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Tutorial 2

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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 the problem solving agent. Algorithm shows in figure 3 shows agent program for program problem solving agent. Agent first formulates goal and problem, then determines or rather searches an action sequence.

Function Simple-Problem-solving-Agent return an action
Static : seq. an action 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 (state)
problem ← formulate -problem (state, goal)
seq ← search (problem)
action ← first (seq)
seq ← Rest (seq)
return action

Fig :- problem solving agent architecture

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Defining the problem is referred to as problem Formulation. It involves defining following five things :

Initial State : It is the starting state that the problem is in

Action It defines all possible actions available to the agent given it is in some state a currently. It is function Action (s) that returns list of all possible actions

Transition Model also known as successor function which define which state/s the system tend to move to when a particular action is executed by the agent.

Goal Test This act as a stopping condition when the state passed to this function is goal state it will return true

path cost It is accumulated cost of performing certain sequence of actions. This can help in determining weether the action sequence under consideration is optinal.

Working :- Based on understanding of problem formulation Students need to formulate following problems

1) Navigate to KGCE workshop from HOD IT cabin with minimum number of moves, moves can be climbing or alighting staircase

2) 8 Puzzle problem

3) The Missionaries and cannibals problem. There are three missionaries and three cannibals who must cross a river using boat which can carry at most two people, under the constraint that for both banks, The boat cannot cross the river by itself with no people on board

4) N Queen's problem. Arrange N queens on a N cross N chess board where no two queens attack each other

5) Two room vacuum cleaner world

6) Water Jug problem