**Take Home Assignment: Exploratory Data Analysis on Load and Weather Data**

**(**Preferred Language: Python — however, feel free to use any other programming language if you prefer)

**Overview**

You are provided with a dataset containing electric load data along with weather data, i.e., temperature over time. The goal of this assignment is to:

* Understand the nature of electricity consumption (load) using time-based patterns
* Explore the relationship between load and weather features
* Extract meaningful insights that could inform further modeling or operational decisions

This is an **exploratory data analysis-focused task** — the emphasis is on how well you understand the data, clean it, visualize trends, and communicate your findings.

**Dataset:** Please use the dataset from zip file given. This dataset includes:

* *Load Data:* Historical hourly load data for a zone.
* *Weather Data:* Corresponding hourly weather data, including temperature.

**Your Tasks**

**1. Data Understanding & Preparation**

* Begin by exploring the structure of the dataset.
* Perform necessary preprocessing like handling missing values, correcting data types, and creating useful time-based features if required.

**2. Exploratory Data Analysis**

* Analyze the load behavior over time.
* Identify and describe any clear patterns, cycles, or anomalies.
* Explore how weather conditions relate to the electric load — are there any trends or correlations?

You may consider different dimensions such as:

* Time of day, day of week, seasonal periods

**3. Insight Generation**

* Summarize your findings by clearly explaining the reasoning behind each insight, not just the visual outcome.

**4. (Optional) Basic Modeling**

* If you wish, try a basic linear regression model to predict electric load using weather or time features. This part is entirely optional and will not be evaluated. However, if you're interested, feel free to attempt a simple predictive task. While it won’t affect your assessment, we’re happy to see your approach to basic modeling if you choose to include it.

**Submission Guidelines:**

* *Deadline:* Two days from the day it’s sent (i.e., sent day + 2 days).
* *Format:* Submit a code with reproducible results and a PDF/doc report.