TASK SHEET

1. Write a program to group a pandas DataFrame by a specific column and calculate the mean value for each group.
2. Implement a function to pivot a pandas DataFrame based on specified columns and aggregate values using a specific function.
3. Create a program to calculate the exponential moving average of a column in a pandas DataFrame.
4. Write a function to perform one-hot encoding on categorical variables in a pandas DataFrame.
5. Implement a program to merge two pandas DataFrames based on multiple columns.
6. Create a function to apply a rolling window function (e.g., rolling mean) to a pandas Series.
7. Write a program to convert a pandas DataFrame with datetime strings to datetime objects and extract components such as year, month, day, etc.
8. Implement a function to interpolate missing values in a pandas DataFrame using linear interpolation.
9. Create a program to calculate the weighted average of a column in a pandas DataFrame using another column as weights.
10. Write a function to calculate the autocorrelation of a column in a pandas DataFrame.
11. Implement a program to convert a pandas DataFrame with categorical variables to a numerical representation using label encoding or one-hot encoding.
12. Create a function to perform cross-tabulation (crosstab) on two columns in a pandas DataFrame.
13. Write a program to apply a function that returns multiple values to each element of a pandas Series and expand the result into separate columns.
14. Implement a function to calculate the distance between two geographical points represented by latitude and longitude in a pandas DataFrame.
15. Create a program to efficiently filter rows in a pandas DataFrame based on a large list of conditions.