

Lab Manual 3

1. Creating DataFrames (Multiple Methods)

```
import pandas as pd

# From Dictionary

data = {
    'ID': [1, 2, 3, 4],
    'Name': ['Alice', 'Bob', 'Charlie', 'David'],
    'Score': [78, 85, 90, 88]
}

df = pd.DataFrame(data)

print(df)

# From List of Lists

data2 = [[101, 'Math', 85], [102, 'Science', 90]]

df2 = pd.DataFrame(data2, columns=['Roll', 'Subject', 'Marks'])

print(df2)
```

2. Inspecting and Understanding Data

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

```
print(df.tail())
```

```
print(df.shape)
```

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

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

3. Row and Column Operations

```
# Add column
```

```
df['Bonus'] = 5
```

```
df['Final_Score'] = df['Score'] + df['Bonus']
```

```
print(df)
```

```
# Drop row and column
```

```
df.drop(3, axis=0, inplace=True)
```

```
df.drop('Bonus', axis=1, inplace=True)
```

```
print(df)
```

4. Filtering and Conditional Selection

```
# Filter data
```

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

```
print(high_scores)
```

```
# Multiple conditions
```

```
filtered = df[(df['Final_Score'] > 80) & (df['ID'] > 1)]
```

```
print(filtered)
```

5. Sorting and Ranking

```
# Sort values
```

```
print(df.sort_values(by='Final_Score', ascending=False))
```

```
# Rank
```

```
df['Rank'] = df['Final_Score'].rank(ascending=False)
```

```
print(df)
```

6. Working with Missing Data

```
import numpy as np
```

```
df.loc[1, 'Final_Score'] = np.nan
```

```
print(df.isnull())
```

```
print(df.fillna(df['Final_Score'].mean()))
```

```
print(df.dropna())
```

7. Renaming Columns and Index

```
df.rename(columns={'Final_Score': 'Total'}, inplace=True)
```

```
df.index = ['A', 'B', 'C']
```

```
print(df)
```

8. String Operations

```
df['Name_Upper'] = df['Name'].str.upper()
```

```
df['Name_Length'] = df['Name'].str.len()
```

```
print(df)
```

9. GroupBy Operations

```
# Grouping example
```

```
data3 = {
```

```
    'Dept': ['IT', 'IT', 'HR', 'HR'],
```

```
    'Employee': ['A', 'B', 'C', 'D'],
```

```
    'Salary': [50000, 60000, 45000, 48000]
```

```
}
```

```
emp_df = pd.DataFrame(data3)  
print(emp_df.groupby('Dept')['Salary'].mean())
```

10. Applying Functions

```
# Apply function  
  
df['Grade'] = df['Total'].apply(lambda x: 'A' if x >= 90 else 'B')  
  
print(df)
```

11. Exporting Data

```
# Save to CSV  
  
df.to_csv('output.csv', index=False)  
  
print("Data exported successfully")
```