**APPLICATION OF PYTHON PROGRAMMING**

**CASE 1: HEALTHCARE APPLICATION:**

**Question**: Design a program that analyzes medical data to identify potential trends or anomalies in patient vitals. The program should be able to read a dataset containing patient information (e.g., age, blood pressure, heart rate) and provide insights such as average vitals, abnormal readings, and trends over time.

**Expected Output:** The program should generate a report highlighting any abnormal readings, trends, and statistical summaries of the patient data.

**Scholarly Analysis:** This question involves data processing and analysis, which are critical skills in healthcare informatics. Students will need to demonstrate proficiency in handling datasets, applying statistical methods, and generating meaningful insights from healthcare data.

**CASE 2: BUSINESS ANALYTICS:**

**Question:** Create a program that performs sentiment analysis on customer reviews for a product or service. The program should read a set of customer reviews, analyze the sentiment (positive, negative, neutral), and provide a summary of customer feedback along with any notable recurring themes.

**Expected Output:** The program should output a sentiment analysis report including the percentage of positive, negative, and neutral sentiments, as well as key themes extracted from the reviews.

**Scholarly Analysis:** This question involves natural language processing (NLP) techniques and sentiment analysis, which are essential in modern business analytics. Students will need to demonstrate proficiency in text processing, sentiment classification, and extracting meaningful insights from customer feedback.

**CASE 2: AGRICULTURAL DATA ANALYSIS:**

**Question**: Develop a program that assists farmers in making irrigation decisions based on soil moisture data. The program should take input on current soil moisture levels and historical weather data, and provide a recommendation on whether irrigation is necessary, considering factors like crop type and local weather patterns.

**Expected Output**: The program should output a recommendation on whether to irrigate or not, along with relevant insights on soil moisture trends and historical weather patterns.

**Scholarly Analysis:** This question integrates principles of agriculture, data analysis, and decision support systems. Students will need to apply knowledge of agronomy, data interpretation, and algorithmic decision-making in the context of precision agriculture.