Tutorial No. - 2

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1.2 Tutorial 2: To understand state space Problem Formulation.

Aim: To understand state Space based Problem Formulation of AI problems so that problem Solving Agent can be Applied

Theory: First we understand problem solving agent. Algorithm shown in @ above figure shows agent program for problem solving agent. Agent first formulates goal and problem then determines or searches an action sequence.

① Function ~~SIMPLE~~ SIMPLE - PROBLEM-SOLVING-AGENT returns an action
static seq, anaction sequence, initially empty
state, some description of current world state
goal, a goal, initially null
problem, a problem formulation
state ← UPDATE - STATE (state, Percept)
if seq is empty then do
goal ← FORMULATE - GOAL
problem ← FORMULATE - PROBLEM
(state, goal)

seq ← Search (problem)

action ← First(seq)
-seq ← REST(seq)
return action

* Problem Solving Agent *

Defining problem is referred to as problem formulation. It involves five things:

Initial state: It is starting state that problem is in.

Actions: It defines all possible actions available to agent, given it is in some state's currently.

Transition model: It is also known as successor function which defines which states system tend to move to when particular action is executed by agent.

Goal Test: This act as stopping condition when state passed to this function is goal state it will return true & searching would stop.

Path Cost:
It is accumulated cost of performing certain sequence of

actions. This can help in determining weather action sequence under consideration is optimal.

Thus a problem can formally specified by identifying, initial state, actions, transition model, goal test and path.

Working: Based on understanding of problem formulat^n students need to formulate Pell. problems. They will clearly show state space up to depth level 3 or till goal node which ever is shallowest.

1. Navigate to KGCE workshop from HOD IT cabin with min. number of moves, moves can be climbing staircase, turning left, right, .

2. R 8 puzzle problem.

3. Missionaries & cannibals Problem. There are 3 missionaries & 3 cannibals who must cross river using boat which can carry atmost two people, under constraint that, for the both banks.

4. N Queen's Problem. Arrange N queens on N cross N chess board where no 2 queens attack each other

5. Two room vacuum cleaner world.

6. Water Jug problem