**Exercise 1: Python, Pandas, and Azure Hands-On**

**Objective**

* Learn how to work with CSV files, manipulate data using Python and Pandas.
* Use Azure Storage API for file uploads and downloads.
* Perform calculations to fix incorrect costs in hosting products data.
* Use Azure Storage and Cosmos DB to upload and manage data.

**Steps and Tasks**

**Part 1: Fix Monthly and Hourly Costs**

1. **Fetch the CSV File:**
   * Read the file from: <https://github.com/nodesense/bsol-azure-ai/blob/main/hosting-products.csv>.
2. **Understand Cost Calculation:**
   * Monthly cost formula: Monthly Cost=(3×CPU Cores)+(2×RAM in GB)+(4×Storage in 100GB)+(3×Bandwidth in TB)
   * Hourly cost formula: Hourly Cost=Monthly Cost / 720 Hourly Cost
3. **Python Tasks:**
   * Read the CSV file using pandas.
   * Calculate and add new columns for Monthly Cost and Hourly Cost.
   * Save the corrected data locally as a new CSV file.

**Part 2: Azure Storage Operations**

1. **Set Up Storage Containers:**
   * Use Azure CLI, Python SDK, or Azure Portal to create a storage account (if not already created).
   * Create two containers:
     + **products-raw**: To store the original CSV file from GitHub.
     + **silver**: To store the corrected CSV file with headers.
2. **Upload Files:**
   * Upload the original CSV file to the products-raw container.
   * Use Azure Storage APIs or Python SDK to upload the corrected CSV file to the silver container.
3. **Python Tasks for Azure Storage:**
   * Write a Python program using Azure Storage SDK to:
     + Upload the original CSV file to the products-raw container.
     + Read the file from the products-raw container and process it with Pandas.
     + Upload the cleaned CSV file to the silver container.

**Part 3: Upload Corrected Data to Cosmos DB**

1. **Set Up Cosmos DB:**
   * Create a Cosmos DB database (if not already available).
   * Create a container within the database to store the cleaned hosting products data.
2. **Python Tasks for Cosmos DB:**
   * Write a Python program to:
     + Read the corrected CSV file from the silver container.
     + Parse the CSV data and insert it into the Cosmos DB container.

**Expected Deliverables**

1. **Local Python Programs:**
   * A script to calculate and fix Monthly Cost and Hourly Cost using Pandas.
   * A script to interact with Azure Storage containers (products-raw and products-silver).
2. **Azure Storage Outputs:**
   * Original CSV in the products-raw container.
   * Cleaned CSV in the products-silver container.
3. **Cosmos DB Output:**
   * Corrected data from the cleaned CSV stored in the Cosmos DB container.