

```
In [5]: #16/10/25
import pandas as pd
df=pd.read_csv(r"C:\Users\Agnel Sharon Jerald\OneDrive\Desktop\Machine learning\sales_data_sample.csv")
df
```

Out[5]:

	TransactionID	Date	Region	SalesPerson	Product	Quantity	UnitPrice	Discount	Category	CustomerType
0	1	2025-01-01	North	Rahul	Laptop	2	60000	5	Electronics	Regular
1	2	2025-01-02	South	Meena	Mouse	5	800	0	Accessories	New
2	3	2025-01-03	East	Ajay	Keyboard	3	1200	10	Accessories	Regular
3	4	2025-01-04	West	Priya	Laptop	1	62000	0	Electronics	Regular
4	5	2025-01-05	North	Karan	Mobile	4	25000	5	Electronics	New
5	6	2025-01-06	East	Rahul	Tablet	2	18000	0	Electronics	Regular
6	7	2025-01-07	South	Meena	Charger	6	500	0	Accessories	New
7	8	2025-01-08	North	Priya	Laptop	3	58000	10	Electronics	Regular
8	9	2025-01-09	West	Ajay	Mobile	2	27000	5	Electronics	Regular
9	10	2025-01-10	East	Karan	Keyboard	5	1000	0	Accessories	New
10	11	2025-01-11	South	Rahul	Laptop	1	61000	0	Electronics	Regular
11	12	2025-01-12	North	Meena	Mouse	4	850	5	Accessories	New
12	13	2025-01-13	East	Priya	Tablet	3	19000	10	Electronics	Regular
13	14	2025-01-14	West	Ajay	Laptop	2	63000	0	Electronics	New
14	15	2025-01-15	North	Karan	Charger	5	550	0	Accessories	Regular
15	16	2025-01-16	South	Rahul	Keyboard	4	1100	0	Accessories	New
16	17	2025-01-17	East	Meena	Mobile	3	26000	5	Electronics	Regular
17	18	2025-01-18	West	Priya	Laptop	2	60000	5	Electronics	New
18	19	2025-01-19	North	Ajay	Tablet	4	18500	10	Electronics	Regular
19	20	2025-01-20	South	Karan	Mouse	6	750	0	Accessories	New

```
In [6]: # Calculate Total Sales Amount for each transaction
df["TotalSales"] = df["Quantity"] * df["UnitPrice"] * (1 - df["Discount"] / 100)
df["TotalSales"]
```

Out[6]:

0	114000.0
1	4000.0
2	3240.0
3	62000.0
4	95000.0
5	36000.0
6	3000.0
7	156600.0
8	51300.0
9	5000.0
10	61000.0
11	3230.0
12	51300.0
13	126000.0
14	2750.0
15	4400.0
16	74100.0
17	114000.0
18	66600.0
19	4500.0

Name: TotalSales, dtype: float64

```
In [7]: # Find total sales by each Region
total_sales_by_region = df.groupby("Region")["TotalSales"].sum().reset_index()
total_sales_by_region
```

Out[7]:

	Region	TotalSales
0	East	169640.0
1	North	438180.0
2	South	76900.0
3	West	353300.0

```
In [8]: df.groupby("Region")['Quantity'].sum().reset_index()
```

Out[8]:

	Region	Quantity
0	East	16
1	North	22
2	South	22
3	West	7

```
In [10]: # Display all transactions where Discount is greater than 5%
discount_gt_5 = df[df["Discount"] > 5]
discount_gt_5
```

Out[10]:

	TransactionID	Date	Region	SalesPerson	Product	Quantity	UnitPrice	Discount	Category	CustomerType	TotalSales
2	3	2025-01-03	East	Ajay	Keyboard	3	1200	10	Accessories	Regular	3240.0
7	8	2025-01-08	North	Priya	Laptop	3	58000	10	Electronics	Regular	156600.0
12	13	2025-01-13	East	Priya	Tablet	3	19000	10	Electronics	Regular	51300.0
18	19	2025-01-19	North	Ajay	Tablet	4	18500	10	Electronics	Regular	66600.0

```
In [11]: # Group data by Category and find average UnitPrice for each
avg_unitprice_by_category = df.groupby("Category")["UnitPrice"].mean().reset_index()
avg_unitprice_by_category
```

Out[11]:

	Category	UnitPrice
0	Accessories	843.750000
1	Electronics	41458.333333

```
In [13]: # Find top 2 SalesPersons with highest total sales amount
top2_salespersons = (
    df.groupby("SalesPerson")["TotalSales"]
      .sum()
      .nlargest(2)
      .reset_index()
)
top2_salespersons
```

Out[13]:

	SalesPerson	TotalSales
0	Priya	383900.0
1	Ajay	247140.0

```
In [15]: # Filter records for only Electronics category where sales are above ₹50,000
electronics_above_50k = df[
    (df["Category"] == "Electronics") & (df["TotalSales"] > 50000)]
electronics_above_50k
```

Out[15]:

	TransactionID	Date	Region	SalesPerson	Product	Quantity	UnitPrice	Discount	Category	CustomerType	TotalSales
0	1	2025-01-01	North	Rahul	Laptop	2	60000	5	Electronics	Regular	114000.0
3	4	2025-01-04	West	Priya	Laptop	1	62000	0	Electronics	Regular	62000.0
4	5	2025-01-05	North	Karan	Mobile	4	25000	5	Electronics	New	95000.0
7	8	2025-01-08	North	Priya	Laptop	3	58000	10	Electronics	Regular	156600.0
8	9	2025-01-09	West	Ajay	Mobile	2	27000	5	Electronics	Regular	51300.0
10	11	2025-01-11	South	Rahul	Laptop	1	61000	0	Electronics	Regular	61000.0
12	13	2025-01-13	East	Priya	Tablet	3	19000	10	Electronics	Regular	51300.0
13	14	2025-01-14	West	Ajay	Laptop	2	63000	0	Electronics	New	126000.0
16	17	2025-01-17	East	Meena	Mobile	3	26000	5	Electronics	Regular	74100.0
17	18	2025-01-18	West	Priya	Laptop	2	60000	5	Electronics	New	114000.0
18	19	2025-01-19	North	Ajay	Tablet	4	18500	10	Electronics	Regular	66600.0

In [16]:

```
# Sort the dataset by Date and SalesPerson in ascending order
df_sorted = df.sort_values(by=["Date", "SalesPerson"], ascending=[True, True])
df_sorted
```

Out[16]:

	TransactionID	Date	Region	SalesPerson	Product	Quantity	UnitPrice	Discount	Category	CustomerType	TotalSales
0	1	2025-01-01	North	Rahul	Laptop	2	60000	5	Electronics	Regular	114000.0
1	2	2025-01-02	South	Meena	Mouse	5	800	0	Accessories	New	4000.0
2	3	2025-01-03	East	Ajay	Keyboard	3	1200	10	Accessories	Regular	3240.0
3	4	2025-01-04	West	Priya	Laptop	1	62000	0	Electronics	Regular	62000.0
4	5	2025-01-05	North	Karan	Mobile	4	25000	5	Electronics	New	95000.0
5	6	2025-01-06	East	Rahul	Tablet	2	18000	0	Electronics	Regular	36000.0
6	7	2025-01-07	South	Meena	Charger	6	500	0	Accessories	New	3000.0
7	8	2025-01-08	North	Priya	Laptop	3	58000	10	Electronics	Regular	156600.0
8	9	2025-01-09	West	Ajay	Mobile	2	27000	5	Electronics	Regular	51300.0
9	10	2025-01-10	East	Karan	Keyboard	5	1000	0	Accessories	New	5000.0
10	11	2025-01-11	South	Rahul	Laptop	1	61000	0	Electronics	Regular	61000.0
11	12	2025-01-12	North	Meena	Mouse	4	850	5	Accessories	New	3230.0
12	13	2025-01-13	East	Priya	Tablet	3	19000	10	Electronics	Regular	51300.0
13	14	2025-01-14	West	Ajay	Laptop	2	63000	0	Electronics	New	126000.0
14	15	2025-01-15	North	Karan	Charger	5	550	0	Accessories	Regular	2750.0
15	16	2025-01-16	South	Rahul	Keyboard	4	1100	0	Accessories	New	4400.0
16	17	2025-01-17	East	Meena	Mobile	3	26000	5	Electronics	Regular	74100.0
17	18	2025-01-18	West	Priya	Laptop	2	60000	5	Electronics	New	114000.0
18	19	2025-01-19	North	Ajay	Tablet	4	18500	10	Electronics	Regular	66600.0
19	20	2025-01-20	South	Karan	Mouse	6	750	0	Accessories	New	4500.0

In [17]:

```
# Find number of transactions for each CustomerType (Regular vs New)
transactions_by_customertype = (
    df["CustomerType"].value_counts().reset_index()
)
transactions_by_customertype.columns = ["CustomerType", "TransactionCount"]
transactions_by_customertype
```

Out[17]:

	CustomerType	TransactionCount
0	Regular	11
1	New	9

In [18]:

```
# Get the most frequently sold product in each region
most_frequent_product = (
    df.groupby(["Region", "Product"])
      .size()
      .reset_index(name="Count")
)
most_frequent_product = most_frequent_product.loc[
    most_frequent_product.groupby("Region")["Count"].idxmax()
]
most_frequent_product
```

Out[18]:

	Region	Product	Count
0	East	Keyboard	2
4	North	Laptop	2
11	South	Mouse	2
12	West	Laptop	3

```
In [20]: # Pivot Table: Total sales by Region and Category
pivot_sales_region_category = pd.pivot_table(
    df,
    values="TotalSales",
    index="Region",
    columns="Category",
    aggfunc="sum",
    fill_value=0
)
pivot_sales_region_category
```

Out[20]:

	Category	Accessories	Electronics
Region			
	East	8240.0	161400.0
	North	5980.0	432200.0
	South	15900.0	61000.0
	West	0.0	353300.0