

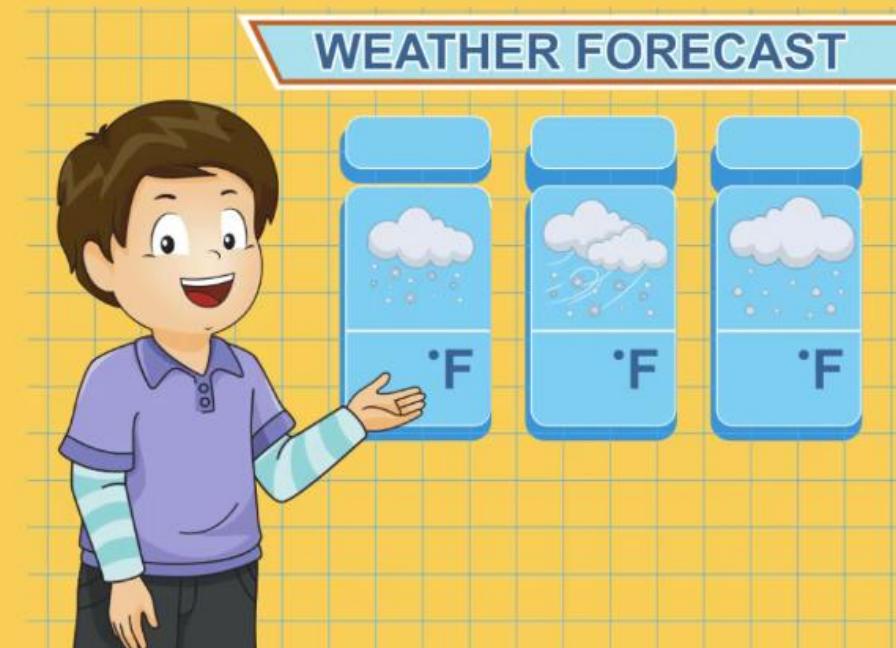
## **Cognate/Professional Electives**

# **Time Series Analysis**

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Lucban, Quezon, Philippines*

# **Game plan for Introduction to Time Series Forecasting**



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Time series data



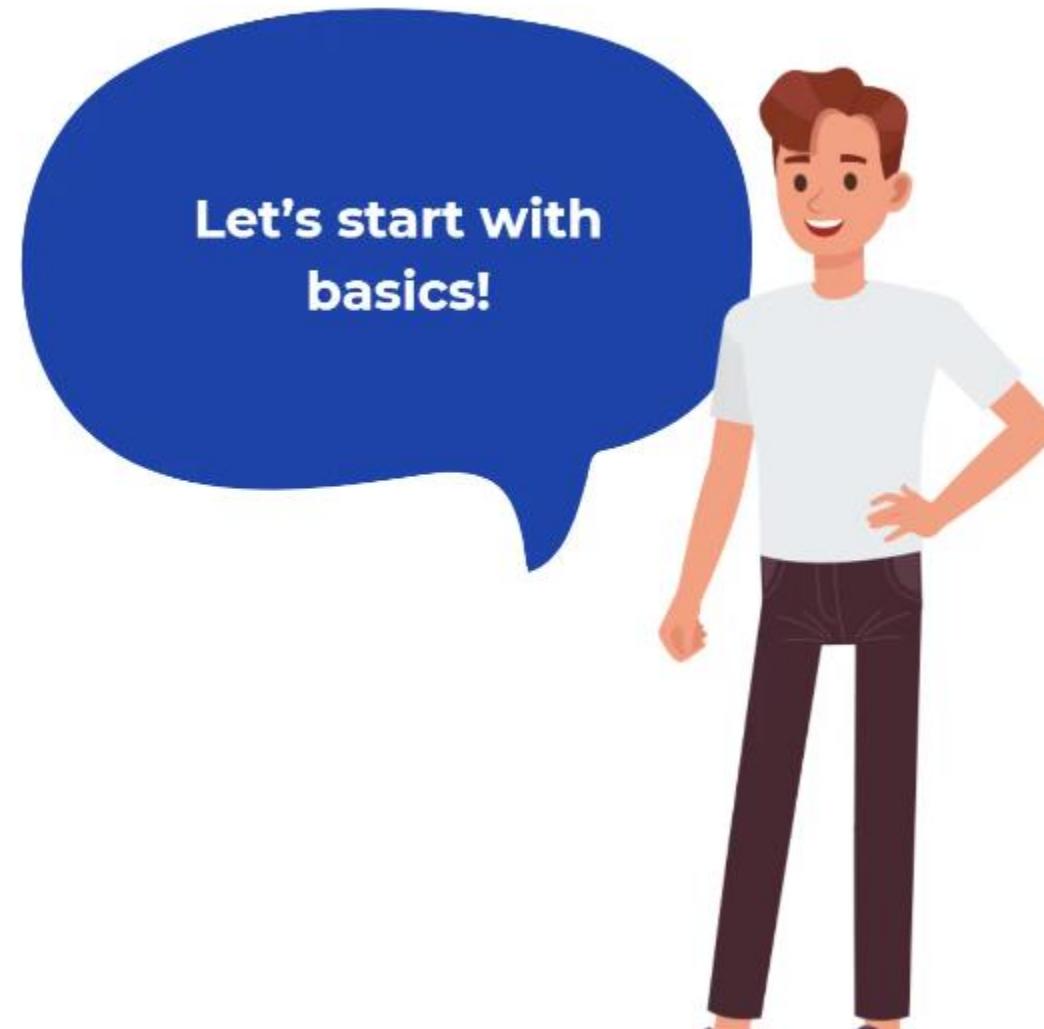
→ Recording changes day by day, month by month.

## Cognate/Professional Electives

**Practical Focus**



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## Cognate/Professional Electives

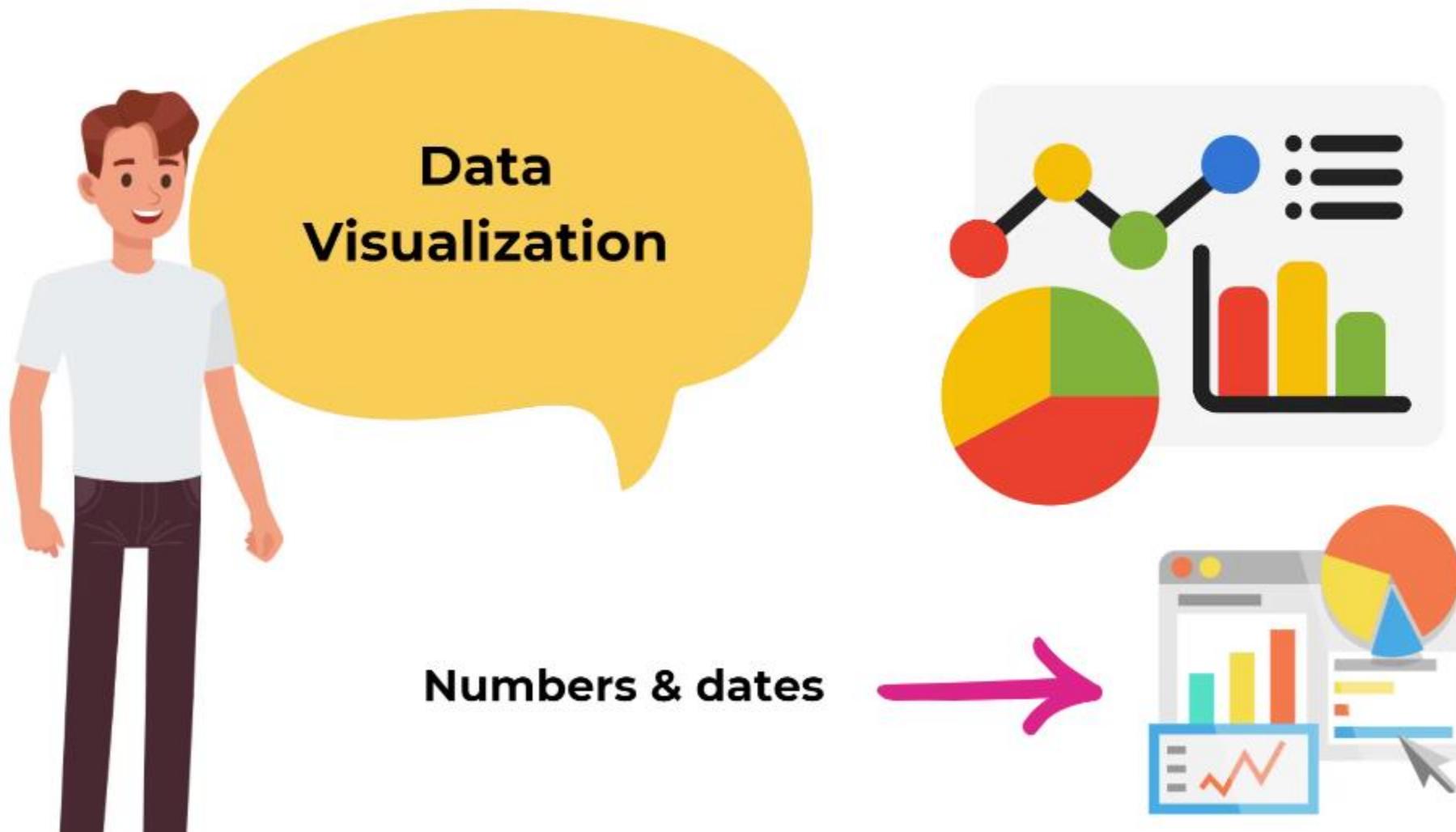
Sorting data is just like putting together a puzzle.



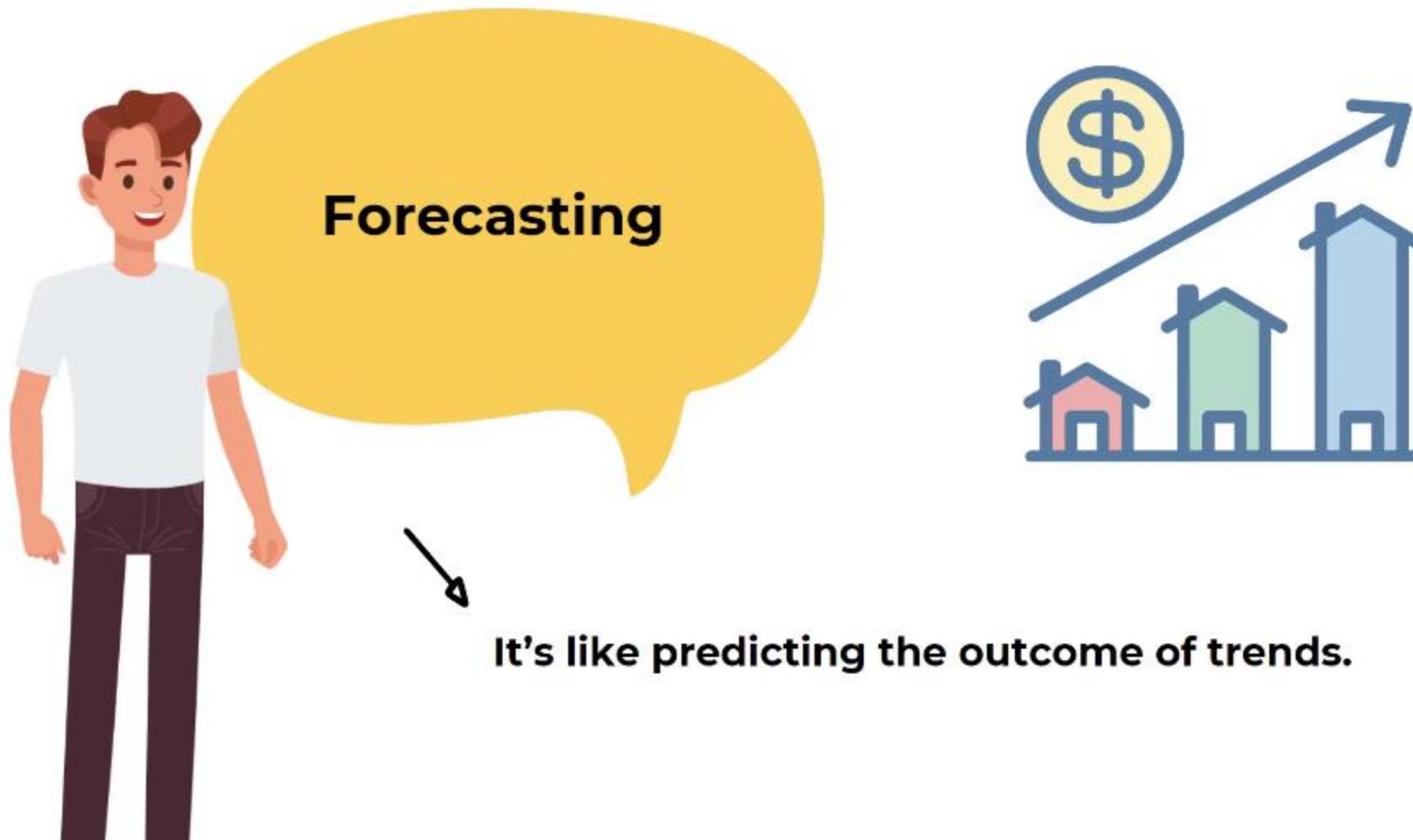
Patterns and trends



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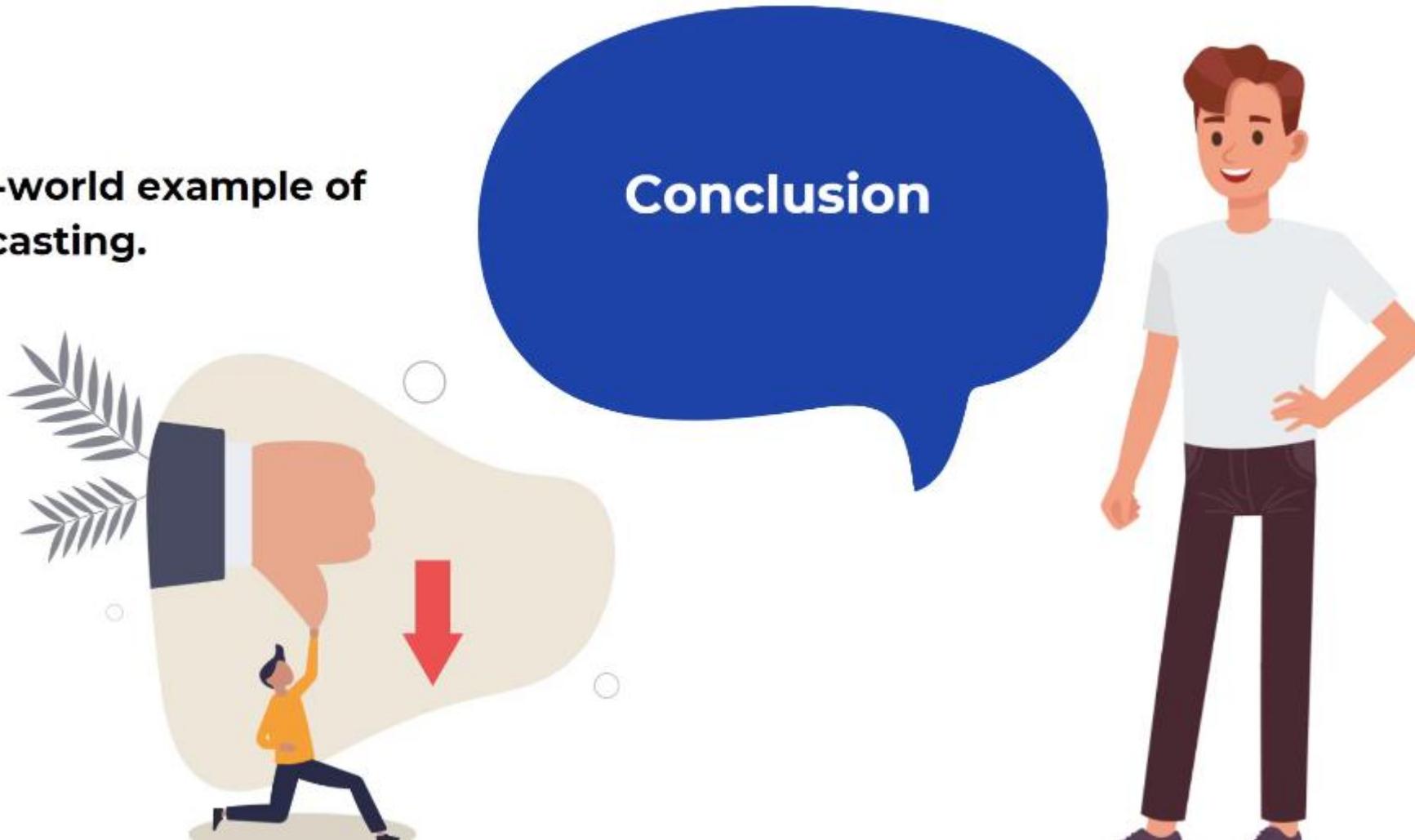


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Real-world example of forecasting.

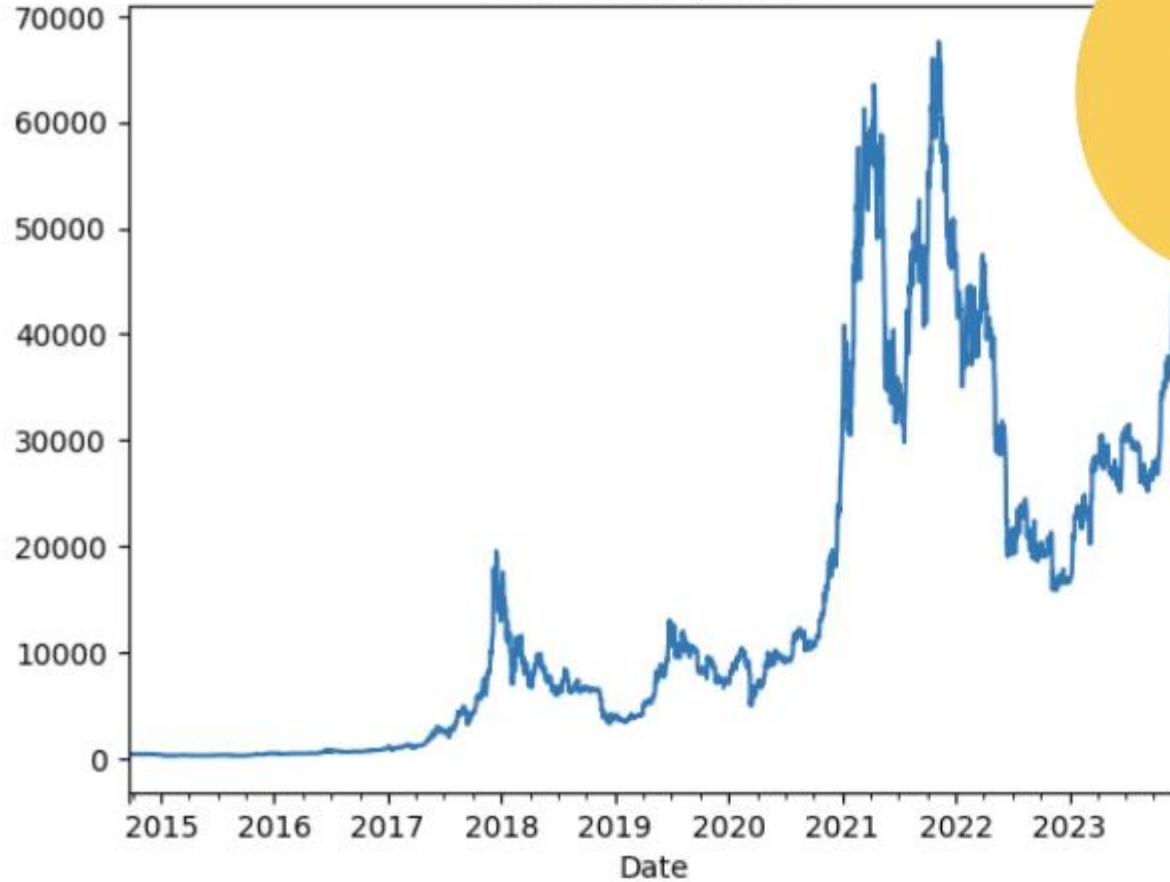


# What is Time Series Data?



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Daily Closing Prices



This is daily price  
of Bitcoin from  
2014 to 2023



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Its market is very unpredictable, and has amazing trends

**Price changes, financial market dynamics and investor behavior.**

**Why Bitcoin Price Data?**



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A timeline story with each data point representing a moment, arranged from oldest to newest.

→ **This data is recorded at regular intervals**

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It is used in weather forecasting

→ **It is also used in economics and healthcare**

The callout box contains two images: one showing a globe with the letters "GDP" and a red arrow pointing upwards over stacks of gold coins, and another showing a medical monitor displaying an ECG waveform and numerical values (123, 321, 231).

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We'll explore  
autocorrelation

- **Seasonality - recognizing recurring patterns**

**Statistical Tools**



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## **Cognate/Professional Electives**

### **01. What best defines “time series data”**

- A. Observations collected across different entities at a single point in time
- B. Observations collected without any inherent ordering
- C. Observations recorded sequentially at fixed or irregular time intervals, where order and spacing carry information
- D. Data that has been sorted alphabetically

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## **02. Which statement correctly captures the idea of seasonality in a time series**

- A.** A one-time jump caused by an exogenous shock
- B.** A pattern that repeats at a regular, known frequency (e.g. hourly, weekly, yearly)
- C.** Noise that has zero mean and no autocorrelation
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### **03. Which of the following is not a common application o time series analysis**

- A. Forecasting electricity demand for grid management
- B. Detecting credit-card fraud by examining transaction sequences
- C. Monitoring a patient's heart-rate signal in real-time
- D. Ranking search-engine results based purely on keyword relevance

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## **Cognate/Professional Electives**

**[Code Demo]**

## Cognate/Professional Electives

04. Which string representation is the most widely adopted international standard for machine-readable dates in time series files?

- A. MM/DD/YYYY
- B. DD-MM-YYYY
- C. YYY-MM-DD
- D. YY/MM/DD

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## **Cognate/Professional Electives**

**05. What is the main purpose of applying a rolling (moving) average to a time series?**

- A.** To increase the sampling frequency of the data
- B.** To eliminate all seasonal effects
- C.** To smooth short-term fluctuations
- D.** To convert a non-stationary series into a stationary one via differencing

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## Cognate/Professional Electives

06. When you create a feature like `df['lag_1'] = df['Close'].shift(1)`, what does that variable represent, and how can it be interpreted in a business-forecasting context?

- A. The day-to-day percentage change in price, useful only for volatility charts
- B. The value of the series exactly one period earlier
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## Cognate/Professional Electives

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**Thank you very much for listening.**