Module 13 - Pandas Time Series Complete

1. **Time Series Data**: This refers to data that is collected and organized in chronological order, typically over a period of time. This type of data is common in finance (stock prices, economic indicators), environmental monitoring (temperature, pollution levels), and various other fields.
2. **Pandas**: This is a popular Python library specifically designed for working with and analyzing data. It provides data structures like DataFrames that are highly efficient for manipulating and exploring time series data.
3. **DateTime Index**: In Pandas, the DateTime Index is a way to store and access time series data where the index of the DataFrame is a series of dates or timestamps. This allows for easy and efficient date-based operations and analysis.
4. **Market Indices**: These are indicators that track the performance of a group of stocks, bonds, or other assets. Common examples include the Dow Jones Industrial Average (DOW), S&amp;P 500, and NASDAQ Composite. They provide insights into overall market trends.
5. **Adjusted Closing Price**: The closing price of a stock or asset on a particular trading day, but adjusted for any corporate actions like stock splits or dividends. This provides a more accurate representation of the asset's value over time.
6. **yfinance**: A Python library that allows you to download historical market data from Yahoo Finance. This is commonly used to get stock prices, index values, and other financial data for analysis.
7. **Plotly**: A library that creates interactive and visually appealing plots and charts. It's often used to visualize time series data in an engaging way.
8. **Colab (Google Colaboratory)**: A free cloud-based platform provided by Google for working with Jupyter notebooks. It's a popular choice for data analysis and machine learning tasks.
9. **Normalization**: The process of scaling data to a specific range, often between 0 and 1. In the context of the document, it's used to compare the growth of different market indices from a common starting point.
10. **Bulls and Bears**: Terms used to describe general market trends. A "bull market" is characterized by rising prices and optimism, while a "bear market" indicates falling prices and pessimism.
11. **Boxplot**: A way to visually represent the distribution of data, showing the median, quartiles, and potential outliers. In the document, it's used to analyze the distribution of the DOW Jones Industrial Average values in 2020, grouped by month.
12. **Percent Change**: A way to express the change in value as a percentage of the original value. The document uses it to calculate the percentage decrease in the DOW from 2008 to 2009 and the increase from 2020 to 2024.
13. **Rolling Mean**: Also known as a moving average, it calculates the average of data points within a specific sliding window. This smooths out short-term fluctuations in time series data, making it easier to see long-term trends.
14. **Hodrick-Prescott (HP) Filter**: A mathematical technique used to separate the trend from the cyclical component in time series data. It helps to identify the underlying long-term direction of the data. The document provides a clear explanation of this filter and its applications.
15. **statsmodels**: A Python library for statistical modeling and analysis. The document uses it to apply the HP filter to the DOW Jones Industrial Average data.