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Experiment No : 04

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EDA - Data Inspection and Analysis using Pandas

Aim: To inspect and analyze data using Pandas through DataFrame viewing, filtering, and calculating descriptive statistics.

Code:

```
# Import necessary libraries
```

```
import pandas as pd
```

```
import numpy as np
```

```
from scipy import stats # For mode
```

```
# Sample DataFrame
```

```
data = {  
    'Name': ['Alice', 'Bob', 'Charlie', 'David', 'Eve'],  
    'Age': [24, 27, 22, 32, 29],  
    'Score': [88, 92, 85, 70, 95]  
}
```

```
df = pd.DataFrame(data)
```

```
# -----
```

```
# 1. Viewing and Inspecting DataFrame
```

```
# -----
```

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```
print("Full DataFrame:\n", df)
```

```
print("\nDataFrame Info:")
```

```
print(df.info())
```

```
print("\nFirst 3 Rows:")
```

```
print(df.head(3))
```

```
print("\nColumn Names:")
```

```
print(df.columns)
```

```
# -----
```

```
# 2. Filtering and Subsetting Data
```

```
# -----
```

```
# Filter rows where Score > 85
```

```
high_scores = df[df['Score'] > 85]
```

```
print("\nStudents with Score > 85:\n", high_scores)
```

```
# Filter rows where Age is between 25 and 30
```

```
age_range = df[(df['Age'] >= 25) & (df['Age'] <= 30)]
```

```
print("\nStudents aged between 25 and 30:\n", age_range)
```

```
# -----
```

```
# 3. Descriptive Statistics
```

```
# -----
```

```
print("\nDescriptive Statistics:")
```

```
print(df.describe())
```

```
# Central Tendency
```

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```
mean_score = df['Score'].mean()  
median_score = df['Score'].median()  
mode_score = stats.mode(df['Score'], keepdims=False)
```

Measures of Dispersion

```
range_score = df['Score'].max() - df['Score'].min()  
variance_score = df['Score'].var()  
std_dev_score = df['Score'].std()
```

```
print(f"\nMean Score: {mean_score}")  
print(f"Median Score: {median_score}")  
print(f"Mode Score: {mode_score}")  
print(f"Range of Scores: {range_score}")  
print(f"Variance of Scores: {variance_score}")  
print(f"Standard Deviation of Scores: {std_dev_score}")
```

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Output:

```
Full DataFrame:
   Name  Age  Score
0  Alice  24    88
1   Bob   27    92
2  Charlie 22    85
3   David 32    70
4    Eve   29    95

DataFrame Info:
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5 entries, 0 to 4
Data columns (total 3 columns):
#   Column  Non-Null Count  Dtype
---  -
0   Name    5 non-null    object
1   Age      5 non-null    int64
2   Score    5 non-null    int64
dtypes: int64(2), object(1)
memory usage: 248.0+ bytes
None

First 3 Rows:
   Name  Age  Score
0  Alice  24    88
1   Bob   27    92
2  Charlie 22    85

Column Names:
Index(['Name', 'Age', 'Score'], dtype='object')

Students with Score > 85:
   Name  Age  Score
0  Alice  24    88
1   Bob   27    92
4    Eve   29    95

Students aged between 25 and 30:
   Name  Age  Score
1   Bob   27    92
4    Eve   29    95


Descriptive Statistics:
      Age      Score
count  5.000000  5.000000
mean   26.800000  86.000000
std     3.962323   9.721111
min    22.000000  70.000000
25%    24.000000  85.000000
50%    27.000000  88.000000
75%    29.000000  92.000000
max    32.000000  95.000000

Mean Score: 86.0
Median Score: 88.0
Mode Score: ModeResult(mode=70, count=1)
Range of Scores: 25
Variance of Scores: 94.5
Standard Deviation of Scores: 9.72111104761179
```

Result: Successfully inspected, filtered, and analyzed the dataset using Pandas and computed key descriptive statistics.