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Activity 2-Application of pandas

Pandas helps with **data cleaning, manipulation, aggregation, filtering, grouping, and visualization**. Below is a breakdown of how Pandas is applied across different types of problems:

Application of Pandas in Data Analysis

1. Reading and Inspecting Data

```
import pandas as pd
df = pd.read_csv('filename.csv')
df.head()       # View first few rows
df.info()       # View column types and nulls
df.describe()   # Summary statistics
```

2. Data Cleaning

```
df.dropna()                # Remove missing rows
df.fillna(0)               # Fill missing values
df['column'] = df['column'].astype(int)  # Convert data types
```

3. Filtering and Slicing

```
df[df['Sales'] > 1000]
df[(df['Region'] == 'North') & (df['Sales'] > 1000)]
df.iloc[0:5]
```

4. Creating New Columns

```
df['Revenue'] = df['Quantity'] * df['Price']
df['Date'] = pd.to_datetime(df['Date'])
```

5. Grouping and Aggregation

```
df.groupby('Product')['Sales'].sum()

df.groupby('Category')['Price'].mean()

df.pivot_table(values='Sales', index='Region', columns='Year', aggfunc='sum')
```

6. Sorting and Ranking

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

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

7. Merging and Joining

```
merged_df = pd.merge(df1, df2, on='Product_ID', how='inner')
```

8. Handling Text Data

```
df['Review_Length'] = df['Review'].apply(len)

df['Cleaned'] = df['Review'].str.lower().str.replace(r'[^\w\s]', '', regex=True)
```

9. Date/Time Operations

```
df['Year'] = df['Date'].dt.year

df['Month'] = df['Date'].dt.month

df.set_index('Date').resample('M').sum()
```

10. Exporting Data

```
df.to_csv('output.csv', index=False)
```