Validation and Debugging Activity

Activity: Showcase implementation of validation and debugging techniques for AI models.

Instructions:

1. **Select an AI Model**:
   - Choose a simple AI model to work with (e.g., Linear Regression, Decision Tree, or K-Nearest Neighbors).

2. **Develop a Validation Strategy:**
   - **Outline a validation strategy that includes:**
     - **Test Data Preparation:** Identify how to split the dataset into training and testing sets. Consider using a common split ratio (e.g., 80/20).
     - **Performance Metrics:** Choose at least two performance metrics to evaluate the model (e.g., accuracy, precision, recall, F1-score).

3. **Create Test Cases:**
   - **Develop a minimum of three test cases for each of the following categories:**
     - **Normal Cases**: Typical inputs the model should handle.
     - **Edge Cases:** Unusual or extreme inputs to challenge the model.
     - **Faulty Inputs:** Inputs that are intentionally flawed or incorrect to test the model's error handling.

4. **Simulate Testing:**
   - **Run the selected AI model with the prepared test cases. Document the following:**
     - **Results:** Record the outcomes of each test case, including performance metrics.
     - **Issues Encountered:** Note any problems or bugs identified during testing.

5. Debugging:

- **For any issues found, outline the steps taken to debug and resolve them. This may include:**
  - Reviewing code for logical errors.
  - Checking the data for inconsistencies or errors.
  - Adjusting model parameters or retraining the model.

6. Share Findings:

- Write and share a summary of your validation strategy, test cases, and findings with your peers or mentor. Focus on:
  - The effectiveness of your validation strategy.
  - Challenges faced during testing and debugging.
  - Lessons learned from the exercise.