**Project Id:** 78G0OL

**Name of the Intern:** AKULA VAISHNAVI

**Problem Statement:**

Analyze and Provide Insights on Amazon Sales Report

**Problem Description:**

The provided dataset contains information about sales transactions on Amazon, including details such as order ID, date, status, fulfilment method, sales channel, product category, size, quantity, amount, shipping details, and more. The objective is to conduct a comprehensive analysis of the data and extract actionable insights to support business decision-making.

**Key Objectives:**

1. Sales Overview: Understand the overall sales performance, trends, and patterns over time.

2. Product Analysis: Analyze the distribution of product categories, sizes, and quantities sold to identify popular products.

3. Fulfilment Analysis: Investigate the fulfilment methods used and their effectiveness in delivering orders.

4. Customer Segmentation: Segment customers based on their buying behaviour, location, and other relevant factors.

5. Geographical Analysis: Explore the geographical distribution of sales, focusing on states and cities.

6. Business Insights: Provide actionable insights and recommendations based on the analysis to optimize sales strategies, improve customer satisfaction, and enhance overall business performance.

**Deliverables:**

1. Comprehensive analysis report summarizing key findings, insights, and recommendations.

2. Visualizations (charts, graphs) illustrating various aspects of the data analysis.

3. Insights on product preferences, customer behaviour, and geographical sales distribution.

4. Recommendations for improving sales strategies, inventory management, and customer service.

**Explanation of the code for the Deliverables:**

1. **Importing Libraries:** Matches the first code cell.
2. **Loading the Data:** Matches the code for reading the CSV file.
3. **Inspecting the Data:** Matches the .head() and .info() calls.
4. **Preprocessing Dates:** Matches the pd.to\_datetime and set\_index steps.
5. **Visualizing Sales:** Matches the code that plots Sales over time.
6. **Holt-Winters Model:** Matches the code for ExponentialSmoothing and the creation of the HW\_Forecast column.
7. **Comparing Predictions:** Matches the plotting of Sales and HW\_Forecast.
8. **Future Forecasting:** Matches the forecast method and its visualization.
9. **Saving Results:** Matches the final to\_csv step.

**Outcome with Explanation:**

1. **Importing Libraries:**

The program is ready to handle data, create graphs, and make predictions. There's no visible output, but the tools are now loaded and available for use.

1. **Loading the Data:**

The sales data from the file is loaded into the program. Although there’s no visible output, the program now has all the sales data ready for analysis.

1. **Inspecting the Data:**
2. data.head(): Displays the first few rows of the data. This helps you see how the data looks, including column names and example values.
3. data.info(): Prints a summary of the data, showing:

* Total rows and columns.
* Column names and their data types.
* Any missing values.

1. **Preparing the Dates:**

 The "Date" column is turned into proper date format.

 The data is reorganized to use dates as row labels, making it easier to analyze trends over time. There’s no visible output, but the data is now well-structured for time-based analysis.

1. **Visualizing Sales:**

A line graph is created showing how sales change over time. We can notice:

* Sales going up or down.
* Seasonal spikes (e.g., during holidays).
* Sudden increases or decreases.

1. **Applying the Holt-Winters Model:**

 The program predicts sales for the same dates in the past (this is called "fitted values").

 A new column, HW\_Forecast, is added to the data with these predicted values.

1. **Comparing Predictions to Real Sales:**

A graph is created comparing:

* + Actual Sales: The real numbers from the data.
  + HW Forecast: What the model predicted for the same period.
  + You can see how closely the predictions match the real sales. This helps evaluate if the model is accurate.

1. **Forecasting Future Sales:**
   * The program predicts sales for the next 12 months.
   * A new graph is created showing:
     1. Past sales as a reference.
     2. A forecast line extending into the future.
   * This gives an idea of how sales might trend in the upcoming year.
2. **You** **are saving the Results:**
   * The entire dataset, including real sales and predictions, is saved to a file called Forecasted\_Sales.csv.
   * can open this file later to view or share the results.

**Conclusion:**

This project analyzes sales data to identify trends and predict future sales using the Holt-Winters model. It provides insights into past performance and forecasts sales for the next 12 months, helping businesses plan better. The results are visualized through graphs and saved for further use. This approach helps decision-makers understand patterns, anticipate changes, and prepare strategies to optimize growth and revenue effectively.