1. Read the sales data and product data from the specified CSV files.
2. Merge the sales data and product data based on the product name.
3. Filter the merged data to retrieve the last four weeks' data.
4. Calculate the overall sales for the last four weeks.
5. Calculate the sales for each product in the last four weeks.
6. Calculate the average sales per week for each product in the last four weeks.
7. Predict the sales for each product in the next week.
8. Calculate the predicted overall sales for the next week.
9. Perform sales analysis for the last four weeks based on product information, including total quantity sold, average cost, average profit, average manpower, and average manufacturing time.
10. Add the predicted next week sales to the analysis.
11. Calculate the EOQ (Economic Order Quantity) for each product.
12. Print the overall sales for the last four weeks.
13. Print the sales analysis for each product in the last four weeks.
14. Calculate and print the summary statistics for the last four weeks' sales.
15. Generate bar graphs for each organization and product, showing sales for each week in the last four weeks.
16. Calculate the EOQ for each product.
17. Calculate the next week's calendar based on available manpower and time to manufacture.
18. Print the EOQ for each product.
19. Print the predicted overall sales for the next week.
20. Print the predicted sales for each product in the next week.
21. Print the next week's calendar.
22. Print the formulas used for calculation

**Read the sales data and product data from the specified CSV files:**

This step involves reading the sales data and product data from separate CSV files. The CSV files contain relevant information such as sales records and product details.

**Merge the sales data and product data based on the product name:**

The code merges the sales data and product data based on the common column "product name" using pandas' **merge()** function. This creates a consolidated dataset with combined information from both sources.

**Filter the merged data to retrieve the last four weeks' data:**

The merged data is filtered to extract the sales data for the last four weeks. This is achieved by considering the date column and selecting the relevant records within the desired timeframe.

**Calculate the overall sales for the last four weeks:**

The overall sales for the last four weeks are calculated by summing up the total quantity sold during that period. This provides an aggregate measure of the sales performance.

**Calculate the sales for each product in the last four weeks:**

The sales for each product in the last four weeks are calculated by summing up the total quantity sold for each product during that period. This provides insights into the individual product sales.

**Calculate the average sales per week for each product in the last four weeks:**

The average sales per week for each product in the last four weeks are calculated by dividing the total quantity sold for each product by the number of weeks (4). This helps understand the average sales trend over time.

**Predict the sales for each product in the next week:**

The code predicts the sales for each product in the next week by using the average sales per week calculated in the previous step. These predictions provide an estimate of the expected sales volume for each product in the upcoming week.

**Calculate the predicted overall sales for the next week:**

The predicted overall sales for the next week are calculated by summing up the predicted sales for each product. This gives an estimate of the total sales expected in the upcoming week.

**Perform sales analysis for the last four weeks based on product information:**

The code performs sales analysis for the last four weeks based on product information. This analysis includes various metrics such as total quantity sold, average cost, average profit, average manpower, and average manufacturing time.

**Add the predicted next week sales to the analysis:**

The predicted next week sales are included in the sales analysis for the last four weeks. This provides a comprehensive view of the sales performance, including the projected future sales.

**Calculate the EOQ (Economic Order Quantity) for each product:**

The EOQ is a formula used to determine the optimal order quantity that minimizes inventory holding costs and ordering costs. The EOQ formula is as follows: EOQ = sqrt((2 \* Ordering Cost \* Predicted Sales) / Cost to Company) where:

Ordering Cost: The cost incurred for placing an order.

Predicted Sales: The estimated sales quantity for the next week.

Cost to Company: The cost associated with carrying inventory (e.g., storage, holding, etc.).

Example: Let's assume the following values:

Ordering Cost = $50 per order

Predicted Sales = 200 units

Cost to Company = $2 per unit

Using the EOQ formula: EOQ = sqrt((2 \* $50 \* 200) / $2) = sqrt((2 \* $10000) / $2) = sqrt($10000) = 100 units

Therefore, the EOQ for this example is 100 units.

**Print the overall sales for the last four weeks:**

This step involves printing the calculated overall sales for the last four weeks. It provides a summary of the total sales volume during that period.

**Print the sales analysis for each product in the last four weeks:**

The sales analysis for each product in the last four weeks is printed. This analysis includes metrics such as total quantity sold, average cost, average profit, average manpower, and average manufacturing time. It helps evaluate the performance of each product.

**Calculate and print the summary statistics for the last four weeks' sales:**

The code calculates and prints summary statistics for the last four weeks' sales. These statistics may include measures such as mean, median, standard deviation, minimum, and maximum values. They provide insights into the distribution and variability of the sales data.

**Generate bar graphs for each organization and product, showing sales for each week in the last four weeks:**

Bar graphs are generated for each organization and product combination, illustrating the sales data for each week in the last four weeks. These graphs provide a visual representation of the sales trends over time.

**Calculate the EOQ for each product:**

The code calculates the EOQ (Economic Order Quantity) for each product using the EOQ formula mentioned earlier. This helps determine the optimal order quantity for each product, considering the associated costs.

**Calculate the next week's calendar based on available manpower and time to manufacture:**

The next week's calendar is calculated based on the available manpower and the time required to manufacture each product. This information is used to allocate resources and schedule production activities effectively.

**Print the EOQ for each product:**

This step involves printing the calculated EOQ for each product. It provides insights into the recommended order quantity that minimizes inventory costs.

**Print the predicted overall sales for the next week:**

The predicted overall sales for the next week are printed. This gives an estimate of the total sales volume expected in the upcoming week.

**Print the predicted sales for each product in the next week:**

The predicted sales for each product in the next week are printed. This provides insights into the expected sales quantity for each product in the upcoming week.

**Print the next week's calendar:**

The next week's calendar, including details such as organization name, product name, quantity to manufacture, manpower required, time required, and completion time, is printed. This helps in planning and coordinating production activities.

**Print the formulas used for calculations:**

The formulas used for various calculations, such as overall sales, average sales per week, predicted sales, EOQ, etc., are printed. This provides transparency and documentation of the mathematical equations employed in the analysis.

These steps collectively perform data analysis, calculations, and visualization to provide insights into the sales data for the last four weeks and make predictions for the next week. The formulas and examples help illustrate the calculations involved in the process.

summary of how each calculation is performed:

**Overall Sales for the Last Four Weeks:**

Calculation: Sum of the total quantity sold in the last four weeks.

Formula: **Overall Sales = Total quantity sold in the last four weeks**

**Sales for Each Product in the Last Four Weeks:**

Calculation: Sum of the total quantity sold for each product in the last four weeks.

Formula: **Product Sales = Total quantity sold for each product in the last four weeks**

**Average Sales per Week for Each Product in the Last Four Weeks:**

Calculation: Total quantity sold for each product divided by the number of weeks (4).

Formula: **Average Sales per Week = Total quantity sold for each product / 4**

**Predicted Sales for Each Product in the Next Week:**

Calculation: Average Sales per Week for each product.

Formula: **Predicted Sales = Average Sales per Week**

**Predicted Overall Sales for the Next Week:**

Calculation: Sum of the predicted sales for each product.

Formula: **Predicted Overall Sales = Sum of Predicted Sales for Each Product**

**EOQ (Economic Order Quantity) for Each Product:**

Calculation: Square root of ((2 \* Ordering Cost \* Predicted Sales) / Cost to Company).

Formula: **EOQ = sqrt((2 \* Ordering Cost \* Predicted Sales) / Cost to Company)**

Example: EOQ = sqrt((2 \* $50 \* 200) / $2) = sqrt(10000) = 100 units

These calculations provide various insights into the sales data, including the overall sales, sales for each product, average sales per week, and predictions for the next week. The EOQ calculation helps determine the optimal order quantity for each product, considering factors such as ordering cost, predicted sales, and cost to the company.