Final Capstone Project: Drools Rule Engine Application

Objective:

This lab exercise aims to synthesize the knowledge and skills you've acquired throughout the Drools course. Working in pairs, you will conceptualize, design, and implement a real-world application using the Drools rule engine, demonstrating your understanding of rule-based systems and their application in solving complex business problems.

Team Formation:

- **Students should work in pairs.**
- **Pairing Criteria:** All students are developers. Non-Java developers must pair with a Java developer in the group to ensure that all technical aspects of the project are adequately addressed.

Part 1: Conceptualization

- **Task:** Together with your partner, brainstorm and select a business concept where the Drools rule engine can be applied effectively. Consider areas such as finance, healthcare, e-commerce, insurance, or any domain with complex decision-making processes.
- **Output:** A brief document (1-2 pages) describing your chosen business concept, why it's suitable for a rule engine, and how Drools can improve or solve the business problem.

Part 2: Domain Modeling

- **Task:** Plan the domain objects and data structures required for your project. You must define a minimum of three domain objects. You may also create additional fact objects as necessary for your business logic.
- **Output:** A document outlining your domain model, including UML class diagrams or similar representations for each domain object and fact object (if used). Also, describe the relationships between these objects.

Part 3: Rule and Session Planning

- **Task:** Design the rules and sessions for your application. Your rules should:
    - Include cross-product evaluation to demonstrate complex decision-making between different domain objects.
    - Utilize execution control techniques such as salience, agenda groups, or activation groups to ensure rules fire in the correct order.
    - Implement derived facts to infer new information from existing data points.
    - Follow the best practices covered in the course regarding rule organization, reusability, and maintenance.
- **Requirement:** Your application must use at least one stateful and one stateless session to demonstrate your understanding of their differences and use cases.

- **Output:** A detailed plan of your rules and sessions, including pseudo-code or detailed descriptions of each rule's logic, the conditions under which they fire, and the expected outcomes. Also, specify which session(s) each rule will be part of and why.

Part 4: Implementation and Execution

- **Task:** Based on your plans in Parts 2 and 3, create the Java classes for your domain objects, write the Drools rules, define the KIE sessions, and integrate everything into a running application.
- **Requirements:**
  - Code quality and organization will be evaluated. Ensure your code is well-commented, and classes and rules are logically organized.
  - Your application must compile without errors and execute the rules as expected.
- **Output:** A fully functional Drools application that:
  - Implements the business concept chosen in Part 1.
  - Utilizes the domain model designed in Part 2.
  - Executes the rules and sessions planned in Part 3, demonstrating successful rule firing and the correct application of stateful and stateless sessions.
- **Demonstration:** Present your application to the class, showing proof of successful rule firing. Explain your decision-making process, the challenges faced, and how you overcame them. Your presentation should include a live demonstration of the application and a code walkthrough.

Evaluation Criteria:

- Creativity and relevance of the business concept.
- Complexity and correctness of the domain model.
- Logical and efficient rule and session design.
- Code quality, readability, and organization.
- Successful execution of the application and rule firing.

This capstone project is your opportunity to showcase your Drools expertise. Approach it with creativity and attention to detail. Good luck!