**PROJECT TITLE: Islamic Families – Food Demand Forecasting**

**GROUP 3**

### Welcome to the repository for our Capstone project at Norquest College. This project focuses on predicting the overall demand for food hampers by analysing seasonal patterns, special religious occasions, and family size, all of which significantly influence consumption trends within Islamic families.

### Problem Statement

How can we forecast the demand for food hampers while accounting for:

* **Seasonal variations** (e.g., summer, winter)
* **Special religious occasions** (e.g., Ramadan, Christmas, Thanksgiving)
* **Family size** and its impact on food consumption

**Project Objective**

To build a predictive system that:

* Anticipates food demand during key periods
* Helps with resource planning and inventory management
* Reduces waste and better serves community needs

**Challenges Addressed**

* Variability across regions and demographics
* Uncertainty due to inflation or unexpected events
* Data preparation: cleaned, merged, de-duplicated, and engineered useful features
* Model selection based on MAE, RMSE, and R² Scor

**Solution**

1. **Data Preparation**

* Joined 2 datasets using a unique key
* Removed nulls, duplicates, and irrelevant columns
* Engineered features: season, special\_occasion, and family\_size
* Applied rolling standard deviation, 7/14-day lags on actual\_pickup

**2. Model Development**

* Tried multiple models for time-series forecasting
* SARIMAX was selected as the best model using AutoARIMA for tuning
* Trained on historical data, tested on the last 30 days

**3 . Model Evaluation**

* Assessed using MAE, RMSE, and R² score
* The final model accurately predicts upcoming demand trends

### Repository Structure

### The repository contains the following files:

### data.csv: Cleaned dataset including merged features for forecasting

### app.py: Streamlit app that hosts the demand forecasting model

### requirements.txt: Lists dependencies like pandas, streamlit, statsmodels, etc.

### Getting Started

To get started with our project, clone the repository and install the required dependencies. The dependencies are listed in the requirements.txt file.

**Link To Notion**

<https://www.notion.so/GROUP-3-CMPT-3835-ISLAMIC-FAMILIES-18c05164c99e80038d6feb31389b401e>

### Link to Application

<https://3835foodhamper-4ub7tiudqsfnetyz3rkra8.streamlit.app/>

### Team Members

Our team consists of the following members:

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