# Time Series Analysis - Questions and Answers

## 85. What is a time series, and give examples of time series data.

A time series is a sequence of data points collected or recorded at specific time intervals. Examples include daily stock prices, monthly sales data, hourly temperature readings, and annual GDP figures.

## 86. Explain the components of a time series (trend, seasonality, and noise).

The components of a time series include:  
- Trend: The long-term movement or direction in the data.  
- Seasonality: Regular, periodic fluctuations due to seasonal factors.  
- Noise: Random variation or irregularities that cannot be explained by trend or seasonality.

## 87. What is autocorrelation in time series analysis?

Autocorrelation is the correlation of a time series with a lagged version of itself. It helps identify repeating patterns or the presence of seasonality in the data.

## 88. How do you perform time series forecasting?

Time series forecasting involves using historical data to predict future values. Techniques include moving averages, exponential smoothing, ARIMA models, and machine learning methods like LSTM networks.

## 89. What are ARIMA models, and how are they used in time series forecasting?

ARIMA (AutoRegressive Integrated Moving Average) models are used to forecast time series data by combining autoregression (AR), differencing (I), and moving average (MA) components. They are effective for non-seasonal, stationary time series.

## 90. Describe exponential smoothing methods in time series analysis.

Exponential smoothing methods forecast future values by weighting past observations with exponentially decreasing weights. Variants include Simple Exponential Smoothing, Holt’s Linear Trend Method, and Holt-Winters Seasonal Method.