

**1. Define non-monotonic reasoning in your own words.**  
Non-monotonic reasoning is a process of drawing conclusions that can later be changed or withdrawn when new information becomes available. Unlike traditional reasoning where conclusions remain fixed, non-monotonic reasoning allows an AI or a person to adapt their beliefs to new facts. This mirrors human thinking, where we often make assumptions based on limited knowledge and revise them as we learn more. It’s essential in artificial intelligence because it helps systems handle uncertainty and incomplete information realistically.

**2. How does non-monotonic reasoning differ from monotonic reasoning?**  
The main difference between monotonic and non-monotonic reasoning lies in how they handle new information. In monotonic reasoning, once a conclusion is drawn, it will always remain valid even when more facts are added; new information can only expand, not contradict, what is already known. In contrast, non-monotonic reasoning allows previously accepted conclusions to be changed or discarded when new evidence arises. This flexibility makes non-monotonic reasoning more suitable for real-world decision-making, where conditions and knowledge often change.

**3. Give a real-life situation where a conclusion must change after new information is added.**  
Imagine you assume your teacher is absent because you don’t see their car in the parking lot. Based on that observation, you conclude that class will be canceled. However, later you find out your teacher took public transportation that day. This new information forces you to change your previous conclusion. This situation shows non-monotonic reasoning in real life — your conclusion was logical given the initial evidence, but it had to be revised when additional facts were discovered.

**4. What is a default rule? Provide one example.**  
A default rule is a general assumption made in the absence of evidence to the contrary. It allows reasoning systems or individuals to make practical decisions even when not all details are known. For instance, the default rule “birds can fly” works in most cases, but if new information appears — such as the bird being a penguin or injured — the rule no longer applies. This kind of reasoning is important in AI because it helps systems make reasonable assumptions while still allowing them to adapt when exceptions are discovered.

**5. How do argumentation frameworks help AI systems decide between conflicting rules?**  
Argumentation frameworks help AI systems manage and resolve conflicts between different rules or pieces of information by evaluating their strength and relevance. When two rules lead to opposite conclusions, the system uses an argumentation process to weigh the evidence, consider priorities, and determine which argument is more acceptable. This approach enables AI systems to reason more like humans — assessing pros and cons, handling uncertainty, and justifying decisions based on the most supported or logical argument.