

Spike: 08

Title: Goal-Oriented Action Planning (GOAP)

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Goals / deliverables:

To implement a GOAP (Goal-Oriented Action Planning) system that allows an agent to plan a sequence of actions based on preconditions and effects to fulfill multiple goals such as eating, sleeping, and staying hydrated. The deliverable is a Python simulation demonstrating intelligent planning.

Technologies, Tools, and Resources used:

- Python 3.11
- No external libraries required

Tasks undertaken:

1. Define the agent's initial world state and goal state
2. Design actions with:
 - Preconditions (requirements)
 - Effects (changes to the world)
 - Cost (optional, used for optimization)
3. Implement an A based GOAP planner to search through valid action sequences
4. Write a simulation loop that:
 - Plans the best action sequence
 - Executes actions step by step
 - Prints the updated world state after each action
5. Extend the system to include:
 - Fire-building and cooking logic
 - Thirst and water gathering
 - Multiple paths to satisfying the same need (e.g., snack vs cooked food)

What we found out:

- GOAP allows agents to plan multi-step solutions rather than reacting to a single goal at a time.
- The agent can make intelligent plans such as:
Gather wood -> build fire -> cook food -> eat cooked food
- The simulation clearly logs each step and shows updated world state values.
- This approach is flexible and can be extended easily to support more complex decision-making.