

Mini Project: Tower of Hanoi

The **Tower of Hanoi** is a mathematical game or puzzle consisting of three rods and three disks of varying diameters, which can slide onto any rod. The puzzle begins with the disks stacked on the first rod in order of decreasing size, with the smallest disk at the top. The objective is to move the entire stack to the third rod, following these rules:

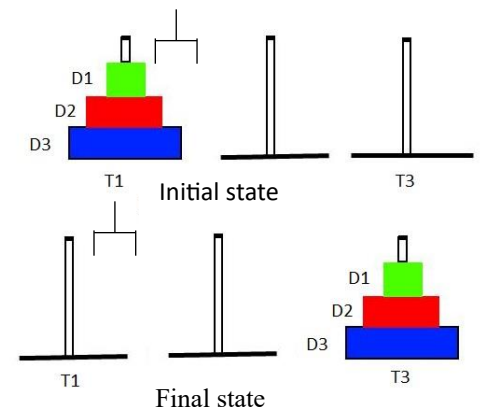
1. Only **one disk** may be moved at a time.
2. Each move consists of taking the **top disk** from one stack and placing it on top of another stack or on an empty rod.
3. No disk may be placed on top of a **smaller disk**.

The objective of this project is to **develop a STRIPS planner** for this problem using Python. The objects in this world are:

- **Towers:** T1, T2, T3 **Disks:** D1, D2, D3

The relationships between these objects include:

- There are objects that are disks.
- There are objects that are towers.
- A disk can be in a tower and be the **top disk**.
- A disk can be on another disk.
- A disk can be **larger than another disk**.
- There are **no disks on a given disk**.
- A disk can be in a tower.
- A tower can be empty.



Tasks

Implement a STRIPS planner in Python for the Tower of Hanoi problem and answer the following questions:

1. **Formalize the relationships** using first-order logic (predicate logic).
2. **Represent the initial and goal states** as shown in the figure.
3. **Define the actions** that can solve this problem.
4. **Provide the sequence of actions** that leads from the initial state to the goal state using a goal-stack planning algorithm.

Technical Points

1. Adapt the Python code of the STRIPS planner for the Block World problem to solve this problem.
2. **Due date:** 04/01/2025
3. Students can work alone or in groups of two.
4. The code must be accompanied by a **short report (2 pages)**.