### Assignment: Exploring Azure Data Services with FMCG Data

**Objective:** This assignment aims to help you understand key Azure data services and how to leverage them for managing and analyzing Fast-Moving Consumer Goods (FMCG) data. By completing this assignment, you will gain hands-on experience with Azure SQL Database, Azure Data Lake, Azure Synapse Analytics, and other Azure data storage services. You will also learn to make informed decisions about selecting the right storage options and data ingestion methods.

### Dataset Description:

You will use the provided FMCG dataset (FMCG\_data.csv) which contains various fields related to product sales, inventory, and other relevant data points.

#### Part 1: Azure SQL Database

1. **Key Features of Azure SQL Database:**
   * **Task:** List and describe at least five key features of Azure SQL Database. Explain how these features can be beneficial for managing FMCG data.
2. **Hands-On Exercise:**
   * **Task:** Create an Azure SQL Database instance.
   * **Data Ingestion:** Upload the FMCG\_data.csv dataset into a table within your Azure SQL Database.
   * **Query:** Write and execute SQL queries to retrieve insights, such as top-selling products, sales trends, and inventory status and find useful insights from the dataset.
3. Which warehouses have the highest total product weight?
4. How many warehouses are located in urban vs. rural areas?
5. What is the average distance of warehouses from the hub?
6. What is the average distance of warehouses from the hub?
7. Which warehouses have reported the most transport issues in the last year?
8. List warehouses with approved government certificates.
9. Which regions have the highest number of competitors?
10. How are warehouses distributed by capacity size?
11. How many warehouses were impacted by flooding?

#### Part 2: Azure Data Lake

1. **Capabilities of Azure Data Lake:**
   * **Task:** Explain the main capabilities of Azure Data Lake. Discuss how it can be used for storing and processing large volumes of FMCG data.
2. **Hands-On Exercise:**
   * **Task:** Create an Azure Data Lake Storage Gen2 account.
   * **Data Ingestion:** Upload the FMCG\_data.csv dataset to the Data Lake.

#### Part 3: Azure Synapse Analytics

1. **Insights into Azure Synapse Analytics:**
   * **Task:** Describe the main features and use cases of Azure Synapse Analytics. How can it be utilized for advanced analytics on FMCG data?
2. **Hands-On Exercise:**
   * **Task:** Set up an Azure Synapse Analytics workspace.
   * **Data Ingestion:** Connect your Azure Synapse workspace to the previously created Azure Data Lake and SQL Database.
   * **Query:** Create and run Synapse SQL queries to perform queries which has been run for SQL.

#### Part 4: Azure Data Storage Services

1. **Overview of Azure Data Storage Services:**
   * **Task:** List and describe different Azure data storage services, including Azure Blob Storage, Azure Table Storage, Azure Queue Storage, and Azure Files. Provide examples of use cases for each in the context of FMCG data.
2. **Choosing the Right Storage Option:**
   * **Task:** Based on the FMCG data characteristics and requirements, recommend the most suitable Azure storage service(s) for:
     + Storing large volumes of raw sales data.
     + Storing structured inventory data.
     + Handling real-time order processing messages.
     + Archiving historical sales records.

#### Part 5: Data Ingestion Methods in Azure

1. **Understanding Data Ingestion Methods:**
   * **Task:** Explain various data ingestion methods available in Azure, such as Azure Data Factory.
2. **Hands-On Exercise:**
   * **Task:** Use Azure Data Factory to create a data pipeline that:
     + Ingests sales data from the FMCG\_data.csv file to Azure SQL Database.
     + Transfers data from an Azure Blob Storage container to Azure Data Lake Storage.

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