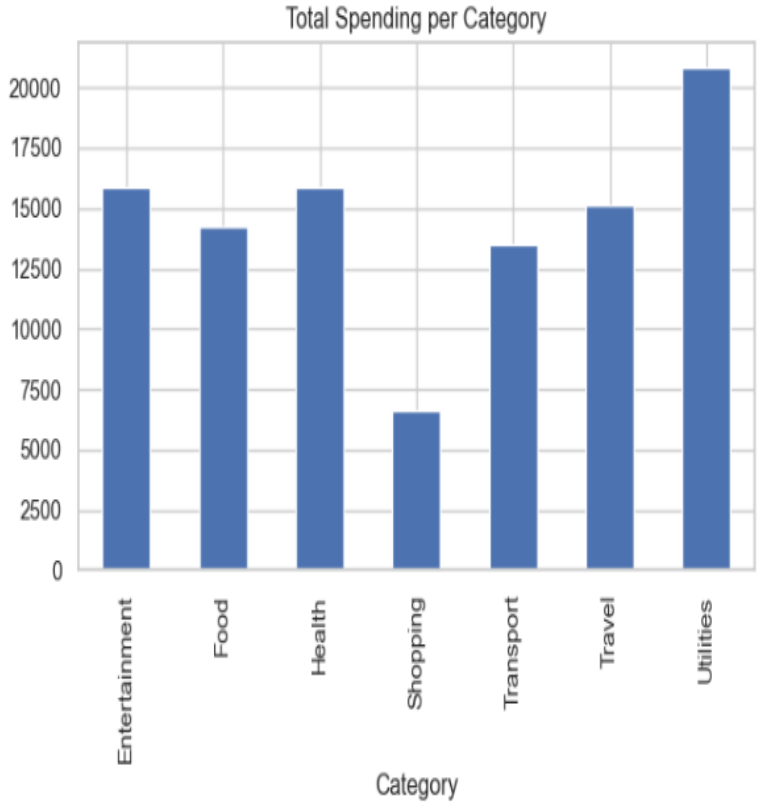
```
========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice:  1
Enter CSV file name:  C:\Users\Dell\Downloads\expenses_100.csv

Dataset loaded successfully!

========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice:  2

===== FIRST 5 ROWS =====
         Date  Amount   Category    Description
0  2025-01-01     790  Transport           Taxi
1  2025-01-02    1758  Transport   Doctor visit
2  2025-01-03      95  Transport  Flight ticket
3  2025-01-04    1173  Utilities      Groceries
4  2025-01-05    1827  Utilities       Bus fare

===== DATA INFO =====
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 4 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   Date         100 non-null    object
 1   Amount       100 non-null    int64
 2   Category     100 non-null    object
 3   Description  100 non-null    object
dtypes: int64(1), object(3)
```

```
memory usage: 3.3+ KB
None

===== COLUMN NAMES =====
Index(['Date', 'Amount', 'Category', 'Description'], dtype='object')

========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice:  3

Available Operations:
1. Show numeric columns
2. Sort by a column
3. Filter category
Choose an operation:  1

Numeric Columns:
   Amount
0     790
1    1758
2      95
3    1173
4    1827

========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice:  4
```

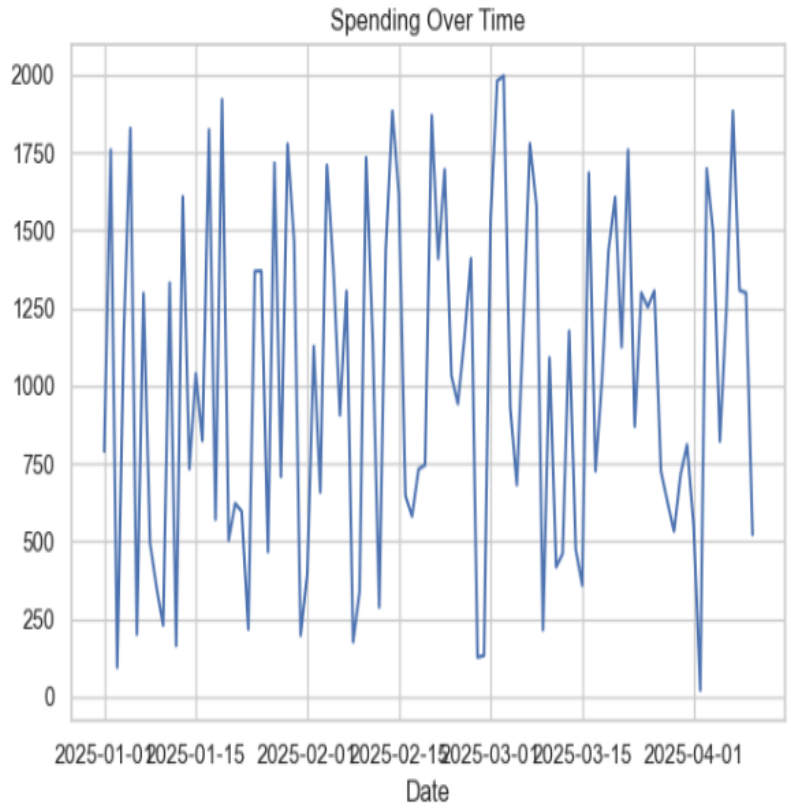
```
Missing Data Before Cleaning:
Date          0
Amount        0
Category      0
Description   0
dtype: int64

Missing Data After Cleaning:
Date          0
Amount        0
Category      0
Description   0
dtype: int64

========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
Enter your choice:  5

===== DESCRIPTIVE STATISTICS =====
            Amount
count   100.000000
mean   1020.020000
std     551.822142
min      22.000000
25%     566.250000
50%    1036.500000
75%    1444.750000
max    1996.000000

========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================
```

```
Enter your choice:  6


Available Charts:
1. Bar Chart - Total Spending per Category
2. Line Chart - Spending Over Time
3. Pie Chart - Category Distribution
4. Histogram - Amount Frequency
5. Boxplot - Category-wise Amount Spread
6. Heatmap - Correlation Matrix
Select a chart:  1
```



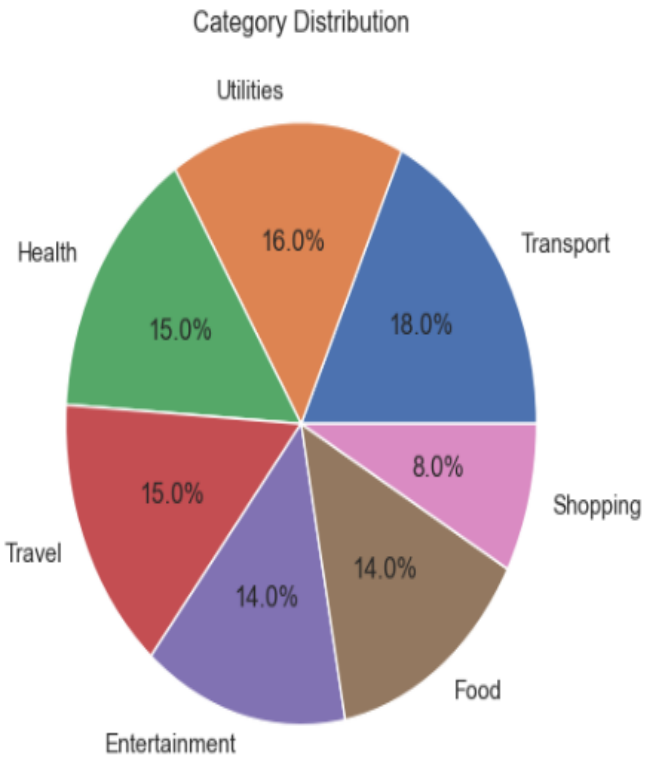

```
========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
```

```
============================================================
Enter your choice:  6

Available Charts:
1. Bar Chart - Total Spending per Category
2. Line Chart - Spending Over Time
3. Pie Chart - Category Distribution
4. Histogram - Amount Frequency
5. Boxplot - Category-wise Amount Spread
6. Heatmap - Correlation Matrix
Select a chart:  2
```



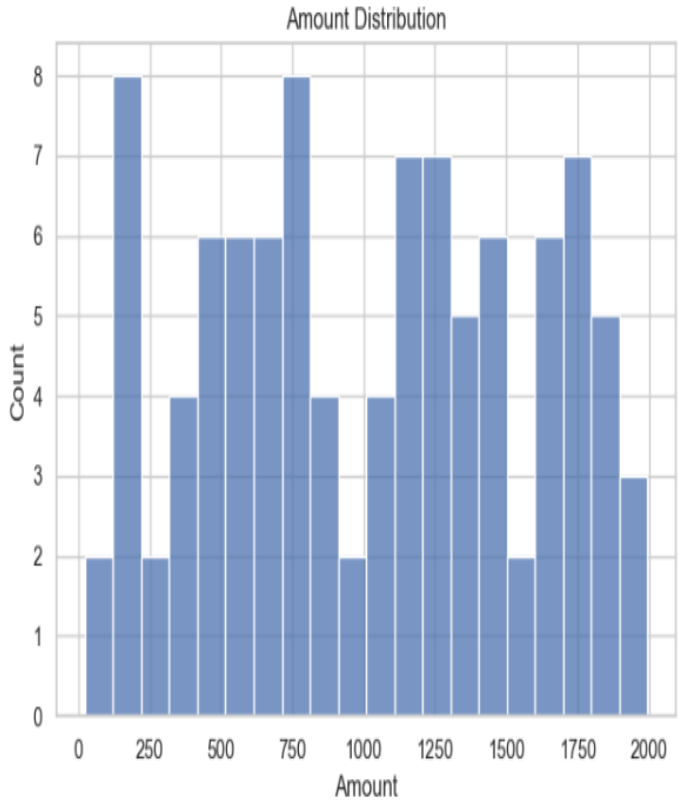

```
========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
```

```
8. Exit
============================================================
Enter your choice:  6

Available Charts:
1. Bar Chart - Total Spending per Category
2. Line Chart - Spending Over Time
3. Pie Chart - Category Distribution
4. Histogram - Amount Frequency
5. Boxplot - Category-wise Amount Spread
6. Heatmap - Correlation Matrix
Select a chart:  3
```



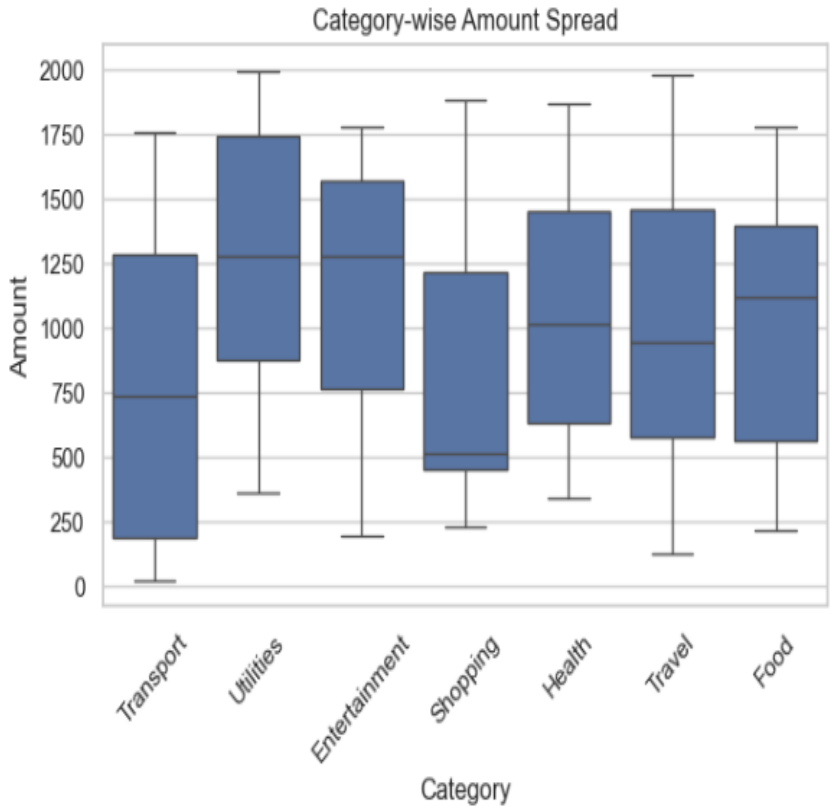

```
========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
```

```
7. Save Visualization
8. Exit
============================================================
Enter your choice:  6


Available Charts:
1. Bar Chart - Total Spending per Category
2. Line Chart - Spending Over Time
3. Pie Chart - Category Distribution
4. Histogram - Amount Frequency
5. Boxplot - Category-wise Amount Spread
6. Heatmap - Correlation Matrix
Select a chart:  4
```



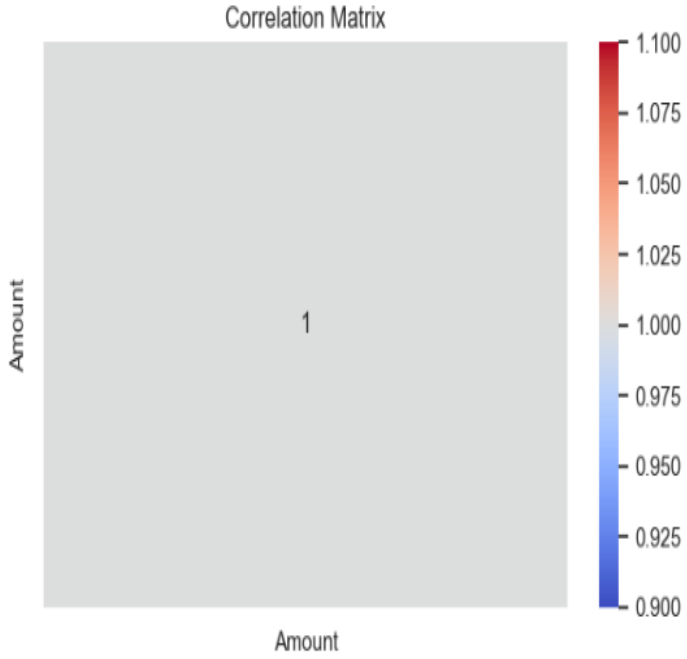

```
========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
```

```
6. Data Visualization
7. Save Visualization
8. Exit
============================================================

Enter your choice:  6


Available Charts:
1. Bar Chart - Total Spending per Category
2. Line Chart - Spending Over Time
3. Pie Chart - Category Distribution
4. Histogram - Amount Frequency
5. Boxplot - Category-wise Amount Spread
6. Heatmap - Correlation Matrix

Select a chart:  5
```




```
========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
```

```
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================

Enter your choice:  6


Available Charts:
1. Bar Chart - Total Spending per Category
2. Line Chart - Spending Over Time
3. Pie Chart - Category Distribution
4. Histogram - Amount Frequency
5. Boxplot - Category-wise Amount Spread
6. Heatmap - Correlation Matrix

Select a chart:  6
```




```
========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
```

```
============================================================

Enter your choice:  7
Enter filename to save (e.g., chart.png):

Visualization saved as:

========== Data Analysis & Visualization Program ==========
Please select an option:
1. Load Dataset
2. Explore Data
3. Perform DataFrame Operations
4. Handle Missing Data
5. Generate Descriptive Statistics
6. Data Visualization
7. Save Visualization
8. Exit
============================================================

Enter your choice:  8

Exiting program. Goodbye!

<Figure size 640x480 with 0 Axes>
```