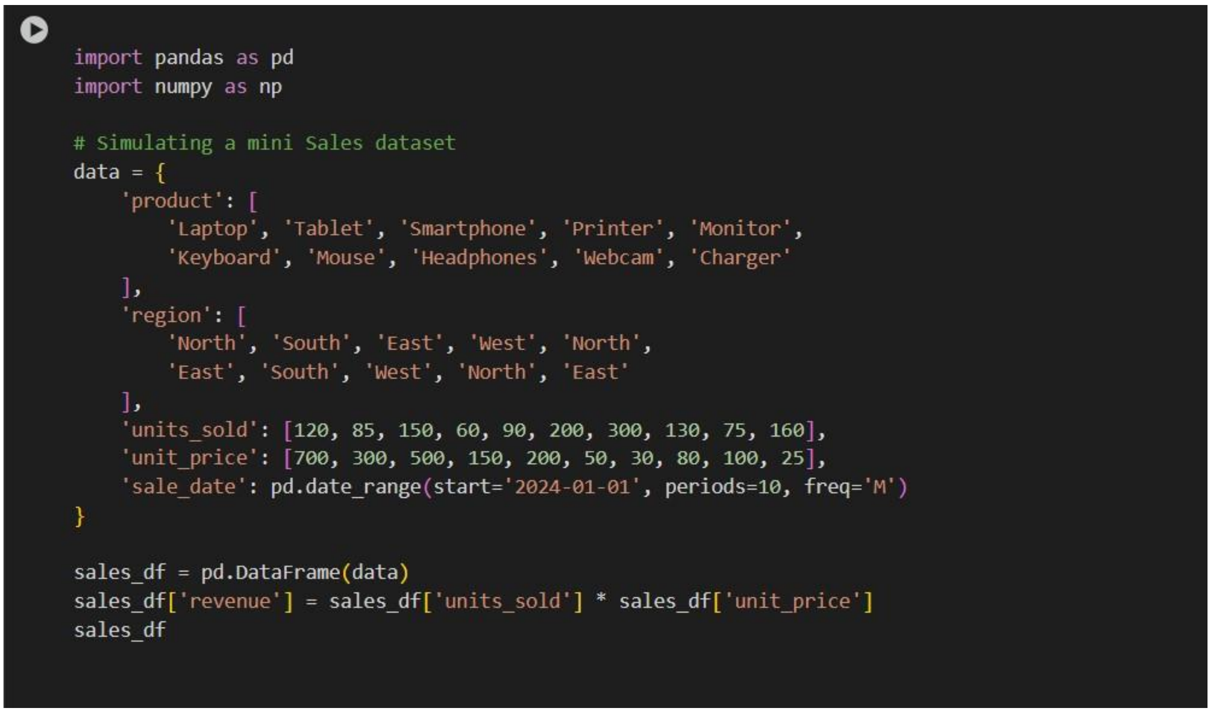
EDS ACTIVITY

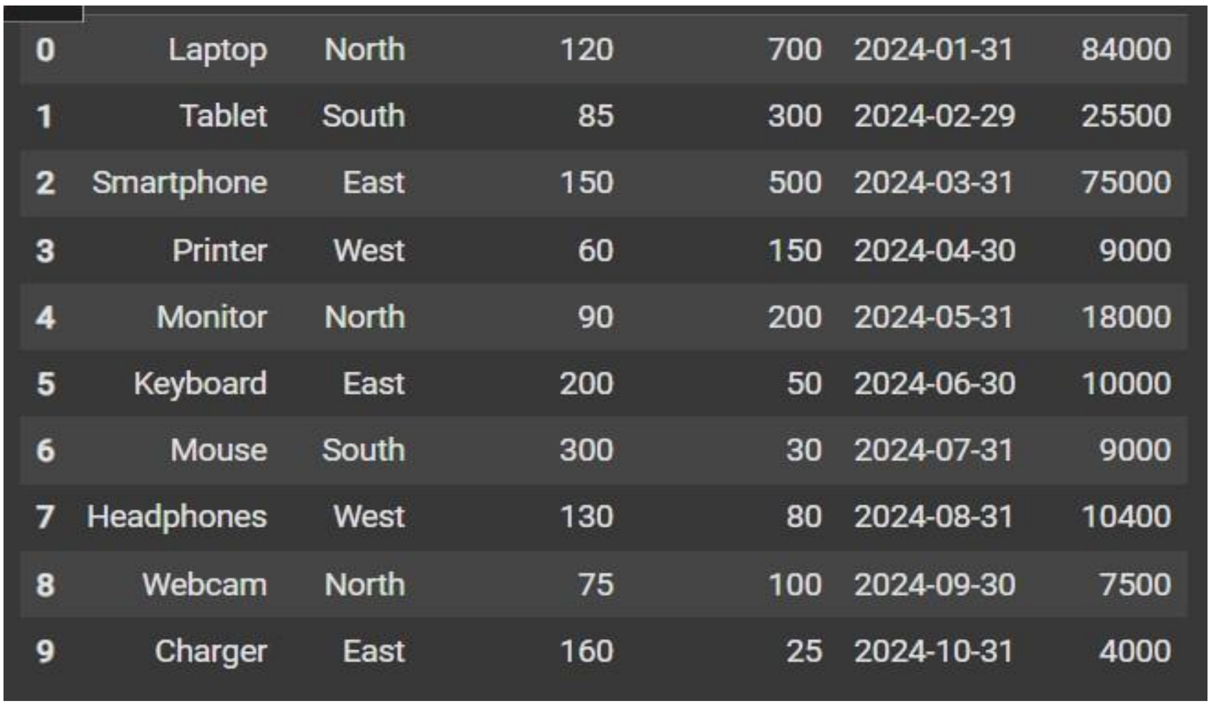
- *Name – Vedant Patil*
- *Division – CS2*
- *Roll no. CS2-02*
- *PRN – 202401040209*
- *Dataset – Sales Dataset*



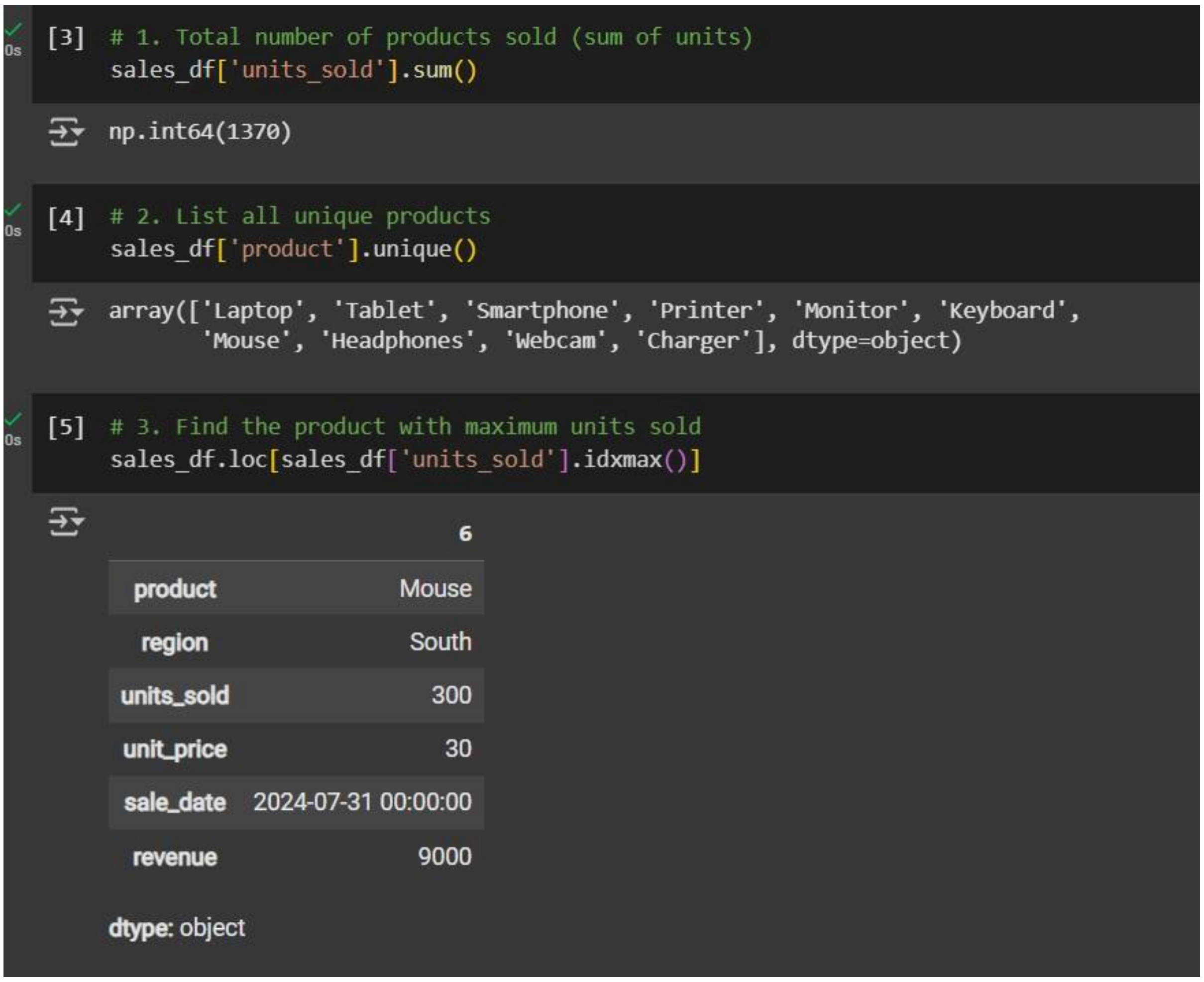
```python
import pandas as pd
import numpy as np

# Simulating a mini Sales dataset
data = {
    'product': [
        'Laptop', 'Tablet', 'Smartphone', 'Printer', 'Monitor',
        'Keyboard', 'Mouse', 'Headphones', 'Webcam', 'Charger'
    ],
    'region': [
        'North', 'South', 'East', 'West', 'North',
        'East', 'South', 'West', 'North', 'East'
    ],
    'units_sold': [120, 85, 150, 60, 90, 200, 300, 130, 75, 160],
    'unit_price': [700, 300, 500, 150, 200, 50, 30, 80, 100, 25],
    'sale_date': pd.date_range(start='2024-01-01', periods=10, freq='M')
}

sales_df = pd.DataFrame(data)
sales_df['revenue'] = sales_df['units_sold'] * sales_df['unit_price']
sales_df
```



```
0      Laptop  North  120  700  2024-01-31  84000
1      Tablet  South   85  300  2024-02-29  25500
2  Smartphone   East  150  500  2024-03-31  75000
3     Printer   West   60  150  2024-04-30   9000
4     Monitor  North   90  200  2024-05-31  18000
5    Keyboard   East  200   50  2024-06-30  10000
6       Mouse  South  300   30  2024-07-31   9000
7  Headphones   West  130   80  2024-08-31  10400
8      Webcam  North   75  100  2024-09-30   7500
9     Charger   East  160   25  2024-10-31   4000
```



```
[3] # 1. Total number of products sold (sum of units)
    sales_df['units_sold'].sum()

    np.int64(1370)
```

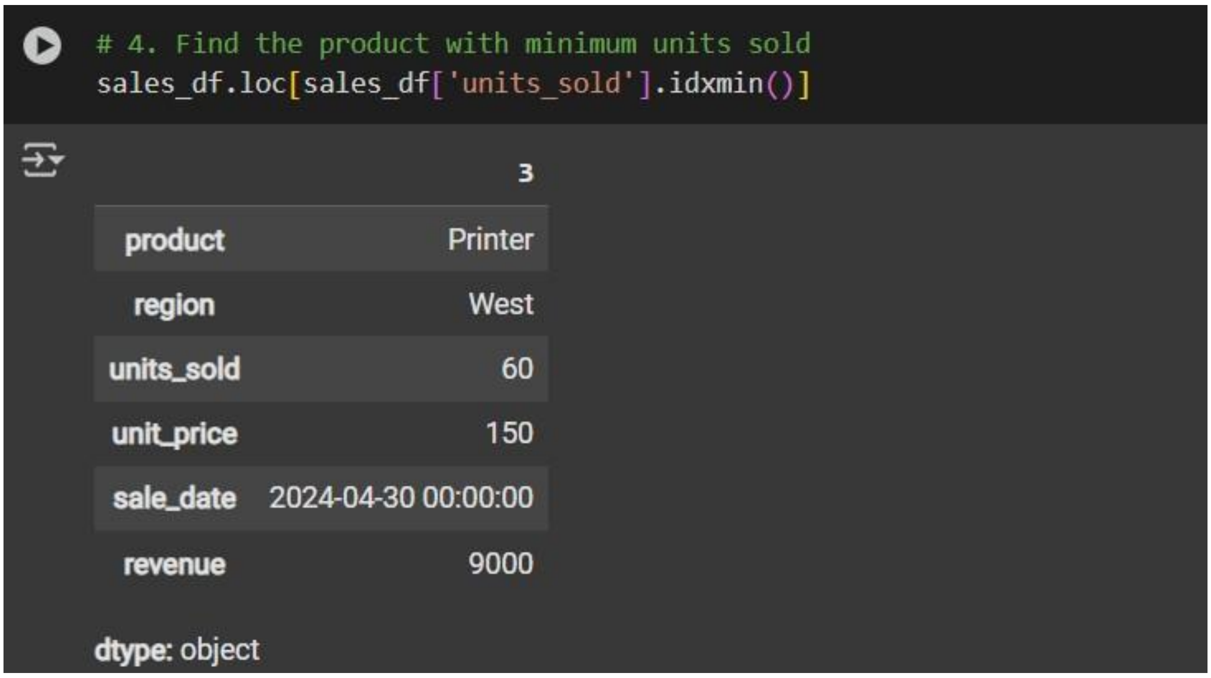
```
[4] # 2. List all unique products
    sales_df['product'].unique()

    array(['Laptop', 'Tablet', 'Smartphone', 'Printer', 'Monitor', 'Keyboard',
           'Mouse', 'Headphones', 'Webcam', 'Charger'], dtype=object)
```

```
[5] # 3. Find the product with maximum units sold
    sales_df.loc[sales_df['units_sold'].idxmax()]
```

	6
product	Mouse
region	South
units_sold	300
unit_price	30
sale_date	2024-07-31 00:00:00
revenue	9000

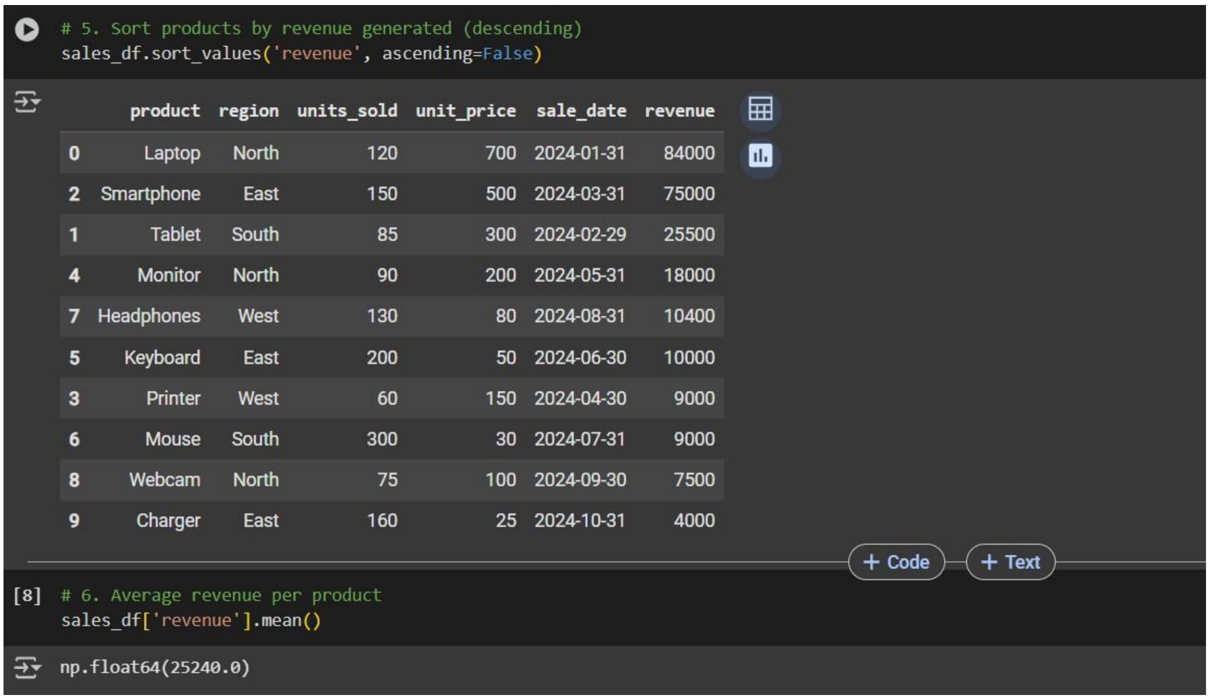
dtype: object



```
# 4. Find the product with minimum units sold
sales_df.loc[sales_df['units_sold'].idxmin()]
```

	3
product	Printer
region	West
units_sold	60
unit_price	150
sale_date	2024-04-30 00:00:00
revenue	9000

dtype: object

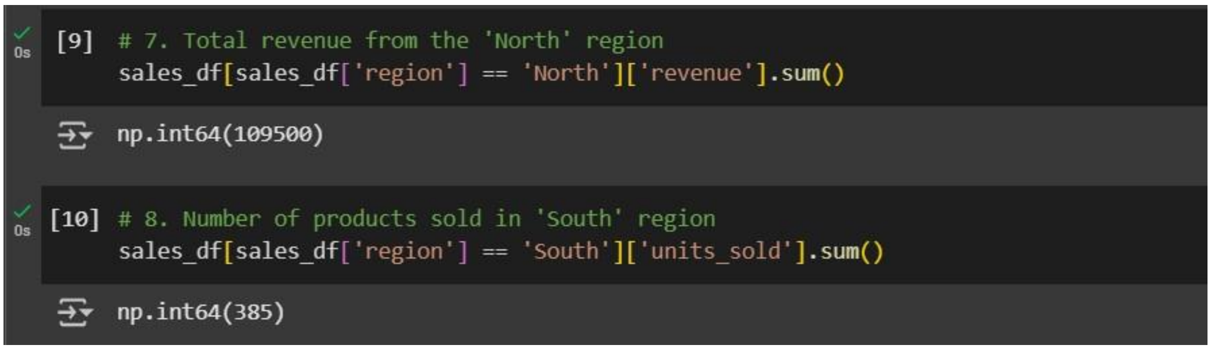


```python
# 5. Sort products by revenue generated (descending)
sales_df.sort_values('revenue', ascending=False)
```

```
      product  region  units_sold  unit_price   sale_date  revenue
0      Laptop   North         120         700  2024-01-31    84000
2  Smartphone    East         150         500  2024-03-31    75000
1      Tablet   South          85         300  2024-02-29    25500
4     Monitor   North          90         200  2024-05-31    18000
7  Headphones    West         130          80  2024-08-31    10400
5    Keyboard    East         200          50  2024-06-30    10000
3     Printer    West          60         150  2024-04-30     9000
6       Mouse   South         300          30  2024-07-31     9000
8      Webcam   North          75         100  2024-09-30     7500
9     Charger    East         160          25  2024-10-31     4000
```

```python
[8] # 6. Average revenue per product
    sales_df['revenue'].mean()
```

```
np.float64(25240.0)
```

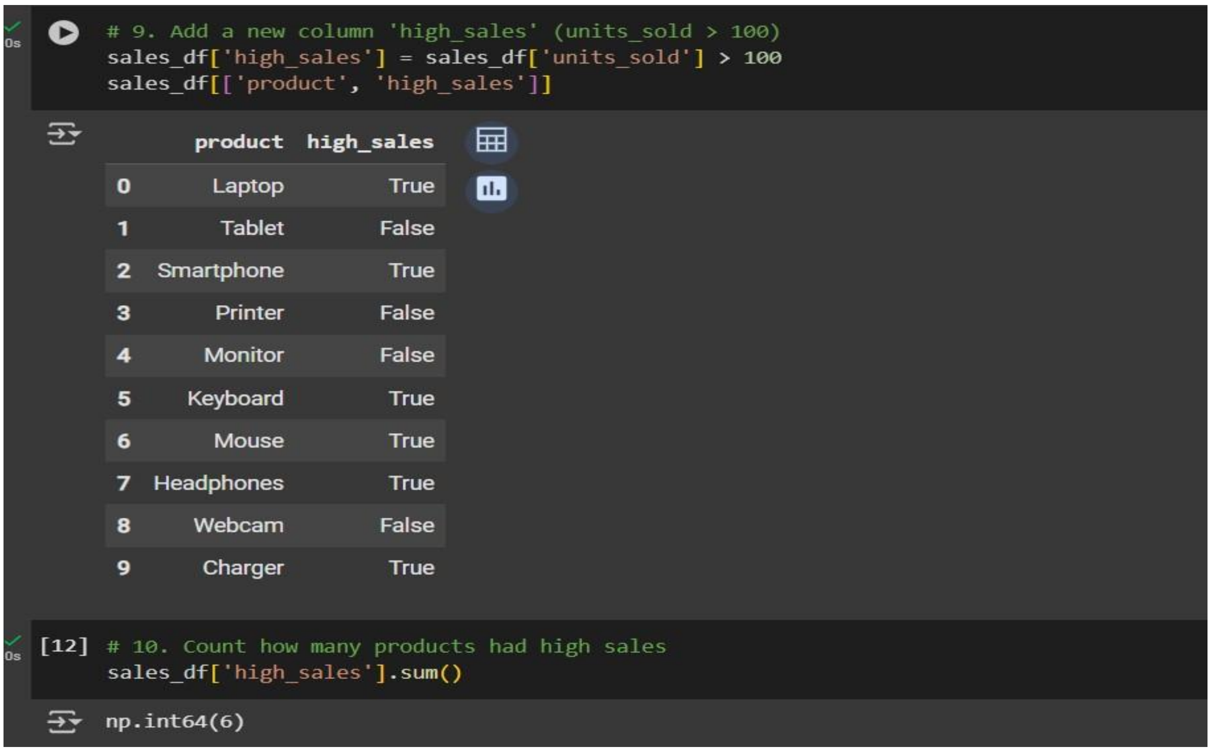


```python
[9] # 7. Total revenue from the 'North' region
    sales_df[sales_df['region'] == 'North']['revenue'].sum()
```

```
np.int64(109500)
```

```python
[10] # 8. Number of products sold in 'South' region
     sales_df[sales_df['region'] == 'South']['units_sold'].sum()
```

```
np.int64(385)
```

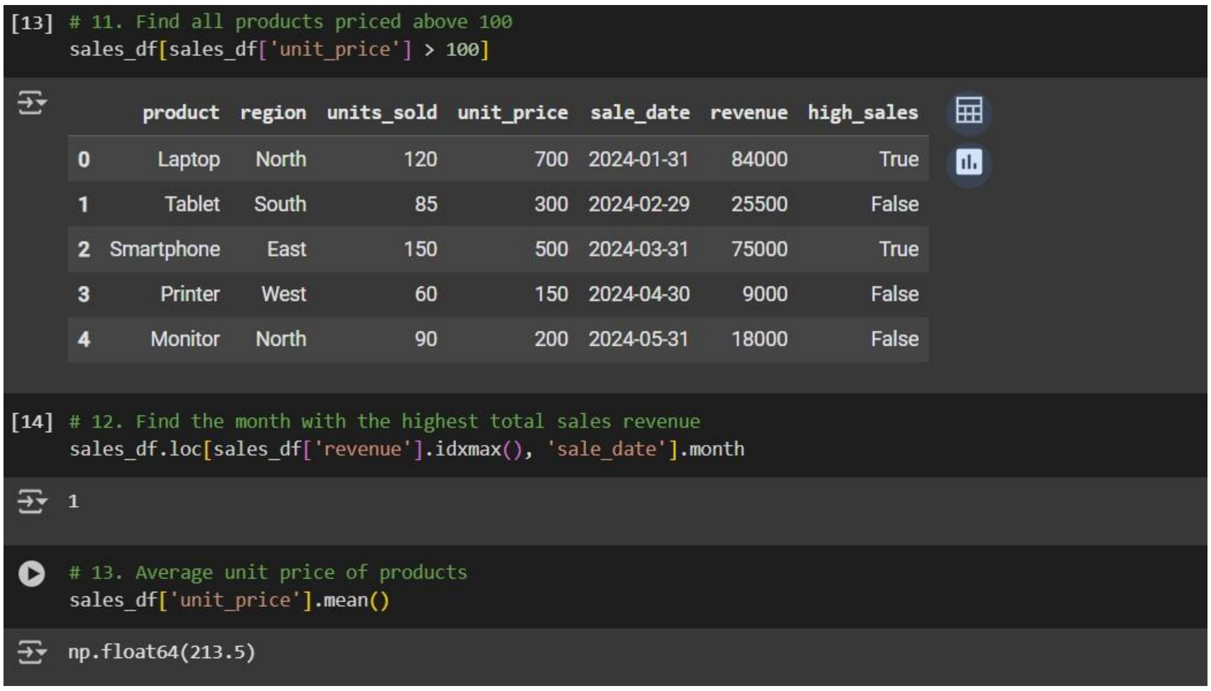


```python
# 9. Add a new column 'high_sales' (units_sold > 100)
sales_df['high_sales'] = sales_df['units_sold'] > 100
sales_df[['product', 'high_sales']]
```

```
      product  high_sales
0      Laptop        True
1      Tablet       False
2  Smartphone        True
3     Printer       False
4     Monitor       False
5    Keyboard        True
6       Mouse        True
7  Headphones        True
8      Webcam       False
9     Charger        True
```

```python
[12] # 10. Count how many products had high sales
     sales_df['high_sales'].sum()
```

```
np.int64(6)
```



```
[13] # 11. Find all products priced above 100
     sales_df[sales_df['unit_price'] > 100]
```

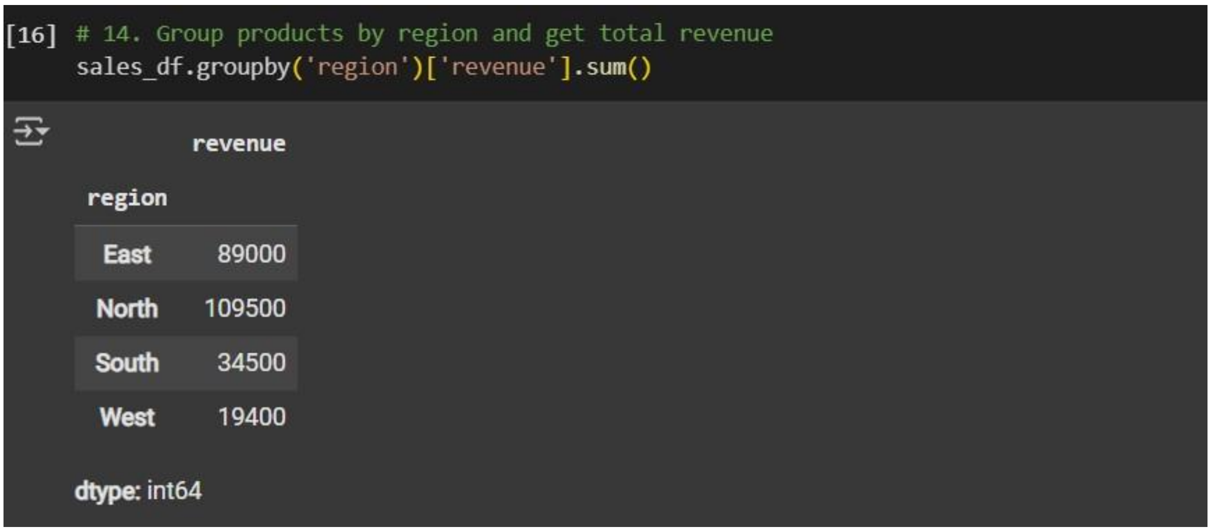
	product	region	units_sold	unit_price	sale_date	revenue	high_sales
0	Laptop	North	120	700	2024-01-31	84000	True
1	Tablet	South	85	300	2024-02-29	25500	False
2	Smartphone	East	150	500	2024-03-31	75000	True
3	Printer	West	60	150	2024-04-30	9000	False
4	Monitor	North	90	200	2024-05-31	18000	False

```
[14] # 12. Find the month with the highest total sales revenue
     sales_df.loc[sales_df['revenue'].idxmax(), 'sale_date'].month
```

```
1
```

```
# 13. Average unit price of products
sales_df['unit_price'].mean()
```

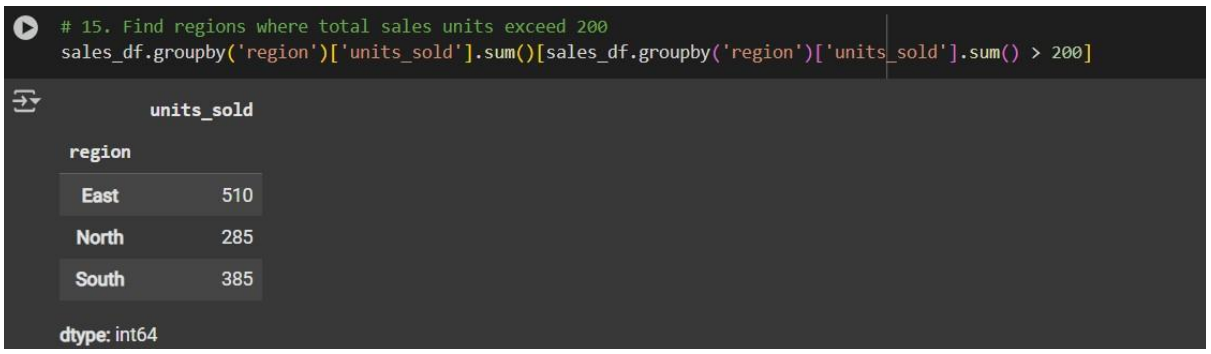
```
np.float64(213.5)
```



```
[16] # 14. Group products by region and get total revenue
     sales_df.groupby('region')['revenue'].sum()
```

region	revenue
East	89000
North	109500
South	34500
West	19400

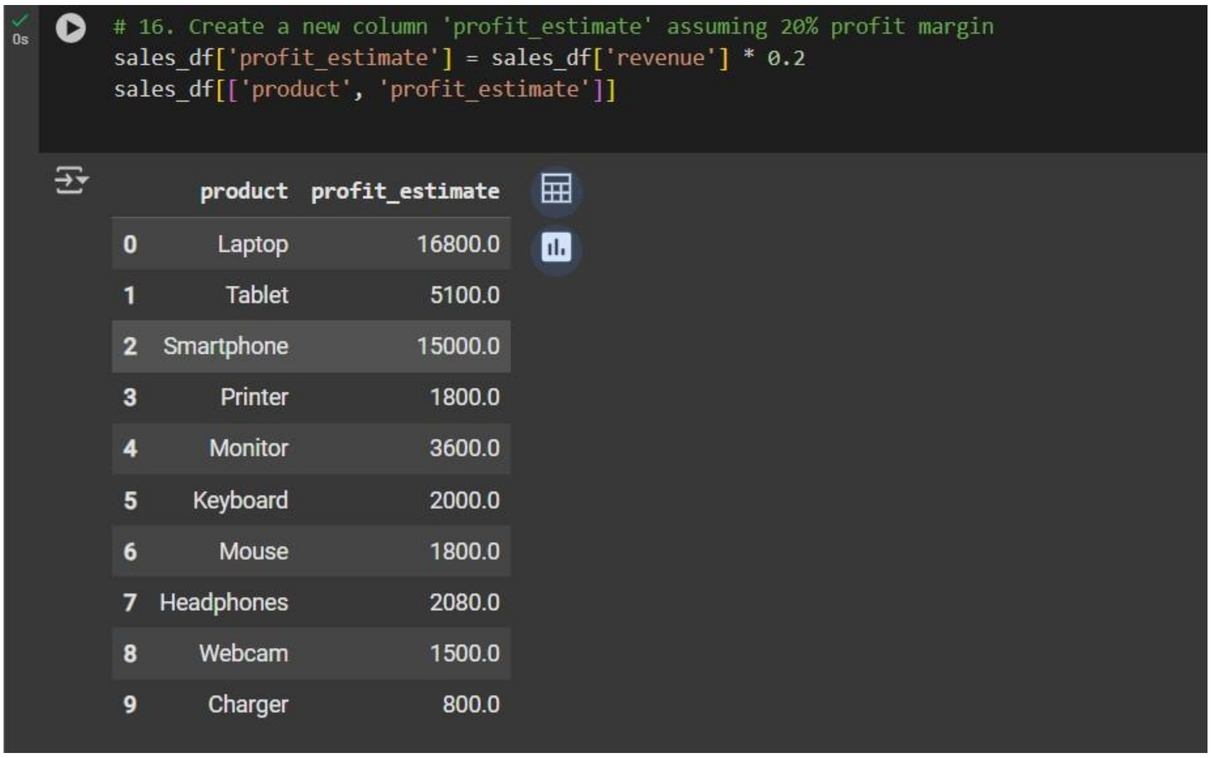
dtype: int64



```
# 15. Find regions where total sales units exceed 200
sales_df.groupby('region')['units_sold'].sum()[sales_df.groupby('region')['units_sold'].sum() > 200]
```

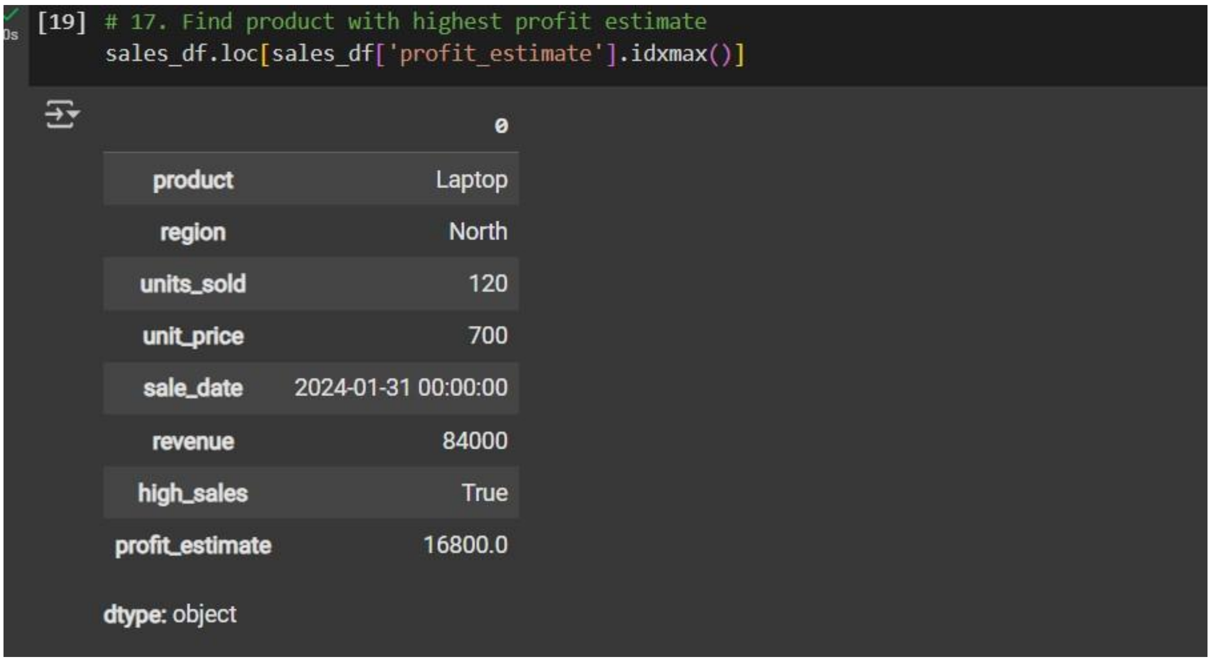
region	units_sold
East	510
North	285
South	385

dtype: int64



```
# 16. Create a new column 'profit_estimate' assuming 20% profit margin
sales_df['profit_estimate'] = sales_df['revenue'] * 0.2
sales_df[['product', 'profit_estimate']]
```

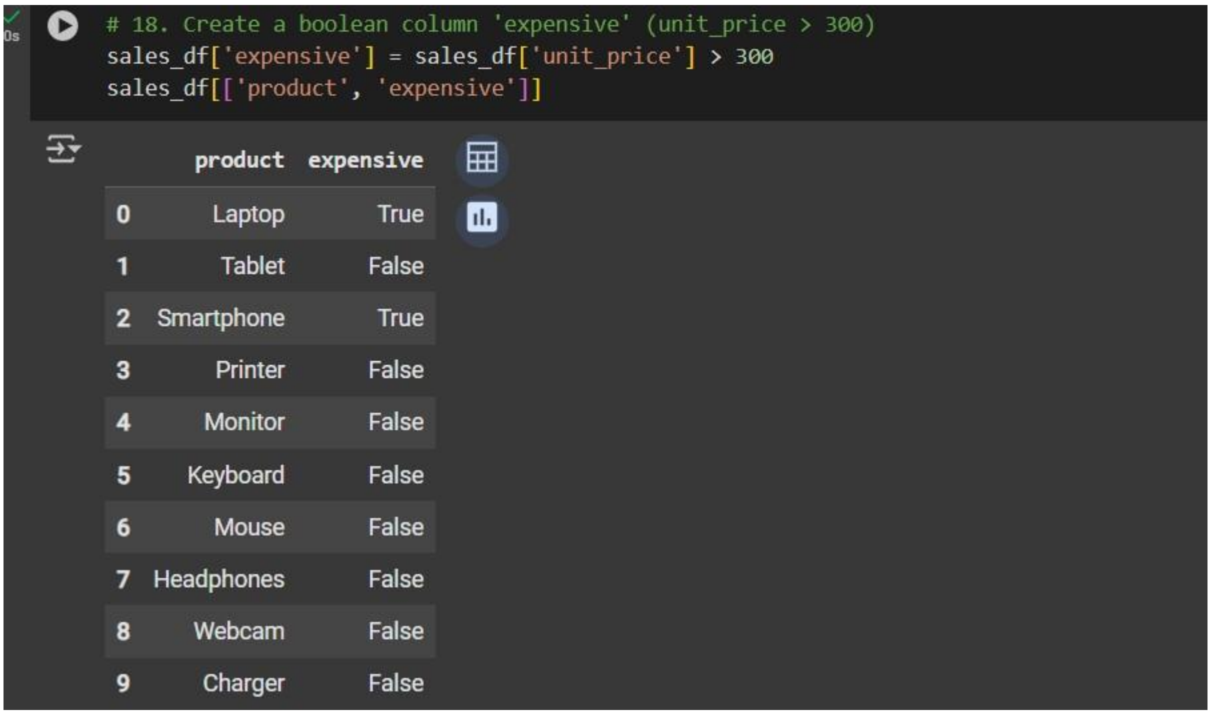
	product	profit_estimate
0	Laptop	16800.0
1	Tablet	5100.0
2	Smartphone	15000.0
3	Printer	1800.0
4	Monitor	3600.0
5	Keyboard	2000.0
6	Mouse	1800.0
7	Headphones	2080.0
8	Webcam	1500.0
9	Charger	800.0



```
[19] # 17. Find product with highest profit estimate
     sales_df.loc[sales_df['profit_estimate'].idxmax()]
```

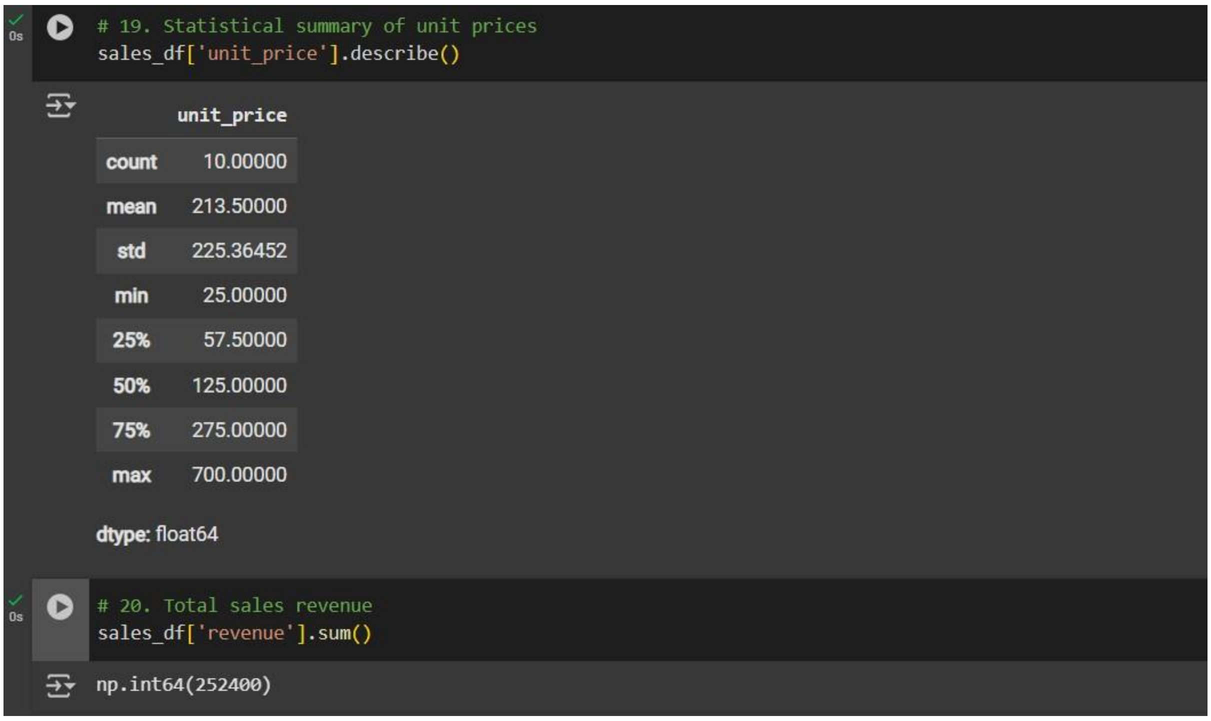
	0
product	Laptop
region	North
units_sold	120
unit_price	700
sale_date	2024-01-31 00:00:00
revenue	84000
high_sales	True
profit_estimate	16800.0

dtype: object



```python
# 18. Create a boolean column 'expensive' (unit_price > 300)
sales_df['expensive'] = sales_df['unit_price'] > 300
sales_df[['product', 'expensive']]
```

	product	expensive
0	Laptop	True
1	Tablet	False
2	Smartphone	True
3	Printer	False
4	Monitor	False
5	Keyboard	False
6	Mouse	False
7	Headphones	False
8	Webcam	False
9	Charger	False



```python
# 19. Statistical summary of unit prices
sales_df['unit_price'].describe()
```

	unit_price
count	10.00000
mean	213.50000
std	225.36452
min	25.00000
25%	57.50000
50%	125.00000
75%	275.00000
max	700.00000

dtype: float64

```python
# 20. Total sales revenue
sales_df['revenue'].sum()
```

```
np.int64(252400)
```