Republic of the Philippines
Laguna State Polytechnic University
Province of Laguna
College of Computer Studies

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Section: BSCS – 3A Prof. Bernandino

"When Logic Changes: Exploring Non-Monotonic Reasoning and Argumentation"

Part I. Conceptual Understanding (20 points)

Instruction:
Answer the following questions briefly but clearly. Each question is worth 4 points.

1. Define **non-monotonic reasoning** in your own words.
   - **Non-monotonic** reasoning is where you get to know new information you will withdraw with your old conclusion.
2. How does non-monotonic reasoning differ from monotonic reasoning?
   - When it comes to **non-monotonic,** they withdraw their old conclusion when the new facts are added. In contrast, the monotonic once you believe in something, it will remain true even when the new facts are added.
3. Give a real-life situation where a conclusion must change after new information is added.
   - I assumed it would be sunny today because the sky was clear in the morning. But when I later saw dark clouds forming, I concluded it might rain instead.
4. What is a **default rule**? Provide one example.
   - **Example:** "Birds can fly." This is true by default, but if new information says the bird is a penguin, the rule no longer applies.
5. How do argumentation frameworks help AI systems decide between conflicting rules?
   - Argumentation frameworks help AI systems compare and evaluate different arguments, determine which ones are stronger or more supported by evidence, and then choose the most reasonable conclusion among conflicting rules.

Part II. Laboratory Application (40 points)

Task 1: Belief Revision Simulation (20 points)

Objective: Implement a simple reasoning program in Python or R that revises conclusions when new information is added.

Output:

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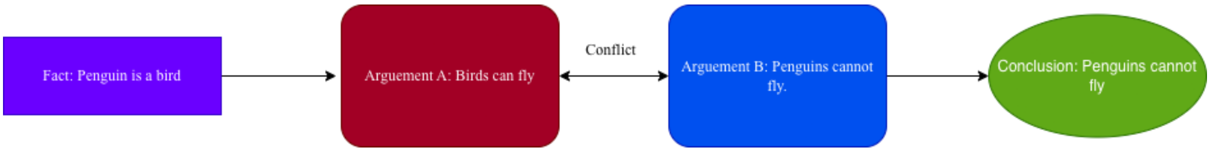
Task 2: Argumentation Framework (20 points)

Objective: Create a simple argument diagram showing conflicting knowledge and how the stronger argument prevails.

Diagram:



Part III. Reflection and Discussion (20 points)

Instruction: Write a short essay (150–200 words) answering the prompt below. “Think of a time when you changed your conclusion after learning new information. How is this similar to non-monotonic reasoning in AI?”

I previously believed that online product reviews were the ultimate indicator of quality, habitually selecting items based solely on high ratings and glowing testimonials. However, my perspective shifted significantly upon learning that many reviews are fabricated or sponsored. This new information forced me to adopt a more critical approach, prioritizing verified purchases and balanced critiques over simple star ratings.

This shift in thinking directly mirrors non-monotonic reasoning in artificial intelligence. In traditional logic, adding information only strengthens a conclusion, but non-monotonic systems—like the human mind—are capable of retracting previous beliefs when faced with contradictory evidence. Just as I discarded my initial trust in reviews after uncovering the reality of digital manipulation, an AI utilizing non-monotonic logic updates its knowledge base and changes its output when it encounters "defeaters" to its original assumptions. Both processes highlight that flexibility is essential for accuracy. By allowing new data to override old premises, both humans and machines can evolve toward more rational, reliable, and sophisticated decision-making in an ever-changing information landscape.