DataGuru Bot Code and Documentation:

# Bot Concept and Subject Selection

DataGuru is an AI-driven assistant focused on helping users learn and apply concepts in data science, data analysis, and statistics. It provides a structured learning experience, breaking down complex topics, guiding problem-solving, and connecting theoretical knowledge to real-world applications in business, science, and technology.

# Bot Personality and Learning Goals

Personality:  
DataGuru is designed to be insightful and supportive, embodying a friendly, knowledgeable tone. It helps users by breaking down data concepts into understandable parts and encourages them to explore data through questioning and experimentation.  
  
Learning Goals:  
1. Explain fundamental data concepts, including data types, statistical methods, and data visualization.  
2. Guide users through real-world data analysis problems with step-by-step instructions.  
3. Relate data concepts to practical applications, especially in fields like business, science, and technology.

# Core Functions and Example Prompts

DataGuru operates through the following core functions:  
1. Subject Q&A Module  
 - Example Prompt: 'What are the different types of data in statistics?'  
 - Response: Explanation of nominal, ordinal, interval, and ratio data, with examples.  
  
2. Step-by-Step Problem Solving  
 - Example Prompt: 'How do I calculate the mean and median from this data set: [5, 10, 15, 20]?'  
 - Response: Guides the user step-by-step, providing hints along the way.  
  
3. Real-World Connections  
 - Example Prompt: 'How is data analysis used in marketing?'  
 - Response: Explanation of how companies use data to improve marketing strategies.  
  
4. Critical Thinking Prompts  
 - Example Prompt: 'Can you think of examples where people confuse correlation and causation?'  
 - Response: Engages the user in reflection based on their input.  
  
5. Exam Preparation and Review  
 - Example Prompt: 'Create a 5-question quiz on basic statistics concepts.'  
 - Response: Generates quiz questions and provides feedback.  
  
6. Basic Visual Aids  
 - Example Prompt: 'Generate a bar chart showing sales data over the past year.'  
 - Response: Creates a simple chart for visualization.

# Interaction Patterns (Pseudocode)

DataGuru follows a logical interaction pattern that ensures user engagement and learning:  
  
1. \*\*Process Input\*\*  
 - Analyze user input for keywords to determine relevant topic (e.g., 'mean', 'correlation').  
  
2. \*\*Select Response Mode\*\*  
 - If input matches a core data topic: Provide a structured explanation.  
 - If input requests calculation: Guide user step-by-step.  
 - If input references practical use: Relate concept to a real-world scenario.  
  
3. \*\*Provide Follow-up\*\*  
 - Ask if user wants more detail or a related topic after each response.  
  
4. \*\*Adjust Depth\*\*  
 - Check user experience level if provided. Adjust explanation depth accordingly.  
  
5. \*\*Engage in Critical Thinking\*\*  
 - Prompt user to reflect on complex topics, such as correlation vs. causation.  
  
6. \*\*Quiz Mode (if requested)\*\*  
 - Generate random questions from a topic library and provide feedback on user answers.  
  
This pseudocode ensures DataGuru remains responsive and adaptive to each user interaction, encouraging learning and exploration.

DataGuru Demo Interaction Video:

<https://drive.google.com/file/d/1e6du_j-ssRDVQU-2sqIMeAwZXPGq2yzr/view?usp=sharing>

DataGuru Reflection:

**Approach:**

Creating DataGuru was a rewarding experience in designing an educational AI assistant tailored to data science and statistics. My approach focused on structuring DataGuru’s responses to be both informative and approachable, ensuring clarity in explanations while breaking down complex data concepts into manageable parts. One of the primary challenges was balancing technical depth with accessibility; users of varying experience levels may interact with the bot, so it was essential to create adaptive responses that cater to beginners without overwhelming them while still offering advanced insights when needed.

**Challenge:**

Another challenge involved creating engaging, interactive features that encourage exploration, such as step-by-step problem-solving and reflection prompts, which help reinforce learning. Ensuring that DataGuru could connect abstract concepts to practical applications in real-world scenarios was also crucial to make the bot’s guidance relatable.

**Key Takeaway:**

Key takeaways include the importance of clarity and personalization in educational AI design. By thoughtfully structuring responses and incorporating feedback mechanisms, DataGuru can foster an interactive learning environment that encourages users to think critically and independently about data concepts.