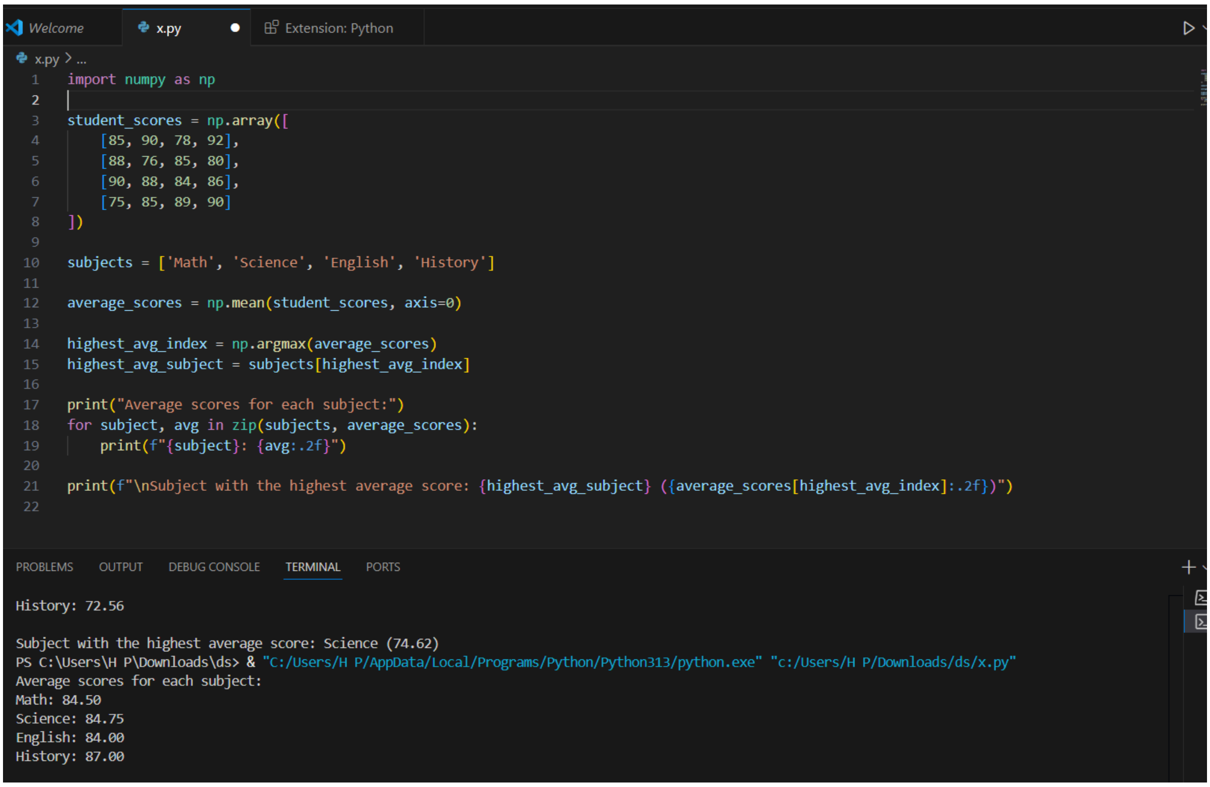
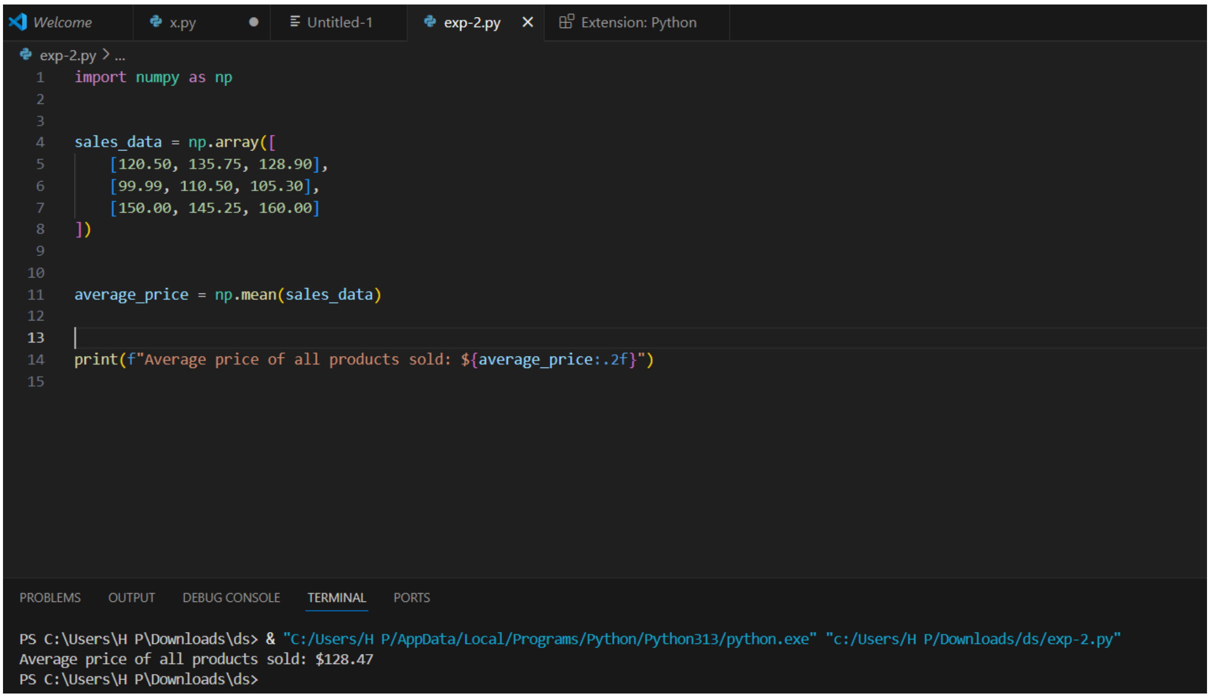
EXP-1



```python
import numpy as np

student_scores = np.array([
    [85, 90, 78, 92],
    [88, 76, 85, 80],
    [90, 88, 84, 86],
    [75, 85, 89, 90]
])

subjects = ['Math', 'Science', 'English', 'History']

average_scores = np.mean(student_scores, axis=0)

highest_avg_index = np.argmax(average_scores)
highest_avg_subject = subjects[highest_avg_index]

print("Average scores for each subject:")
for subject, avg in zip(subjects, average_scores):
    print(f"{subject}: {avg:.2f}")

print(f"\nSubject with the highest average score: {highest_avg_subject} ({average_scores[highest_avg_index]:.2f})")

```

```
History: 72.56

Subject with the highest average score: Science (74.62)
PS C:\Users\H P\Downloads\ds> & "C:/Users/H P/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/H P/Downloads/ds/x.py"
Average scores for each subject:
Math: 84.50
Science: 84.75
English: 84.00
History: 87.00
```

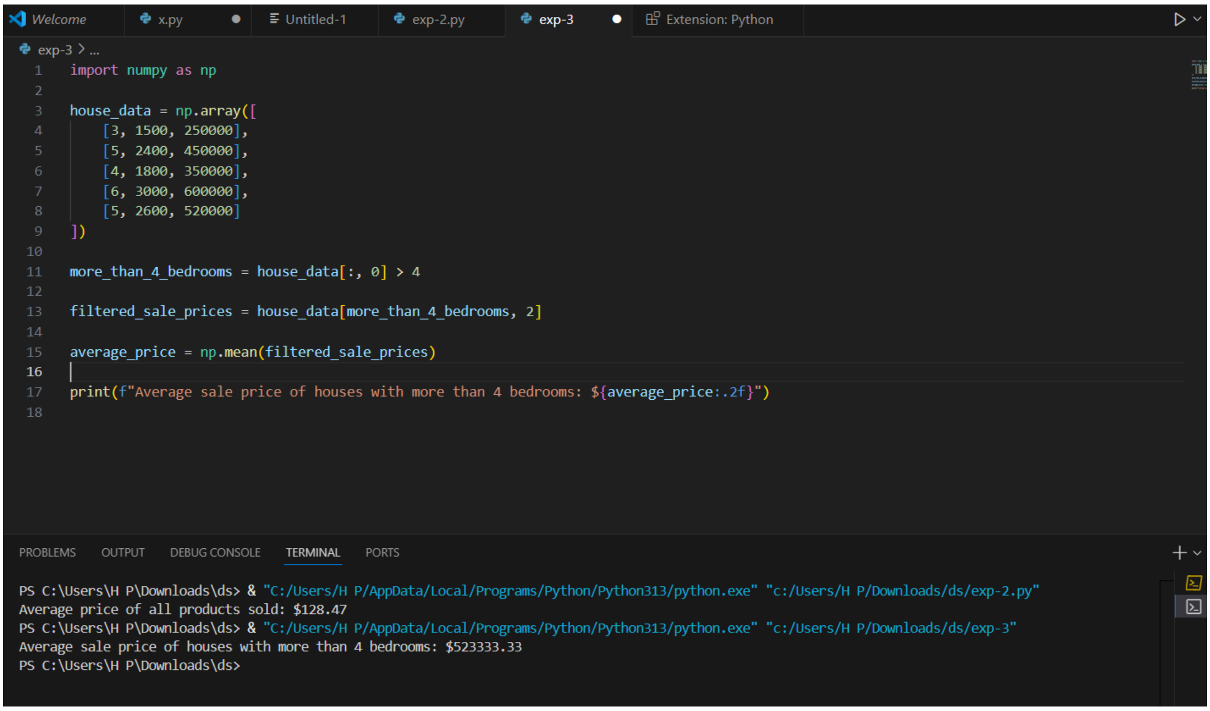
EXP-2



```python
import numpy as np


sales_data = np.array([
    [120.50, 135.75, 128.90],
    [99.99, 110.50, 105.30],
    [150.00, 145.25, 160.00]
])


average_price = np.mean(sales_data)


print(f"Average price of all products sold: ${average_price:.2f}")

```

```
PS C:\Users\H P\Downloads\ds> & "C:/Users/H P/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/H P/Downloads/ds/exp-2.py"
Average price of all products sold: $128.47
PS C:\Users\H P\Downloads\ds>
```

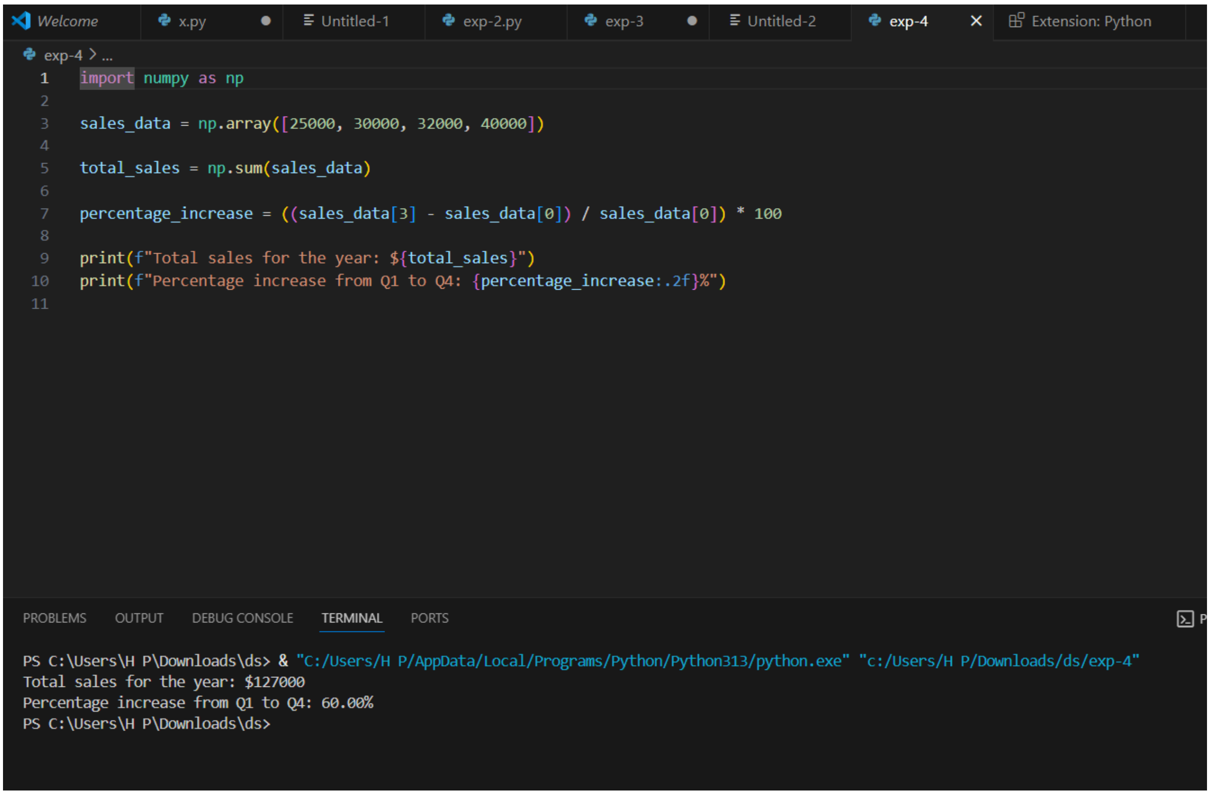
EXP-3



```python
import numpy as np

house_data = np.array([
    [3, 1500, 250000],
    [5, 2400, 450000],
    [4, 1800, 350000],
    [6, 3000, 600000],
    [5, 2600, 520000]
])

more_than_4_bedrooms = house_data[:, 0] > 4

filtered_sale_prices = house_data[more_than_4_bedrooms, 2]

average_price = np.mean(filtered_sale_prices)

print(f"Average sale price of houses with more than 4 bedrooms: ${average_price:.2f}")
```

```
PS C:\Users\H P\Downloads\ds> & "C:/Users/H P/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/H P/Downloads/ds/exp-2.py"
Average price of all products sold: $128.47
PS C:\Users\H P\Downloads\ds> & "C:/Users/H P/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/H P/Downloads/ds/exp-3"
Average sale price of houses with more than 4 bedrooms: $523333.33
PS C:\Users\H P\Downloads\ds>
```

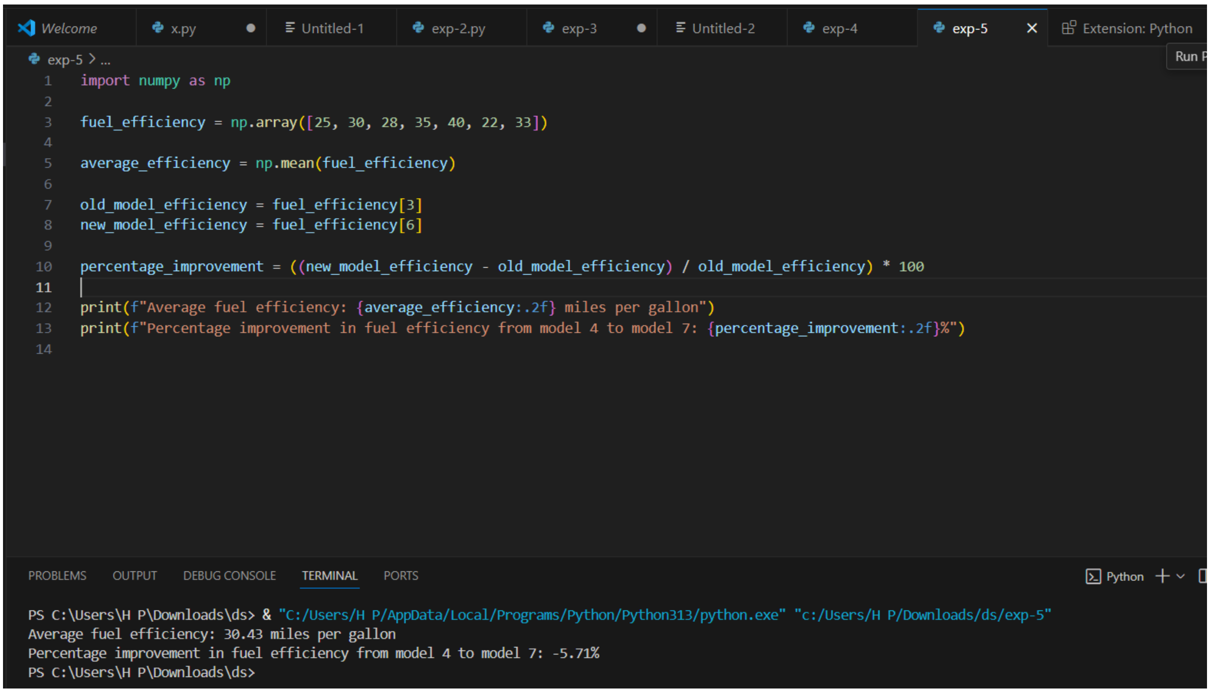
EXP-4



```python
import numpy as np

sales_data = np.array([25000, 30000, 32000, 40000])

total_sales = np.sum(sales_data)

percentage_increase = ((sales_data[3] - sales_data[0]) / sales_data[0]) * 100

print(f"Total sales for the year: ${total_sales}")
print(f"Percentage increase from Q1 to Q4: {percentage_increase:.2f}%")
```

```
PS C:\Users\H P\Downloads\ds> & "C:/Users/H P/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/H P/Downloads/ds/exp-4"
Total sales for the year: $127000
Percentage increase from Q1 to Q4: 60.00%
PS C:\Users\H P\Downloads\ds>
```

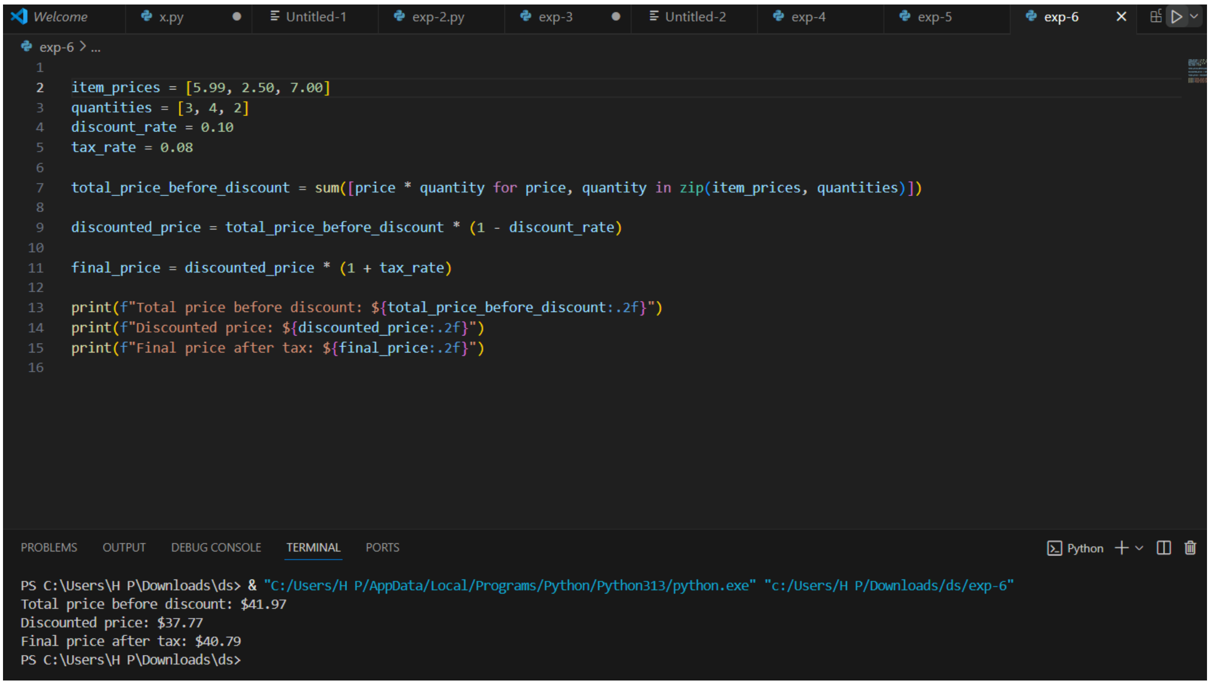
EXP-5



```python
import numpy as np

fuel_efficiency = np.array([25, 30, 28, 35, 40, 22, 33])

average_efficiency = np.mean(fuel_efficiency)

old_model_efficiency = fuel_efficiency[3]
new_model_efficiency = fuel_efficiency[6]

percentage_improvement = ((new_model_efficiency - old_model_efficiency) / old_model_efficiency) * 100

print(f"Average fuel efficiency: {average_efficiency:.2f} miles per gallon")
print(f"Percentage improvement in fuel efficiency from model 4 to model 7: {percentage_improvement:.2f}%")
```

```
PS C:\Users\H P\Downloads\ds> & "C:/Users/H P/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/H P/Downloads/ds/exp-5"
Average fuel efficiency: 30.43 miles per gallon
Percentage improvement in fuel efficiency from model 4 to model 7: -5.71%
PS C:\Users\H P\Downloads\ds>
```

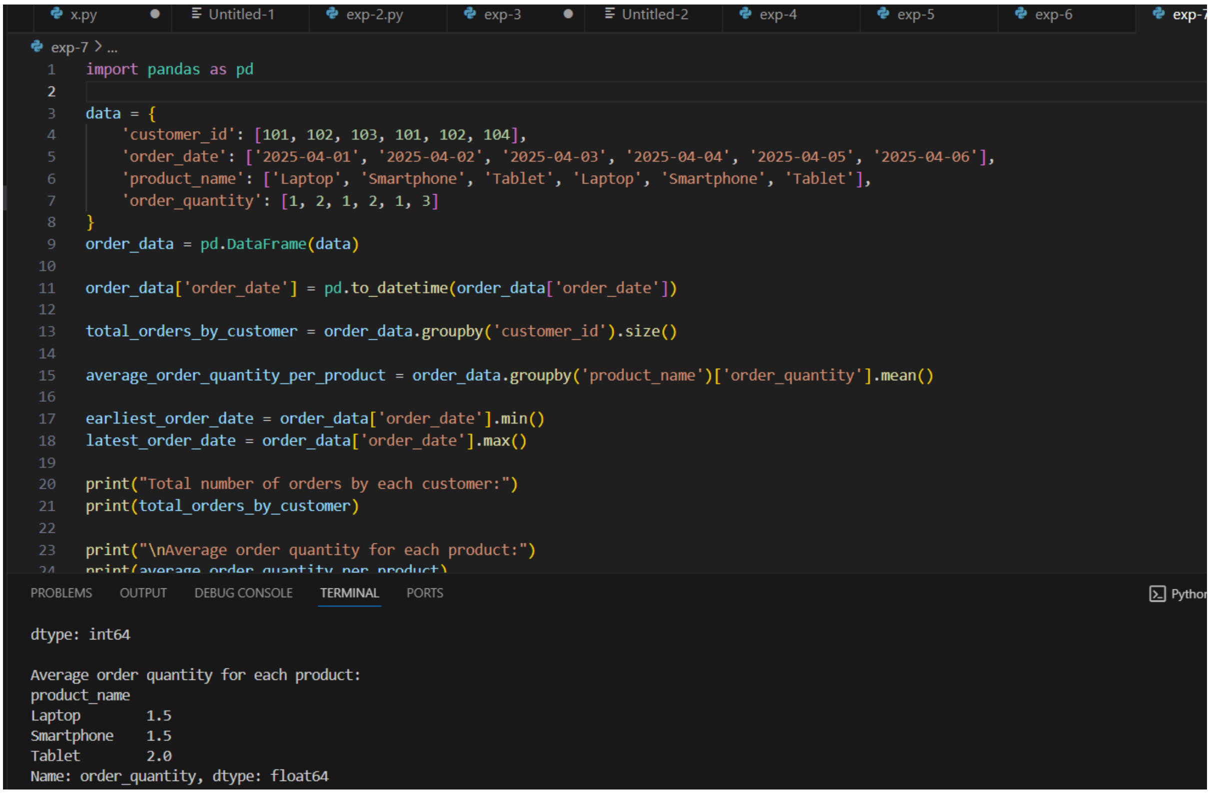
EXP-6



```python

item_prices = [5.99, 2.50, 7.00]
quantities = [3, 4, 2]
discount_rate = 0.10
tax_rate = 0.08

total_price_before_discount = sum([price * quantity for price, quantity in zip(item_prices, quantities)])

discounted_price = total_price_before_discount * (1 - discount_rate)

final_price = discounted_price * (1 + tax_rate)

print(f"Total price before discount: ${total_price_before_discount:.2f}")
print(f"Discounted price: ${discounted_price:.2f}")
print(f"Final price after tax: ${final_price:.2f}")
```

```
PS C:\Users\H P\Downloads\ds> & "C:/Users/H P/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/H P/Downloads/ds/exp-6"
Total price before discount: $41.97
Discounted price: $37.77
Final price after tax: $40.79
PS C:\Users\H P\Downloads\ds>
```

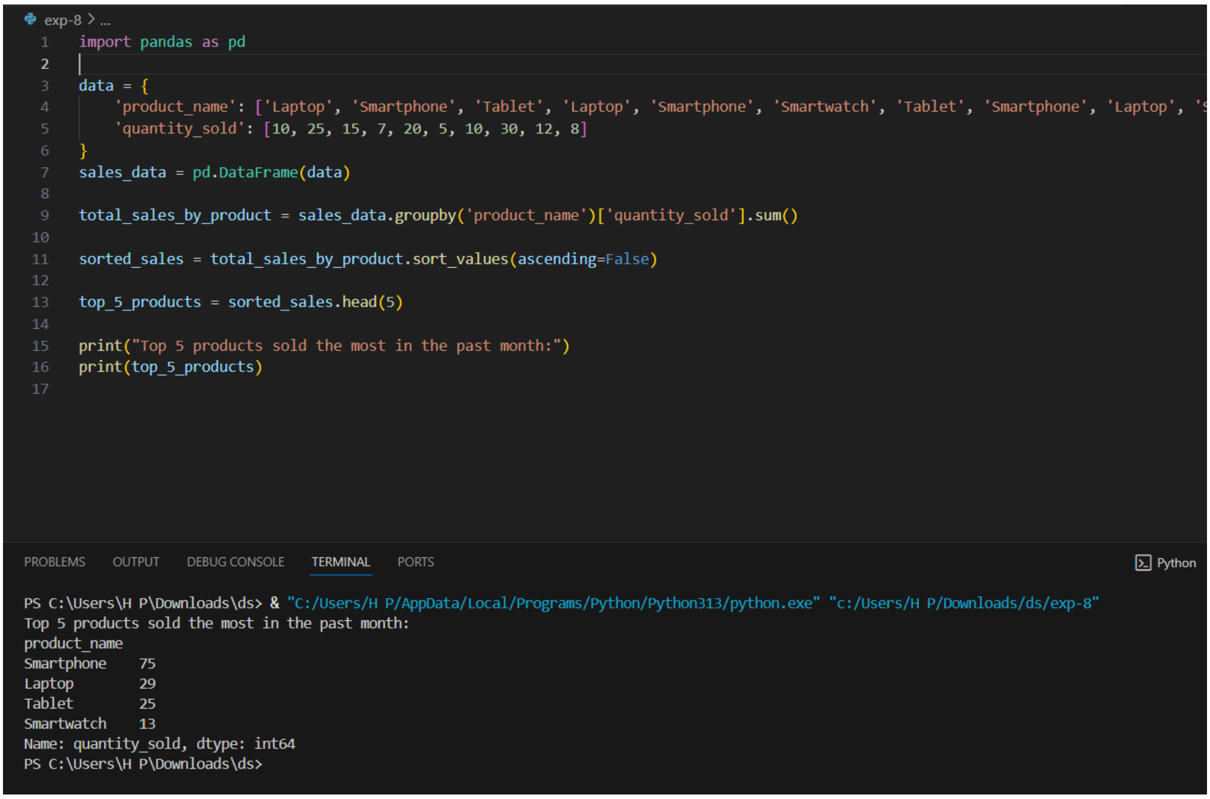
EXP-7



```python
import pandas as pd

data = {
    'customer_id': [101, 102, 103, 101, 102, 104],
    'order_date': ['2025-04-01', '2025-04-02', '2025-04-03', '2025-04-04', '2025-04-05', '2025-04-06'],
    'product_name': ['Laptop', 'Smartphone', 'Tablet', 'Laptop', 'Smartphone', 'Tablet'],
    'order_quantity': [1, 2, 1, 2, 1, 3]
}
order_data = pd.DataFrame(data)

order_data['order_date'] = pd.to_datetime(order_data['order_date'])

total_orders_by_customer = order_data.groupby('customer_id').size()

average_order_quantity_per_product = order_data.groupby('product_name')['order_quantity'].mean()

earliest_order_date = order_data['order_date'].min()
latest_order_date = order_data['order_date'].max()

print("Total number of orders by each customer:")
print(total_orders_by_customer)

print("\nAverage order quantity for each product:")
print(average_order_quantity_per_product)
```

```
dtype: int64

Average order quantity for each product:
product_name
Laptop        1.5
Smartphone    1.5
Tablet        2.0
Name: order_quantity, dtype: float64
```

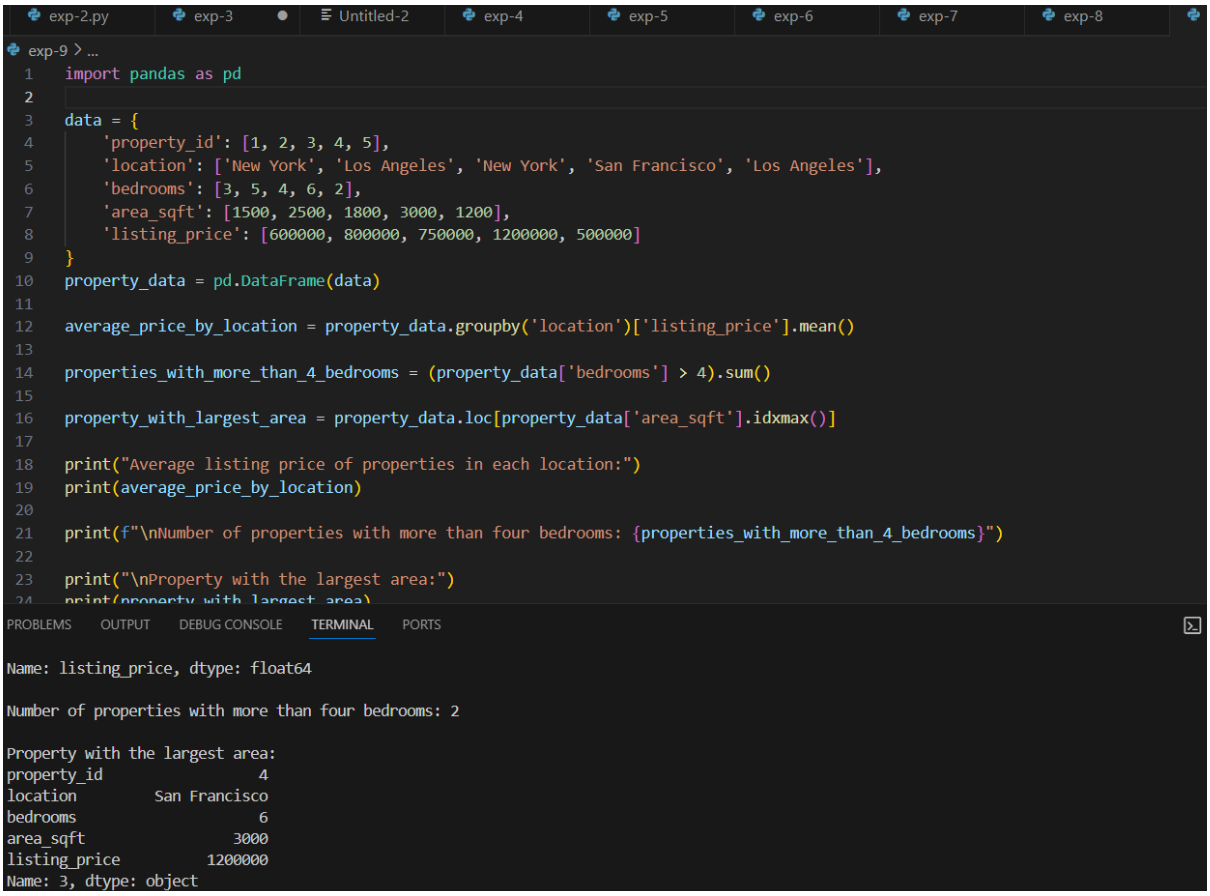
EXP-8



```python
import pandas as pd

data = {
    'product_name': ['Laptop', 'Smartphone', 'Tablet', 'Laptop', 'Smartphone', 'Smartwatch', 'Tablet', 'Smartphone', 'Laptop', 'S
    'quantity_sold': [10, 25, 15, 7, 20, 5, 10, 30, 12, 8]
}
sales_data = pd.DataFrame(data)

total_sales_by_product = sales_data.groupby('product_name')['quantity_sold'].sum()

sorted_sales = total_sales_by_product.sort_values(ascending=False)

top_5_products = sorted_sales.head(5)

print("Top 5 products sold the most in the past month:")
print(top_5_products)
```

```
PS C:\Users\H P\Downloads\ds> & "C:/Users/H P/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/H P/Downloads/ds/exp-8"
Top 5 products sold the most in the past month:
product_name
Smartphone    75
Laptop        29
Tablet        25
Smartwatch    13
Name: quantity_sold, dtype: int64
PS C:\Users\H P\Downloads\ds>
```

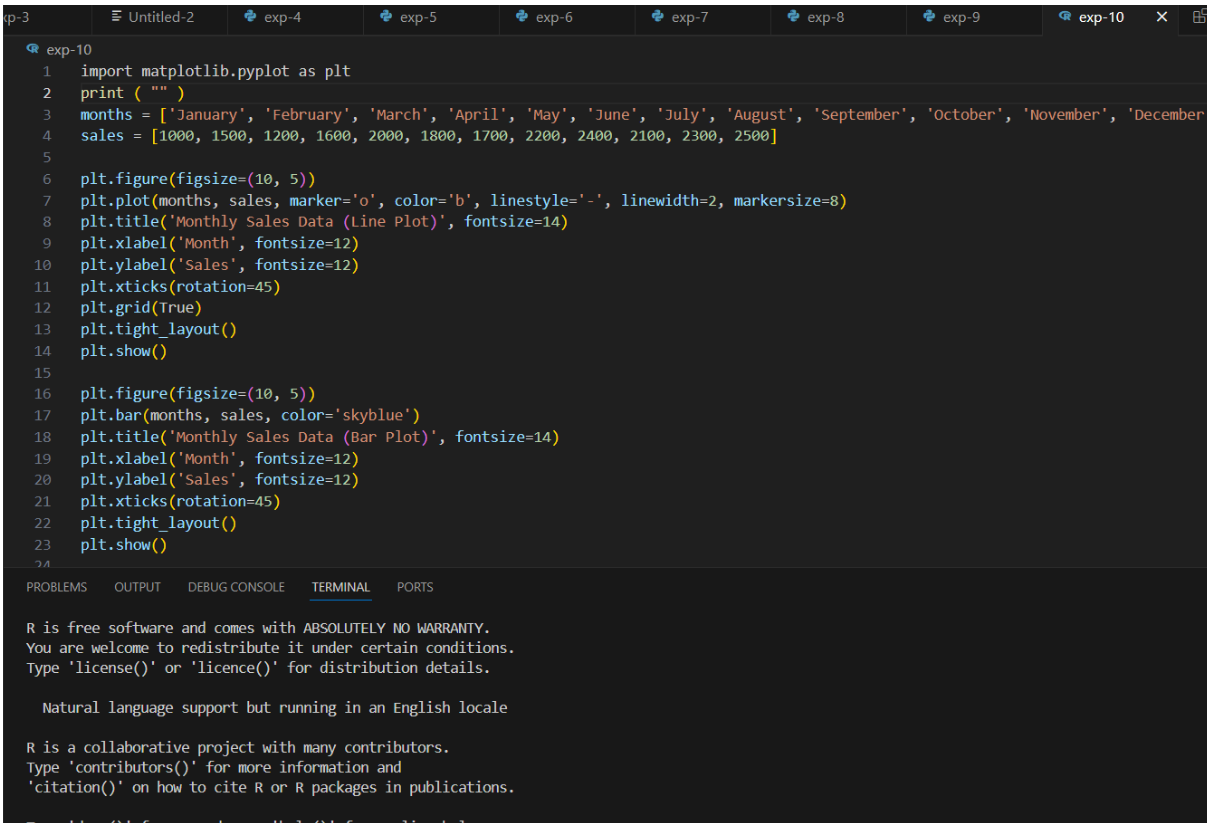
EXP-9



```python
import pandas as pd

data = {
    'property_id': [1, 2, 3, 4, 5],
    'location': ['New York', 'Los Angeles', 'New York', 'San Francisco', 'Los Angeles'],
    'bedrooms': [3, 5, 4, 6, 2],
    'area_sqft': [1500, 2500, 1800, 3000, 1200],
    'listing_price': [600000, 800000, 750000, 1200000, 500000]
}
property_data = pd.DataFrame(data)

average_price_by_location = property_data.groupby('location')['listing_price'].mean()

properties_with_more_than_4_bedrooms = (property_data['bedrooms'] > 4).sum()

property_with_largest_area = property_data.loc[property_data['area_sqft'].idxmax()]

print("Average listing price of properties in each location:")
print(average_price_by_location)

print(f"\nNumber of properties with more than four bedrooms: {properties_with_more_than_4_bedrooms}")

print("\nProperty with the largest area:")
print(property_with_largest_area)
```

```
Name: listing_price, dtype: float64

Number of properties with more than four bedrooms: 2

Property with the largest area:
property_id                4
location       San Francisco
bedrooms                   6
area_sqft               3000
listing_price        1200000
Name: 3, dtype: object
```

EXP-10



```python
import matplotlib.pyplot as plt
print ( "" )
months = ['January', 'February', 'March', 'April', 'May', 'June', 'July', 'August', 'September', 'October', 'November', 'December
sales = [1000, 1500, 1200, 1600, 2000, 1800, 1700, 2200, 2400, 2100, 2300, 2500]

plt.figure(figsize=(10, 5))
plt.plot(months, sales, marker='o', color='b', linestyle='-', linewidth=2, markersize=8)
plt.title('Monthly Sales Data (Line Plot)', fontsize=14)
plt.xlabel('Month', fontsize=12)
plt.ylabel('Sales', fontsize=12)
plt.xticks(rotation=45)
plt.grid(True)
plt.tight_layout()
plt.show()

plt.figure(figsize=(10, 5))
plt.bar(months, sales, color='skyblue')
plt.title('Monthly Sales Data (Bar Plot)', fontsize=14)
plt.xlabel('Month', fontsize=12)
plt.ylabel('Sales', fontsize=12)
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

```
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```