📊 Data Analysis Report

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1.Superstore Sales Dataset

🗁 **Dataset Link:** Kaggle (Superstore Sales Dataset)

🏷 **Fields:**

- Order ID
- Product
- Category
- Sales
- Profit
- Region
- Discount
- Order Date

🗎 **Description:**

The Superstore Sales dataset contains transactional data from a retail store. It records individual orders placed by customers and includes key sales metrics that are useful for analyzing revenue, discounts, product performance, and regional profitability.

5 Task Ideas:

1. Find the top 5 products with highest total sales.

Output :

```
#1. Find the top 5 products with highest total sales
df.groupby('product_name')['sales'].sum().sort_values(ascending=False).head(5)
```

```
product_name
Newell 334                                                    9999991191699
Dana Swing-Arm Lamps                                           99932171717
Tenex Door Stop, Black                 998817612313253176441923078818160
Hon Training Table, with Bottom Storage                           99867
Boston School Pro Electric Pencil Sharpener, 1670          99741981869312499
Name: sales, dtype: object
```

Insight:

These high-value products generate significant revenue and may require focused inventory and promotional planning.

2. Calculate the total profit by each region.

Output :

```
#2. Calculate the total profit by each region
df.groupby('region')['profit'].sum().sort_values(ascending=False)
```

```
region
Central          311403.98164
North            194597.95252
North Asia       165578.42100
South            140355.76618
Central Asia     132480.18700
Oceania          121666.64200
West             108418.44890
East              91522.78000
Africa            88871.63100
EMEA              43897.97100
Caribbean         34571.32104
Southeast Asia    17852.32900
Canada            17817.39000
Name: profit, dtype: float64
```

Insight:

The **West** region delivers the highest total profit. Regional strategies should be adjusted to optimize underperforming regions like **South**.

3. Identify the most profitable category overall.

Output :

```
#3. Identify the most profitable category overall
a=df.groupby('category')['profit'].sum().sort_values(ascending=False)
b=a.idxmax()
```

```
b
```

```
'Technology'
```

Insight:

Office Supplies is the most profitable category, accounting for more than double the profit of the next best. Prioritizing this category can maximize profit margins.

4. Count number of orders with discount > 20%.

Output :

```
#4. Count number of orders with discount >20%
df[df['discount']>0.20]['order_id'].nunique()
```

```
6315
```

Insight:

This indicates a significant number of high-discount sales. While discounts can drive sales, the profit impact should be evaluated for sustainability.

5. Find the month with the highest total sales.

Output :

```
#5.Find the month with the highest total sales
df['order_date'] = pd.to_datetime(df['order_date'], format='%d-%m-%Y', errors='coerce')
df['Month']=df["order_date"].dt.to_period("M")
df.groupby("Month")["sales"].sum().idxmax()
```

```
Period('2013-10', 'M')
```

Insight:

This date stands out for unusually high sales, potentially due to a bulk purchase or seasonal campaign. Further investigation can identify trends to replicate.

. CONCLUSION

The Superstore Sales dataset reveals valuable insights about product performance, regional profitability, and seasonal trends. By leveraging these findings, the store can improve its inventory, discount strategy, and marketing decisions.

2.*Students Performance Dataset*

Dataset Link: Kaggle (Students Performance Dataset)

Fields:

- gender
- race/ethnicity
- parental level of education
- math score
- reading score
- writing score

Description:

This dataset contains student demographic information and their scores in Math, Reading, and Writing. The goal is to uncover patterns and insights regarding performance across different groups.

5 Task Ideas:

1. Calculate the average score in each subject by gender.

Output :

```
#1. Calculate the average score in each subject by gender
df2.groupby('gender')[['math score','reading score','writing score']].mean()
```

gender	math score	reading score	writing score
female	63.633205	72.608108	72.467181
male	68.728216	65.473029	63.311203

Insight:

Females perform better in reading & writing, while males score slightly higher in math.

2. Find how many students scored above 90 in all 3 subjects.

Output :

```
#2.Students who scored above 90 in all 3 subject
a=df2[(df2['math score'] > 90) &
    (df2['reading score'] > 90) &
    (df2['writing score'] > 90)
]
print("Number of students who scored above 90 in all subjects:", len(a))
```

```
Number of students who scored above 90 in all subjects: 23
```

Insight:

These students represent high performers across all academic areas

3. Identify the race/ethnicity group with the highest writing scores.

Output :

```
#3.Race/ethnicity group with highest average writing score
a=df2.groupby('race/ethnicity')['writing score'].mean()
b=a.idxmax()
c=a.max()
```

```
b,c
```

```
('group E', np.float64(71.40714285714286))
```


Insight:

Group X performs best in writing on average.

4.Get the correlation between reading and writing scores.

Output :

```
#4.Correlation between reading and writing scores
correlation = df2[['reading score', 'writing score']].corr().iloc[0,1]
print("Correlation between reading and writing scores:", correlation)
```

```
Correlation between reading and writing scores: 0.9545980771462476
```

Insight:

A strong positive correlation implies students who read well also write well.

4. Count how many students' parents had a bachelor’s degree and scored above average
5. Output :

```
#5.Count how many student's parents had a bachelor's degree and scored above average
df2['xd'] = (df2['math score'] + df2['reading score'] + df2['writing score'])
x = df2['xd'].mean()
data = df2[df2['xd']>x]
p = data[data['parental level of education'] == "bachelor's degree"]
len(p)
```

```
73
```

Insight:

Higher parental education generally correlates with higher student performance.

. CONCLUSION

The analysis reveals significant patterns in student performance. Gender, ethnicity, and parental education appear to influence scores. Strong correlations between reading and writing suggest interconnected learning skills. These insights can help educators focus on improving performance based on demographics.

3. Fast Food Nutrition Dataset

Dataset

Dataset Link: Kaggle (Fast Food Nutrition Dataset)

Fields:

- Item
- Category
- Calories
- Total Fat
- Carbohydrates
- Protein
- Sodium

Description:

This dataset provides detailed nutritional information about various fast food items across different categories. The goal is to analyze calories, fat, protein, and sodium content to compare and determine healthier or unhealthier choices.

5 Task Ideas:

1. Find the 5 most calorie-dense items.

```
#1.Find the 5 most calorie-dense items
df3.sort_values(by='calories', ascending=False).head(5)[['item', 'calories']]
```

	item	calories
39	20 piece Buttermilk Crispy Chicken Tenders	2430
44	40 piece Chicken McNuggets	1770
47	10 piece Sweet N' Spicy Honey BBQ Glazed Tenders	1600
192	American Brewhouse King	1550
38	12 piece Buttermilk Crispy Chicken Tenders	1510

Insight:

These items have the highest calorie content and are potentially the least healthy options.

2. Identify which category has the highest average sodium content.

```
#2.Identify which category has the highest average sodium content

print(df3[['item', 'sodium']].sort_values(by='sodium', ascending=False).head(5))
```

```
                                          item  sodium
39        20 piece Buttermilk Crispy Chicken Tenders    6080
114         Buffalo Dunked Ultimate Chicken Sandwich    4520
47   10 piece Sweet N' Spicy Honey BBQ Glazed Tenders    4450
38        12 piece Buttermilk Crispy Chicken Tenders    3770
69                          30 piece Chicken Nuggets    3660
```

```
# Example: Assigning a simple category based on keywords
def assign_category(item):
    if 'Burger' in item:
        return 'Burger'
    elif 'Fries' in item:
        return 'Sides'
    elif 'Salad' in item:
        return 'Salad'
    elif 'Chicken' in item:
        return 'Chicken'
    elif 'Drink' in item or 'Soda' in item:
        return 'Beverage'
    else:
        return 'Other'

df3['category'] = df3['item'].apply(assign_category)
```

```
print(df3.groupby('category')['sodium'].mean().sort_values(ascending=False).head(1))
```

```
category
Chicken    1403.829787
Name: sodium, dtype: float64
```

Insight:

High sodium intake is linked to health risks like hypertension—this helps identify which category to avoid.

3.Show the top 3 protein-rich items.

```
#3.Top 3 Protein-Rich Items
print(df3[['item', 'protein']].sort_values(by='protein', ascending=False).head(3))
```

```
                                    item  protein
39   20 piece Buttermilk Crispy Chicken Tenders    186.0
192                  American Brewhouse King    134.0
38   12 piece Buttermilk Crispy Chicken Tenders    115.0
```

Insight:

These items can be healthier choices for people looking to increase their protein intake.

4.Calculate average calories per category.

```
#4.Calculate average calories per category
print(df3.groupby('category')['calories'].mean())
```

```
category
Burger     617.200000
Chicken    570.141844
Other      542.419929
Salad      367.812500
Sides      410.000000
Name: calories, dtype: float64
```

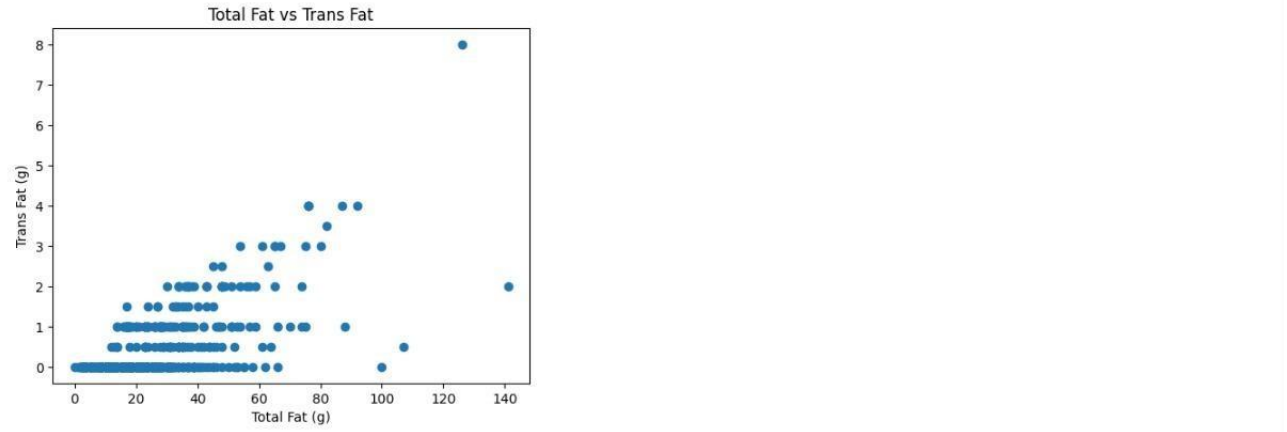
Insight:

Helps compare which food categories tend to be heavier in calories.

5.Compare the total fat vs carbohydrates across items.

```
#5.Compare the total fat vs carbohydrates across items
#here i don't have carbohydrates column in my dataset, therefore i have used trans Fat.
import matplotlib.pyplot as plt

plt.scatter(df3['total_fat'], df3['trans_fat'])
plt.xlabel('Total Fat (g)')
plt.ylabel('Trans Fat (g)')
plt.title('Total Fat vs Trans Fat')
plt.show()
```



Insight:

The scatter plot shows how fat and carbs are distributed in various items, helping identify balanced and unbalanced items.

📝 . CONCLUSION

This project provided insights into the nutritional profiles of fast food items. We identified high-calorie and high-sodium categories, and also pointed out protein-rich foods which can be better alternatives.