**Assignment No: 3**

**Problem Statement:**

Parse a family tree using a knowledge base.

**Theory:**

A family tree is a hierarchical diagram that represents the relationships between family members across different generations. A knowledge base is a structured collection of facts and rules used to infer relationships within the tree. Parsing a family tree involves identifying and understanding relationships such as parents, siblings, children, grandparents, and more using logical rules.

* Facts: These are explicit relationships within the family tree, such as "X is the parent of Y."
* Rules: Logical rules that derive new relationships from facts, such as "If X is the parent of Y and Y is the parent of Z, then X is the grandparent of Z."

**Methodology:**

1. Define Relationships:
   * Parent(X, Y): X is a parent of Y.
   * Child(X, Y): X is a child of Y.
   * Sibling(X, Y): X and Y share the same parents.
   * Ancestor(X, Y): X is an ancestor of Y if X is a parent or grandparent of Y.
2. Knowledge Representation:
   * Use facts to define relationships and rules to infer additional relationships.
   * In logic-based programming languages like Prolog, facts and rules are represented as:

parent(john, mary).

parent(mary, alice).

sibling(mary, paul).

1. Parsing and Inference:
   * Use reasoning techniques such as forward chaining or backward chaining to infer new relationships, such as determining if someone is a grandparent or cousin.
   * Example queries:
     + grandparent(john, alice) would return true or false based on the available facts and defined rules.
2. Visualization (Optional):
   * After parsing, the relationships can be visualized in the form of tree diagrams or graphs to clearly represent the family structure.

**Conclusion:**

We successfully parsed the family tree using a knowledge base and inferred relationships such as siblings, parents, and ancestors by applying logical rules.