import pandas as pd

import numpy as np

data\_new = {

'X': [10, 20, np.nan, 40, 50, np.nan, 70],

'Y': [np.nan, 22, 33, 44, np.nan, 66, 77],

'Z': ['alpha', 'beta', 'gamma', np.nan, 'delta', 'epsilon', 'zeta'],

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

}

df\_new = pd.DataFrame(data\_new)

print("Original DataFrame:")

print(df\_new)

missing\_data\_new = df\_new.isna()

print("\nMissing Data in DataFrame:")

print(missing\_data\_new)

df\_new\_dropna\_rows = df\_new.dropna()

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

print(df\_new\_dropna\_rows)

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

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

print(df\_new\_dropna\_cols)

df\_new\_fillna = df\_new.fillna(value={'X': df\_new['X'].mean(), 'Y': df\_new['Y'].mean(), 'Z': 'missing', 'W': 0})

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

print(df\_new\_fillna)

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

print("\nDataFrame with Duplicates:")

print(df\_new\_with\_duplicates)

duplicates\_new = df\_new\_with\_duplicates.duplicated()

print("\nDuplicates in DataFrame:")

print(duplicates\_new)

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

print("\nDataFrame after removing duplicates:")

print(df\_new\_no\_duplicates)