```
========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice: 1
Enter the path of the dataset (CSV file): c:\Users\princ\AppData\Local\Packages\5319275
Dataset loaded successfully!

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice: 2

--- Explore Data ---
1. First 5 rows
2. Last 5 rows
3. Column names
4. Data types
5. Basic info
Enter your choice: 2
  Region  Year  Sales
3   West  2021  40000
4  North  2022  52000
5  South  2022  46000
6   East  2022  48000
7   West  2022  50000

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
```

```
==========================================================
Enter your choice: 2

--- Explore Data ---
1. First 5 rows
2. Last 5 rows
3. Column names
4. Data types
5. Basic info
Enter your choice: 1
  Region  Year  Sales
0  North  2021  45000
1  South  2021  38000
2   East  2021  42000
3   West  2021  40000
4  North  2022  52000

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
==========================================================
Enter your choice: 2

--- Explore Data ---
1. First 5 rows
2. Last 5 rows
3. Column names
4. Data types
5. Basic info
Enter your choice: 3
Index(['Region', 'Year', 'Sales'], dtype='str')

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
==========================================================
Enter your choice: 2
```

```
========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice: 3
Original Sales Array (first 5 values): [45000 38000 42000 4000
Tax Calculation (10% of Sales, first 5 values): [4500. 3800. 4

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice: 4

--- Handle Missing Data ---
1. Display rows with missing values
2. Fill missing values with mean (numeric only)
3. Drop rows with missing values
Enter your choice: 1
No missing values found.

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice: 4

--- Handle Missing Data ---
1. Display rows with missing values
```

```
==========================================================
Enter your choice: 2

--- Explore Data ---
1. First 5 rows
2. Last 5 rows
3. Column names
4. Data types
5. Basic info
Enter your choice: 4
Region      str
Year      int64
Sales     int64
dtype: object

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
==========================================================
Enter your choice: 2

--- Explore Data ---
1. First 5 rows
2. Last 5 rows
3. Column names
4. Data types
5. Basic info
Enter your choice: 5
<class 'pandas.DataFrame'>
RangeIndex: 8 entries, 0 to 7
Data columns (total 3 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   Region  8 non-null      str
 1   Year    8 non-null      int64
 2   Sales   8 non-null      int64
dtypes: int64(2), str(1)
memory usage: 324.0 bytes
None

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
```

```
Enter your choice: 4

--- Handle Missing Data ---
1. Display rows with missing values
2. Fill missing values with mean (numeric only)
3. Drop rows with missing values
Enter your choice: 22
Invalid choice.

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice: 4

--- Handle Missing Data ---
1. Display rows with missing values
2. Fill missing values with mean (numeric only)
3. Drop rows with missing values
Enter your choice: 3
Rows with missing values dropped.

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice: 5

--- Descriptive Statistics ---
              Year       Sales
count     8.000000      8.0000
mean   2021.500000  45125.0000
std       0.534522   4882.5491
min    2021.000000  38000.0000
25%    2021.000000  41500.0000
50%    2021.500000  45500.0000
75%    2022.000000  48500.0000
max    2022.000000  52000.0000
```

```
========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice: 6

--- Data Visualization ---
1. Bar Plot
2. Line Plot
3. Scatter Plot
4. Pie Chart
5. Histogram
Enter your choice: 4
Enter column for Pie Chart (e.g., Region): 4
Column not found.
Plot displayed successfully!

========== Data Analysis & Visualization Program ==========
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations (Numpy/Math)
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
```

```
========== Data Analysis & Visualization Program ==========
. Load Dataset
. Explore Data
. Perform DataFrame Operations (Numpy/Math)
. Handle Missing Data
. Generate Descriptive Statistics
. Data Visualization
. Save Visualization
. Exit
============================================================
nter your choice: 7
nter file name to save (e.g., plot.png): piechartplot.png
isualization saved as piechartplot.png

========== Data Analysis & Visualization Program ==========
. Load Dataset
. Explore Data
. Perform DataFrame Operations (Numpy/Math)
. Handle Missing Data
. Generate Descriptive Statistics
. Data Visualization
. Save Visualization
. Exit
============================================================
nter your choice: 8
xiting the program. Goodbye!
leaning up resources... Goodbye!
S C:\Users\princ> =
```