import pandas as pd

import numpy as np

data = {

'A': [1, 2, np.nan, 4, 5, np.nan, 7],

'B': [np.nan, 2, 3, 4, np.nan, 6, 7],

'C': ['foo', 'bar', 'baz', np.nan, 'qux', 'quux', 'corge'],

'D': [np.nan, np.nan, np.nan, np.nan, np.nan, np.nan, np.nan]

}

df = pd.DataFrame(data)

print("Original DataFrame:")

print(df)

missing\_data = df.isna()

print("\nMissing Data in DataFrame:")

print(missing\_data)

df\_dropna\_rows = df.dropna()

print("\nDataFrame after dropping rows with any missing data:")

print(df\_dropna\_rows)

df\_dropna\_cols = df.dropna(axis=1)

print("\nDataFrame after dropping columns with any missing data:")

print(df\_dropna\_cols)

df\_fillna = df.fillna(value={'A': df['A'].mean(), 'B': df['B'].mean(), 'C': 'missing', 'D': 0})

print("\nDataFrame after filling missing data:")

print(df\_fillna)

df\_with\_duplicates = df.append(df.iloc[2], ignore\_index=True)

print("\nDataFrame with Duplicates:")

print(df\_with\_duplicates)

duplicates = df\_with\_duplicates.duplicated()

print("\nDuplicates in DataFrame:")

print(duplicates)

df\_no\_duplicates = df\_with\_duplicates.drop\_duplicates()

print("\nDataFrame after removing duplicates:")

print(df\_no\_duplicates)