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**AI ASSIGNMENTS**

**Assignment - 8**

#include <bits/stdc++.h>

using namespace std;

struct Rule {

string conclusion;

vector<string> premises;

};

bool backwardChaining(const string &goal, const set<string> &facts, vector<Rule> &rules, set<string> &visited) {

if (visited.find(goal) != visited.end()) return false;

visited.insert(goal);

if (facts.find(goal) != facts.end()) {

cout << "Fact '" << goal << "' is known." << endl;

return true;

}

for (auto &rule : rules) {

if (rule.conclusion == goal) {

bool allPremisesTrue = true;

for (auto &p : rule.premises) {

if (!backwardChaining(p, facts, rules, visited)) {

allPremisesTrue = false;

break;

}

}

if (allPremisesTrue) {

cout << "Goal '" << goal << "' inferred using rule." << endl;

return true;

}

}

}

return false;

}

int main() {

// --- Known Facts ---

set<string> facts = {"fever", "cough"};

vector<Rule> rules = {

{"flu", {"fever", "cough"}},

{"infection", {"flu", "sore\_throat"}},

{"infection", {"fever"}}

};

string goal = "infection";

set<string> visited;

if (backwardChaining(goal, facts, rules, visited))

cout << "Goal '" << goal << "' is achievable from facts." << endl;

else

cout << "Goal '" << goal << "' cannot be achieved from facts." << endl;

return 0;

}

