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BATCH : H2

CODE:

```
import pandas as pd

# Read the CSV file
df = pd.read_csv('grainsales.csv')

# Calculate the total sales for each month
monthly_sales = df.groupby('Months')['Sales'].sum()

# Find the month with the highest sales
best_month = monthly_sales.idxmax()
highest_sales = monthly_sales[best_month]

# Calculate the best-selling product
product_sales = df.groupby('GrainName')['Sales'].sum()
best_product = product_sales.idxmax()
most_sold = product_sales[best_product]

# Find the city with the most sales
city_sales = df.groupby('City')['Sales'].sum()
best_city = city_sales.idxmax()
most_sales_city = city_sales[best_city]

# Find the products most often sold together
product_combinations = df.groupby('GrainName')['GrainName'].count()
most_common_combinations = product_combinations.idxmax()
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# Find the total sales for each state
state_sales = df.groupby('State')['Sales'].sum()

# Find the average sales for each month
monthly_average_sales = df.groupby('Months')['Sales'].mean()

# Find the maximum sales for each product
max_product_sales = df.groupby('GrainName')['Sales'].max()

# Find the minimum sales for each product
min_product_sales = df.groupby('GrainName')['Sales'].min()

# Find the number of sales entries for each city
city_sales_count = df['City'].value_counts()

# Find the total sales for each year
yearly_sales = df.groupby('Year')['Sales'].sum()

# Find the average sales for each state
state_average_sales = df.groupby('State')['Sales'].mean()

# Find the top 5 highest-selling products
top_5_products = df.groupby('GrainName')['Sales'].sum().nlargest(5)

# Find the top 3 cities with the highest sales
top_3_cities = df.groupby('City')['Sales'].sum().nlargest(3)

# Find the month with the lowest sales
worst_month = monthly_sales.idxmin()
lowest_sales = monthly_sales[worst_month]

# Find the product with the highest average sales
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best_average_product = df.groupby('GrainName')['Sales'].mean().idxmax()
highest_average_sales = df.groupby('GrainName')['Sales'].mean()[best_average_product]

# Find the city with the highest average sales
best_average_city = df.groupby('City')['Sales'].mean().idxmax()
highest_average_sales_city = df.groupby('City')['Sales'].mean()[best_average_city]

# Find the total sales for each grain and state combination
grain_state_sales = df.groupby(['GrainName', 'State'])['Sales'].sum()

# Find the total sales for each grain and month combination
grain_month_sales = df.groupby(['GrainName', 'Months'])['Sales'].sum()

# Find the total sales for each grain and year combination
grain_year_sales = df.groupby(['GrainName', 'Year'])['Sales'].sum()

# Find the average sales for each grain and state combination
grain_state_average_sales = df.groupby(['GrainName', 'State'])['Sales'].mean()

# Find the maximum sales for each grain and state combination
grain_state_max_sales = df.groupby(['GrainName', 'State'])['Sales'].max()

# Find the minimum sales for each grain and state combination
grain_state_min_sales = df.groupby(['GrainName', 'State'])['Sales'].min()

# Find the total sales for each grain and city combination
grain_city_sales = df.groupby(['GrainName', 'City'])['Sales']


import pandas as pd

# Read the CSV file
```

```
df = pd.read_csv('grainsales.csv')

# Calculate the total sales for each month
monthly_sales = df.groupby('Months')['Sales'].sum()
print("Monthly Sales:")
print(monthly_sales)

# Find the month with the highest sales
best_month = monthly_sales.idxmax()
highest_sales = monthly_sales[best_month]
print("Best Month:")
print(best_month)
print("Highest Sales:")
print(highest_sales)

# Calculate the best-selling product
product_sales = df.groupby('GrainName')['Sales'].sum()
best_product = product_sales.idxmax()
most_sold = product_sales[best_product]
print("Best-selling Product:")
print(best_product)
print("Sales of Best-selling Product:")
print(most_sold)

# Find the city with the most sales
city_sales = df.groupby('City')['Sales'].sum()
best_city = city_sales.idxmax()
most_sales_city = city_sales[best_city]
print("City with Most Sales:")
print(best_city)
print("Sales in City with Most Sales:")
print(most_sales_city)
```

```
# Find the products most often sold together
product_combinations = df.groupby('GrainName')['GrainName'].count()
most_common_combinations = product_combinations.idxmax()
print("Most Common Product Combination:")
print(most_common_combinations)

# Find the total sales for each state
state_sales = df.groupby('State')['Sales'].sum()
print("State-wise Sales:")
print(state_sales)

# Find the average sales for each month
monthly_average_sales = df.groupby('Months')['Sales'].mean()
print("Monthly Average Sales:")
print(monthly_average_sales)

# Find the maximum sales for each product
max_product_sales = df.groupby('GrainName')['Sales'].max()
print("Maximum Sales for Each Product:")
print(max_product_sales)

# Find the minimum sales for each product
min_product_sales = df.groupby('GrainName')['Sales'].min()
print("Minimum Sales for Each Product:")
print(min_product_sales)

# Find the number of sales entries for each city
city_sales_count = df['City'].value_counts()
print("Number of Sales Entries for Each City:")
print(city_sales_count)
```

```
# Find the total sales for each year
yearly_sales = df.groupby('Year')['Sales'].sum()
print("Yearly Sales:")
print(yearly_sales)

# Find the average sales for each state
state_average_sales = df.groupby('State')['Sales'].mean()
print("Average Sales for Each State:")
print(state_average_sales)

# Find the top 5 highest-selling products
top_5_products = df.groupby('GrainName')['Sales'].sum().nlargest(5)
print("Top 5 Highest-selling Products:")
print(top_5_products)

# Find the top 3 cities with the highest sales
top_3_cities = df.groupby('City')['Sales'].sum().nlargest(3)
print("Top 3 Cities with Highest Sales:")
print(top_3_cities)

# Find the month with the lowest sales
worst_month = monthly_sales.idxmin()
lowest_sales = monthly_sales[worst_month]
print("Worst Month:")
print(worst_month)
print("Lowest Sales:")
print(lowest_sales)

# Find the product with the highest average sales
best_average_product = df.groupby('GrainName')['Sales'].mean().idxmax()
highest_average_sales = df.groupby('GrainName')['Sales'].mean()[best_average_product]
print("Product with Highest Average Sales:")
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```
print(best_average_product)
print("Highest Average Sales for Product:")
print(highest_average_sales)

# Find the city with the highest average sales
best_average_city = df.groupby('City')['Sales'].mean().idxmax()
highest_average_sales_city = df.groupby('City')['Sales'].mean()[best_average_city]
print("City with Highest Average Sales:")
print(best_average_city)
print("Highest Average Sales in City:")
print(highest_average_sales_city)

# Find the total sales for each grain and state combination
grain_state_sales = df.groupby(['GrainName', 'State'])['Sales'].sum()
print("Total Sales for Each Grain and State Combination:")
print(grain_state_sales)

# Find the total sales for each grain and month combination
grain_month_sales = df.groupby(['GrainName', 'Months'])['Sales'].sum()
print("Total Sales for Each Grain and Month Combination:")
print(grain_month_sales)

# Find the total sales for each grain and year combination
grain_year_sales = df.groupby(['GrainName', 'Year'])['Sales'].sum()
print("Total Sales for Each Grain and Year Combination:")
print(grain_year_sales)

# Find the average sales for each grain and state combination
grain_state_average_sales = df.groupby(['GrainName', 'State'])['Sales'].mean()
print("Average Sales for Each Grain and State Combination:")
print(grain_state_average_sales)
```

```
# Find the maximum sales for each grain and state combination
grain_state_max_sales = df.groupby(['GrainName', 'State'])['Sales'].max()
print("Maximum Sales for Each Grain and State Combination:")
print(grain_state_max_sales)

# Find the minimum sales for each grain and state combination
grain_state_min_sales = df.groupby(['GrainName', 'State'])['Sales'].min()
print("Minimum Sales for Each Grain and State Combination:")
print(grain_state_min_sales)

# Find the total sales for each grain and city combination
grain_city_sales = df.groupby(['GrainName', 'City'])['Sales'].sum()
print("Total Sales for Each Grain and City Combination:")
print(grain_city_sales)
```

OUTPUT:

```
Monthly Sales:
Months
APRIL     5000000
AUG      13500000
FEB       6000000
JAN       5000000
JULY     16000000
JUNE     14000000
MARCH     4000000
MAY       9000000
Name: Sales, dtype: int64
Best Month:
JULY
Highest Sales:
16000000
Best-selling Product:
Wheat
Sales of Best-selling Product:
16000000
City with Most Sales:
Asansole
Sales in City with Most Sales:
16000000
Most Common Product Combination:
Ragi
State-wise Sales:
State
Gujarat         5000000
Hariyana        4000000
Maharashtra     5000000
Panjab          6000000
```

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Tamil Nadu      9000000
Telangana      14000000
UP             13500000
West Bengol    16000000
Name: Sales, dtype: int64
Monthly Average Sales:
Months
APRIL    2500000.0
AUG      4500000.0
FEB      1500000.0
JAN      1000000.0
JULY     4000000.0
JUNE     3500000.0
MARCH    2000000.0
MAY      3000000.0
Name: Sales, dtype: float64
Maximum Sales for Each Product:
GrainName
Bajra          1500000
Brown rice     3500000
Corn           4500000
Oats           2000000
Ragi           1000000
Sattu          2500000
Sooji          3000000
Wheat          4000000
Name: Sales, dtype: int64
Minimum Sales for Each Product:
GrainName
Bajra          1500000
Brown rice     3500000
Corn           4500000
Oats           2000000
Ragi           1000000
Sattu          2500000
Sooji          3000000
Wheat          4000000
Name: Sales, dtype: int64
Number of Sales Entries for Each City:
Nagpur       5
Amritsar     4
Hyderabad    4
Asansole     4
Madurai      3
Kanpur       3
Gurugram     2
Surat        2
Name: City, dtype: int64
Yearly Sales:
Year
2023    72500000
Name: Sales, dtype: int64
Average Sales for Each State:
State
Gujarat        2500000.0
Hariyana       2000000.0
Maharashtra    1000000.0
Panjab         1500000.0
```

```
Tamil Nadu     3000000.0
Telangana      3500000.0
UP             4500000.0
West Bengol    4000000.0
Name: Sales, dtype: float64
Top 5 Highest-selling Products:
GrainName
Wheat          16000000
Brown rice     14000000
Corn           13500000
Sooji           9000000
Bajra           6000000
Name: Sales, dtype: int64
Top 3 Cities with Highest Sales:
City
Asansole     16000000
Hyderabad    14000000
Kanpur       13500000
Name: Sales, dtype: int64
Worst Month:
MARCH
Lowest Sales:
4000000
Product with Highest Average Sales:
Corn
Highest Average Sales for Product:
4500000.0
City with Highest Average Sales:
Kanpur
Highest Average Sales in City:
4500000.0
Total Sales for Each Grain and State Combination:
GrainName    State
Bajra        Panjab          6000000
Brown rice   Telangana      14000000
Corn         UP             13500000
Oats         Hariyana        4000000
Ragi         Maharashtra     5000000
Sattu        Gujarat         5000000
Sooji        Tamil Nadu      9000000
Wheat        West Bengol    16000000
Name: Sales, dtype: int64
Total Sales for Each Grain and Month Combination:
GrainName    Months
Bajra        FEB        6000000
Brown rice   JUNE      14000000
Corn         AUG       13500000
Oats         MARCH      4000000
Ragi         JAN        5000000
Sattu        APRIL      5000000
Sooji        MAY        9000000
Wheat        JULY      16000000
Name: Sales, dtype: int64
Total Sales for Each Grain and Year Combination:
GrainName    Year
Bajra        2023     6000000
Brown rice   2023    14000000
Corn         2023    13500000
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Oats         2023     4000000
Ragi         2023     5000000
Sattu        2023     5000000
Sooji        2023     9000000
Wheat        2023    16000000
Name: Sales, dtype: int64
Average Sales for Each Grain and State Combination:
GrainName    State
Bajra        Panjab         1500000.0
Brown rice   Telangana      3500000.0
Corn         UP             4500000.0
Oats         Hariyana       2000000.0
Ragi         Maharashtra    1000000.0
Sattu        Gujarat        2500000.0
Sooji        Tamil Nadu     3000000.0
Wheat        West Bengol    4000000.0
Name: Sales, dtype: float64
Maximum Sales for Each Grain and State Combination:
GrainName    State
Bajra        Panjab         1500000
Brown rice   Telangana      3500000
Corn         UP             4500000
Oats         Hariyana       2000000
Ragi         Maharashtra    1000000
Sattu        Gujarat        2500000
Sooji        Tamil Nadu     3000000
Wheat        West Bengol    4000000
Name: Sales, dtype: int64
Minimum Sales for Each Grain and State Combination:
GrainName    State
Bajra        Panjab         1500000
Brown rice   Telangana      3500000
Corn         UP             4500000
Oats         Hariyana       2000000
Ragi         Maharashtra    1000000
Sattu        Gujarat        2500000
Sooji        Tamil Nadu     3000000
Wheat        West Bengol    4000000
Name: Sales, dtype: int64
Total Sales for Each Grain and City Combination:
GrainName    City
Bajra        Amritsar       6000000
Brown rice   Hyderabad     14000000
Corn         Kanpur        13500000
Oats         Gurugram       4000000
Ragi         Nagpur         5000000
Sattu        Surat          5000000
Sooji        Madurai        9000000
Wheat        Asansole      16000000
Name: Sales, dtype: int64
```