Time Series Assignment Part II

1. Consider the same dataset as presented in Part I (or an alternative dataset if more convenient), comprising a minimum of 120 observations, preferably exhibiting *seasonality*.

2. Divide the series into *approximately* two segments: 80% for training and 20% for testing purposes.

3. With the *training data*: Apply a complete *ARIMA* analysis of the series. Justify the selection of the optimal model based on measures like MSE and AIC.

   Illustrate the corresponding *ACF* and *PACF* diagrams and explain their behaviour.

4. Apply a bootstrap method to evaluate estimates and confidence intervals.

5. Forecast the subsequent 20% of observations (test data) and assess the outcomes.

6. Summarize the main ideas of **Vector Autoregressive Models** (VAR) (at least 2 pages) and write an example with an application with R or Python (at least 2 pages).

> **NOTE**: All programs must be extensively annotated and explicated.
> You may incorporate codes and examples from the provided slides; however, any additional analyses beyond those will be greatly valued.
> Any codes without explanations will assumed to be fully copied from *ChatGPT*.

Final date of delivery: 19th March.