TUTORIAL: KNOWLEDGE REPRESENTATION SCHEMES (KRS)

1. Provide an example of a system which provides knowledge. The example should consist of purpose and evidence of the knowledge that differs from the conventional system.

   - A built-in utility in Microsoft Windows operating systems, Windows Troubleshooter helps users identify and fix common issues they could be having with their system. It employs automated diagnostics and reasoning to solve problems, which sets it apart from other troubleshooting techniques. A user only needs to launch the relevant Troubleshooter from the Control Panel or Settings menu to resolve issues like hardware malfunctions or problems with network connections. After analyzing the system and gathering information about the issue, the troubleshooter will try to solve it automatically or provide step-by-step instructions for fixing it manually. The Windows Troubleshooter's capacity to offer consumers practical feedback and suggestions for averting similar problems in the future is another benefit. To increase compatibility and stability, the Troubleshooter could advise updating a device driver to the most recent version if it finds that the driver is the source of the issue.

2. Consider several issues in data such as inconsistency, incompatible, and missing data. Provide some example of the data problem and suggest several solutions.

   - Three prevalent problems in data management are incomplete, inconsistent, and incompatible data. Variations in data format or content, such as several date formats in a database, are referred to as inconsistencies. Using data cleansing technologies, putting validation criteria into place, and standardizing data formats are some solutions. When two datasets with distinct structures or coding systems are combined, incompatibility arises. One can employ data mapping, standardize coding systems, or make use of data integration tools to handle this. Another problem is missing data, like blank fields in a survey dataset. Imputation techniques, record deletions where practical, and data collection are some of the solutions. Organizations may improve data quality and reliability for improved decision-making by putting these ideas into practice.

3. Provide an example for each knowledge category below:

   a) Procedural knowledge

   - Procedure how to ride a bicycle: The ability to pedal, steer, brake, and balance when riding a bicycle. It involves a series of operations or procedures that, in order to produce the desired result, must be carried out in a specific order.

   b) Declarative knowledge

   - Knowing the capital city of the country: Understanding that Tokyo is the capital of Japan, Paris is the capital of France, and London is the capital of the United Kingdom. It involves declarative or declarative factual information.

c) Meta-knowledge

- Knowing how to acquire knowledge efficiently: Meta-knowledge is the ability to use different study techniques, such as summarizing, underlining, and retrieval practice. It entails understanding one's own thought processes as well as methods for retaining information and solving problems.

d) Heuristic knowledge

- Using rules of thumb to solve issues: The ability to tackle a difficult issue by dividing it up into smaller, more manageable components, as in the "divide and conquer" technique. It involves useful rules or short cuts that support decision-making and problem-solving, frequently without ensuring the best possible outcome.

e) Structural knowledge

- Understanding the organization and relationships within a system: Understanding the hierarchical structure of an organization, including the relationships between different departments, teams, and roles, represents structural knowledge. It involves knowledge about the framework, architecture, or layout of a system or concept.

4. Convert the following statements into propositional logic.

a) If assignment done, then go to class.

- assignment_done → go_class

b) The chicken soup is tasty and ice cream is sweet, then the restaurant is full.

- chickensoup_tasty ∧ icecream_sweet → restaurant_full

c) School will be closed if today is Sunday

- ¬Sunday → school_open

d) Project will be failed if system is incomplete, or report is not submitted

- ¬system_incomplete ∨ ¬report_not_submit → project_complete

e) Knowledge can be obtained by learning and observing.

- learning ∧ observing → knowledge_obtain

5. Match the following logic with the most appropriate statement.