Question 1:

I have selected the topic of **Credit Cards** to apply the data science methodology. In today's digital economy, credit cards have become a widely used financial tool, enabling seamless transactions both online and offline. However, alongside this convenience comes the persistent risk of fraudulent activities, which pose serious financial challenges for both cardholders and financial institutions. By focusing on credit card transaction data, I aim to showcase how data science techniques can be leveraged to tackle the critical issue of fraud detection and prevention within the financial sector.

Question 1.1:

Can we accurately detect fraudulent credit card transactions based on patterns in transaction history, spending behavior, and customer profiles?

Question 2:

- **Analytic Approach:** Use predictive analytics with machine learning classification to detect fraud.
- **Data Requirements:** Transaction details (amount, time, location, merchant, customer history, fraud label).
- **Data Collection:** Gather historical credit card transaction data from banks or open datasets.
- **Data Understanding & Preparation:** Clean data, handle missing values, balance classes, and engineer features.
- **Modeling & Evaluation:** Train ML models (e.g., Random Forest, XGBoost) and evaluate with precision, recall, F1, and ROC-AUC.