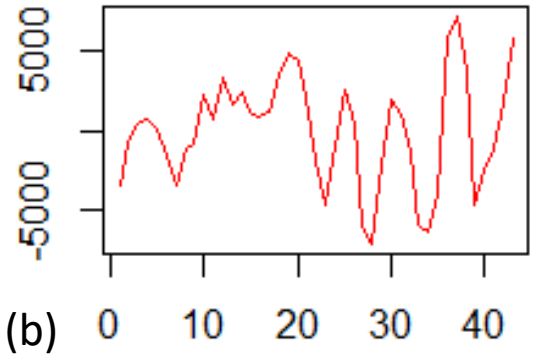
# APAC Consumer Segment Sales Forecast

1. Fig a represent the actual graph.

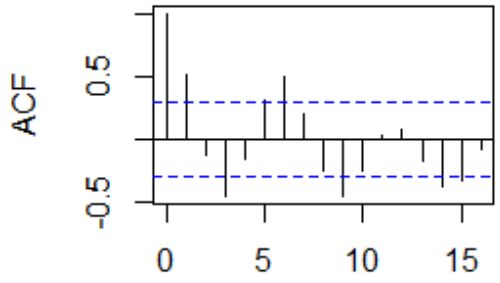
2. It is seen from graph c that ACF is decreasing and increasing seasonally with serial correlation
3. Graph d, PACF has 3 spikes compared to 6 in ACF and hence displays a sharp cut-off .
4. Figure e represents the white noise, part of series that shows no trend neither seasonality



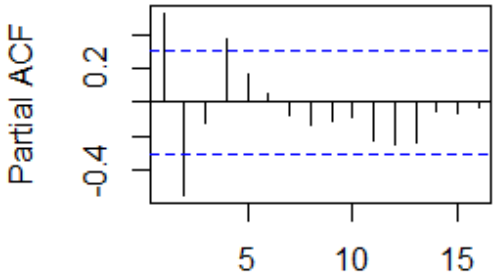

(a)



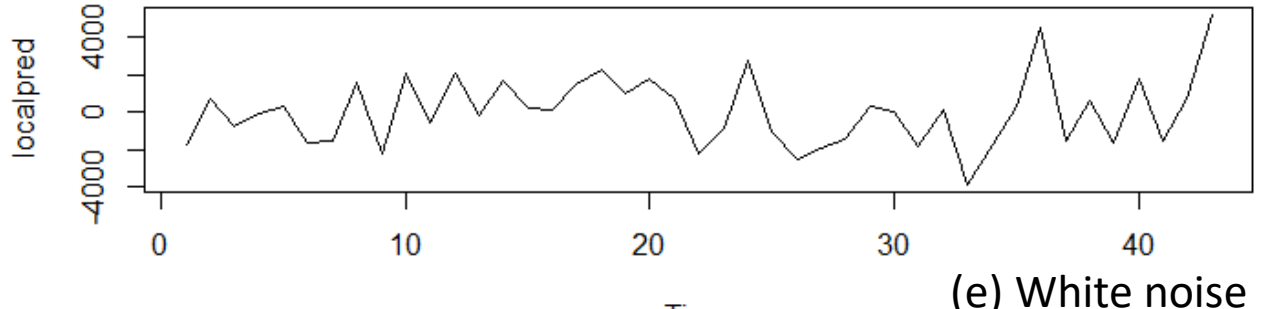

(b) Series After Removing the Trend




(c)




(d)

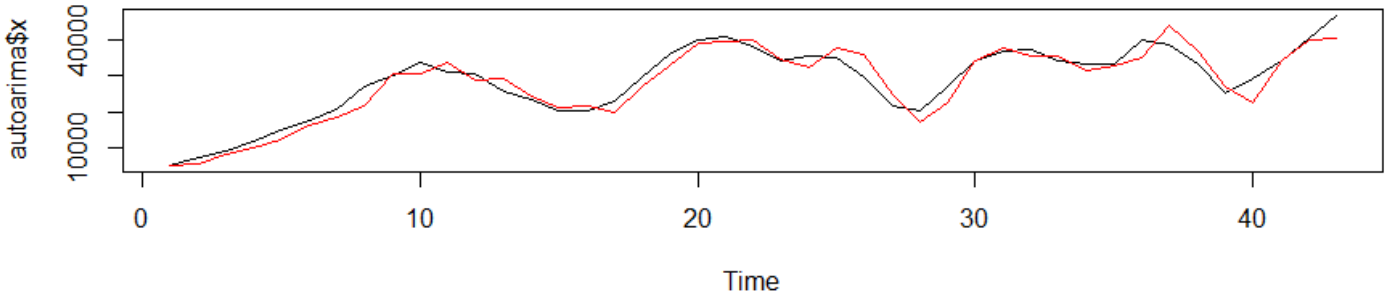


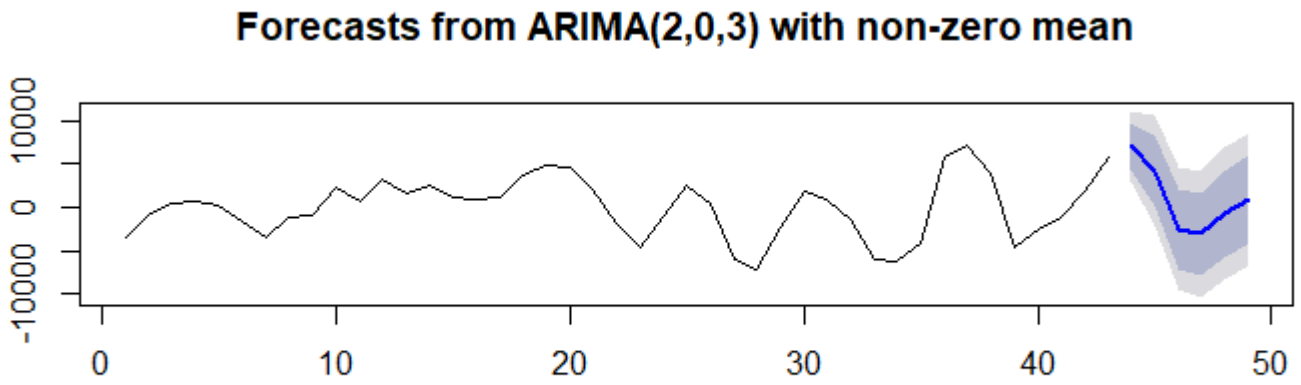

(e) White noise

(d)

# APAC Consumer Segment Sales Forecast

- Auto ARIMA has performed better with 37% accuracy compared the decomposition with 27%.
- The forecasted average sales for 6 months should be around 45390.64

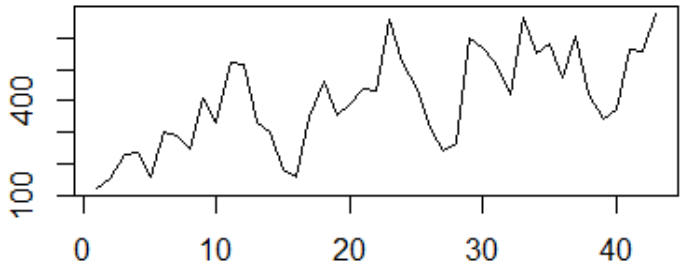


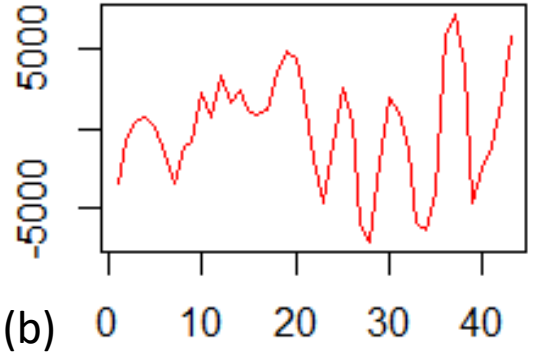
# APAC Consumer Segment Quantity Forecast

1. Fig a represent the actual graph.

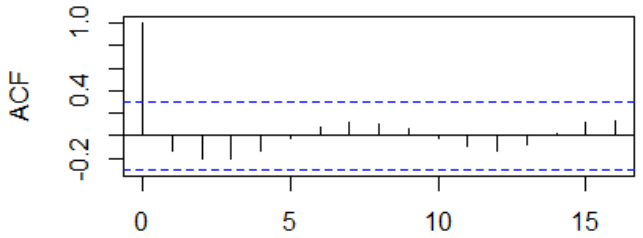
2. It is seen from graph c that ACF is sharply decreases with little seasonality.
3. Graph d, PACF has 3 decreasing spikes compared to 1 in ACF and hence displays a sharp cut-off .
4. Figure e represents the white noise, part of series that shows no trend neither seasonality




(a)




(b) Series After Removing the Trend

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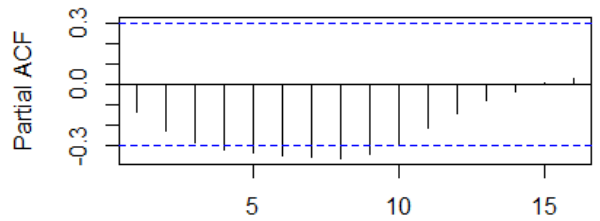


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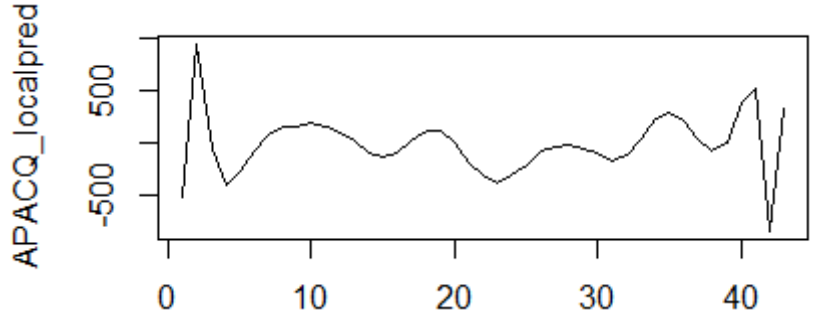
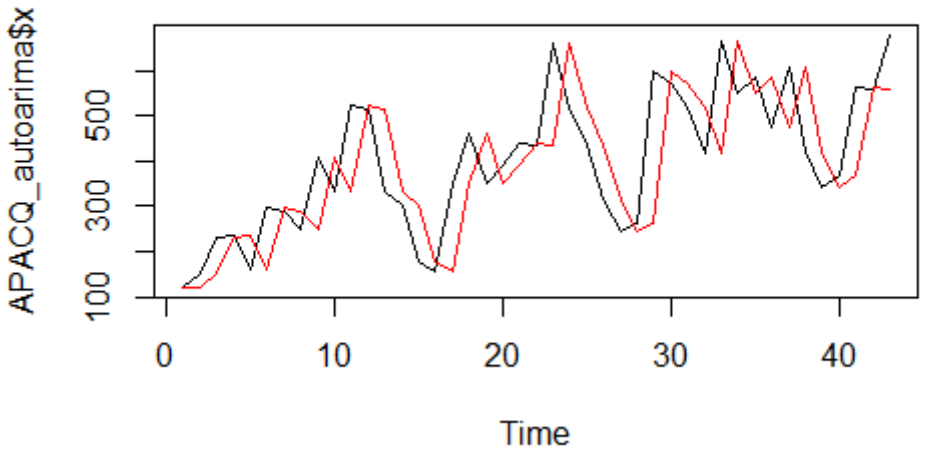


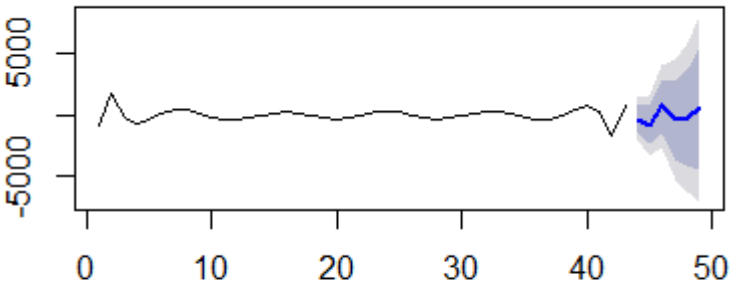

(e) White noise

(d)

# APAC Consumer Segment Quantity Forecast

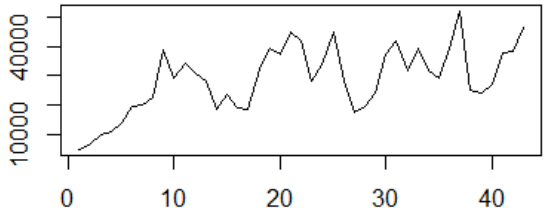
- Auto ARIMA has performed better with 24% accuracy compared the decomposition with 18%.
- The average quantity to be sold for 6 months should be around 534



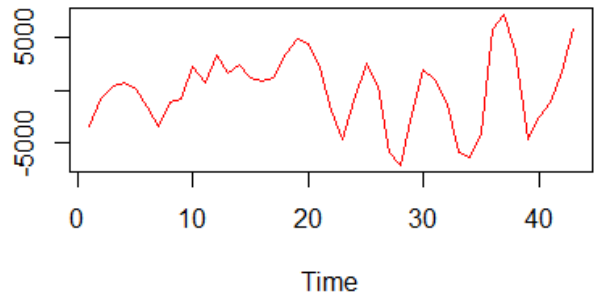



# EU Consumer Segment Sales Forecast

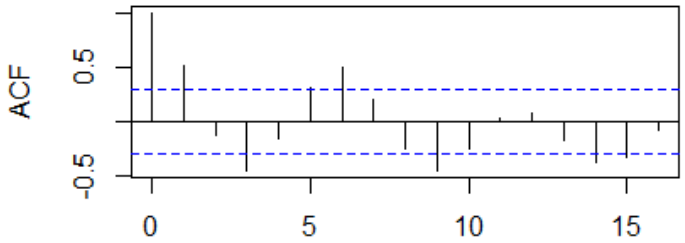
1. Fig a represent the actual graph and fig b shows the seasonality
2. It is seen from graph c that ACF is decreasing and increasing seasonally with serial correlation
3. Graph d, PACF has 3 spikes compared to 6 in ACF and hence displays a sharp cut-off .



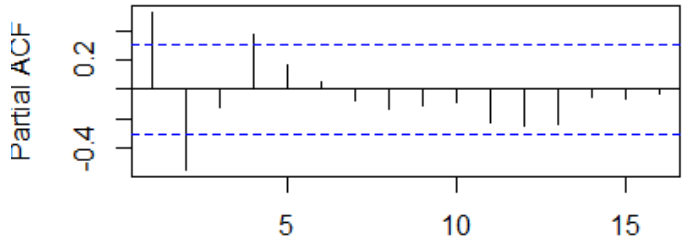

(a) Actual Series




(b)
Series After Removing the Trend



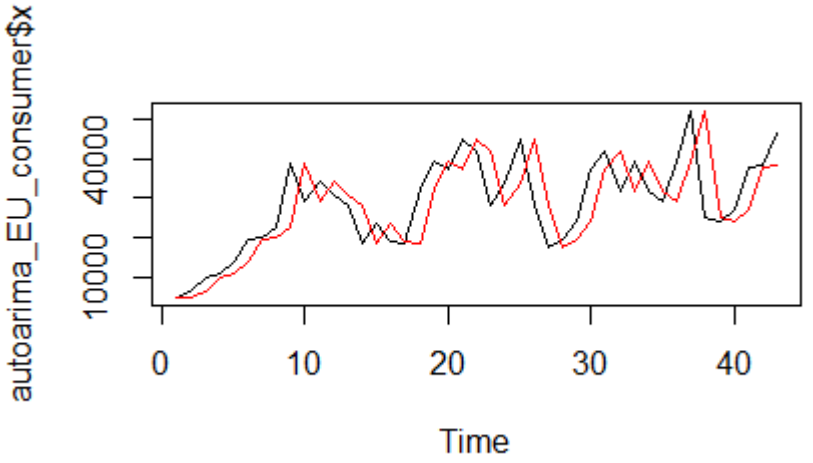

(c)

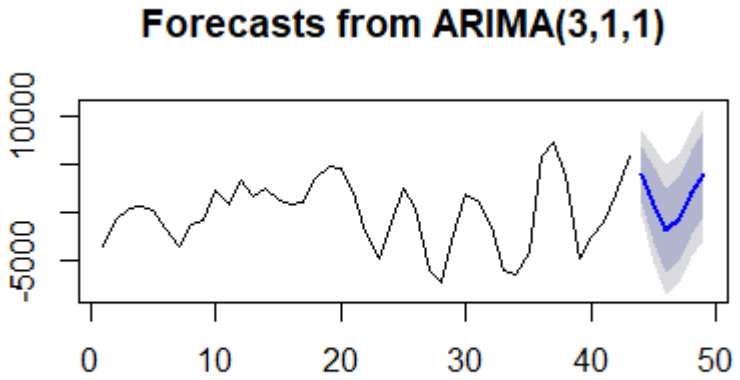



(d)

# EU Consumer Segment Sales Forecast

- Auto ARIMA has performed better with 37% accuracy compared the decomposition with 26%.
- The forecasted average sales for 6 months should be around 41759.1



# EU Consumer Segment Quantity Forecast

1. Fig a represent the actual graph and fig b shows the seasonality
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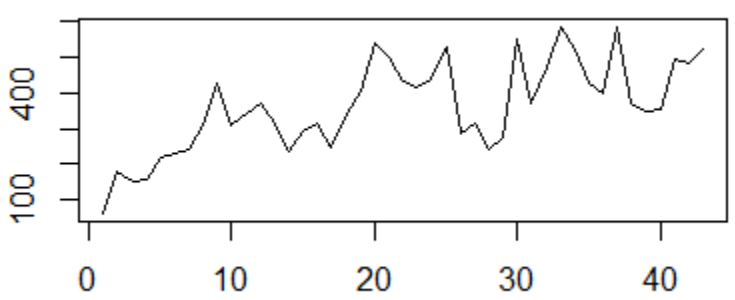
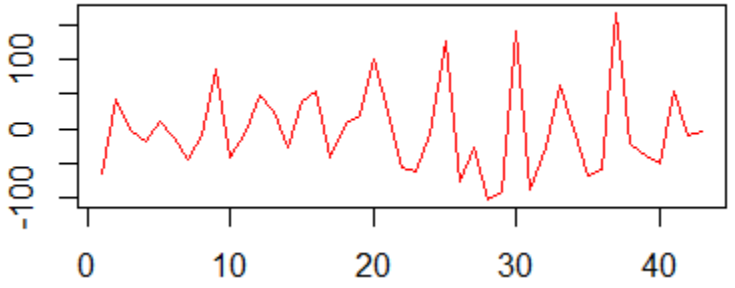
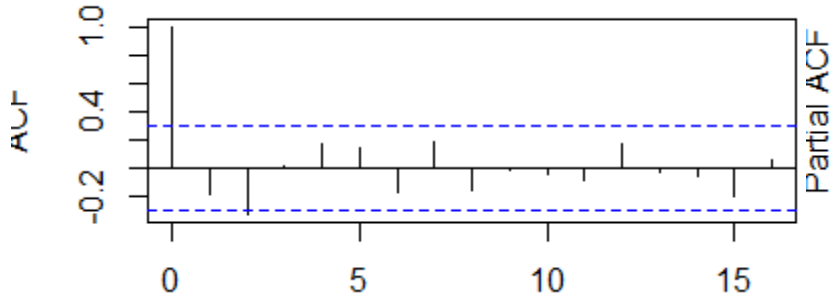



(a) Actual Series




(b)
Series After Removing the Trend

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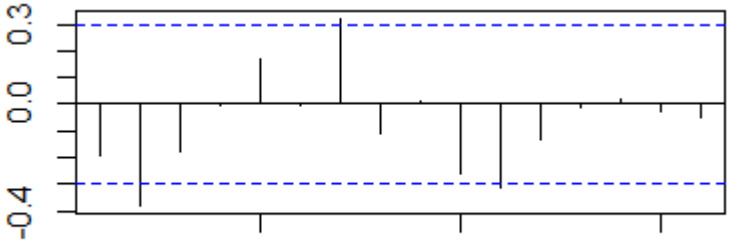


(d)

# EU Consumer Segment Quantity Forecast

- Auto ARIMA has performed better with 24% accuracy compared the decomposition with 17%.
- The average quantity to be sold for 6 months should be around 504