📌 Project Overview:

This project focuses on leveraging machine learning to optimize pricing strategies for **Gemineye**, a luxury jewelry brand. You will work through order-level data to build predictive models that address inefficiencies in current pricing practices. The goal is to develop data-driven pricing strategies that maximize revenue, respond to market dynamics, and improve customer satisfaction.

Additionally, you are required to complete the **Jewelry Price Optimization with Machine Learning** project as available on the Amdari website.
Follow the provided video tutorials and replicate your project submission accordingly, including all suggested enhancements such as experiment tracking with MLflow and version control via Git.

📎 Project details can be found here:
https://www.amdari.io/projects/details/29

🧠 Business Context:

Industry: Luxury Goods – Jewelry
Company: Gemineye

Gemineye is known for its bespoke offerings and craftsmanship. It faces challenges in setting optimal prices due to inconsistent regional strategies, lack of demand prediction, and dynamic market behavior.

🎯 Business Problems Addressed:

- Risk of overpricing leading to customer churn
- Underpricing reducing profit margins
- Inefficient dynamic pricing
- Lack of insight into customer pricing behavior

🎯 Project Objectives:

- Optimize jewelry pricing using machine learning

- Integrate ML-driven insights into business workflows
- Increase revenue and customer retention
- Enable dynamic and personalized pricing

🛠️ Tech Stack & Tools:

- **Language:** Python
- **Libraries:** `numpy`, `pandas`, `matplotlib`, `seaborn`, `scikit-learn`
- **Experiment Tracking:** MLflow
- **Version Control:** Git, GitHub

📊 Data Description:

Feature	Description
Order datetime	Timestamp of order placement
Order ID	Unique identifier for each order
Purchased product ID	Product identifier
Quantity of SKU	Quantity ordered
Category ID	Jewelry category identifier
Category alias	Jewelry category name (e.g., earrings)
Brand ID	Jewelry brand identifier
Price in USD	Selling price of jewelry item
User ID	Customer identifier
Product gender	Intended gender (male/female)
Main color	Primary color of jewelry

Main metal	Material used for mount
Main gem	Primary gemstone used

🔄 Workflow Summary:

1. **Data Ingestion & Cleaning**
2. **Exploratory Data Analysis (EDA)**
3. **Feature Engineering**
4. **Model Development (with MLflow tracking)**
5. **Model Evaluation & Selection**
6. **Reporting & Strategy Recommendations**

🚀 Project Enhancement Features:

- MLflow used for experiment tracking and artifact management
- Git and GitHub for source code version control
- Final report includes actionable business recommendations

📌 Key Deliverables:

- Cleaned and feature-engineered dataset
- EDA report and visualization notebook
- Machine Learning model with tracked experiments via MLflow
- GitHub repository with version-controlled code
- Final business report with strategy recommendations