Python Development:

Task #1: Inventory Management System

Scenario:
You are part of a team at XPACE TECHNOLOGIES tasked with developing an inventory management system. Your objective is to build a Python-based application that allows users to manage an inventory of items by adding, removing, updating, and searching for items. This system will help the company keep track of its stock and ensure efficient management of resources.

Task Description:
Your task involves the following steps:

1. **Data Collection and Exploration:**
   - Create a sample dataset representing the inventory, which includes features such as item ID, item name, quantity, price, and category.
   - Explore the dataset to gain insights into its structure and distributions.
2. **Feature Engineering:**
   - Design a data structure to store the inventory items. This may include using lists, dictionaries, or classes.
   - Ensure the data structure supports operations such as adding, removing, updating, and searching for items.
   - Implement data validation to handle incorrect or missing values.
3. **System Design and Development:**
   - Develop a menu-based interface to interact with the inventory system.
   - Implement functions to add new items, remove existing items, update item details, and search for items based on their attributes.
   - Ensure the system handles edge cases, such as trying to update or remove items that do not exist.
4. **User Interaction and Input Handling:**
   - Create a user-friendly interface that prompts users for input and displays results clearly.
   - Implement error handling to manage invalid inputs and provide appropriate feedback to users.
5. **Data Persistence:**
   - Implement functionality to save the current state of the inventory to a file (e.g., CSV or JSON) and load it back into the system. This ensures that the inventory data is preserved between sessions.

6. **Documentation and Reporting:**

- Document your code with comments explaining key steps and decisions made during development.
- Write a brief report summarizing your approach, including details on the data structure, user interface design, implemented features, and any challenges faced. Discuss potential future improvements.

Submission Requirements:

- Organize your code into well-documented Python scripts or Jupyter notebooks. Include comments to explain key steps and decisions made during development.
- Create a virtual environment for your project and perform all coding within this environment. Submit the entire virtual environment folder along with your code for evaluation. This ensures that the evaluation team can activate the same environment and run your code seamlessly.
- Provide a README file with clear instructions on how to activate the virtual environment, run the code, install dependencies, and reproduce the results. Include any additional notes or considerations for reviewers.
- Write a brief report summarizing your approach, including details on the data structure, user interface design, implemented features, and any challenges faced. Discuss potential future improvements.

Deadline:

The deadline for completing tasks and submitting final deliverables is June 3, 2024, allowing ample time for a thorough project completion.

Submission Process for Internship Tasks

Interns are required to submit their completed tasks via email. Please follow the instructions below to ensure your submission is correctly formatted and complete.

1. Email Submission:
   - Send an email to: submission@xpacetechnologies.com
2. Email Subject Format:
   - Use the following format for the subject of your email: ID+TaskName
   - For example: "PYDEVINT-240324-XTxxxx+[TaskName]"
3. Email Body:
   - Include a brief introduction of yourself and a summary of the project. Mention your full name, internship ID, and a short description of the task you are submitting.
4. Attachments:
   - Attach a PDF file containing the project documentation.