Week 1. Introduction

SOLUTIONS TO PREPARATORY QUESTIONS.

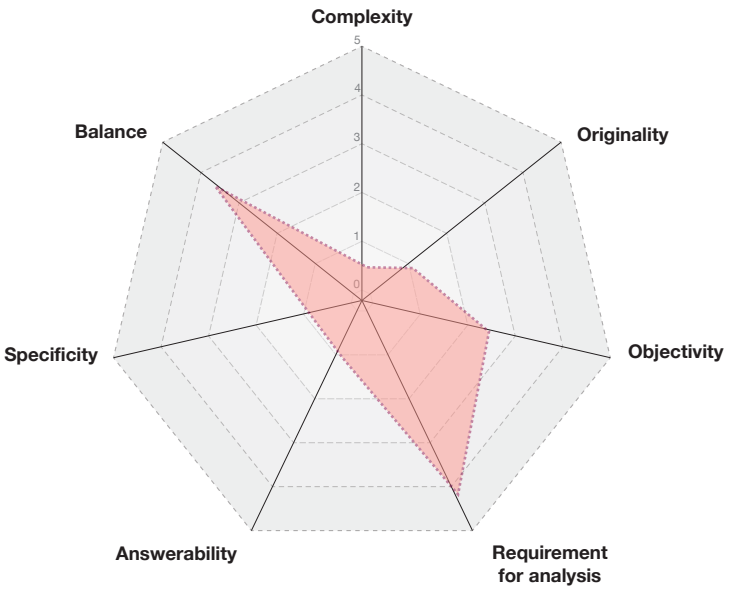
Q1. Read the following research question carefully and describe in your analysis whether it is a good research question or not. Please use the "Research Question Quality Control" criteria as a framework for your analysis.

Can robots improve the quality of life of the elderly citizens?

Let's look at the different dimensions of the Research Question Quality Criteria and assess this question.

- **Complexity:** This question can be answered as a YES/NO question, so it is not a good question.
- **Balance:** This question is balanced as it is focusing on a single topic.
- **Originality:** This question is not very original and many researchers have done research related to this question or are working on a specific aspect of this question.
- **Objectivity:** The question does not ask for opinions or value judgments. However, quality of life is not well defined here, or not sufficiently specified to be measurable.
- **Specificity:** As noted above, quality of life is a general term, and we might benefit from clarifying what constitutes quality of life. Also, robots is a general term and we might want to specify what kind of robots are being studied. The same goes for elderly citizens, we could be more specific about the target group.
- **Answerability:** This is a very broad question that will take a lot of time and resources to answer completely. Also, it can be answered using either inductive or deductive reasoning, but may require many studies to answer adequately.
- **Requirement of analysis:** This question requires a fair amount of analysis to answer, so it can score high in this category.

The following spider chart summarizes the above assessment. Please note that this is still subjective.



Q2. Which type of reasoning starts with an observation or set of observations and proceeds to propose the most likely explanation, often used in forming hypotheses in science?

A. Inductive reasoning
B. Deductive reasoning
C. Abductive reasoning **[Correct]**
D. Counterfactual reasoning

Q3. In the context of scientific research, which of the following statements best describes the key difference between a scientific theory and a scientific law?

A. A theory is an explanation supported by extensive evidence and experimentation, while a law is a universally accepted principle based on observation.
B. A theory is a broad explanation that integrates many hypotheses and observations, while a law is a precise statement that describes a fundamental principle of nature. **[Correct]**
C. A theory is a provisional explanation that may change as new evidence is discovered, while a law is a definitive statement that remains constant regardless of new findings.
D. A theory is a hypothesis that has been extensively tested and verified, while a law is a principle that is still under investigation and subject to change.