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# Anwar Siraj
# DS-VS-Batch-5 (NED)
# Q: Question 1 (20 marks)
# A dataset containing information about the sales of different
products in a retail store is available at sales_data.csv. Analyze the
dataset and identify the top-selling products, the most profitable
products, and the products with the highest customer satisfaction.
Visualize your findings using appropriate charts and graphs.

import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

import pandas as pd
sales_data = pd.read_csv(r"C:\Users\binary\Downloads\Exam\
sales_data.csv", encoding='latin1')

sales_data.head()
```

```
   ORDERNUMBER  QUANTITYORDERED  PRICEEACH  ORDERLINENUMBER
SALES  \
0        10107               30      95.70                2  2871.00

1        10121               34      81.35                5  2765.90

2        10134               41      94.74                2  3884.34

3        10145               45      83.26                6  3746.70

4        10159               49     100.00               14  5205.27


         ORDERDATE   STATUS  QTR_ID  MONTH_ID  YEAR_ID  ...  \
0   2/24/2003 0:00  Shipped       1         2     2003  ...
1    5/7/2003 0:00  Shipped       2         5     2003  ...
2    7/1/2003 0:00  Shipped       3         7     2003  ...
3   8/25/2003 0:00  Shipped       3         8     2003  ...
4  10/10/2003 0:00  Shipped       4        10     2003  ...

                     ADDRESSLINE1  ADDRESSLINE2           CITY STATE  \
0        897 Long Airport Avenue           NaN            NYC    NY
1             59 rue de l'Abbaye           NaN          Reims   NaN
2  27 rue du Colonel Pierre Avia           NaN          Paris   NaN
3             78934 Hillside Dr.           NaN       Pasadena    CA
4                7734 Strong St.           NaN  San Francisco    CA

  POSTALCODE COUNTRY TERRITORY CONTACTLASTNAME CONTACTFIRSTNAME
DEALSIZE
0      10022     USA       NaN              Yu             Kwai
Small
1      51100  France      EMEA         Henriot             Paul
```

```
Small
2      75508  France      EMEA        Da Cunha            Daniel
Medium
3      90003     USA       NaN           Young             Julie
Medium
4        NaN     USA       NaN           Brown             Julie
Medium

[5 rows x 25 columns]
```

```
sales_data.columns
```

```
Index(['ORDERNUMBER', 'QUANTITYORDERED', 'PRICEEACH',
'ORDERLINENUMBER',
       'SALES', 'ORDERDATE', 'STATUS', 'QTR_ID', 'MONTH_ID',
'YEAR_ID',
       'PRODUCTLINE', 'MSRP', 'PRODUCTCODE', 'CUSTOMERNAME', 'PHONE',
       'ADDRESSLINE1', 'ADDRESSLINE2', 'CITY', 'STATE', 'POSTALCODE',
       'COUNTRY', 'TERRITORY', 'CONTACTLASTNAME', 'CONTACTFIRSTNAME',
       'DEALSIZE'],
      dtype='object')
```

```
import datetime

top_selling_products = sales_data.groupby('PRODUCTCODE')
['QUANTITYORDERED'].sum().sort_values(ascending=False).head(10)
print("\nTop Selling Products:")
print(top_selling_products)
```

```
Top Selling Products:
PRODUCTCODE
S18_3232     1774
S24_3856     1052
S18_4600     1031
S700_4002    1029
S12_4473     1024
S24_3949     1008
S50_1341      999
S18_1097      999
S18_2432      998
S18_1342      997
Name: QUANTITYORDERED, dtype: int64
```

```
sales_data['PROFIT'] = sales_data['SALES'] -
(sales_data['QUANTITYORDERED'] * sales_data['PRICEEACH'])
most_profitable_products = sales_data.groupby('PRODUCTCODE')
['PROFIT'].sum().sort_values(ascending=False).head(10)
print("\nMost Profitable Products:")
print(most_profitable_products)
```

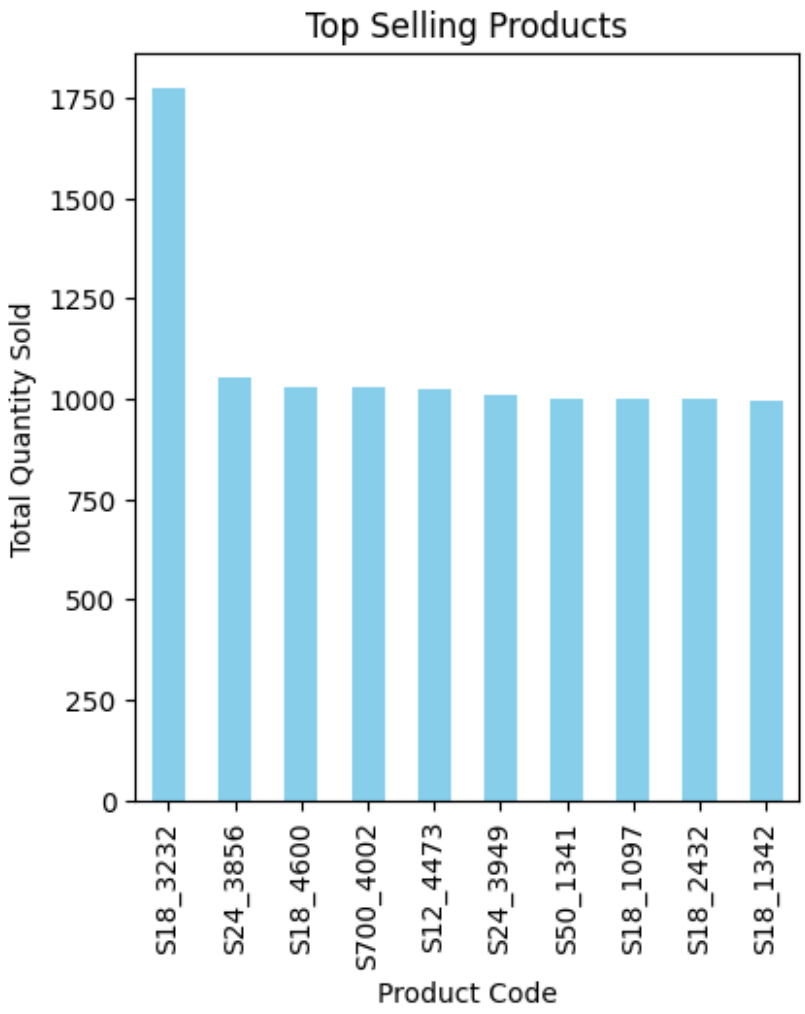
```
Most Profitable Products:
PRODUCTCODE
S18_3232    112218.79
S10_1949     94973.03
S10_4698     79488.77
S12_1108     77514.82
S18_2238     58323.95
S12_1099     57049.58
S12_3891     57042.11
S18_2795     49280.30
S18_1749     48252.66
S18_1662     47765.04
Name: PROFIT, dtype: float64
```

```
customer_satisfaction = sales_data.groupby('PRODUCTCODE')
['SALES'].mean().sort_values(ascending=False).head(10)
print("\nProducts with Highest Customer Satisfaction:")
print(customer_satisfaction)
```

```
Products with Highest Customer Satisfaction:
PRODUCTCODE
S10_1949    6824.036786
S10_4698    6553.887308
S12_1108    6484.050769
S18_1749    5786.837273
S18_2238    5726.812963
S12_3891    5589.693846
S18_3232    5543.181154
S12_1099    5487.080400
S12_2823    5384.852308
S18_1662    5362.383462
Name: SALES, dtype: float64
```

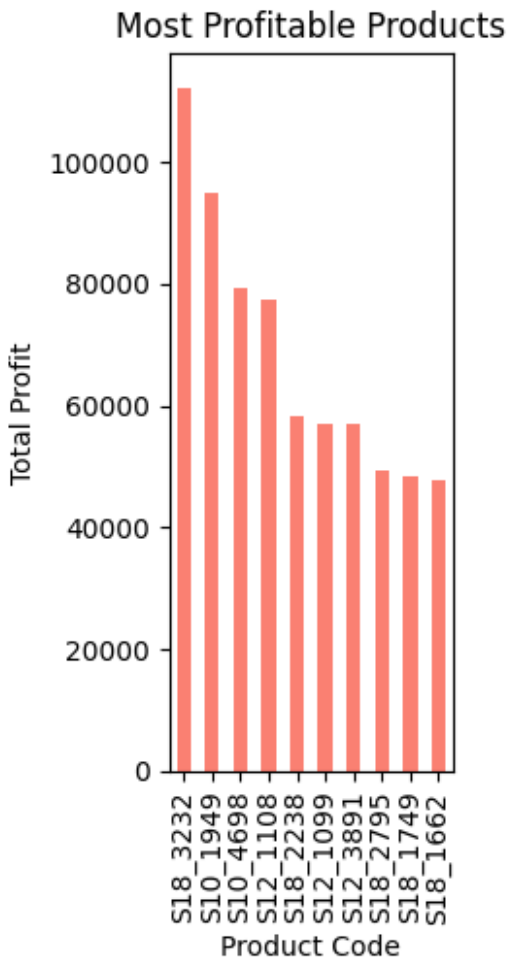
```
plt.figure(figsize=(15, 5))
plt.subplot(1, 3, 1)
top_selling_products.plot(kind='bar', color='skyblue')
plt.title('Top Selling Products')
plt.xlabel('Product Code')
plt.ylabel('Total Quantity Sold')
```

```
Text(0, 0.5, 'Total Quantity Sold')
```



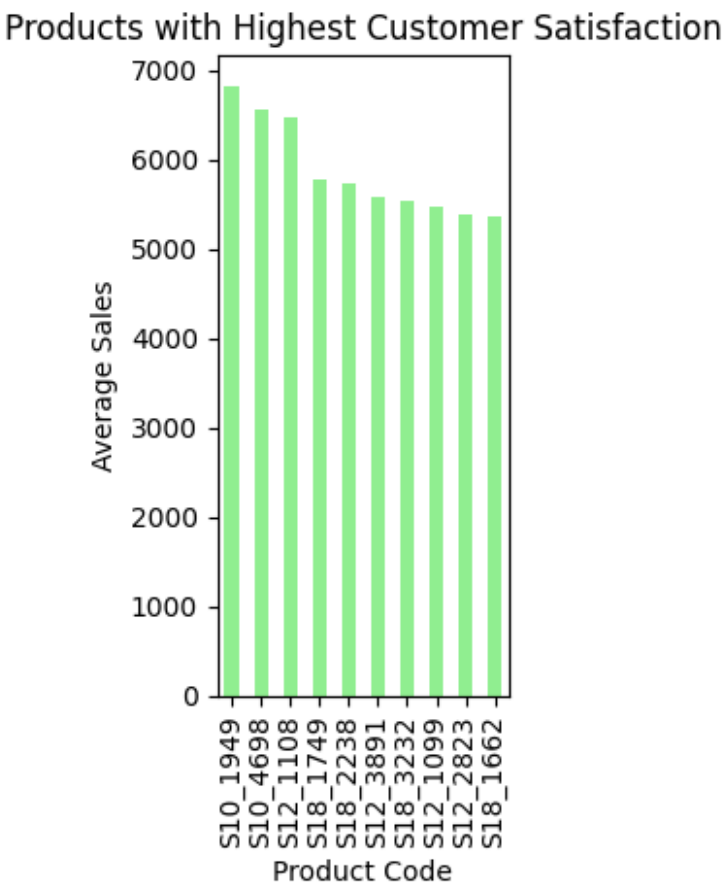

```
plt.subplot(1, 3, 2)
most_profitable_products.plot(kind='bar', color='salmon')
plt.title('Most Profitable Products')
plt.xlabel('Product Code')
plt.ylabel('Total Profit')

Text(0, 0.5, 'Total Profit')
```




```
plt.subplot(1, 3, 3)
customer_satisfaction.plot(kind='bar', color='lightgreen')
plt.title('Products with Highest Customer Satisfaction')
plt.xlabel('Product Code')
plt.ylabel('Average Sales')

plt.tight_layout()
plt.show()
```


Products with Highest Customer Satisfaction
Average Sales
7000
6000
5000
4000
3000
2000
1000
0
S10_1949
S10_4698
S12_1108
S18_1749
S18_2238
S12_3891
S18_3232
S12_1099
S12_2823
S18_1662
Product Code