**FINAL PROJECT**

**TOPIC PROPOSAL**

**Title:** Capital Bikes Demand: Predict & Optimize!

**Project Team:** Team 3 (Aakash Hariharan, Abhilasha Singh, Trisha Singh, Vishal Fulsundar)

**Research Topic:** Urban mobility is undergoing rapid transformation, with shared bicycle systems becoming a cornerstone of sustainable transport. The **Capital Bikes system** aims to provide efficient and accessible transportation to the city's residents and visitors. However, optimizing bike availability and station utilization is critical to meeting the increasing demand while reducing operational costs. This project focuses on predicting bike demand and optimizing resource allocation by leveraging historical usage data and external factors like weather.

**SMART Question(s):**

The following SMART (Specific, Measurable, Achievable, Relevant, Time-bound) questions guide our analysis and model development:

1. How does weather (temperature, precipitation, and wind speed) influence daily bike demand across different seasons in the Capital Bikes system?
2. Which bike stations in the Capital Bikes system experience the highest utilization rates?
3. What are the key performance indicators (KPIs) for optimizing bike station utilization, and how can these be tracked effectively?
4. How can historical data and weather conditions be used to predict hourly bike demand at each station?

These questions aim to uncover critical insights about demand patterns, station usage, and optimization strategies to enhance the efficiency and sustainability of the Capital Bikes system. By addressing these, the project will support data-driven decision-making for improved resource allocation and operational management.

**Source of Data Set(s) :** The dataset is sourced from Kaggle website (https://www.kaggle.com/code/arshmankhalid/capital-bikes-demand-predict-optimize).

**Dataset Details:**The dataset used in this project comprises over observations and includes variables.

**Git Hub Repository**: