**Prosit 3 : What's the problem ?**

**Keywords** :

* Simplex **\***
* Operation research
* Sub-optimal
* Systems of equations / inequations **\***
* Metaheuristics
* Generic problem-solving methods
* Dynamic programming
* Linear programming **\***
* Adaptive approach
* Least complex approach

**Context :**

Finding an efficient solution for an NP-hard problem, like the Traveling Salesman Problem (TSP), requires careful consideration of different approaches. Agathe suggests exploring Operations Research methods, including the Simplex method, dynamic programming, or metaheuristics. The goal is to balance the pursuit of exact solutions with practical ones that perform well under time constraints, ensuring computational feasibility while addressing the problem's complexity.

**Problematic statement :**

How can an efficient solution be found for a complex optimization problem, knowing that finding an optimal solution in polynomial time is impossible due to the problem’s computational complexity?

**Hypothesis :**

* Try using Simplex (algorithm)
* Try using Linear programming, dynamic programming **\***
* Metaheuristics
* Systems of equations / inequations (constraints)

**Constraints :**

* Computation time
* Problem size (Large)

**Action plan :**

1. Study the **hypothesis** and **resources**.
2. Formalize the constraints of the project using system of **equations** & **inequations**.
3. Compare **Simplex**, **Linear** and **Dynamic** programming (Theoretically and mathematically).



After comparing the things mentioned in the Action Plan, find a solution.

**Bonus :**

Can the simplex, linear and dynamic programming approach be applied to VRP. Justify