**Day 3: Synthetic Data Generation**

**Goal:**

To build an automated Python-based data generator that creates two CSV files — one for campaign metadata and one for daily performance metrics — representing marketing activity across Google Ads, Facebook Ads, and YouTube Ads.

1. Created a new-folder scripts/ and added a Python file *generate\_synthetic\_data.py*.
2. Imported key Python libraries: pandas, random, datetime, and os.
3. Created base lists for platforms (1=Google Ads, 2=Facebook Ads, 3=YouTube Ads), campaign objectives, and regions.
4. Wrote logic to randomly generate 10 campaigns with attributes such as objective, region, platform, dates, and budget.
5. Used pandas DataFrames to save this campaign data into *database/campaigns.csv*.
6. Created a nested loop to simulate daily campaign performance metrics including:

* Impressions
* Clicks
* Conversions
* Spend
* Revenue  
  for each campaign across multiple days.

1. Exported this metrics data to *database/metrics.csv*.
2. Verified that the files were automatically generated and saved inside the */database* folder.

**Key Learnings:**

* Learned how to use Python to generate synthetic datasets for database testing and analytics.
* Understood how campaigns connect with metrics through foreign keys (1-to-many relationship).
* Practiced using pandas DataFrames for structured data creation and export.
* Applied randomization logic to simulate real-world marketing behavior — such as CTR, conversions, spend, and revenue.
* Reinforced understanding of data pipelines — generating, storing, and preparing data for SQL ingestion.
* Followed consistent folder structuring and version control practices using GitHub.